FEB 1996

Britain's favourite Personal Computer magazine

How hot is Java? P232

Personal Computer World

Personal Computer World

February 1996 £2.95

Overseas Price £3.95
Germany DM 20,00 Italy 18,000 Lire
Spain 1,225 PTS Malta Lm 2.85c
Holland HFL 17,95 Belgium 364.00 BFr
Finland FIM 49.50 Canada CAN$12.95

VNU Business Publications

133MHz Pentium p119

MODEM MEGATEST V.34 fax/modems reviewed ● Six Pentium Professional PCs tested ● Enhanced CDs ● Visual Programming group test ● Low priced lasers from £299 ● Hot Java ● MS Access 95 ●

Modem MegaTest

16 of the best V.34 fax/modems reviewed

Pentium Pros

Six P6s on trial

Enhanced CDs

Where data and audio meet

Low priced lasers

from just £299

Qemm 8 for Win95

IF YOUR CD-ROM OR 3.5" DISK ARE MISSING ASK YOUR NEWSAGENT

Visual programming group test

ALL HARDWARE TESTED BY THE VNU LABS

VOL19 NO2

DOUBLE DISK SUPER PACK

Win95 software, Actua Soccer demo and Linux: details page 8

02

9 770142 023069

Contents

V34 Modems 198

So you want to get online? First step is to get hold of a fast, up-to-the-minute modem. Geoff Marshall tested fifteen, priced from as little as £139.

PCW **Cover Photography** by Bruce *Mackie*

Cover Disk or CD-ROM

● *Cover Disk* 8

Hey! Tiny Elvis is alive and kicking on our disk. Plus, find your way with our mini version of the AA's A to B route planner.

● *PCW Interactive CD-ROM* 9

650Mb of programs, with demos, games, a selection of the best utilities, and more...

(CD-ROM Notes continue on page 102.)

Group Tests

Visual Programming 130

● Visual Basic once ruled the roost but now it has a whole host of young pretenders with which to contend. Tim Anderson checks out the opposition.

V34 Modems 198

● 15 fast modems on test.

Awards '96 Nominations 119

● Your chance to vote for the 1996 *PCW* awards and **WIN** a **Dan Pentium 133.**

Features

Enhanced CDs 88

by GEORGE COLE

Are interactive albums a passing fad or the next CD-ROM revolution? We explain what they are and check out a selection.

Dominic O'Brien 98

by MICHAEL HEWITT

Want to beat the odds? Dominic O'Brien reveals how a PC and a brilliant memory helped him to blackjack gambling success.

Amstrad PcW 16 106

by SIMON ROCKMAN

A sense of *déja vdu* surrounds our review of this new desktop machine.

Pentium Pros 122

by DYLAN ARMBRUST

A mini round-up of the first superfast Pentium Pro machines to hit the *PCW* office.

ABC GraphicsSuite 175

by PAUL FISHER

Powerful, general-purpose graphics software for Windows 95 that doesn't cost an arm and a leg.

Access 7 for Win95 184

by ELEANOR TURTON-HILL

Easier than ever for non-programmers to use, but the phrases "a dog" and "runs like" tend to spring to mind.

Ergonomics & RSI 190

by NICKY GLATTER

Are you sitting comfortably? A lot of PC users aren't, and repetitive strain injury could be the result.

Cheap laser printers 218

by ELEANOR TURTON-HILL

Personal laser printers churn out excellent black and white text and graphics, and can cost as little as £300. We test out the latest generation.

Delphi Tutorial: Part 4 222

by TIM ANDERSON

In the final part of our Delphi tutorial, we tackle building a database application and making Delphi's data-aware components slot together.

Personal Computer World

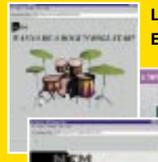
First Impressions 55

Long Term Tests

Regulars

Hands On

CUTTING EDGE



Left *Java jive*
Below *Explore Compton*

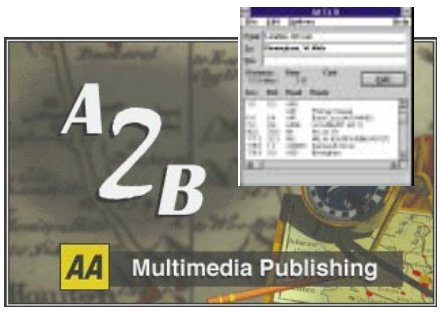
Above *Kids' Stuff: Maths Workshop*
Left *Screenplay: Mortal Kombat 3*

PCW Cover Disk

If you've always poo-poohed claims that Elvis is alive and well and stacking shelves in Asda, proof to the contrary is here at last. Tiny Elvis is an invaluable utility which allows The King to randomly pop up onto your desktop. He'll dance, and provided you have a sound card, he may even offer some constructive criticism of your Windows setup.

A to B

The AA's nifty A to B Route Planner could save the day for the directionally challenged — we've squeezed the cut-down version onto our cover disk. It includes the UK's 150 biggest towns and cities. Even though the number of cities is limited, the number of possible combinations you can try runs to several billion. The locations supported range from Blackpool to Bognor Regis, Winchester to Wolverhampton. If you would like to upgrade to the full release of the program, call the number that appears in the program and remember to quote "ATOB/PCW"



Aberdeen - Gramp
Barnsley - S.York
Barrow-in-Furness - Cumb
Basildon - Essex
Basingstoke - Hants
Bath - Avon
Bedford - Beds
Birkenhead - Mersyd
Birmingham - W.Mids
Blackburn - Lancs
Blackpool - Lancs
Bognor Regis - W.Susx
Bolton - Gt.Man
Bootle - Mersyd
Bournemouth - Dorset
Bradford - W.York
Brentwood - Essex
Brighton - E.Susx
Bristol - Avon
Burnley - Lancs
Bury - Gt.Man
Cambridge - Cambs
Cannock - Staffs
Cardiff - S.Glam
Carlisle - Cumb
Chatham - Kent
Chelmsford - Essex
Cheltenham - Gloucs
Chester - Ches
Chesterfield - Derbys
Clacton-on-Sea - Essex
Coatbridge - Strath
Colchester - Essex
Coventry - W.Mids
Crawley - W.Susx
Crewe - Ches
Darlington - Dur
Derby - Derbys
Doncaster - S.York
Dover - Kent
Dudley - W.Mids
Dundee - Tays
Dunfermline - Fife
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Greenock - Strath
Grimsby - Humb
Guildford - Surrey
Halesowen - W.Mids
Halifax - W.York
Hamilton - Strath
Harlow - Essex
Harrogate - N.York
Hartlepool - Cleve
Hastings - E.Susx
Havant - Hants
High Wycombe - Bucks
Hove - E.Susx
Huddersfield - W.York
Ipswich - Suffk
Keighley - W.York
Kidderminster - H&W
Kilmarnock - Strath
Leamington Spa - Warwks
Leeds - W.York
Leicester - Leics
Lincoln - Lincs
Liverpool - Mersyd
London - Gt.Lon
Lowestoft - Suffk
Luton - Beds
Maidstone - Kent
Manchester - Gt.Man
Mansfield - Notts
Margate - Kent
Middlesbrough - Cleve
Middleton - Gt.Man
Newcastle-under-Lyme - Staffs
Newcastle-upon-Tyne - T&W
Newport - Gwent
Northampton - Nhants
Norwich - Norfk
Nottingham - Notts
Nuneaton - Warwks
Oldham - Gt.Man
Oxford - Oxon
Paisley - Strath
Peterborough - Cambs
Plymouth - Devon
Poole - Dorset
Portsmouth - Hants
Preston - Lancs
Reading - Berks
Redditch - H&W
Rochdale - Gt.Man
Rochester - Kent
Rugby - Warwks
Scunthorpe - Humb
Sheffield - S.York
Shrewsbury - Shrops
Slough - Berks
Southend-on-Sea - Essex
Southport - Mersyd
St Albans - Herts
St Helens - Mersyd
Stafford - Staffs
Staines - Surrey
Stevenage - Herts
Stirling - Cent
Stockport - Gt.Man
Stoke-on-Trent - Staffs
Stourbridge - W.Mids
Sunderland - T&W
Sutton Coldfield - W.Mids
Swansea - W.Glam
Swindon - Wilts
Tamworth - Staffs
Tayport - Fife
Telford - Shrops
Torquay - Devon
Tunbridge Wells - Kent
Wakefield - W.York
Wallasey - Mersyd
Walsall - W.Mids
Warrington - Ches
Waterlooville - Hants
Watford - Herts
West Bromwich - W.Mids
Weston-super-Mare - Avon
Widnes - Ches
Wigan - Gt.Man
Winchester - Hants
Woking - Surrey
Wolverhampton - W.Mids
Worcester - H&W
Worthing - W.Susx
York - N.York

IMPORTANT

If you have problems with the Cover Disk such as receiving a "Cannot read from drive A", error, please return the disk to the duplicator: TIB plc (*PCW*), TIB House, 11 Edward Street, Bradford BD4 7BH (who may be contacted on 01274 736990) together with a stamped addressed envelope and two 25p stamps. Where it is a duplication fault, the postage will be returned along with a replacement disk.

If your problem is not due to a faulty disk, and a phone number is shown for the publisher of the program in question, then it will probably be quicker for you to call them first as they will be able to provide direct assistance on their own programs faster than might otherwise be possible.

Alternatively, ring our Cover Disk hotline on weekdays between 10.30am and 4.30pm on 0891 715929. Calls are charged at 39p per minute cheap rate and 49p at all other times.

The *PCW* cover disk is virus checked at every stage of production. However, *PCW* will not accept liability for any problems arising from the use of the disk. Installing or running any of the programs on the disk indicates your agreement to this condition.

You are advised not to install any software on a networked PC before checking the disk. While *PCW* maintains a high standard of quality control, disks may be damaged in transportation. Check the disk's shutter before inserting it in the drive by sliding it to the left and allowing it to spring back.

PCW Interactive CD-ROM

David Price introduces this month's blockbuster of a CD-ROM, crammed with fantastic multimedia demos, fast-action shoot-em-ups, stunning soccer games, a selection of the best utilities, and much, much more. It may be cold outside, but PCWI brings you a CD-ROM to warm the most frozen of cockles.

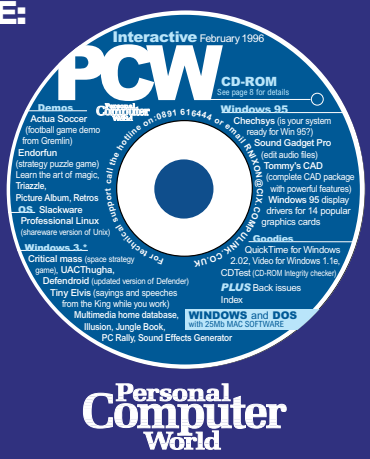
MAIN FEATURES

Demos

This month the PCWI CD-ROM is under siege from more explosive demos than Mururoa Atoll. Included is Tempest 2000 — hectic new arcade action from the resurgent Atari and their top programmer Jeff Minter who reputedly owns a real-life Llama farm! While Endor Fun promises mind-bending and

F E B R U A R Y 1 9 9 6

PCW INTERACTIVE:
Entire Contents List



Personal Computer World

DEMOS

Actua Soccer — A bigger hit than Eric Cantona at Selhurst Park.
The Art of Magic — Learn where to stick your wand.
Endor Fun — Mind bending, stategy, and subliminal messages — it's no endor fun.
Picture Album — Produce your own photo albums and accompanying text.
Retros — Stylish demo and video selection from the beat combo of the same name.
Tempest 2000 — Llama-man and Atari programmer Jeff Minter's pulsating shoot-em-up.
Triazzle — Rotate your pieces devillishly, puzzle fiends.
Hexen — The Doom creators bring you an excellent new game
You're Hired — Job interview test simulator.

FEATURES

Oakley date services — Oakley's superb and complete Smart software.
Linux — The powerfully compatible operating system for PCs

MAGAZINE

Delphi — Hands on the Delphi files accompanying the magazine tutorial
Windows 95 — A mixed bag of pulsating Microsoft tools.
Visual Basic Hands On — The file bonanza from the VB articles continues.
PCW Back Issues — Tip toe down memory lane.

C O N T I N U E S O V E R

F O L D H E R E

WINDOWS 3.1 & DOS

Critical Mass — Acclaimed game for Buzz Aldrin with a taste for mayhem.
Cthuga — Turn your PC into a fractal disco light spectacular.
Defendroid — Shoot your boosters off in ecstacy with top hole arcade memories.
TheJungle Book — Be the king of the swingers.
Illusion — How did you ever live without this graphic editing package?
Jazz Jackrabbit — Hi-spec updated demo of the new improved bunnymungous favourite
Multimedia Home Database — Plot labour-saving routines for other people while you put your feet up.
PC Rally — Not a gathering of junior police-men; a fast and addictive driving game.
Sound Effects Generator — Create and edit sounds like you never believed.
Spelling Sentry — Invaluable utility for Windows Write files.
Tiny Elvis — Stunted Presley arrives unexpectedly.

WINDOWS 95

Otto's Resolve — Unmissable Context Menu for shortcuts.
Win95 Graphic Display Drivers
Copy QM — Essential backup for Microsoft High Density floppy copying.
NBench — Gives your PC's operating system a thorough check-up.
Sound Gadget Pro — Gorgeous 32-bit sound editing.
Tommy's CAD — Fab CAD (Easy and powerful)

EXTRAS

Moneybox — Cash flow and accountancy support for the Hush Puppy-wearing Chancellor of the Exchequer in your household.

MACINTOSH

Just for you Mac pleasure-seekers out there, we've included 25Mb of the latest Shareware to tickle your juicy Apples and get your Macs flapping.

[Minimum requirements: 4Mb free RAM (some can be in a permanent swapfile), 386SX/33 processor, Windows 3.1. Users with less than this should be able to run all the DOS programs on the CD-ROM directly from DOS or Windows (rather than using the front-end). For best performance we recommend: 8Mb installed RAM, 486 DX/50 processor, Windows 3.11 or Windows 95]

CONTINUES ON PAGE 103

CONTINUED FROM PAGE 9

PCW Interactive is packed full of demos and features. There's something for everyone

controversial subliminal messages, so decide for yourself. And don't miss Actua Soccer, a cutting edge game which is as close as you or George Graham can get to the real thing.Plus there are many more fabulous demos to try out.

Windows 95

We bring you the latest gadgets and gizmos to complement your flashy new Windows 95 operating system.

Utilities

As usual we bring you the backup to some of our most popular magazine articles, and among this stash of goodies is the indispensable Windows 95 Microsoft Power Tools and some Delphi gems. Plus there's Oakley's complete set of SMART software, a powerful operating system, and the ever present incredible shrunken Elvis will bring your PC to new heights of usefulness.

Mac software

If Al Bunny's Typing, Cribbage and Sonix fail to quicken your pulse then you must already be in cryogenic suspension! Includes all this and over 20Mb more fun, games and utilities.

About last month's CD-ROM

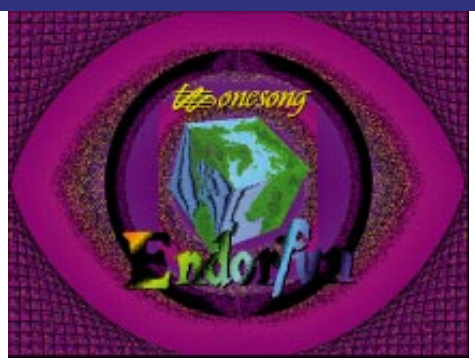
Some readers may have received a General Protection Fault when running the CompuServe demo on last month's disc. If this happened to you, you should not use the front-end to call it up, but you can run the demo and install the new version of WinCim if you double click on the program CSERVE.EXE in the root directory of the CD using File Manager (or Windows 95 Explorer).

Configuring Video for Windows

If you select the "New users start here" button, on the first page of PCW Interactive you'll have the opportunity to install the latest version of the Video for Windows runtime, so that you can view the digital movies on the CD. If you haven't installed Video for Windows from a PCW Interactive CD before, then you should install this new version as it contains the latest drivers which deliver higher quality, a larger size and a faster playback rate. If you don't install the new version, some videos will display the message "Cannot display this video", or give similar warnings.

There are also some extra buttons on the Video for Windows page, which allow you to fine-tune your PC's performance without having to leave PCW Interactive or restart Windows. In particular you can choose to have digital movies played back on your PC at full screen resolution! That's right, without having to recourse to hardware add-ons such as MPEG cards, you can have full screen digital videos when you run the PCW Interactive CD-ROM.

But please remember that when you exit from PCW Interactive, if you leave

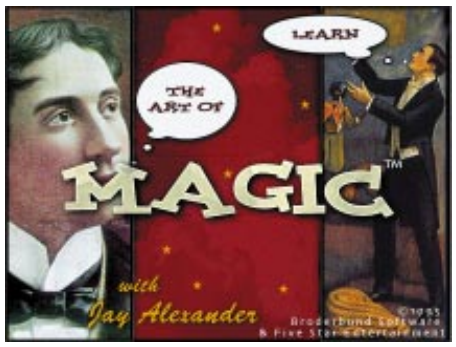


Mind-bending strategy with Endor Fun

Graphics editing with Illusion

All that Jazz Jackrabbit

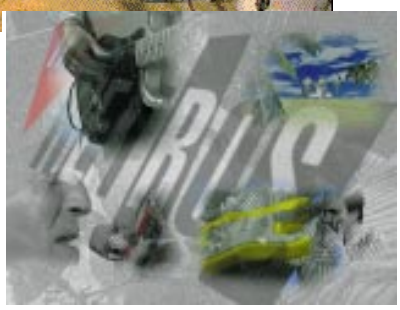
Jumpin' Jazz Jackrabbit



Could it be Magic? Yes, just like that

CONTINUED

Right and below *Retros: dig that crazy beat combo*
Far right *Triazzle: Rotate your pieces in a devilish fashion, puzzle fans*



the option for full screen video selected, then all video in other applications will also be full screen. If you don't want this, then re-run PCW linteractive and select the "Windowed" option and quit again.

Testing your CD-ROM

If you suspect your CD-ROM may actually be faulty or damaged you can run the file CDTEST.EXE in the SYSTEM directory of the CD-ROM. The program will then examine every byte of data in the PC partition of the disc to see if it can be correctly read. The process takes up to 35 minutes and generates a verification code if the disc passes the test. If the CD-ROM fails this test, try cleaning it with a light solution of washing-up liquid and dry it with a lint-free cloth and run the test again. If it still fails, return your CD-ROM to the magazine for a free replacement.

You are free to copy the CDTEST.EXE program to your hard disk in order to test other CD-ROMs, as long as it is not distributed in any way. If you are running CDTEST from your hard drive you need to specify the CD-ROM drive to test, as follows:

CDTEST D:

Note: We offer this tool "As is" purely as an aid to diagnosing possible faults, some of which may occur because an older version of MSCDEX.EXE is in use and not because of a faulty CD-ROM, and disclaim any responsibility for any erroneous error reports it may generate.

IMPORTANT — READ THIS!

General Protection Faults

If you receive General Protection Faults when running PCWI or playing any digital videos, your graphics display driver may not be entirely 100 percent Microsoft compatible. The answer is therefore to install one of Microsoft's own drivers, as follows (but NOT if you are using Windows 95, as the drivers supplied with it are even newer than the ones on this disc):

1. Run "Windows Setup" from File Manager, then select "Options" followed by "Change System Settings".
2. Scroll through the list of displayed graphic drivers until you get to the final entry "Other Display (Requires Disk from OEM)", and select it.
3. Insert this month's CD-ROM into the drive and replace the "A:\" prompt with "D:\SYSTEM\SVGA256" (changing the D: to the correct letter if your CD-ROM is not in drive D:), then press Return.
4. Scroll through the new drivers until you find the ones beginning "Super VGA...." and select the one for the resolution you prefer to use. The driver will then be installed and Windows restarted. PCWI and Video for Windows should then have no further problems.

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

If video for Windows install fails

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

If PCWI is slow to load or runs slowly

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

Windows NT and OS/2

Unfortunately Macromedia Director, the program used to create PCWI, is incompatible with Windows NT. However, you should be able to run PCWI from OS/2 by simply calling up PCWI.EXE from the command line.

PCW Advice & Contacts

The *PCW* CD-ROM is virus checked at every stage of production. However, PCW will not accept liability for any problems arising from its use. You are advised not to install software on a networked PC before checking the disc.

For technical support on the CD-ROM and the programs on it call the VNU 24-hour Hotline on 0891 616 444. This is a computerised touch-tone advice system providing hints and tips on a wide range of topics. It also offers you the opportunity to speak to a member of our technical support staff during office hours by pressing the "0" key on your keypad. Calls cost 39p min off-peak and 49p at all other times (tone phones only).

Using the computerised system, you can access the information you need very quickly. If you ask to speak to a member of our technical support staff and we cannot answer your question immediately, we will offer to call you back at our expense. Outside office hours you can leave us a message by pressing the "9" key. If you leave your phone number, we'll call you back at the earliest opportunity during office hours.

If you prefer you can email rnixon@cix.compulink.co.uk, or CompuServe: 70007,5547, or write to us at the magazine.

Personal Computer World

ABC AUDIT BUREAU OF CIRCULATIONS BUSINESS PRESS
154,482
JAN-JUNE '95

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BACK ISSUES

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

VNU House, 32-34 Broadwick Street, London W1A 2HG.
Main Switchboard Tel 0171 316 9000.

Advertisement typesetting by Typematters, London N1.
Origination by Latent Image, 6 Balmoral Grove, London N7.
Printed and bound in the UK by St Ives plc, Plymouth. Distributed by Comag, Tavistock Road, West Drayton, Middlesex **(01895 444055)**.

Editorial

For a long time, dragging a free "journalist's account" out of CompuServe was like rock-climbing in roller skates. Then Microsoft relaunched Microsoft Network, about a zillion Internet Service Providers appeared, and America Online decided to launch in the UK. It's now hard to get within 50 yards of anyone at CompuServe without being knocked off your feet by a ton of free accounts.

Perhaps I am exaggerating a little, but the Internet is responsible for waking quite a few slumbering giants. The Online Information Show was a dozy backwater a couple of years ago; full of librarians dusting off text-based CD-ROMs.

Last year, in early December, it was held at Olympia (this year, perhaps Earls Court?) and was chock-full of Internet stuff. At the show, companies who for years have charged a bomb for providing "business intelligence" on private networks were scrabbling to get onto the Internet. MAID, for example, which sells the Corporate Profound database, announced it had turned all its mainframes into a giant Web site.

One by one, the main objections to using the Internet are being eliminated. The bandwidth is low and it falls over all the time: telecomms companies and large corporations are continually putting in new pipes to remedy that. Most of the content costs nothing and is worth little: people are now talking about four levels of Internet access; free, pay as you go, subscription and premium (where you subscribe and pay as you go).

Increasingly, the Internet and online have become synonymous, which is why companies like Microsoft and CompuServe are frantically back-pedalling on their proprietary bulletin board approaches and re-launching, with heavy emphasis, on the Internet.

● Microsoft joins calls for cheaper digital lines, page 21

Ben Tisdall
Editor

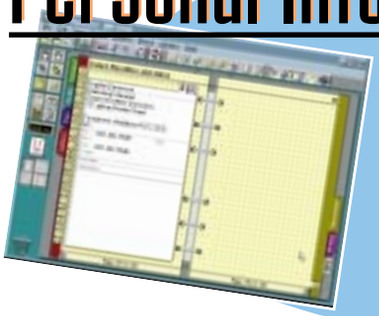
Next Month

Personal Computer World

Multimedia Notebooks

Pentium notebooks with sound and CD-ROM drives

Personal Information Managers



All-in-one diaries, schedulers and address books

Suite talking:

MS Office 95

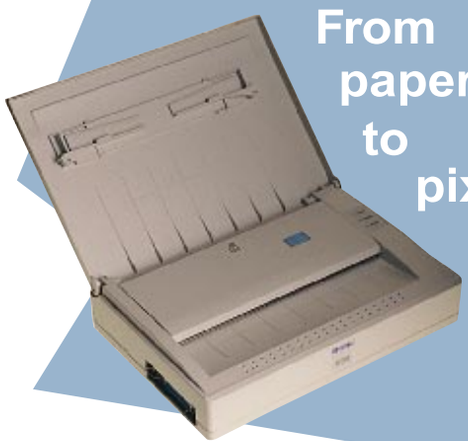
vs

SmartSuite 95

Hard disk upgrades: *which one to buy.*

Document Scanners

From paper to pixels



March ´96 issue
— On sale Thursday 8th February

April ´96 issue
— On sale Thursday 7th March
• *Sound cards*
• *DTP software*

NEWS Highlights

Amstrad revamps its PCW word processor

Amstrad has launched a PC/TV, the Amstrad Integra, and updated versions of its best-selling PCW word processor.

Amstrad chairman, Alan Sugar, claimed the £899 Integra was "a breakthrough in price". Sugar sees it as the first generation of a technology that will migrate onto large-screen TVs in the future.

The entry-level product has an 80MHz 486DX2 processor and just 4Mb of memory. Upgrading to the 8Mb needed by Win95 costs £110; the software bundle of WordPerfect Works, Quicken 4, Links Pro, Encarta and Descent adds another £100.

Otherwise, it is reasonably well specified with a quad-speed CD-ROM, PCI bus, TV with Fastext and remote control, a 540Mb hard disk and a 14.4bps fax/modem.

Long-time readers may be more interested in the new PcW 16 *(review, page 106)*. The original PCW 8256, launched in 1984 to instant acclaim, sold 800,000 in a year. This success was consolidated by the PC1512, launched in '86 at £399.

Amstrad's PcW 16 also costs £399. It comes with a much improved screen, a Canon bubblejet printer, and a 3.5in floppy drive which will read DOS disks. Software now includes a diary, address book and spreadsheet.

The PcW 16 is also available with an Oki laser printer for £499 or on its own for £299.

The decision to launch a new PCW was based on a hunch and continued interest from existing users, said Sugar. Users will be able to transfer existing PCW files onto the new disks.

Ben Tisdall

Gates strikes Internet gold

Bill Gates nailed his colours to the Internet mast last month with a strategy speech that could prove as important as the Win95 launch – and provoked calls for a new monopoly probe.

He described the Net as "the new goldrush" and said online transactions of as low as one cent would become viable, opening up vast business possibilities.

Most controversial was a range of software moves that will squeeze specialists like Netscape. Gates announced:

- New free versions of his Internet Explorer browser for Windows 3.1, NT and 95 as well as the Mac OS. In Win95, it allows you to drag-and-drop hypertext links to the desktop where they appear as shortcuts – and that's just the start (see story, left).
- Visual Basic Script, with security features for online use. Browsers will be able to run VBS apps. It is clearly designed to compete with Java (see page 29).
- Active VRML, to enable 3D animations. It will require extensions to the Web's HTML scripting language.
- A "digital signature initiative" to use encryption techniques to certify the source of a file.
- Internet Studio, a new Web authoring tool. Allows you to give Web pages magazine-quality graphics. Viewers will be freely available.

One snippet of news almost got lost in Gates's Net stategy speech: there will be no Windows 96.

Instead there will be a major free add-on for Net users which will "integrate folders and Web pages," Gates said.

This will allow you to view page hierarchy of Web sites, or navigate your PC like it is a Web site. This will only work with sites that support the features.

Gates said there will be a major upgrade of Microsoft Office, which will also be bound tightly to the Net. All applications will support the Web page-description language HTML.

The effect of all these changes will be to merge the browser into Windows, so that you will not have to start a separate application to use the Web.

See www.microsoft.com for more details.

Bill Gates says we'll have to wait for broadband connections, but British Telecom is experimenting with this optical link capable of 80Gbits/sec. Sadly, BT seems reluctant to give us a humble 64Kbit/sec — see page 21 and News Analysis, page 35.

The speech was a retreat in that Gates appeared to be relaunching his Microsoft Network (MSN) more as a friendly Internet gateway than as a CompuServe-style provider of services.

MSN access was bundled with Win95, provoking a monopoly probe which at one point threatened to scupper the launch. MSN proved a damp squib because it was not ready in time. UK lines were unusably slow.

That will change: Gates has signed up leading UK provider Unipalm-Pipex to supply fast local-call access all over the country.

Clive Akass

NexGen unveils the chip that launched $840m AMD deal

NexGen has released details of the processor that inspired rival chip-cloner AMD to instigate a $840 million merger late last year.

The Nx686, which will launch later this year (96) in a 180MHz version, would present a major challenge to Intel's Pentium and Pentium Pro if it lives up to its hype. Key claims are:

- It will run 32-bit applications as least as fast as a Pentium Pro, which is reckoned to be 35 percent faster than a Pentium.
- It will run 16-bit (that is, pre-Win95) applications up to 50 percent faster than a Pentium of the same clock speed. The Pentium Pro, optimised for 32-bit server applications, actually runs them 25 percent slower.
- It will save costs by using existing Pentium boards.
- The power consumption will be low enough for mobile use.
- It has built-in multimedia acceleration.

The Nx686 has no on-chip Level 2 cache like the Pentium Pro, but has a large Level 1 cache: 32Kb for data and 32Kb for instructions.

AMD will drop its proposed sixth-generation K6 chip if the NexGen merger is approved as expected. Instead, Nx686 will be sold as the K6 and will include some AMD technology.

NexGen has also announced 120MHz and 133MHz versions of its Nx586 processor.

Clive Akass

• *PowerPC challenge — page 30.*

Pentium power

Intel has announced the immediate availability of 150MHz and 166MHz Pentiums — and said 100MHz and 120MHz versions will be driving entry-level systems by the middle of this year.

The latest 3.3-volt devices are based on a 0.35 micron manufacturing process and will cost $547 and $749 respectively in 1000-plus quantities.

Lord Owen could start a new publishing trend with his latest book *The Balkan Odyssey*. It comes with a CD of extra material like the picture above. The CD was created on a PowerMac with the aid of Apple's Media Tool.

Lord Owen said: "The wealth of video footage and the filmed testimonies add weight and value to the printed word."

AOL sets foot in Page Three land

America's favourite family online service is launching in Britain, a little unsure of our views on language and sex. It has built up four million users with offerings of games, news and shopping — and Internet access with full parental control. Unlike CompuServe, it charges no premiums for specialist services. UK prices will be £5.95 a month plus £1.85 for each hour above five hours.

Last year AOL had to reverse a decision to ban the word breast after breast cancer patients complained that they could no longer discuss their ailment.

AOL UK chief, Jonathan Bulkeley, said of the land of Page Three girls: "We will have to get used to things here."

A rather more robust line is taken at www.durex.com, a new site set up by Durex maker LIG. It offers advice on romance and safe lovemaking, complete with details of the correct way to put on a condom.

Short Stories

CD giants agree new 4.7Gbyte format

- Final details have been announced of the specification for the next-generation compact discs, with an initial capacity of 4.7Gbytes.

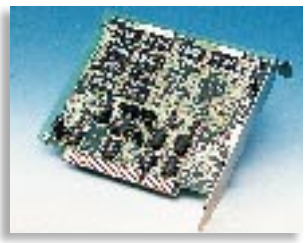
An agreement in broad terms was announced at Comdex in Las Vegas (see Newsprint, January), where industry heavyweights promised the first discs would be available by the end of this year.

The new standard is based mainly on the proposed SD format, but uses more robust error correction from the rival MMCD proposal. It will be called the DVD (digital video disc).

Penguin online

- Penguin, which pioneered the high-class paperback, has gone online. You can order books or search for titles from its site at www. bookshop. co.uk/penguin.

3D card



- A 3D graphics accelerator for the PC is set to bring a new level of realism to the games market, according to Number Nine.

The £229 FX Reality is based on Rendition's Verité 3D graphics engine.

Number Nine 01256 381194

Flash offer

- The PCD-896 card holds between 1Mb and 16Mb of solid-state flash memory which is used to emulate a standard PC drive. Prices start at £109 for 1Mb.

IMS 0703 771143

Microsoft joins calls for cheaper digital lines

British Telecom is standing firm against increasing pressure to reduce the minimum £400 sign-on charge for a fast digital ISDN line.

Among those lobbying for a cut in the charge has been Microsoft, whose new MSN online service will shortly offer ISDN access.

UK desktop product marketing manager, Andrew Lees, told me BT would not budge, and he believes the charge should become a political issue. He said: "This country could fall behind if we don't increase the takeup of ISDN. £400 is not significant for a big organisation but it is a lot for individual users. "

BT claims that an ISDN link actually costs more than £400 to install, and that smaller sign-on charges elsewhere in Europe are offset by higher usage fees.

This argument does not stand up in Gemany. Deustche Telekom charges about £59 for a basic installation and about 10p for a six-minute peak-rate local call, ISDN or standard — admittedly more than BT.

But a 15 percent VAT charge which comes into force this month [January] will not be passed on to the customer, leaving VAT-exempt businesses about 13 percent better off (the difference is due to tariff boundary changes). This means digital calls actually average out cheaper in Germany than standard ones, because proportionately more businesses use ISDN, so there is no question of ISDN users being surcharged to recoup installation costs.

Ian Macgregor, senior UK marketing manager for Deutsche Telekom, believes BT is discouraging ISDN takeup because it does not have the capacity to match the potential demand.

BT was early in moving from the old analogue system to digital, so that many of its digital switches predate ISDN and have to be upgraded, Macgregor said: "There is always a risk that if you enter the market first, you enter in a less developed form. In Germany we are entering a situation where the PSTN (the old phone network) is being sidelined by this new ISDN."

Clive Akass

ISDN installation becomes more competitive if you have a lot of lines. There are two bands: ISDN 2, with a minimum two 64Kbits/sec channels; and ISDN 30, with a minimum 15. Charges are:

	Installation	Per quarter
ISDN 2 Two channels	£400	£84
ISDN 30 15 channels	£594	£209
Per channel extra	£99	£34.95
Per 30-plus extra	£58.67	£34.95

British Telecom may have kept its ISDN prices high but it has slashed the prices of PhoneDisc, its CD-based national directory. This started out at about £2,000, plus hundreds of pounds a year for quarterly updates.

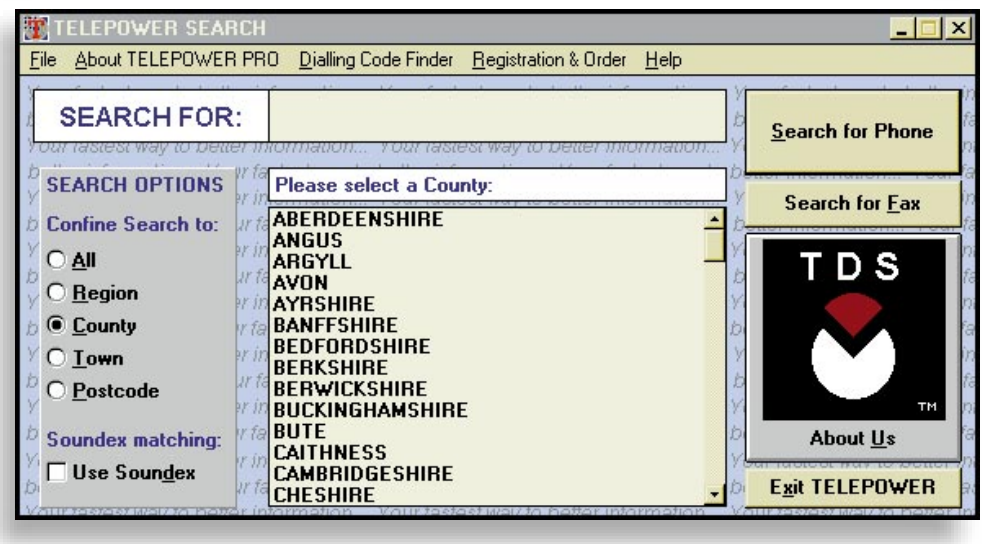
Cheeky, when it is your personal details they are selling, and the equivalent for the entire US can be bought for a few dollars. Anyway, a single-user version can now be bought for £199. There are various deals for networked versions.

But a new CD-based directory from TDS Informs (see screenshot below) still looks a bargain at £40. It lists only UK business numbers, but it is fast and easy to use and will even do phonetic searches for when you are unsure how to spell a name.

A network version should be available this month. Prices start at £299 for up to 10 users.

• PhoneLink is now offering a free DIR service for subscribers to its TelMe online information system.

TDS 01494 465646; PhoneDisk 0800 919199; TelMe 0800 991155



Short Stories

Confusion over EC's CE label on EMC

● New regulations on electronic equipment coming into force this month are causing fear and confusion in the computer industry. Not least because of the acronyms: all new computer equipment has to carry the EC's CE label to show it conforms to EMC guidelines.

The CE label means the equipment complies with European (EC) regulations, the most important of which for PCs involve limiting electromagnetic (EMC) interference.

However, much equipment is likely to be sold without the label because there is a three-month waiting list at testing labs.

Smaller PC makers fear they may be pushed out of business by the need to test every configuration they sell.

Keith Warburton, president of the Personal Computer Association, warns: "We believe that many computer manufacturers do not intend to comply." He says this could give them a price edge over more scrupulous vendors.

Contest date

● Get your entries in quick if you want to compete in the 1996 British Computer Society programming competition — closing date is 26th January. Teams aged between 17 and 30 will face tasks using C or C++.

BCS 01793 417417
http://www.bcs.org.uk

Online sales

● UK Online is to sell Internet software kits through Dixons. Starting price, including email and ten hours free access, is £10.

UK Online 01749 333300

Cheap laser

● Texas Instruments is selling its 600dpi Win/4 Windows-only laser printer for £399.

TI 0181 875 0044

Short Stories

BBC closes Networking Club

● The BBC has stopped selling Net access and is closing its Networking Club – to the fury of some members. The BBC will continue to have a Web presence, with activities concentrated at a new Multimedia Centre.

BBCNC members have been passed on to Pipex, which has in any case been providing their lines: the BBC was a reseller.

A BBC insider said the closure was apparently due to aggressive competition. But he added: "The decision foxed me and many others because we could see the club being a big success.

"We were sending out 100 [information] packs a week and getting responses from about a third of them. And that was without any marketing. They just wouldn't do any marketing."

The BBC said in a statement: "The BBC remains totally committed to on-line development."

Escom clamps down after FAST practice

Staff at high-street computer chain Escom have been selling software without proper licences, backup disks or manuals, the company admits.

They seem to have clinched sales by bundling software that was not covered by Escom's deals with its software suppliers, according to Geoff Webster, chief executive of the Federation Against Software Theft (FAST).

FAST moved in following complaints from customers. "Escom senior management were appalled when they learned what was going on," he said.

Escom claims to be Britain's third biggest PC retailer less than a year after moving into British high streets by taking over the Rumblelows chain early last year. It has agreed to train its staff fully on licensing and customers' rights.

Escom UK head, Geoff Saunders, said the problems had arisen because of an inadequate command structure after the Rumblelows purchase. "To be frank, the issues raised by FAST were one of a number of concerns at the time.

"We were very pleased to receive the information from FAST, particularly in view of the fact that it was so specific, so that we could do something about it."

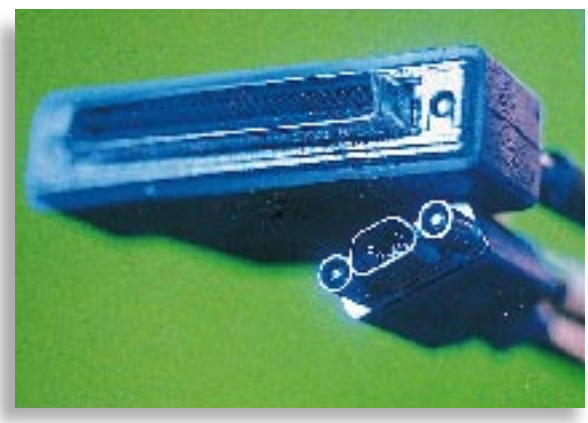
Escom customers who believe they have not got proper licences are invited to contact their local store with proof of purchase.

FAST 01753 527999

If you're wondering whether you would be better off hiring a computer, you might turn to Livingston Rental's new Web pages. Easy-to-use browse and search tools facilitate your choice .

Livingston Rental 0181 943 5151
http://www.livingston.co.uk

Rival high-speed links have no parallel



Three serial technologies competing to supersede parallel SCSI as a high-speed peripherals link were all demonstrated at Comdex.

Parallel links are more bulky than serial, and tiny differences in transfer rates on each parallel line cause problems at high speeds. The three alternatives are:

● Firewire, better known as 1394. Backed by Apple, it runs at up to 100Mbits/sec, though 400Mbits/sec is planned. It is used at the moment for consumer items like Sony's new digital camcorder, but mass pricing may give it a wider role.

● Serial Storage Architecture (SSA). First developed at IBM's UK labs at Havant (now Xyratex). Uses a bi-directional loop on which each device has two inputs and two outputs, giving four 20Mbyte /sec data paths. In practice, the transfer rate is rather less. The loop can be broken without stopping data flow.

● Fibre-channel. A dual loop of copper or fibre runs at 100Mbyte/sec. Drives can be hot-plugged in and out. Like SSA, it uses SCSI protocols.

Storage vendors seem to be keeping all their options open, backing fibre channel, SSA, and SCSI.

Xyratex, which bought fibre-channel specialist Peer Protocols, offers storage systems based on all three.

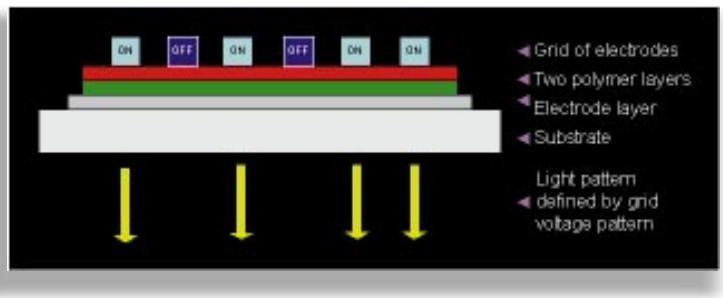
David James, program manager of test-systems marketing, said: "SSA exists today as a stable technology with firm specifications. Fibre channe is not quite there yet."

He said SSA silicon is cheaper, though there are plans to reduce fibre-channel costs. But fibre can also add 50 percent or more to the power consumption of a drive, leading to cooling problems.

"SSA uses interleaving to allow several devices to talk at once. Fibre-channel allows only two devices to talk at the same time, so it needs to arbitrate between them. This arbitration can be a big overhead if you are accessing lots of small records. So fibre-channel is best for applications like video-on-demand, where you have long bursts of data."

The slower Universal Serial Bus will be included on all Intel motherboards later this year and is expected eventually to oust the familiar but sluggish PC serial and parallel ports.

LEP into the age of electronic paper



Light fantastic: the LEP screen in action

A new display technology that could lead to something akin to electronic paper is emerging from the laboratory and into commercial products.

It uses light-emitting polymers (LEPs), which behave much like the light-emitting diodes (LEDs) used as status lights: they light up when a forward voltage is applied (diodes, like valves, resist current in one direction).

The difference is that LEP can be produced as a flexible sheet — and, crucially, it lights up only at the point of electrical contact. This means the pixels that make up an image can be defined by a simply-made pattern of electrodes.

An active matrix screen, by contrast, needs a self-contained transistor for each pixel. Current active-matrix screens are also only about three percent efficient — much the same as prototype LEPs, according to Cambridge Display Technology (CDT) business development manager, Mark Gostnick.

But LEP screens could become as much as 25 percent efficient — that is, a quarter of the energy they consume will be emitted as useful light. This will make them much easier on batteries and potentially as bright as cathode-ray tubes: CDT believes they could eventual see off the CRT. Other uses include virtual-reality systems and head-up displays.

Moreover, LEPs work in reverse: light can cause a current to flow. So LEP displays could become input as well as output devices, making them even more like paper. Also, different polymers produce light at a different wavelength, enabling the creation of colour screens.

CDT was set up to develop the technology, which is based on discoveries made at Cambridge University by Professor Richard Friend in 1989. Backers include the rock group Genesis and Cambridge University itself, but CDT is seeking further investment. Professor Friend, Cavendish professor of physics at Cambridge, is a director.

The first products, expected in 1997, will be unexciting backlighting panels and numeric displays. Screens are not expected to appear before the turn of the century.

The relative ease of manufacture should lead to cheaper displays. But Gostnick said: "The launch price will be a commercial consideration."

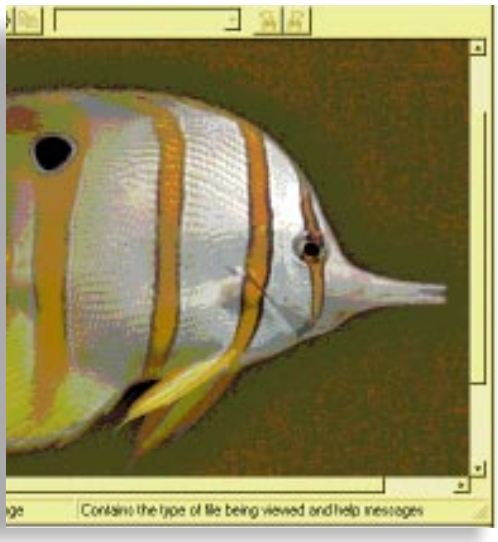
CDT 01223 276351

Clive Akass

QuickView Plus looks good

Win95 users will have discovered by now that its QuickView viewer is a poor animal that gives you a crude text view of files in certain formats. (Many may not even realise that Win95 *has* a viewer: you don't get the module unless you go out of your way to choose it during the Win95 installation.)

Microsoft licensed the technology from Inso, publisher of the Outside In viewer. Now Inso is offering QuickView Plus, which replaces the standard version in Windows 95 and allows you to scan graphics, spreadsheet, and word-processor files.



The facility is available in File Open boxes as well as the Win95 Explorer. It costs £39.99. A Win 3.x version is available.

Software Compatibility Centre 01344 885224

Tim Bajarin in the US

Grist to the Pagemill

● Intel's Mike Richmond said recently that the Gutenberg Press ushered in the first age of publishing, the Mac ushered in the second, and the Internet is bringing in the third, which will change publishing for centuries.

Apple has made the Mac a great Net client, but has missed its role as a Net publisher. But a new Mac program from DTP pioneer Adobe makes Web pages very easy to create. You don't need to know HTML. You create content by editing it on the screen.

You can think of it as PageMaker for the Web. In fact, Pagemill reminds me of my first PageMaker demo in 1985 where I had a hunch then that this product would have a big impact.

It beats PC products such as WebMaster from Quarterdeck and Netscape's 2.0 Gold.

Apple needs to push this Net connection to its advantage, just as it did with PageMaker in the early days of desktop publishing. The Net could seriously impact Apple's ability to stay in the market forefront .

Tinseltown trivia

● Computer luminaries like Intel chief Andy Grove (and me) mixed with Hollywood stars for the world premiere of Disney's Toy Story in San Francisco.

It is a good family film, but notable mostly for being the first to be animated completely by computer. Here are some trivia:

The 110,064 frames took more than 800,000 machine hours to render and 500Gbytes to store. An individual frame could take between 45 minutes and 20 hours using 300 Sun workstations. The maximum weekly output was 3.5 minutes of film.

Short Stories

Stackable storage

● Digital has come up with two storage enclosures, which it claims offers a new flexibility for big users of storage. The idea is that you can mix and match from a range of mission-critical storage devices. Internal SCSI connections cut out the need for a mesh of exterior cables.

The smaller device accommodates two 3.5in devices; the other, four 3.5in devices and one 5.25in CD drive (or one 3.5in, one 5.25in and one CD drive).

Digital also claims to have boosted the performance of its StorageWorks RAID array by 67 percent.

Digital 0500 827140

Slow business

● The US market for PCs is almost saturated, and sales growth will stem from people buying second and third machines, according to a new survey.

PC sales are increasing faster in Europe and the Far East than in the US, says the survey by New York-based Link Resources. Up to four in ten US homes will have a PC by the end of the year, and more than one in ten will own two PCs.

Share deal

● Shareware programs and news can now be accessed via a new site set up by the International Association of Shareware Professionals (ASP) at www.asp-shareware.org.

WinFax Pro 7.0

● The new WinFax Pro 7.0 for Win95 includes over 100 new fax-based features to help non-technical as well as advanced users. It costs £99, or £35 for an upgrade.

Delrina 0181 207 3163

Quick fix

● QAS has announced Win95 versions of its QuickAdress Rapid and QuickAdress Pro address-processing packages.

QAS 0171 498 0303

Oracle announces new Web tools

On the day that Microsoft announced an avalanche of Internet initiatives, Oracle had an announcement of its own. Based around existing Oracle 7 server technology, the new Oracle WebSystem is claimed to bring a degree of intelligence to Web-based information on both the Internet and internal company LANs. WebSystem consists of the client PowerBrowser and an Oracle WebServer.

Oracle has released a beta version of its browser, PowerBrowser (available on Oracle's Web site) which is designed to run with Oracle WebServer.

A Basic interpreter and relational database built into the browser will interact with WebServer, allowing information to be updated on the fly.

Network Loadable Objects (NLO) written in Basic are designed to turn static data into dynamic data including multimedia content. Intelligence can track a site for visitors' preferences and build a profile so that next time they log on, dedicated data is automatically loaded onto the PowerBrowser.

In keeping with the current spirit of co-operation (which really means that no-one wishes to be seen as the company that broke the open spirit of the Internet while secretly trying to gain advantage), Network Loadable Objects will be used to support Java applets and Adobe Amber which loads Acrobat viewers into Web browsers.

Oracle claims PowerBrowser will fully support HTML 3.0, and will submit its NLO and Database Markup Language (DBML) to the World Wide Web Consortium for approval as standards. DBML is designed to extend HTML to allow Web browsers to link to SQL databases.

PowerBrowser will later include a Personal Publisher option, a drag-and-drop HTML editor to create Web sites, and browser apps for use in PowerBrowser. PowerBrowser will be free but WebServer options will start at around £4,000.

Oracle UK 01344 860066

http://www.oracle.com/

• *See Tim Bajarin, page 232.*

Tulip tunes in to tomorrow

A new machine from Tulip confirms the belief of those who believe the notebook is evolving into tomorrow's desktop.

The Tulip ID-45 system box is only 3.8in deep and has notebook features such as two Type 3 PC Card slots (rather than an expansion board) and an exterior power supply that sits by your mains socket. It uses a DX4/100 chip but a Pentium version should be available next year.

Stereo sound and Ethernet connectivity is built into the motherboard. The ID-45, targeted for front office use and special projects, also has sophisticated power management which can be tuned to allow a network manager access at minimum power drain.

It comes with an elegant 14in swivel monitor, although Tulip UK's new managing director, Neil Grayston, said a future option could be a standalone colour active-matrix screen.

Tulip is also offering a 75MHz Pentium-based £1399 PC/TV, with a built-in 14.4Kbps modem, quad-speed CD, and sound card.

Grayston claimed that frame-grabbing and other facilities put it ahead of rival models.

Tulip 01293 420200

Short Stories

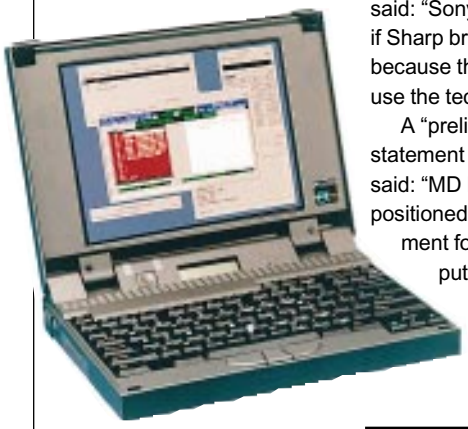
Act 3a

● Symantec has developed a version of its contact manager Act! for the Psion 3a organiser. It will cost £99, on either solid-state disk or floppy.

Psion 0171 262 5580

Slow business

● One in four businesses in the UK still lacks a PC — though six in ten of this minority plan to buy one within a year, according to a Compaq survey.



Tadpole packs Alpha power

● Tadpole has launched what it claims is the world's most powerful portable, the Alphabook 1, driven by Digital's 233MHz Alpha 21066 AXP chip.

It packs the power of an Alpha workstation into a rugged 7.151b notebook case. Prices start at £9550.

Tadpole 01223 428200

Foreign affair

● Ever had to deal with unmatched plugs and sockets or foreign pay phones when travelling with your notebook? TeleAdapt offers help, on a Web page, on world phone systems.

TeleAdapt 0181 421 4444
http://www.teleadapt.co.uk

SHARP CHALLENGES THE FLOPPY WITH CHEAP MINI-DISK DRIVE

Sharp is preparing a new challenge to the floppy disk with the launch of an internal 140Mb mini-disk drive with a factory price of around £130. Exterior and portable versions are also in the pipeline.

The "super-floppy" drive will take exactly the same £15 mini-disks that are used in the Sony Mini-Data drive, which costs more than three times as much. Sony originally announced its MD drive, which also plays audio mini-disks, as a successor to the floppy disk.

But Sony says it has no plans for a cheaper internal version of the drive. A spokesman for the company said: "Sony will be very pleased if Sharp brings out a drive, because the more people who use the technology, the better."

A "preliminary product" statement issued at Comdex said: "MD Data is being positioned as a floppy replacement for the personal computer. Also, a line-up of mini-disk consumer products is in planning (personal digital assistant, still camera). Mini-disk will offer a single medium across many applications platforms." The statement said the new drives would go into mass production in the second half of next year.

However, the MD drives may still arrive too late to fight off rival drives from Iomega and Syquest, both taking disks of a similar capacity, and the Jaz and MAXit drives (see below).

Initial specs of the Sharp drive do not enthrall: the data transfer rate is 150Kb/sec, about that of a single-speed CD, and the mean access time is 300 milliseconds.

Sharp UK said the drivers would not be available before the end of this year (96).

A new contender in the burgeoning super-floppy market is launched this month by Xyratex, the former IBM research establishment that was bought out by its UK management.

The MAXit drive will cost £356, or £311 for the internal version, and will take 540Mb magnetic disks costing about £40. As important for its prospects is the fact that it will read and write 230Mb Syquest disks, which have become a standard medium for exchanging desktop-publishing and graphics files.

But the MAXit will come against Iomega's Jaz drive, listed at $499 in the US, which is likely to sell at much the same price with VAT when it arrives in the UK — probably before the end of March. The Jaz drive takes 1Gb disks costing about £60.

The MAXit will come out initially with a SCSI interface for both Mac and PC, but a parallel version will follow.

Xyratex 01705 486363

More for less: the world's first 36-bit flatbed scanner is halved in price

The price of Microtek's ScanMaker III, the world's first 36-bit A4 flatbed colour scanner, has been halved to £1499. It is bundled with Adobe Photoshop LE, Caere OmniPage Direct 2.0, Microtek's own batch scanning and colour correction software, and is fitted with a transparency adaptor.

An additional £100 upgrades Photoshop to the full version.

Scanning in 36 bits allows a greater tonal dynamic range and more subtle variations between shades.

Information can be lost during image corrections, but starting with 36 bits at least ensures you get a good 24 bits. It's like a 130mph car performing well at 70mph.

In July 1995 *PCW* reviewed 18 A4 colour flatbed scanners including the ScanMaker III and the Agfa Arcus II, then the only 36-bit models available and both weighing in at around the £3000 mark with transparency adaptor.

Also at the same price was the 30-bit Umax PowerLook Pro, which beat the other two on speed and was only just pipped on quality by the Agfa; the PowerLook Pro has since been upgraded to 36-bit. The Microtek, with a poor overall result, didn't come close.

At £1499 the ScanMaker III represents considerably better value than before, but now puts itself in the cut-throat end of the market. Consider the Umax S8 Pro at around £1500, or the countless wonders from Hewlett-Packard, Epson, Agfa, and again Umax, all under £800.

Gordon Laing

Microtek fron Computers Unlimited 0181 200 8282; Agfa UK 0181 231 4200; Umax from IMC 01753 830999; Epson UK 01442 61144; Hewlett Packard 01344 369222

Virus experts in race to beat the macro bombs ...

Anti-virus experts are racing to plug the security gap caused by the new macro bombs. Major anti-virus packages now offer first-fix protection against known macro viruses like Concept, believed to be one of the most widespread viruses in the world only weeks after its release.

But no-one has yet come up with a foolproof way of neutralising any mischievous macro, whether or not it reproduces to qualify as a virus.

WordPerfect keeps its macros safely apart from its documents, but Microsoft cannot not do this without function-loss and major re-engineering.

Word macros become part of the document and are sent with it. Jimmy Kuo, senior virus researcher at McAfee's, says that even with Microsoft's help, deciphering the Word format has been a major problem for researchers tackling the new threat.

Switching off Word's auto-execute facility defuses some macro bombs but does not prevent you passing them on; nor does it stop bombs that pose as an existing macro. But Kuo said: "One thing we have suggested to Microsoft is to have auto-execute off as a default, rather than the other way round."

A novice programmer could bodge up something very nasty using Concept as a template, but this very simplicity may have limited the damage.

Carey Nachenberg, virus-engineer with Norton Anti-Virus publisher Symantec, said: "Most virus writers are aged between 13 and 24. They do it to show how clever they are. I think macro viruses are beneath their dignity."

● McAfee has just launched WebScan, which places downloaded documents in quarantine while it checks them out. It can be downloaded on a try-before-you-buy basis from www.mcafee.com. It has also launched anti-virus products for all major operating systems including Win95.

McAfee UK 01344 304730

EDO modules

NEC has launched 4Mb, 8Mb and 16Mb SIMM modules using its new EDO chips, which are claimed to be 25 percent faster than standard DRAM.

NEC 01908 691133

... but the problem of power over security may be with us for ever

The macro-virus scare is only part of a wider problem posed by the new fashion for downloading mini-programs.

Java and the new net-ready Visual Basic languages produce mini-programs that can be downloaded and executed. Both can be run by browsers to perform a one-off task like presenting a form to be filled in by a user.

A macro-laden Word document is in effect also an executable file — unlike plain email, which is inert text. The danger with executables is that they may do things you know nothing about, such as spying on your system.

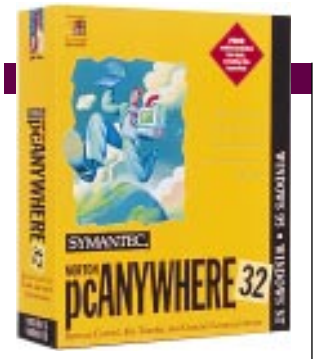
Both Java and VB designers limit what their products can do in host systems. But Norton's virus guru, Carey Nachenberg, believes Java may not be completely secure. "My guess is there are ways in which you can use Java that the designers haven't thought of."

Andrew Lees, Microsoft's desktop products manager, says you cannot have the full power of a macro language *and* absolute security. "Ultimately, you have to trust where you get a document from."

This is one reason why Microsoft is plugging the idea of digital signatures (*see page 21*) using encryption to guarantee a source. Lees said: "Downloading a file is no different from buying a can of beans from a supermarket. You trust that it is not poisoned because you trust the source."

A good point. Except that the Concept virus (see above) was inadvertently distributed six months ago by Microsoft on a Windows 95 technical disk. It is now among the most widespread in the world.

Clive Akass



PC Anywhere is going places

● Symantec claims the new PC Anywhere is the first all-32-bit remote-control module. It includes Norton's anti-vurus software.

PC Anwhere supports various gateways and networks including a TCP/IP Internet connection.

The package can be used with Win96 and NT but not Win 3.1 (the rival 95-ready LapLink allows a Win95 machine to run a Win3.x one remotely).

Symantec 01628 592222

Teletext deal

● Compware is offering Teletext Viewer software for £50, and a suitable PC capture card for £169.

Compware 01223 425293 (evenings)

Multimedia start

● A new series from Andromeda Interactive aims to introduce children to the art of multimedia presentations. Each £30 CD carries stills, video, sound, and text clips on a theme like cars or space, plus a sophisticated Edit suite.

Andromeda 01235 529595

Spell tutor

● Starspell, a CD to help kids of all ages and abilities to learn spelling, is available for £50 from Fisher-Marriott. It is designed for use at home and in schools.

Fisher-Marriott 01203 616325

Short Stories

Pippin the Web post

● Apple president Michael Spindler showed the Pippin set-top box using Netscape to access Web pages, and described it as the first device capable of taking the Internet to the mass market.

Pippin, which uses a TC as a monitor, also incorporates a CD drive and can access online video and games.

SoundEdit16 upgrade

● Macromedia announced version 2.0 of SoundEdit 16, described as "a significant upgrade" to the audio package which runs native on the PowerMac.

New features include batch processing of files, and advanced compression.

128-bit PCI graphics board

● Number Nine has launched a 128-bit graphics and video accelerator for the Power Mac. The PCI-based Imagine 126 with 8Mb of VRAM supports resolutions up to 1600 x 1200 in 16.8 million colours. A 4Mb board costs £319.

Number Nine 01256 381194

Travelling modem

● Portable Add-ons has released a fax-modem approved for use in 16 countries. Software with the £259 Euromodem V.34 lets you change configurations easily for each country.

Portable Add-ons 01483 241333

Mac studio

● A Power Mac-based multimedia studio has been set up at the Abbey Road recording studio made famous by the Beatles.

Newsprint welcomes feedback from readers. Send your news and views to Clive Akass at clive_akass@pcw.ccmail.compuserve.com or cakass@dial.pipex.com

Mac clones spearhead assault on Wintel reign

Several British PC makers are considering building PowerPC boxes rather than fight mega-boxshifters like Gateway and Dell, according to Motorola.

UK marketing manager, Gordon Stubberfield, says the company sees an initial market among businesses who plan to standardise on Windows NT, with its new Win95-style front-end, rather than the relatively untried Win95 itself. Unlike 95, NT runs native on the PowerPC.

But a wider market could be opened in the second half of 1996 with the release of products based on the PowerPC platform, formerly known as the Common Hardware Reference Platform (CHRP). This will run NT, Unix, OS/2, AIX and, last but not least, the Mac OS.

If it lives up to expectations, it could allow system builders to offer Macs at PC prices, with PC-style software bundles — and most importantly, be capable of working with cheap PC peripherals. One of the big problems of owning a Mac has been the cost of add-ons; and a perceived benefit, especially among first-time buyers, is that the Mac OS is easy to use.

Moreover, there is a joker lurking in PowerPC pack. IBM has developed a chip called the PowerPC 615 that runs Intel code, native. In principle it works like the NexGen (*see page 19*), with an outer shell of hard-wired logic translating Intel code into RISC instructions for the PowerPC core.

A PC based on this chip could in theory be used by just about any major operating system. IBM engineers are said to be struggling with the problem of getting it to switch operating systems without rebooting.

Motorola has signed a deal to supply PowerPC boards, using the 603, 603e and 604 chips, to UK distributor Flashpoint. Mark Hobbs, marketing manager of Flashpoint's parent Macro group, said several UK system builders are interested but it was too early to name names.

Clive Akass

Motorola 01628 39121;
Flashpoint 01753 538715

CHRP, CHRP... visitors inspect the new common platform at Comdex

Top 10 Windows and DOS

	Product	Manufacturer	Last month
1	Encarta 96	Microsoft	-
2	Windows 95 U/G	Microsoft	1
3	First Aid 95 for Win95	RMG	4
4	MS Office 4.2 U/G	Microsoft	8
5	MS Cinemania	Microsoft	-
6	MS AutoRoute Exp UK & IRE	Microsoft	5
7	Magnaram 95	Quarterdeck	-
8	MS Office Pro 95	Microsoft	3
9	Dr Solomons Anti Virus Quarterly	S&S International	-
10	MS Plus for Win95	Microsoft	6

Top 10 DOS

1	Frameworks XE v1.0	Ashton Tate	-
2	Flight Simulator v5.1	Microsoft	2
3	PCDOS Version 7	IBM	1
4	MSDOS v6.22	Microsoft	-
5	Turbo C++ v3.0	Borland	4
6	QEMM 7.5	Quarterdeck	3
7	Norton PC Anywhere	Symantec	-
8	SimCity 2000	Maxis	-
9	Turbo Pascal v7.0	Borland	7
10	Pegasus Solo Accounts	Pegasus	10

Top 20 Windows

	Product	Manufacturer	Last month
1	Encarta 96	Microsoft	-
2	Windows 95 U/G	Microsoft	1
3	First Aid 95 for Win95	RMG	4
4	MS Office 4.2 U/G	Microsoft	8
5	MS Cinemania	Microsoft	-
6	AutoRoute Exp UK & IRE	Microsoft	5
7	Magnaram 95	Quarterdeck	-
8	MS Office Pro 95 U/G	Microsoft	3
9	Dr Solomons Anti Virus Quarterly	S&S International	-
10	MS Plus for Win95	Microsoft	6
11	Uninstaller 3.0	Microhelp	10
12	Cleansweep 95	Quarterdeck	-
13	MS Publisher v3.0	Microsoft	-
14	CorelDraw 5 to 6 U/G	Corel	20
15	MS Office 95 v7	Microsoft	-
16	RAM Doubler	Connectix	9
17	MS Office Pro 4.3	Microsoft	11
18	Norton Anti Virus Win95	Symantec	-
19	CorelDraw 3	Corel	-
20	Smartsuite	Lotus	7

Figures supplied by Software Warehouse and relate to bestsellers for November 1995.

An **alternative** access

Oracle has seen the light and it costs only $500. Tim Bajarin reports on a new approach to home computing.

The PC industry has become complacent, following the Windows 95 launch. Conventional wisdom is that the computing world is ruled by Intel and Microsoft, with Apple getting a thin slice. Desktop power, already at what was recently considered to be mainframe level, can be expected to rise further to handle a new dimension of rich digital media types.

So a proposal by Larry Ellison, chairman of Oracle, for a $500 PC has introduced a refreshing element of controversy. It involves a new approach to delivering information and entertainment to offices and homes.

Ellison sees his cheap, rudimentary PC being used to access processing power as well as data; all the work will be done by the back-end server. The PC will be able to use any chip or operating system, thanks to a new network OS layer that will also work with the software running on the servers.

Larry Ellison

The most amazing part of this vision, apart from an entire shift in the computing model, is the $500 access device on which Ellison is working. It will contain 4Mb of DRAM, 4Mb of flash RAM, a $50 microprocessor, a $50 ATM chip or similar network option, keyboard, mouse, infra-red port, PCMCIA slot, and monitor.

Ellison reckons he can build it for about $330. Upgrades, debugging and maintenance will only need to be done at the server end. In essence, the user will rent the operating system, applications and information. Instead of paying $85 for an annual Windows upgrade, you would pay, say, a $15 annual OS fee. The applications, or Java applets (see *Cutting Edge*, p232) would be cheap too, compared with most of today's prices. In addition, you would have an almost unlimited amount of information from the Internet and other suppliers.

Of course, this vision assumes a greater bandwidth than is generally available today, and a relatively inexpensive price. Ellison revealed his vision at a Comdex panel shared by Ray Smith, chairman of the Bell Atlantic phone company.

Smith said Bell Atlantic will rapidly deploy various high-speed data conduits to facilitate this type of computing model. It will push ISDN (64Kbits per channel) into the home, charging $19.95 per month for the line and $0.01 per minute during prime time, for use of the line.

Over time, to facilitate video-on-demand services, it will deploy ADSL, which can deliver 1.5Mbits/sec down the line with a 64Kbits/sec return channel (ISDN delivers 64Kb). In 1997 it will add VDSL, which can send up to 10Mbits/sec downstream and 640Kbits/sec upstream.

Both Ellison and Smith see the network as a computer accessed by a multitude of low-power devices. Microsoft chairman Bill Gates scoffs that there is no need, given the power available at the desktop and that the model would create a new generation of slaves to the mainframe.

One analogy is with real estate: Gates offers users land and allows them to build on it as they please, purchasing the plans and tools from him and paying maintenance costs. Ellison would be a benevolent landlord offering low-cost, low-maintenance apartments with the benefits of a personal residence.

Ironically, they could both be right. Ellison's view would bring computing to a whole new generation of users who can't afford a PC. And it could be applied to set-top boxes, handheld computers and other digital devices. Gates would give new versions of an OS and applications to users who could afford the more powerful desktop PCs and wish to retain independence from a network supplier.

The models will co-exist: exactly how, may come down to the demographics of each user. Nevertheless, Ellison's ideas should give the PC industry a lot to think about.

Ricoh points the way

Innovation last year in portable computing was limited to processor upgrades — except for the improved handwriting technology in the Newton and the DEC HiNote Ultra. But Ricoh showed off a really cool device called the G1200; an 8.5in x 11in colour tablet weighing only 4.5lb, complete with a built-in CD-ROM drive. I believe it could usher in a computing concept I call "personal presentations". The CD-ROM drive enables you to make elaborate multimedia presentations. And, with new software like Software Publishing's ASAP, you can even create presentations on the fly. The screen can be driven by a pen or your finger, but an auxiliary keyboard will be available.

The G1200 has two PC Card slots, so you can use it for comms as well. It will have a price of around $3,500. But the concept is powerful, and prices could fall if other manufacturers take it up.

ANALYSIS

Some service; **no** smiles

We aren't receiving a decent level of customer service from direct sellers. Ben Tisdall asks why.

It's good to talk… if you can get a call-back

ANALYSIS

What level of service do customers have the right to expect from PC manufacturers who sell direct?

In the December issue we printed a letter from a disgruntled Gateway 2000 customer. Generally speaking, Gateway is one of the more respected direct vendors but the numerous letters we've received, outlining similar experiences at the hands of Gateway and others, suggests a problem.

The direct channel offers the advantage of build-to-order, but lacks the buffer of a dealer. Shouting down the phone at a faceless support person doesn't have the same impact as marching into your local computer dealership.

A recurring complaint is that manufacturers don't return phone calls, yet the larger direct vendors have sophisticated customer databases. When you first make an enquiry, your details will be added to a database. Thereafter, each time you call you'll be asked for a customer reference number of some kind.

At Dell and Gateway, for instance, the database holds a history of each customer, their past purchases and enquiries. Yet at Gateway, if staff promise to investigate and call you back, there's no alarm system to remind them.

The priority at every direct vendor, and often a hard one to meet, is to answer incoming phone-calls. If, as at Dell, illuminated displays are flashing on the sales and support floors telling you how many calls are waiting and then being lost, outgoing calls can easily assume a low priority.

Another common complaint is that the system is impersonal. A former Gateway customer who now gives the company a wide berth, is Sam Phillips, the MD of a small multimedia developer. He complains: "You never get to speak to the same person twice. The best you can do is leave a voice-mail message. I must have called 20 times about two hard drives I was buying from them."

John Shepheard, Gateway's UK and Ireland country manager, says Gateway is considering "buddy systems" so that small groups of sales or technical support people cover for each other, but points out that Gateway's long trading hours make it impossible to guarantee that the same people will always be available.

But it's clear that at Gateway, major corporate accounts expect, and get, a better service than the little guys. "With major accounts, one of the initiatives is a dedicated team. Three names are given out to major accounts," admitted Shepheard.

Most of the direct manufacturers aim for delivery times between five and ten working days. In an industry where product lifecycles are measured in months, supply problems often mean they are unable to meet these commitments.

Paul Berry, MD of Simply Computers, cites the case of 540Mb hard drives: "You'll see them advertised in your magazine, but you won't be able to buy them," he said. The drive manufacturers, it seems, have already made the transition to 1Gb as the entry level, even though they're more expensive for consumers.

Gateway, for instance, is currently at the receiving end of a worldwide shortage of the high-end 4Mb WRAM Matrox Milennium graphic cards. Each day, update sheets are passed from operations to the customer response team which then hits the phone to alert customers about shortages and delays. At the time of order placement, customers are invited to check on its status by calling a freephone number while they're waiting for their machines. It sounds fine in theory, but combine a peak in demand, a large intake of new staff, shortage of components, Gateway's decision to move its third-party support from HP to ICL and the sheer bad luck that is bound to befall a proportion of customers, and the potential for disaster is considerable.

Credit card authorisations only last for nine days, at which point vendors are forced to take the money or reject the order. But we've heard from readers who've had to wait six weeks for kit to arrive.

According to Howard Davis, at market research company Context, "The general trend within the industry is for margins to be squeezed. This is pushing down product reliability, which surfaces as customer support calls. The vicious circle is pretty clear."

Users are able to buy increasingly powerful PCs for lower and lower prices. But it seems that if you buy direct, you can't be certain of receiving a level of service and support which the customers of any high street department store would take for granted.

The price **ISDN**'t right

ISDN technology is more affordable, so why does BT charge so much for its fast digital lines? Clive Akass reports.

Web-surfing by modem is like watching a film projected erratically at one frame per second: you get only a flicker of the possibilities. Modems were fine when almost all online activity was text-based, but even modest graphics on a Web page are enough to overwhelm the fastest 28.8Kbits/sec models. Modems are yesterday's technology.

Today's readily available technology is ISDN; an all-digital phone link which gives you 64Kbits/sec per channel (you get a minimum of two channels) and allows you to chase those hyperlinks almost as easily as turning the pages of a book. Better still is a leased line such as the one we have at *PCW*; this effectively puts you online permanently so that the Net becomes like an extra hard disk of infinite capacity.

Basic ISDN is more affordable for most pockets; or rather, it should be. An ISDN adaptor can now be bought for under £200, the price of a fast modem, and ISDN running charges are similar to those of a standard line. But the start-up cost is still high. You may need to buy adaptors to use your fax machine and voice phone, which are designed for standard analogue lines, or pay extra for a PC ISDN interface with analogue jacks built-in. BT can charge £400 to plug you in (see *Newsprint,* page 21) — up to ten times the price of an ISDN link on the continent.

There are no plans to reduce prices, according to BT's ISDN business development manager June Campbell. "We already lose money installing ISDN lines," she told me last month. "They cost us more than we charge." Low sign-up charges on the continent, she continued, are offset by high online costs, so British Telecom works out cheaper in the long run. And, she claimed that although ISDN takeup is far higher in Germany and France, most lines are used like conventional analogue links. "The number of people using ISDN for purposes such as fast file transfers [for which it was designed] is actually higher in the UK."

Bob Jones, MD of ISDN specialist 3Com-Sonix, dismisses these arguments. He says: "BT loses money on installing a standard line and makes up the cost in line rentals. No-one will mind paying a little extra per minute for ISDN, but they will baulk at paying £400 to sign on."

In a sense, the argument is already out of date. Basic ISDN can cope with the low-resolution pictures and small-frame video clips that the Web throws at us today. But, whatever the BT salesmen tell you, a single 64Kbit channel is too slow for high-quality video-conferencing and other, demanding, multimedia data; a magazine-standard colour picture can still take you minutes to download.

Sooner or later we will be viewing 64Kbit/sec ISDN with the same faint amusement with which we recall 64Kb memories, and wondering how we coped with so little. There is no technological reason why every home cannot have a cheap 2Mbits/sec or 10Mbits/sec fibre link.

Britain is well placed to lead the world in online services: we're small enough to wire up relatively easily and wealthy enough to afford the long-term investment; we speak the international language and our comms infrastructure is in some respects more advanced than that of the US. Additionally, our TV and radio services, and thus potentially our online content, are among the best quality in the world.

Bill Gates said at Comdex that data networks need initially to go through a "mid-band" phase because online services are not yet generating enough money to justify massive investment in a broad-band infrastructure.

That may be true of the US (though see Tim Bajarin's *Analysis* on page 31), but politicians in Britain are more likely to question whether it is in the national interest to wait for revenues before investing. Just as they might soon start to question whether it is in the national interest for BT to discourage ISDN.

● BT ISDN helpdesk 0800 181514

A 13th-century map, from a British Library CD, indicates the wealth of unique material Britain has to offer the online world

ANALYSIS

Adaptor or modem?

There is some confusion over ISDN terminology. A conventional phone produces an electrical analogue of sound vibrations; a modem allows you to pass digital data down an analogue line by MOdulating an audio signal at one end and DEModulating it at the other.

A basic ISDN adaptor does neither because it links a digital device (such as your PC) to a digital line. Nevertheless, it is often called an ISDN modem. More confusing, an adaptor may include a kind of reverse-modem which digitises an analogue signal, and vice-versa to allow you to use analogue devices like your old phone and fax machine. (Fax data thus passes from digital to analogue and back again before transmission.)

All-digital fax machines and phones will drop in price when ISDN use is widespread.

Computations

BY ROWLAND MORGAN

WILL the information age save the planet?

Computerless wartime Britain defeated Nazi Europe while importing a mere six or seven supertankers of paper products a year.

Who's playing master-race today? We are. Heavily-computerised, we import at least 24 supertanker loads of printing paper alone. Even our domestic production of printing paper is currently three times the gross imports that sufficed for World War II.

The chip has saved energy, not trees. While executive men wring their hands about mayhem in the temperate forests, secretary women press buttons on chip-powered printers, copiers and faxes. Less than 50 transmission reports exhaust a typical fax-roll without conveying a single message.

UK-made printing paper only contains 11 percent recycled fibre, most of it industrial, and the guarantees on most machines ban fully-recycled paper. The Canadian province of British Columbia, a major UK supplier, has cut more wood in the last two decades of computerisation than it did in the preceding 100 years.

Eco-printer maker, Kyocera, expects a modest-sized network printer to use a stack of virgin paper tall enough to punch a hole in the ceiling every month (25,000 sheets). Offices in the USA now generate more than 775 billion pages of paper per year. That's about six million sheets per working minute, or a stack nearly one kilometre high. A year's US office paper would stack 12,000 times higher than Mount Everest.

In the midst of this improbable scenario, the UK's £40 billion-a-year environment administration has no hard paper-recycling target for business, and zero statistics on volume, although many collecting outfits struggle on through wild price fluctuations.

Hopeful visions of a paperless office accompanied the arrival of the personal computer, but soon faded. It seems likely that the vision of an Internet future that cuts paper use will prove equally fantastic unless heroes emerge to impose the 50 percent recycled fibre-content requirement in office paper that common sense dictates. The Government could make a start with its paper purchases, worth £64 million a year.

● Sources: CSO Fighting With Figures (657 Kilo tonnes in 1942, 573 Kilo tonnes in 1943)/Euromonitor European Marketing Data & Statistics (1.5 million tonnes)/Kyocera Electronics (UK) Ltd/IEEE Environmental Forum 1994/UK Paper Federation (Graphics papers: 4.2 million tonnes used, 1.8 million tonnes produced)/Demos.

CAN computerisation remedy this anomaly?

BT offers a £100-£400 CD-ROM, and an online service costing five to seven pence per number-search which 12,000 big subscribers use. It's considering discounts for forfeiting the right to a book, but it means paying for what is now free. It's clear that the directory should be a Web site that is free, like the books. Three million Internet subscribers would cancel at least 3,000 tonnes of phone books straight away. It's been working for ten years in France where the Minitel network, linked to the phone system, saves by comparison 10,000 tonnes of paper a year.

● Sources: HoC Official Report vol 267 no 5 col 77/BT/Teleshare 2000/Quid 1995, Robert Laffont, Paris.

STATELLITE

Experts on recycling listed in the University of London's A-Z of university experts (covering more than 3,000 areas of expertise): 0

● Source: University of London A-Z of Experts.

HOW many people in the world really count?

Novelist Will Self recently claimed that for him it was fewer than half a dozen. Whether or not they count, people want a telephone, and 91 percent of UK households now have one, totalling nearly 21 million residential exchange lines. And all of them qualify for at least one telephone book. Adjacent areas can qualify, and in a London borough this can mean 19 free books for one line. A business with 500 lines, averaging over 7,000 calls a working day, can receive pallet-loads of phone books. BT actually has to advertise for subscribers receiving too many to cancel them.

The nation's telephone books use 61,000 tonnes of paper a year, and delivering them would require a 40Km jam-up of 2,650 juggernauts.

Every 18 months, BT prints 20 million new books using anything up to 77 percent non-consumer-recycled fibre. On this basis, when the Chinese reach British levels of telephony they'll be using 1.2 million tonnes of paper a year for phone books — nearly the whole of UK graphic-quality production.

STATELLITE

All Britain's present energy needs could be met with hydrogen from one percent of its water supply.

● Source: The Worldwatch Institute: State of the World 1995.

EVERY mobile phone contains a toxic battery that must be scientifically reclaimed every 18 months. Most of them are still dumped.

There are 3.5 million British mobiles; more than all the handsets Britain had when Alfred Hitchcock moved to Hollywood. The USA has over 40 million; three times as many as Mexico's conventional phone system. By the year 2000, over 100 million will be in use worldwide, and there will be as many mobiles in Britain as conventional telephones in the whole of India. There'll be a mobile for every fourth adult in America. Japan will have more mobiles than all the telephones in China. There may even be a clockwork mobile phone, designed by my neighbour, clockwork-radio genius Trevor Bayliss. But worldwide, eight out of ten people seldom use any kind of telephone.

● Sources: Marketline\Euromonitor\Baygen Ltd\Panos

SAMPLE GREEN CONFIGURATION
Printer: Ecosys FS-400. No cartridge. Low ozone emissions. Recycled-paper friendly. Low wattage. Computer: Colossus P133. Energy: doze and standby options, Energy Star 8W-80W. Radiation: CE regulation low. Recycling: company motherboard scheme.

STATELLITE

A conventional personal computer produces about 16 times its own weight in global-warming gases per year.

● Source: Edwin Datchesski at the Environment Council, London (0.8 tonnes CO_2 from electricity generation).

PCW Illustration by Stephen *Caplin*

Sounding Off

Michael Hewitt

Just as all new microwave ovens now come supplied with a Delia Smith or Sophie Grigson opus, so multimedia PCs tend to arrive bundled with numerous free CD-ROMs. Some programs can be moderately life-enhancing. But in amongst the gems, there's always the CD-ROM equivalent of Noisettes of Tabasco-marinated Guinea Fowl with Prunes — something you try once, spit out, and give to the dog. This is how I'd classify the majority of PC voice recognition programs.

Back in July, a few weeks after having taken delivery of my current hardware, I yielded to temptation and installed a freebee that had come along with it.

As you're probably aware, they all work in much the same way: you say "Excel" into the microphone, and it automatically fires up Word for Windows; then you say "PaintShop Pro", and it formats your hard disk… and so on. Anyhow, the thing stayed on my PC for ten minutes, five of which I spent persuading it to turn itself off.

Since then, I've been cautious about such strokes of technological genius. So when IBM said it was sending round a machine loaded with its "revolutionary" VoiceType system, I took the usual precautions of hanging garlic around the door frame and installing a crucifix.

As well as voice-activating keyboard and program functions, VoiceType also converts spoken English into typewritten text. That's the theory, anyway. I suppose some authors would get their rocks off by trying to write their column using it? Not me. That's not to say, however, that the system doesn't work; it does — to a degree. It's just that, having spent several days playing with it, I came away thinking (as you do of microwave egg-poachers): "Nice, but what *is* the point?"

VoiceType requires a 486 or better, at least 16Mb of RAM and a spare grand for the special card and software. Once you've got these elements together, you kick off with the so-called Enrolment session.

Presumably, VoiceType is attuned by default to the sound of a US West Coast drawl. Therefore during Enrolment, you've got to teach it to recognise the voice of someone who talks proper. This takes about three quarters of an hour — if you come from Glasgow or Birmingham it doesn't bear thinking about — and necessitates reading 120 simple sentences into the machine.

Having done this, you've then to go away and occupy yourself for three or four hours (trying to find something good to say about Microsoft Network, for instance) while the computer processes your words of wisdom and sets up recognition algorithms. But then, it's showtime.

Unfortunately, you can't pretend to be Jean-Luc Picard and speak to the computer in your everyday voice. Instead, you've got to make like Vincent Price in "The Abominable Dr Phibes" and carefully enunciate each word separately ("Six — killed — you — Victoria, — my — beloved, — so — six — shall — pay — the — price — and — die!"). This is a pain in the arse, but if you can manage it, your words are converted, as if by magic, into text on your computer screen.

Well, perhaps 95 percent of the time, they are. VoiceType's built-in context analyser allows it to distinguish between homonyms such as "there" and "their" fairly well, which makes occasional stupid errors all the more irritating: "Tax person liquidators" for "Thermal image cameras" and "wayside" for "VoiceType" are but two that spring to mind. And, this is after several hours of training the system, too.

OK, so the technology is in its infancy and that's to be expected — no matter. But this brings me back to my first question: what *is* the point? Certainly, for disabled people such a system (once perfected) would be ideal. But why would anyone want to use it in a business or journalistic environment?

Some would argue, as IBM does in its promotional literature, that you can speak faster than you can type. Yes, if you say the first thing that comes into your head, you can. Maybe *Sun* columnists are a ready market for this sort of technology. But for the rest of us, a keyboard forces us to pause and reflect; to think about what we want to write. What about people who haven't learnt how to use a keyboard? Well, instead of shelling out well over a grand for VoiceType, why don't they just pay £60 for *Mavis Beacon Teaches Typing* and take a couple of weeks to learn?

Don't misunderstand me. I look forward to the day when I can talk to my computer, but I want to to be able to say: "Computer; turn on the television… defrost my vegeburger… take us out of earth orbit…" and that sort of thing. Otherwise, I regard speech recognition as technology for technology's sake. And having thus declared my position I can now *guarantee* that in five years time, everyone will be using it.

Don't you get irritated by journalists who use their columns to plug their own products or books? I do. There's no way that I'd say anything along the lines of: "If you've got any money left after Christmas, why not buy *Travels with a Laptop*, by Michael Hewitt (ISBN 1-85032-164-7) available for £9.95; a handy laptop companion that, in non-technical language, demystifies modems, acoustic couplers, phone plugs, and communications software to help you communicate from anywhere in the world via your laptop."

Aah, would that others had my level of self-control.

Homefront

Tim Nott

Of all the talismans and trinkets that you need to carry around to live a full and active life, which would be the worst to lose? Consider the following nightmare scenarios — feel free to tick as many as you like.

(A) You have driven to a remote spot in the highlands, locked your car, gone for a bracing walk and returned to find that by some inexplicable and previously unnoticed accident, you have dropped your keys somewhere among the heather of Ben Doon and it's starting to get dark.

(B) You queue up at the check-in desk for your flight to San Francisco. For the seventeenth time that morning, you feel inside your coat pocket for your passport and ticket and… *for the first time*, they are not there any more.

(C) Your notebook PC greets you with a cheery: "Cannot read from drive C:"

(D) You sip the last of your coffee and brandy and reach for your credit card to pay the impressive bill, incurred wining and dining the boss's daughter/son… it has vanished.

(E) You stagger from a taxi at 3am outside your house, and search your person for the cash needed to pay the driver. It seems to have disappeared. Never mind, you know you have a tenner stashed behind the clock on the mantelpiece so you reach for your front door keys and… yup, they've gone, too.

(F) You are standing, in the moonlight on Westminster Bridge, having just exchanged phone numbers with the most wonderful person you have ever met in your entire life. As you embrace tenderly for the first time, your elbow knocks your Filofax from the stone balustrade and into the Thames below.

Yes, well, it brings me out in a cold sweat just writing about it. But never mind — the day is coming when you won't need to carry all these artefacts around. I have been reading Bill Gates' vision of the future.

The Wallet PC will do away with things such as cash, tickets, keys and queueing. Book a flight and your reservation will be recorded in your Wallet; just wave it at the departure gate and you'll be through. Wave it at your car or house and all will be unlocked, just for you. Wave it at the waiter or taxi-driver and electronic cash will trickle from your pocket to theirs. It will do all sorts of other tricks, such as make phone calls, tell you where in the world you are, and take photographs.

This is all fine and wonderful, and it would be churlish of me to point out that like so many of Bill's visions ("A computer on every desk; a computer in every home") it does give Microsoft the opportunity to sell millions of new operating systems. But there is a more serious snag to this vision. What if you lose the Wallet PC? No tickets. No money. No credit. No keys. No identity. You will be an un-person.

Protest all you like as airport security escorts you gently, but firmly, from the departure lounge. Watch powerlessly as the authorities tow away your car. You don't have the key to open or start it, or any identification to show that you are the owner. You don't have any money to make a phone call but even if you did, the phones don't take cash, anyway. You spend the rest of your days living in a cardboard shanty town with other, Wallet PC-less travellers, on the outskirts of the airport. Such nutrition that you are able to scavenge consists of cold, leftover in-flight meals from also-ran airlines with poor security.

But the *really* chilling thing is that you won't have to lose your Wallet PC in the physical sense at all. Suppose, by one of those incredibly unlucky coincidences that affect computer users; Something Goes Wrong? There you stand, horror-struck, reading the message on the Wallet's screen: "Tickets.EXE has caused a General Protection Fault in Passport.dll and will be closed down. Cannot open Money.doc, drive C: not responding. Phone.EXE cannot communicate with COM:1. You are at departure gate 17, Gatwick South. Do you want to take a photo?"

Fortunately, Bill Gates is not the only visionary. Instead of the Gatesian "one gizmo does everything" approach, Nicholas Negroponte, of the MIT Media Labs suggests taking everyday objects and making them smarter. You don't need door keys, not because they are incorporated into some whizzo personal accoutrement, but because your front door recognises you. It opens without you having to put down your shopping, turns on the lights and puts the kettle on.

And thanks to the brainpower of AND, the Dutch software house, frequent travellers at Schipol Airport have for some time been able to use a smartcard-cum-fingerprint scanner to bypass the formalities. And though there's not much chance of getting a GPF in your finger, the card stores two "back-up" fingers. Now, that's what I call being digital.

Straight Talking

Barry Fox

Japanese electronics factories practice a draconian system of quality control (QC). The production lines check progress through all stages of manufacture but independently the company's head office employs its own staff who work in a separate area of the factory.

It's their job to take random samples of the finished products, and check that the factory has not missed any problems. To the factory staff, these QC inspectors are the enemy. This is why most Western electronics companies have folded, been taken over by Japanese companies or adopted Japanese working practices.

Apricot's first range of PCs were beautifully styled, but because a resistor in the power supply was under-specified, they overheated and broke free from the circuit board. If Apricot had soak-tested a few PCs the factory would have known to change the resistor for one with a higher Wattage rating. Instead, Apricot's customers had to find out the hard way. Then Japan's Mitsubishi took over.

Look on the back of most Western brand or no-name hardware, and you will see a label admitting that the product was bought from factories in Taiwan, Korea or China. Unless their own company name is at risk, these factories will often cut corners on QC. Before long, most PC hardware will be made in Japanese or Korean-run factories, and carry Far Eastern brand names; consumers can only benefit.

The Western software publishers will last longer, simply because of the language and cultural barriers. So our only hope is to shame or bully them into practising QC, with a positive feedback loop between the customer helpline and the developers.

In the eighties, Quarterdeck developed a terrific program called Desqview which allowed multitasking with DOS programs. Desqview came with a memory management system called QEMM and a good analysis tool called Manifest. It was a winning combination. But thanks to Quarterdeck's rotten marketing, Microsoft had time to make Windows 3.1, DOS 6 and Memmaker work well enough to bring Quarterdeck to the point of collapse.

Now, under ex-Philips, ex-Apple, Gaston Bastiaens, Quarterdeck is riding high again with some good new Web and utility products. All the company needs now is QC with a feedback loop into the developers. For years there was a truly stupid problem with QEMM. Although Setup is gloriously easy and automatic, it leaves some machines with a big "WARNING" message that comes up on every boot. It tells the user to modify Config.sys by adding the parameter SH:N because there is no Shadow RAM.

If the average Joe, who bought QEMM on the promise of simplicity, tries to edit his Config.sys with a wordprocessor, he risks adding control codes which upset bootup. QEMM routinely makes a lot of other changes to the user's Config.sys. If it is smart enough to detect the No Shadow RAM problem, it could perfectly well make the extra small change to Config.sys. A QC checker would spot this kind of nonsense. I've raised it many times, but the WARNING is still there in new QEMM Version 8. A QC checker would never have let Quarterdeck's European office release the latest version of the Cleansweep uninstall utility with a promise on the box that it works with Windows 3.1, when in fact it doesn't. (Tip: ask for a voucher which entitles you to a free Windows version when it's ready). Nor would the European outfit have released a batch of CD-ROMs which contain Quarterdeck's Mosaic but won't install because the serial numbers on the jewel box are wrong. (Tip: Try changing a "c" for "0").

Canon can't. Even the Japanese lose sight of QC when they sell software, probably because it is sourced outside Japan. Canon has admitted to me that there is no known way to stop some of its Colour Bubblejets printing text in jumbo font from Window's Notepad, and throwing up errors on large files. Windows is hardly an obscure program. Printing edited ASCII from Notepad is hardly an outrageous requirement.

Netscape's Jim Clark seemed a sensible chap. He's now selling his famous browser in a shrink-wrap package. On installation I got a long error message, telling me that it wouldn't install on a PC with Win32s. In the UK, Netscape can't help. But there is someone in the US who helps journalists get their systems working. Sorry Jim. What interests me is what help can the customer expect from a local phone call, not what a company will do to help journalists write unreal reviews.

For years I've used and recommended Norton Commander as a great way to manage files. Recently I loaded the new, improved, Version 5. The improvement is that it needs more free base memory, so it gives error messages and runs slower on systems that worked perfectly well with previous versions. After several weeks, Symantec was unable to explain the thinking behind this unique strategy of product enhancement, quality control and customer satisfaction.

Business Matters

Nick Beard

Document imaging systems are to be avoided. They are expensive, troublesome, and tend to be used to avoid the real effort of putting document management strategies into effect. We have one; for other reasons.

Here's how it works. Last month I wrote about the work we are doing in piloting the "client/server" version of our clinical workstation. As regular readers will know, I am employed at a medical centre in Scotland.

We have installed an integrated suite of clinical information systems, enabling us to operate mostly without paper medical records. The systems, mainly from the Cerner Corporation, run on a Digital VAX 7620. We use PCs to access the applications. The GUI workstation is X-based. Replacing X with MS Windows requires careful planning, and knock-on effects of each adjustment in a sensitive system must be anticipated.

This is not the only client/server applications work in progress. Our financial systems suite is also being prepared for the shift to Windows, and there are several data-access applications we have built in Visual Basic and Access to enable easy access to complex data. Working with Crystal Reports, our programmer has been frenetically trudging through the mire of management reporting to produce a simple "executive information system".

Document imaging systems allow documents to be captured into electronic information systems as pictures of the original. It is akin to faxing the document into your computer. Cerner does not provide document imaging so we use Image Engine from Imnet.

The elements of a document imaging system are scanning, indexing, storage, retrieval. There are refinements to these elements (such as quality control of the scanning and indexing processes, or stored-image location-management) but in essence these are the main areas. Scanning takes place either on demand or retrospectively. Once a system is in place, continuous scanning is probably the best approach, preventing a backlog of pages. One of the main attractions of document imaging systems is the relative ease with which document legacies can be brought into the modern systems fold, so bulk scanning of old records is usually necessary. Scanning is a potentially laborious process; the documents must be organised, sequenced and labelled.

The "context" in which a document is viewed may be lost on-screen. It's easy to recognise a page as the fifth in a paper file, and the subject matter may be gleaned by flicking to the first page. But this isn't always the case in poorly designed document viewing systems. Scanning quality is a crucial early step in the overall process. We use a scanner with a sheet feeder and hardware compression.

Once the image has been acquired, it's indexed; a labelling process, enabling document retrieval. Once a document has been scanned and filed electronically, it's a huge task to find it unless it has been properly indexed.

When we first acquired the system, we bought an optical jukebox. Images were written simultaneously to magnetic disc and to the optical platter. The magnetic disc served as a cache, so that recently scanned images (pertaining to current or recently "active" patients) would be available faster. When the magnetic cache was full, the images would be deleted on the basis of age, so that subsequent retrieval would be from the jukebox. But the optical jukebox failed, and we've decided not to replace or repair it. We had not filled the cache, and have now increased its size. Many people automatically associate document imaging with optical storage when there is no need to. Document images can be stored in the same way as almost any other data.

Image retrieval is what distinguishes a document imaging system. Our clinical systems link to the imaging system in a seamless fashion. To retrieve information, users click a representative "icon". Numeric information, such as lab results, is visible in the icon; clicking pulls yet more data. Textual information (e.g the interpretation of an X-ray image) is retrieved as text. Scanned images; clicking the icon causes the picture to appear. The Oracle repository (the electronic medical record) keeps an index of document location. If the location is an Oracle table, great. If not, it sends a message to the Image Index, stating "Dr Hughes is at workstation address ABC.124.XX, and wants image reference PQ45." The image is sent directly to the PC and the client-based image viewer pops into action. On summoning the information, the user does not necessarily know that it will be a document image. Thus the document imaging piece is effectively "hidden"; so the user interface is consistent.

Systems management involves remembering rules of thumb which only a professional should break. "Document imaging systems are to be avoided" is one such rule of thumb.

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CompuServe 71333,2330
or fax **0171 316 9313**

Letters

Net niggles

Latest Internet snobbery: "Oh yes, I have an email account but I never use it". Latest Internet excuse; "I got your email but my reply must have got lost in the Iinternet". Grrrr...

Walter Gray
wagray@dra.hmg.gb

Attention, Adobe

I was pleased to learn, on reading PJ Fisher's "First Impression" of PageMaker 6.0, that I was not the only one who thought PageMaker had no drag-zoom facility.

In fact, it was not "sorely lacking" — it's always been there in version 5.0 (and, for all I know, in earlier versions). After several years of wishing one could select an area to zoom, I discovered that control-spacebar produces a tool to do just that. There must be many users who, like me, spent a lot of time fiddling about with the zoom shortcuts and the scroll bars to get the bit we were working on to occupy the whole screen.

Perhaps Adobe will be a little more thoughtful, though as they haven't bothered to update the interface for version 6.0, maybe not.

Tony Brooks
(Computer Consultant to Charities)
East Sussex

Poetry corner

It felt like an earthquake
But we know it's not that
The post has arrived
And your mag's squashed the cat!

I use the wheelbarrow
To manhandle the tome
Down through the hall
To a solid floored room.

I thumb through the pages
Till my digit's sore
And search for the item
I've been waiting for.

My blood pressure's rising
A stroke is a risk
Instead of a CD
There's a high-density disc.

A long time ago
I'd sent in a form
Requesting a CD
As my monthly norm.

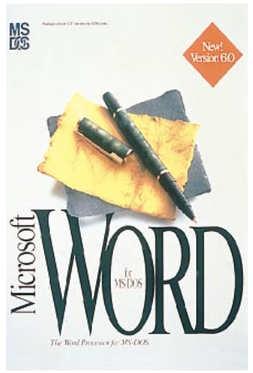
The floppies kept coming
So early this year
I phoned "Subscriptions"
And made my choice clear.

Who's using my CDs?
Where did they go?
Can you retrieve them?
Please don't say "no"!

Phil Grix
South Humberside

The keys to success

Like Adrian Bailey (Letters, December issue) I train students to use Word 6. But, unlike Mr Bailey, I see no problems with the program, and I think the reason for this is that I came to computer teaching from a different direction. Most word-processing teachers seem to be either professional teachers or professional computer users; they have never earned their living typing, so they tend to use the mouse much more than touch-typists do. I've recently retired from secretarial work and, with 40 years of keyboard experience, I naturally go for the keycodes first. After all, one uses a word processor to key in text, and that means fingers on the keyboard — why take them off it for formatting? So for font and paragraph formatting, I go over the keycodes time and time again, and as far as toolbar buttons are concerned, concentrate at first on the five on the left: new document, open document, save, print, and print preview.



Here are a few new and useful things available on Word 6 (I'm working from memory so far as Word 2 is concerned, so no doubt loads of people will tell me if I'm wrong): keycodes for superscript and subscript, keycode for leading apostrophes (necessary with Smart Quotes), keycodes for copying and pasting formats, dashed and dotted line borders, the borders toolbar, uneven width newspaper columns, accessing menus with right mouse button, AutoCorrect (what a wonderful thing), a menu for non-printing characters in capitals, Draw revamped and, best of all, the ability to create customised toolbars with text buttons. With these I can set up demonstrations on the screen. Students can click on buttons marked "Start demo", "Next Step", "End", and various functions demonstrate themselves. It's fun and it works.

Mrs J Elliott
Upminster

Help wanted

Ten or twelve years ago I invested in a word processor called an Amstrad 8256. I had an urge to write magazine articles for profit. Now, I do not suppose you even remember what an Amstrad 8256 was, but it paid for itself within the first twelve months — and I'm still using it. No repairs, no breakdowns, and it still looks like new. So you can stop snorting in derision.

I decided to get up to date, I bought your magazine — this was going to be easy. Choose what fitted my requirements and then go for it. Return to line one — HELP.

Is it absolutely necessary to write in an unknown language and present such a totally confusing picture?

I laid down what I thought I would like to bring me into line with the present and serve me into a new millennium. Please control any irresistible urge you may have to roll about the carpet holding your sides, because it all seems so simple to me.

I have two thousand pounds to help me attain my objective. I want a machine and package which will:

- be a word processor and support my writing;
- btore my research data;
- brovide a "card index" system for my sources; and
- allow me, as a marine historical artist, to draw, paint and view from different angles the product of my research in order to decide the best angle from which to create the work of art.

There are grandchildren to consider because I would like to encourage them in the future and it may well be that the Internet would assist me (try getting details of the rigging of a Dutch East Indiaman c1720 without splashing out on several trips to Amsterdam and Rotterdam as I have had to do).

If, at this point, you and your colleagues feel this is so simple it is hardly worth spen… no, wasting time on, then please take the time to jot down on a postcard what you recommend would fit the bill and one reader would be in awe of your professional expertise and warmth.

Philip Dyson
East Sussex

PCW replies:
We would generally recommend a PC running Windows 95 and with at least 16Mb of memory. Ironically though, Amstrad has just launched a follow-up to its PCW8256 word processor — the PcW 16. We've reviewed it on pages 106-110. It won't offer you Internet access, but in most other respects it might fit your requirements.

Thumbs up from down under

Just a quick note to say how much I am enjoying *PCW*, which has appeared in my local newsagent in the deep south of South Australia. I particularly like the no-nonsense journalistic style of the interviews and comments on new products, compared to the "soft soap" approach of Australian (and American) journos who avoid negative comments lest they upset an advertiser in their particular magazine.

The adverts run in your magazine are a great way of comparing products, for both technical advancements and value for money in comparison to products available over here.

Finally, I am a new Internet user and I am stunned by the vastness of the Net, and am awed by the fact that it is possibly just the beginning of a global information network that would have been a fairy story only a few years ago.

To everyone at *PCW*, keep up the good work.

mark bellgrove
mambo@ozemail.com.au

F-Prot: the choice of the professional

I was disappointed to find that in your anti-virus software group test you only reviewed the shareware version of F-Prot, particularly since the other packages in the test were "professional" versions. As a result, people may well ignore one of the best packages around.

F-Prot Professional includes DOS, Windows, Windows 95 and OS/2 versions, all in the one box, for £100 (with four quarterly updates). The Windows version has a resident VxD-based program, Gatekeeper, which does the same job as the DOS TSR and with very little loss of performance. The scanner is quick, there is the facility for full scheduling of scans, and it works with any network. In fact, the network features alone set it apart, because most other vendors require you to buy a separate package for networks and then it often only works with NetWare. F-Prot Professional has extensive network functionality, including remote administration of scanning on workstations and remote updating.

Furthermore, F-Prot Professional takes an enlightened view of licensing. Anyone whose office PC has a licensed copy of F-Prot can make a copy and use it at home, for no extra charge. There are multiple-user licences available at greatly reduced rates, and these are restricted to covering just one site in an organisation.

I have no connection with the publishers or writers of this software, but I do use it.

Phil Stanton
phil@equinox.co.uk

PCW replies: *F-Prot is supplied and supported in the UK by Portcullis Computer Security (0181 868 0098)*

Wakey, wakey

I have a message for Peter Brown (Letters, October): Keep complaining as loudly as you like. When are software houses going to wake up to the fact that the term "upgrade" does not apply to the vast amounts of money we have to spend bringing our PCs up to their exacting specifications?

As for Kenneth Henry (Letters, December): I'm sure planet Earth would be obliged, Kenneth, if you would be good enough to take yourself and your arrogant stupidity off to planet Gates. And stay there.

Harry Knibb
harry@knibb.demon.co.uk

The Z Files

Considering how rude the writer of the letter "Correct Diagnosis" is about Nick Beard's lack of knowledge, he astounds with his own ignorance. In particular, Intel did not design the Transputer. It was Inmos. Also, the work which I think the correspondent refers to was a formal spec (in Z) of the IEEE floating point standard. The spec was then used to produce the Transputer's (sorry, I can't remember which model) microcode. This was a sterling piece of work. The Z spec enabled consistency checking of the IEEE format and some bugs in the standard to be found.

Formal methods were also used in the design of the VIPER chip, that sank under the weight of law suits. Formal methods are simply another tool in the engineer's toolbag. Some things they do well. Some they do less well.

Dr Gary Morgan,
Advanced Computer Architecture Group,
Department of Computer Science,
University of York

Fuller figures, please

I applaud your decision to adopt the Doom 2 benchmark as part of your VNU benchmarks, but please give the actual figures for these in the review. Performance for Windows often scarcely correlates to games video performance, so providing a single figure that is effectively the product of both of these does a disservice to both the gamer and the Windows user. The figure may mislead certain groups: for example, a Windows user might choose a recommended machine only to find its net performance owed significantly to a games performance that he or she did not care about.

The fps rating figure given by the Doom benchmark has a clear and useful meaning. I'm sure users want the actual figure. You could still provide the combined rating, but also give separate Windows and games ratings.

Finally, you nearly explained exactly what the users had to do to run the benchmark. Please give the complete details. I am sure your advertisers would welcome this, as users could easily compare their own machine with the ones reviewed and realise just how slow machines manufactured a couple of years ago are at running 3D games

Jeff Rollason
100031,3537@compuserve.com

Make room for Macs

I'm worried about you. Having found no Mac software whatsoever on your last cover

CD, I don't know whether you're still committed to being a real cross-platform magazine aimed at all users (and one of very few at that) or another PC magazine clone. I daren't take out a subscription while you're still teetering between the two. Your fence-sitting shames even Paddy Ashdown. Get your act together. "No room", really! The only times I've heard that before are:
1. That notorious innkeeper scene in the Bible. He was probably lying.
2. Microsoft Windoze(TM) when its pathetic little resources thingy has run out of space. It's *definitely* lying.

Reprovingly,
Matthew Powell
mcp26@hermes.cam.ac.uk

Horror story

I am full of sympathy for Mr Geal and his problems with Gateway 2000, as I had a similarly horrific experience at their hands. I purchased a P5-66 machine from them in March '94. After two hard disk crashes and several days worth of time spent restoring system files (never mind redoing work which was unretrievable) I decided enough was enough. They had already admitted to me that there was a problem with that particular model of machine (why couldn't they have told me this when I bought it?). They had even instructed me to change a jumper setting on the motherboard, changing the speed from 66kHz to 60 (effectively knocking £300 off the value) before they finally

Less PR, more people

Judging by the number of complaints in recent issues of *PCW* about hardware and software reliability and service, all is not well with some manufacturers and retailers. In recent months I have found:

1. Products are being advertised well before they are available. When you phone to enquire about availability it's like a well-rehearsed script. "We're expecting them in at the beginning of next month..."

2. Sales staff at supposedly specialist retailers are becoming as ill-informed as their brethren in the high street multiples. I recently overheard a salesman at the counter of one of your regular advertisers telling a customer that their PC was better than a competitor's because it had an Intel processor whereas the other had a Cyrix one, and "everyone knows they fall over all the time." When questioned as to what he meant by this, he crashed in a flood of meaningless waffle.

3. Managing Directors and PR agencies give one set of replies to you and those whose letters you publish, and another to the rest of us. When I wrote to one of these people recently to let him know how much I had been required to spend because of the poor reliability of his equipment (just outside its one year of warranty) and the ignorance of his technical support staff, all I got in reply was a form letter saying it was being looked into, followed by a deafening silence.

4. Internet Service Providers are being economical with the truth about the speed of the service they provide. I've decided that www is nothing to do with the world wide web, it's "Why are We Waiting?" In the case of my own provider the service is unusable at peak times, even with a fast modem.

Surely *PCW* is big enough to take the side of its readers and start publishing our views as to who is a saint and who is a sinner in the PC supply world.

Barney Tyrwhitt-Drake
barney@tdrake.demon.co.uk

decided they'd designed-in the wrong power supply.

Having lost confidence in both machine and technical support, I decided to return it to them for a refund — as far as they were concerned, under their limited 30-day money-back guarantee, from my point of view because the machine failed to live up to the conditions of the Sale of Goods Act. I sought legal advice and was told that I had a good case for reclaiming the substantial cost of return carriage of the machine to Ireland (which Gateway normally don't cover) and for damages, given the amount of my valuable time which their faulty machine wasted.

When the free legal advice afforded by my trade association ran out, I was told I could institute a small claims court action to recover the £100 plus return carriage and £500 damages. But when I approached my local county court, the story was that Gateway would almost certainly have the action transferred to Dublin, so I should take out an action in the equivalent Irish court.

While I don't want to bore you further with the details of my particular case or Gateway's cavalier attitude, I should like to sound a note of warning to your readers. While Britain and Ireland are both members of the EU, the fact of the matter is that if you buy something by mail order outside the jurisdiction of British courts, you have major headaches involved in getting any kind of redress when things go wrong. Perhaps the multi-page adverts which your magazine and others carry from Gateway and other non-UK companies should come with some kind of warning — "What will you do if something goes wrong?"

I for one will never again buy from someone I can't sue in a British court. Friend in the business? They have to be joking.

Clive Tully, Norwich (Member, British Guild of Travel Writers)

Posing a problem

Further to your article in *PCW*'s "Guide to getting online", is it any wonder that "Women in particular are vulnerable to harrassment from men" when articles such as yours, purporting to be a simple explanation of the Internet, start with a quarter-page photo of a woman posing in nothing much more than a pair of high heels and black stockings? What has that got to do with the Internet?

We are actively working to demonstrate the advantages of telematics, and "Women in particular" constantly ask me if it isn't true that the Net is full of porn. It looks like their worst fears are confirmed on opening *PCW*'s Comms supplement.

Kate Whittle *for* Microsyster — computer training and support for women

***PCW replies**: Unfortunately, the caption for the picture you mention was omitted from the final page by our repro house. It read: "One view of the Internet is that it's full of junk and porn." Without the caption, the picture does look gratuitous.* ■

Hindsight

10 years ago: February 86

The sought-after inside front cover advert was taken by PC Communications' Breakout internal modem. It offered V.21 300/300 and V.23 1200/75 and was a snip at £499 + VAT. It allowed sluggish access to the dazzling online services of the day like Telecom Gold and Prestel.

Update

28,800 V.34 modems are now available for under £200. See this month's cover story.

5 years ago: February 91

"Cheap 486 rivals" ran PCW's front cover. The prices of the two machines reviewed were £3,534 and £4,065. Those prices included VGA monitors, around 100Mb of hard disk, a 25MHz 486 processor and 2 or 4Mb of memory.

Update

It's a truism that personal computers get constantly cheaper and more powerful. Even so, it's surprising just how much they've come down in price in half a decade.

First Impressions

Contents

First Impressions includes the irresistible "Gadgets" selection on page 57. Highlights include a 166MHz Pentium Pro Viglen Genie — as fast as you can get; Microsoft Money for Win95 — home finance looks good; Power Computing's nice-price Mac clone; and Dell's desirable Latitude ST120.

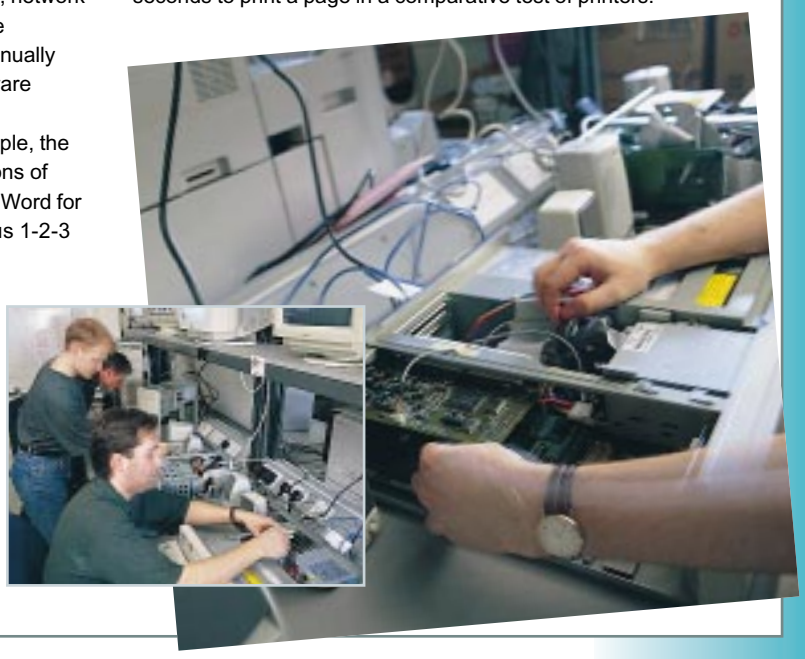
VNU European Labs

VNU Labs tests cover every kind of hardware and software including PC hardware, printers, network products, modems and software applications. The tests are continually developed and enhanced to reflect hardware and software developments.

Our tests closely simulate real-world use. For example, the suite of PC hardware benchtests uses complete versions of industry-standard applications like Microsoft Excel and Word for Windows, WordPerfect 6.0 (DOS and Windows), Lotus 1-2-3 version 3.4 (DOS) and FoxPro (Windows and DOS).

Application tests are the backbone of all the VNU Labs system evaluations but it's nearly impossible to pin an application result to a specific machine component. Only system-level tests (also known as low-level tests) can reliably tell the difference. VNU Labs' system-level test suite is called Euromark. The tests, which are mainly Windows-based, quickly size up a hard disk, sound card, motherboard, display adaptor and printer, and give individual and overall figures.

● To make them easy to read at a glance, all the graphs in *PCW* are now drawn so that the bigger the bar, the better the result. Normally we'll also include the original data we worked from: for example, the time in minutes and seconds to print a page in a comparative test of printers.



HARDWARE

Viglen Genie PCI MDT P5/166MHz

Faster chip + modified motherboard = speed like you've never seen. This 166MHz Pentium Genie really flies, as Adele Dyer found out.

The next-generation Pentium Pro chip [see page 122] will be the heart of the fastest Intel-based PCs, but only if you're running 32-bit applications under a 32-bit OS. Anyone using a combination of 16- and 32-bit apps including games, under DOS, Windows 95, 3.x, or OS/2, will be best off with the fastest conventional chip they can get their hands on, and they don't come any faster than the Intel 150MHz and 166MHz Pentiums released in the new year.

We got our hands on a Viglen Genie PC, wrapped around the fastest 166MHz Intel Pentium chip, and the speed really shone through from the first moment we powered it up. We tested it with Windows 95 — a notorious slow starter — and the extra speed of the chip was immediately apparent. Other little giveaways are its smoothness of operation in, for example, moving windows around and opening and closing applications. The overall feel was of a machine that was more than capable of running anything we could throw at it, with ease and sophistication.

When we ran the Doom2 and benchmark tests we were seriously impressed. It easily outclassed even the fastest P120s we looked at last month. We ran a short test which primarily tests the speed of the processor and the video card by not dropping any frames in a short, action-packed sequence. The P166 scored a staggering 64 frames per second, over 20 percent faster than the best P120 we tested last issue.

The same excellent performance was demonstrated in the benchmark tests. These test a machine's performance on a number of applications, including Word, Excel and Access. It sailed through all of them with flair and verve, coming out well ahead of the P120s.

The speed improvements have come about through two innovations — a faster chip and a modified motherboard. The latter, a revised Endeavor from Intel, allows you to clock the CPU at two and a half times the speed of the board; the Triton chip set runs at 66MHz.

All of this was doubtless helped by the hard drive, a 1Gb Quantum Fireball. This is one of the fastest EIDE hard disks around at the moment, helped in part by its excellent cacheing.

The rest of the kit is roughly the same as in the Viglen P120 we tested in the last issue. The video card is a Matrox Millenium with 2Mb of WRAM, the CD-ROM drive a six-speed EIDE from Teac — a winner, incidentally, in our CD-ROM drive roundup last month.

There is no separate sound card. Instead there is a Vibra 16S chip on the motherboard with a riser card for all the IO connections. If you're not too fussed about such things as wavetable sound, this has the advantage of freeing up a valuable extra ISA slot.

To round off the spec, there is 256Kb pipeline burst cache on a stick and 16Mb of EDO RAM, which is rather inconveniently located under the hard disk. The chip itself nestles under a very flat heat sink with a Socket 7 ZIF socket. A fan on the case draws the heat away from the chip, while the flat heat sink leaves enough room for full-length cards.

The 17in monitor supplied has a reasonably dark and flat tube, offering high contrast with low distortion. The controls include rotation, barrel and pincushion, as well as giving you scope to set the level of red and blue and to run at either 9300K or 6500K.

The P166 copes with consummate ease whatever you wish to throw at it and seriously outpaces its older, slower brothers. On the price front, in early 1996 you are looking at a mark-up of around £160 over a similarly-specced P150, £240 over a P133 or £350 over a P100. As usual the fastest Intel chip costs quite a premium, but with system prices continually falling, the asking price of around £2,400 seems almost reasonable. Let's face it: if you've got over £2,000 to spend on a machine, you might as well get the fastest one you can; and right now, the Pentium 166 is the fastest machine for running a combination of 16- and 32-bit applications.

PCW Details

Price £2,477 approximately
Contact Viglen 0181 758 7000

Good Points The fastest chip for running 16- and 32-bit applications.
Bad Points P166 systems will cost around £350 more than P100s.
Conclusion Even so, Viglen's super-system seems reasonable at around £2,400.

SOFTWARE

Microsoft Money for Windows 95

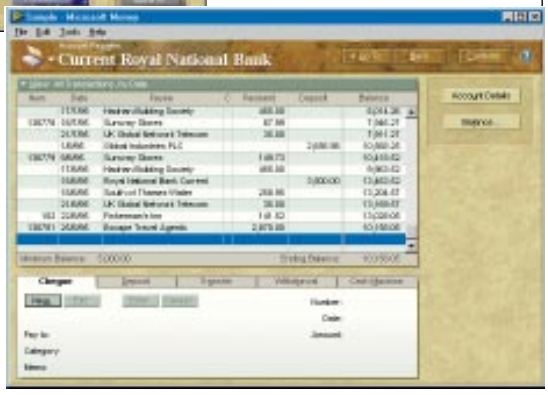
The rehabilitated Money is good enough to have rival personal finance packages quaking in their boots. Be very afraid, says Paul Begg.

Microsoft's attempted purchase of Intuit, the developer of the top-selling personal finance package Quicken, was perceived by many as a covert admission that Microsoft's own personal finance software, Money, was an inferior product. When the acquisition of Intuit fell through, people wondered if Microsoft would ditch Money or, if not, how it would market a program it had been prepared to abandon. Well, Microsoft didn't dump Money, they changed it. Now Windows 95 specific, it won't work under Windows 3.1.

Money 95 is a very slick program that bears no resemblance whatsoever to the earlier versions and which could even shake Quicken's grip on the home market. Quicken's original success was based on Intuit having identified a market need and filling it with a simple-to-use product that did everything a user might want it to do. Additional features have been added over the years, with the result that Quicken has put on weight and developed the muscle to handle small business tasks. In the process, it has lost something of its original simplicity. Money now looks great, handles well, and it clearly targeted at the home user. Quicken would do well to watch out.

The clever thinking behind Money is reflected in the attractive main screen. Conveying a businesslike approach with it's manilla-coloured folder, it is also upbeat. This is a serious program handling serious matters in a way that won't frighten even the dumbest user. From the main screen you can choose one of several options. You can go to the account register, payment calendar, account manager, investment portfolio, report and chart gallery, the payees and categories section, or launch a planning wizard. The US version has one addition, a link to online banking services. No agreement has been reached between either Microsoft, Intuit or any UK bank to provide similar services so the feature has been removed from the UK version.

The payment calendar is where you can set up scheduled payments — regular incomings and outgoings such as salary cheques and standing orders. With this information entered, Money automatically enters it into the transaction ledger. In this way your records will always be up-to-date, which is essential if you are living on a tight budget. The calendar can also be used to record reminders of single transactions such as when you should make your final holiday payment.



Left *The attractive opening screen makes business look comfortable*

Below *All the information you need, at hand and easy to find*

The investment portfolio keeps a record of your current investments and their value, allowing you to update the market prices as they change. Investment accounts is the place to record and track investments with a fluctuating market value, such as shares, gilt-edged stocks, bonds and PEPs. For assets such as property, you should open a tailored asset account in Money.

The Report and Chart Gallery is where you can get a complete view of your financial status. You can see where and to whom your money has gone, track trends (noting when there seems to be higher than average outgoings and why this is the case, thus enabling you to compensate for it). There are 26 reports and charts that group your finances into five areas: spending habits, what I have, what I owe, investments, and taxes. Money lets you personalise this area, creating up to 50 reports and charts to an area called "favourites", which is really a way of getting quick access to the information that interests you most.

There is a section called payees and categories, a particularly useful feature that I'd like to see expanded. This section allows you to list the name, address, phone number and account number of the people to whom you pay money. Money will even dial the phone number for you and there is a place for making brief notes. Finally, Money has five planning wizards to take you step-by-step through tasks such as calculating loans and mortgages or setting up a retirement goal.

PCW Details

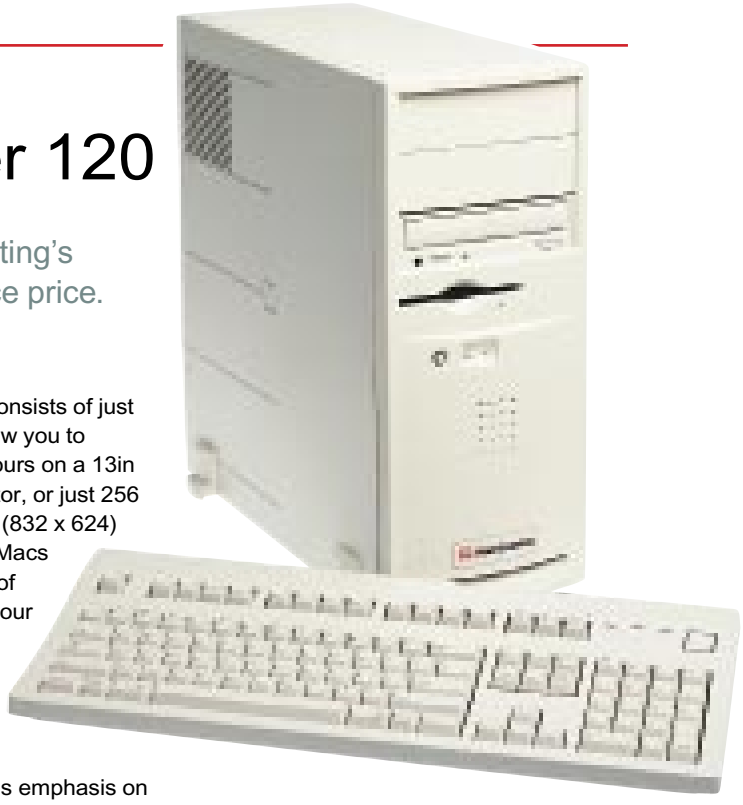
Price £29.99
Contact Microsoft 01734 270001

Good Points It's simple and non-frightening.
Bad Points No bad points spring to mind, though additional features such as a Home Inventory would be useful.
Conclusion A solid home finance package that looks good and is easy to use.

HARDWARE

Power Computing Power 120

Cliff Joseph gives the thumbs-up to Power Computing's Power 120: a powerful, reliable Mac Clone at a nice price.



Apple's attempts to license the Mac OS haven't exactly taken the market by storm. Radius is losing money hand over fist, while Daystar's Mac clones haven't seen the light of day in the UK.

Power Computing is the only company that has managed to get any of its products into the UK, but at least it's come up with something that's well worth a second look. Two models are currently available. The Power 120 reviewed here is a large tower design, and there is also an entry-level desktop unit called the Power 100.

The "120" refers to the machine's processor, a 120MHz PowerPC 601. That's a clever choice by Power Computing as Apple doesn't produce a 601-based Power Mac that runs at this speed. This allows Power Computing to offer something that is clearly different from any of Apple's own product range.

At around £1900 plus VAT, the Power 120 is slightly more expensive than Apple's 100MHz Power Macintosh 7500, but it's also noticeably faster. In fact, the Power 120 performs just as you'd expect — 20 percent faster overall than the Power Macintosh 7500 in our benchmark tests. This makes it a good choice if you want more power than the 7500 can offer, but don't want to pay £3000 or more for Apple's PowerPC 604-based Power Mac 8500.

The rest of the machine's hardware configuration is fairly straightforward; 8Mb RAM, 256Kb of level 2 cache, 540Mb hard disk, and quad-speed CD-ROM. All the peripheral connectors conform to Mac standards, with serial ports for printer and modem, Apple Desktop Bus (ADB) for keyboard and mouse, and Power Computing has even used Apple's high-speed GeoPort telecommunications interface as well. The on-board sound system provides 16-bit, 44kHz audio input and output — though there's no microphone supplied as there is with all Apple products — and there's also a built-in Ethernet interface.

Only two features of the machine's design give any cause for criticism. The on-board video system consists of just 1Mb DRAM. This will allow you to display thousands of colours on a 13in or 14in (640 x 480) monitor, or just 256 colours on 15in and 17in (832 x 624) monitors. Apple's PowerMacs tend to use at least 2Mb of VRAM, giving greater colour depths, and not having true 24-bit colour even on a 13in or 14in monitor seems like a bit of an oversight, especially given the Mac's emphasis on graphical applications.

It is possible to buy an optional display card which will provide greater colour support, but while this is fine for graphics professionals, not everyone will want to do this. This card fits into a processor direct slot (PDS), a proprietary Apple bus used in a number of Mac models.

More significant is Power Computing's decision to stick with NuBus expansion slots in this model. Apple's Power Macs have now all adopted the PCI bus architecture (apart from its consumer-orientated Performa models). This allows the machines to be upgraded with new CPU daughterboards as well as allowing them to use PCI-based graphics cards such as Apple's new QuickDraw 3D graphics accelerator.

If you've already got some expensive NuBus graphics accelerators or digital video cards, then Power Computing's choice of the NuBus architecture allows you to go on using those cards. But if you're looking to buy a new machine with an eye to future upgrades, the lack of PCI slots is a disadvantage. Power Computing has recently launched a PCI-based machine in the US, but we were unable to find out when this is likely to be available in the UK.

Of course, the most important question to ask about any Mac-compatible machine is whether or not it is truly Mac-compatible. In this instance, the answer seems to be a simple "yes". The operating system and some of the machine's basic chipsets are directly licensed by Apple, ensuring complete compatibility. A previous user had made a bit of a mess of the System Folder, but once this was corrected we experienced no software compatibility problems with the machine at all.

Power Computing has also bundled in some useful software to round out the package. There are copies of ClarisWorks 3 (not the latest, which is 4.0), Now Utilities and Now Up To Date, plus a US version of Quicken, which seems a bit pointless. There's also FWB's hard disk and CD-ROM toolkits, which are definitely worth having,.

The Power 120 isn't going to have Apple quaking in its boots just yet, though a PCI version and the price cuts that Power Computing is promising once its manufacturing volumes are ramped up might just do the trick. Nonetheless, this is a powerful and reliable Mac-compatible machine at an attractive price.

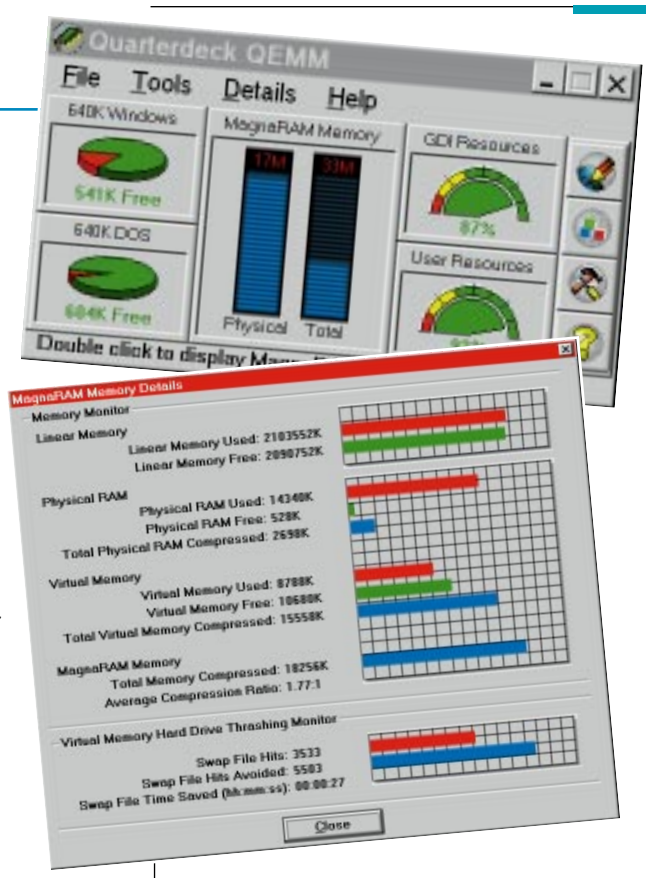
PCW Details

Price £1,899 (excluding monitor).
Contact Computer Warehouse
0181 838 5553
Good Points Affordable and fully Mac-compatible.
Bad Points Uses Nubus rather than PCI slots.
Conclusion A genuine alternative to the "official" Power Mac range.

SOFTWARE

Quarterdeck QEMM 8.0

Quarterdeck have excelled themselves with the best way to streamline your system under Windows 95, says Eric Adler.



Top *This Quarterdeck QEMM MagnRam monitor clearly shows system resource usage*

Above *Virtual memory hard drive montior shows reduced swap file hits and system time saved*

QEMM from Quarterdeck has long been recognised as the leading memory management software and the new version offers improved system optimisation from within Windows 95. This is a full 32-bit program, providing advanced memory mangement and diagnostic procedures which radically improve system performance, making it well worthwhile to use Qemm in place of the Microsoft system tools.

The Qemm 8 package is fast approaching a full system management toolbox. It includes the Quarterdeck Magna RAM memory multiplier, an improved version of the Manifest system diagnostic program which provides detailed information on DOS and Windows memory usage, IRQ interrupt settings, hardware settings, system files, PMCIA adapters, network resources, CMOS settings and processor testing.

The processor testing routines can, for example, be used to read the manufacturer's initial settings on Pentium and other advanced chips; detecting the difference between a genuine Intel P100 and an overclocked P75 or a Nextgen chip. This facility will be of particular value to readers considering buying a computer which happens to have the heatsink glued onto the CPU, so making it dificult to read the manufacturer's labels by other means.

Inclusion of a 32-bit implementation of QEMM Magna RAM memory compression, which is also available as a separate program, makes this package especially good value. Magna RAM compresses data in memory, making better use of RAM and reducing the need for virtual memory on hard disk (swap file hard disk access is far slower than compressed RAM). This feature appears to be 100 percent transparent and does not affect Benchmark times, but makes more memory available for resource hungry programs reducing the number of hard disk hits used for virtual memory.

The virtual memory hard drive thrashing monitor confirms the first intuitive appraisal of Magna Ram performance and shows that at least fifty percent of hard disk hits can be avoided and saving a few seconds per hour may at first appear trivial, the result is a smoother running system with far less frenetic windows swap file activity.

Magna RAM does not merely reduce swap file activity, many programs are able to use the compressed RAM — Mathematica 2.3 enhanced running in WIN95 thought it had 24Mb of free RAM available on a 16Mb machine and performance-improved accordingly - allowing more active notebooks to be opened with simultaneous kernels without loss of performance. US Navy Fighter, "The Program" (see *PCW* CD-ROM Dec 95) and other memory hungry programs can be run in Windows 95 after QEMM optimisation, which previously required Windows 95 to be closed down and reopened as a DOS session.

A previous weakness of QEMM was its lack of SCSI support; it was not possible to run QEMM optimise with several popular SCSI controllers without first manually editing the configuration. QEMM 8 now includes improved support for SCSI adapters and other bus mastering devices, so that with this version, memory conflicts caused by SCSI controllers are a thing of the past, QEMM 8 installed and optimised on a WIN95 system with an Adaptec controller in less than five minutes without any hassle or fuss.

Quarterdeck are pioneers of memory management software. They gained their reputation in the days of DOS, when the superiority of QEMM compared to Microsoft products in freeing up conventional memory — loading TSRs and device drivers into upper memory, permitting larger programs to be run in limited Ram — was sufficient to ensure the success of the company. Nowadays Quarterdeck produce more than just memory management software and QEMM is far more than a simple optimisation program, but in its own way QEMM 8 is as far in advance of the features offered in Windows 95 as the original Qemm was in advance of Dos. Qemm 8 will still out-optimise a system compared to Microsoft and makes more memory available for programs which require it.

PCW Details

Price RRP £79.95 (street price £50 - £60), upgrade from any previous version £29.95
Contact 01245 496699, fax 01245 495284
Email: qservice@qdeck.com

Good Points
Excellentsoftware which brings out the best in a Windows 95 or Win32s system

Bad Points
Should have been included in Windows 95.

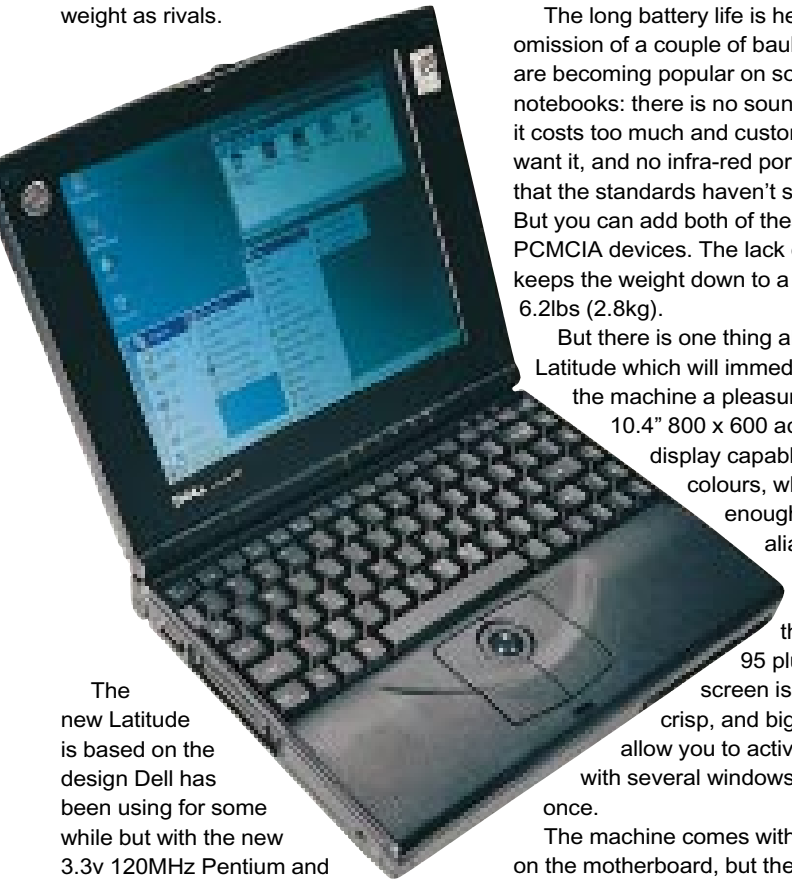
Conclusion
A very stable, easy-to-use product which will fine-tune (supercharge?) any Windows 95 system.

HARDWARE

Dell Latitude ST120

Fast, with long-life batteries and a quality screen: Simon Rockman didn't want to part with this new notebook.

Latitude notebooks are designed by Dell and built by Sony. This gives them their most valuable ingredient: the lithium ion battery. Development of this new technology has been pioneered by Sony so while other companies have lithium ion, Dell has always been a little way ahead. The result is notebooks with a longer battery life at the same weight as rivals.



The new Latitude is based on the design Dell has been using for some while but with the new 3.3v 120MHz Pentium and Pico power technologies chipset. The Pentium is 2.9V internally, so it doesn't draw very much power and can be used in the film mounting preferred by notebook manufacturers. The result is a very fast machine with an acceptable battery life.

Dell doesn't quote a life, but refers to the "Veritest" test in which the battery lasted four hours on a single charge, using a mixture of Microsoft applications. We got a similar result which is encouraging since quoted times and real life are often so far apart.

In addition to long life the battery has some other remarkable characteristics. There is no memory effect (more accurately called voltage depression), and a bar graph of LEDs on the battery shows the remaining charge. The computer can be recharged in 90 minutes.

The long battery life is helped by the omission of a couple of baubles which are becoming popular on some notebooks: there is no sound – Dell says it costs too much and customers don't want it, and no infra-red port – Dell says that the standards haven't settled yet. But you can add both of these as PCMCIA devices. The lack of a CD-ROM keeps the weight down to a sensible 6.2lbs (2.8kg).

But there is one thing about the new Latitude which will immediately make the machine a pleasure to use. The 10.4" 800 x 600 active matrix display capable of 65,535 colours, which is good enough for the anti-aliased fonts and 3D icons in the Windows 95 plus pack. The screen is extremely crisp, and big enough to allow you to actively multitask with several windows open at once.

The machine comes with 8Mb RAM on the motherboard, but the smallest machine on the Dell price list is 16Mb – 8Mb might be available as a special order but you really would want to do something odd to specify that. There are two sockets for DIMM (dual in-line memory modules which, using 16Mb DIMMs makes the machine expandable to 40Mb. If 32MB DIMMs become available, it would be possible to expand the Dell to 72Mb. With the 16Mb supplied with the review machine, it felt very quick under Windows 95.

There is full compatibility with plug and play and power management, which means the machine wears a "Designed for Windows 95" sticker to match the Intel Inside (please give us a discount on the chips) one. The screen is excellent, and makes going back to a conventional notebook feel like staring through a porthole. It really is possible to see that you would be more productive with a higher resolution machine.

The PCMCIA sockets are well supported and include simple DMA facilities, something which is likely to become an increasing trend since some PCMCIA cards will demand this.

The build quality of Latitudes has always been excellent. One long term test machine survives a very rough life and has only suffered minor wear and tear. The new machine is compatible with the docking station of the old models and has the same up-and-over garage door-type flap at the back to protect the keyboard, printer, monitor and serial ports, but there is a new, beefier power supply and hence a new, deliberately incompatible, power socket.

There is a 16550 UART to give high speed serial connections and the external video will display at a resolution of 1024 by 786 in 256 colours thanks to the Cirrus Logic video chipset. Performance is helped with a 256k cache, which puts it on a par with (fill in name when I've done the test) reviewed in January's Pentium desktop roundup.

Faster, more competent machines are regular visitors to the VNU labs, but it's rare for it to be so painful to have to send one back.

PCW Details

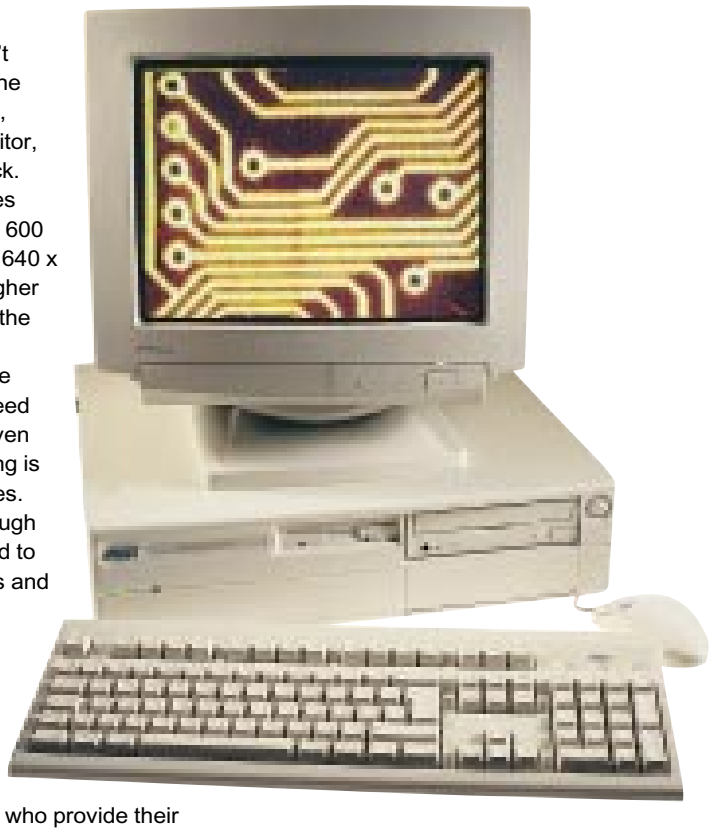
Price £3599
Contact Dell 01344 720000

Good Points Very fast; amazing screen; long, long battery life
Bad Points I don't have £3,599.
Conclusion Roll on next Christmas.
Spec Dell Latitude ST120, 16Mb RAM, 810Mb hard disk

HARDWARE

AST Advantage 613e vs Brother Solo

Brother beats AST in the war for the home PC market, says Ken McMahon.



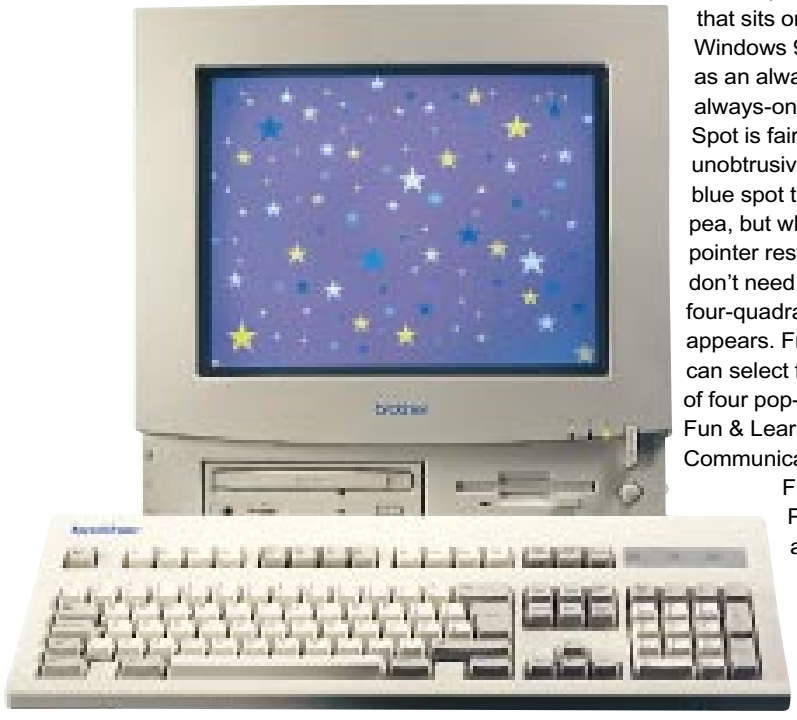
Brother and AST are the latest in a long line of office PC manufacturers falling over themselves to get a slice of the home market with living room-friendly products. Unlike most of the PCs we looked at in the November issue, neither of these two offers built-in TV reception. They do, however, come with Windows 95 pre-installed, serious software bundles for work-from-home types and a selection of Multimedia CD-ROMs and a quad-speed CD-ROM drive for fast and furious entertainment.

There the similarity ends. For one thing, the machines look quite different. The AST comes in two bits — a "pizza box" processor unit which houses the Cyrix M1sc100/75MHz processor, 850Mb hard disk, the Toshiba CD-ROM drive, floppy drive, and 14.4kb/sec fax modem. The modem card occupies one of the three available expansion slots. There is 8Mb of RAM fitted as standard.

The 14" tilt and swivel monitor which sits atop the processor box is thoroughly feeble in every respect. It's so bulbous that there is very noticeable distortion of the screen image at the edges which is impossible to eliminate by adjustment. It also means you can't easily make use of the entire available area, which, on a 14" monitor, is a serious drawback.

1MVRAM provides 256 colours at 800 x 600 or 32,000 colours at 640 x 480 pixels. At the higher resolution however, the monitor's maximum refresh rate is a mere 60Hz at and that speed it's so flickery that even a few minutes viewing is very tiring on the eyes. As if that wasn't enough it wasn't until we tried to adjust the brightness and contrast to obtain a better picture that we discovered they were already set to maximum.

By contrast with some other manufacurers, who provide their own custom-built GUI as an alternative to Windows, AST have opted for Spot. This is a helper application that sits on the Windows 95 desktop as an always-open, always-on-top window. Spot is fairly unobtrusive — a small blue spot the size of a pea, but when the pointer rests on it (you don't need to click) a four-quadrant collar appears. From this you can select from any one of four pop-up menus; Fun & Learning, Communication, Financial and Productivity and Ask AST.



In addition to MS Works you get Quicken, Multimedia Connect Lite, Cinemania 95, Encarta 95 and MS golf. The external speakers produce very nice sound from the Creative Labs Vibra 16 sound card.

The Brother Solo PC, as the name suggests, houses the motherboard. This contains an Intel Pentium 100MHz processor, 14" or 15" monitor, speakers, 500Mb hard disk, CD-ROM, floppy drive and everything else in one off-white unit very similar in style to the Apple Performa 5300 and Compaq Presario.

The Solo has a few unusual hardware features. A button below the power switch puts the system into suspend mode manually, should you decide to wander off for a while. You just press the keyboard or move the mouse to start things up again on your return. An overscan button on the left panel next to the picture adjustment controls provides an oversize picture right up to the screen edges and on the other side there's a sound mute button next to the volume wheel and headphones jack. The built-in microphone is mounted invisibly directly

below the screen area.

Round the back you'll find one parallel and two serial ports, a joystick port, VGA in and out and PS/2 style mouse and keyboard sockets. The 16-bit soundcard provides line in and out jacks and a midi port as well as bass and treble boost switches. The S3 trio64 with 1Mb on-board VRAM (expandable to 2Mb) produces a nice steady image at 72Hz at 800x600 and will display 16 million colours at 640 x 480 at 60Hz.

Bundled software includes MS Works, MS Money, Dangerous Creatures and Encarta 95. Unusually, Brother doesn't include any GUI assistance for novice users, but the manual is very clear and comprehensive.

The Solo chassis design mounts the motherboard vertically and the "split and swing" casing provides easy access to the insides. Optional upgrades include a TV tuner, MPEG card, video capture card, Fax/Modem card and LAN card. There is 8Mb RAM fitted as standard, upgradable to 128Mb. There are 4 vacant expansion slots, two of them PCI bus, so there's planty of room to accommodate upgrades.

In terms of performance there's not much between these two machines. But in every other arena the Brother machine wipes the floor with the AST. The overall design, the display, expansion options and everything else about it with the exception of the soapbar mouse and "clicky" keyboard is superior.

PCW Details

AST Advantage 613e
Contact 0990 611611
Price About £1400

Good Points Good performance.
Bad Points Very poor-quality display.
Conclusion The display makes it a definite non-starter.

Brother Solo
Contact 01279 416888
Price £1399

Good Points Excellent integral design; good hardware spec for a home PC.
Bad Points Unpleasant keyboard.
Conclusion Excellent overall design makes it a serious contender with other all-in-one machines.

HARDWARE

Canon BJC-610

Superb quality colour inkjet at a nice price — Eleanor Turton-Hill bags a bargain.

The BJC-610 is Canon's latest colour inkjet printer. It's equipped with four separate ink cartridges, offers 720 x 720dpi resolution and handles a variety of different paper types. Like other printers which have appeared recently, this one is compatible with both Windows 3.x, and Windows 95 and the whole system is designed to comply with the Microsoft Windows Printing System. This optimises the speed of the printing process and feeds relevant error messages back to the user during the printing process. It will also talk to you at appropriate moments if you've got your PC wired up for sound (you can disable this if you prefer).

The driver supplied is easy to install and gives an impressive degree of control over all kinds of printing functions. A range of settings allow you to configure the printer for best results according to the type of document you want to produce, the type of paper you're using, and the resolution you need. For the highest quality results the driver should be set to "graphics" or "photographic" mode, with the resolution on its highest gauge, and the correct paper selected. The BJC-610 can cope with many different types of media including glossy paper, transparencies, and high gloss film.

Each of the four cartridges (black, cyan, yellow and magenta) slot inside the printer individually, and this arrangement has advantages when it comes to cutting down on running costs. If you use one colour more than the others, it can be replaced separately. This is particularly relevant to the use of black which tends to be the first colour to wane. For this reason the black cartridge is twice the size of the others.

High resolution or high gloss paper has a dramatic effect on the quality of output, and the driver must be adjusted to the correct paper setting if you want to exploit this fully. The BJC-610 can cope with many different types of media including glossy paper, transparencies, and high-gloss film, and if you're really looking for professional colour results, this printer certainly delivers the goods.

In our tests, the BJC-610 gave consistently high quality results with excellent depth and contrast in all colour tones and a near-photographic quality to some images. Pure text also came out crisp and clear, especially in its high quality mode, but this tended to be slow.

If you want to print something out quickly there's a high speed option which produces a draft quality output. The list price for the BJC-610 has been set at £449, but the street price is expected to drop to as little as £370 which makes it excellent value for money.

PCW Details

Price £449 (RRP), £370 (expected street price)
Contact Canon 0500 246246

Good Points Great quality of output; well designed.
Bad Points Slow for high-quality output. Some large full-colour graphics documents took over 20 minutes to complete.
Conclusion Absolute bargain.

SOFTWARE

Apple Newton 2.0

Slow handwriting recognition, lack of compatibility and a high price burden the Newton. Simon Rockman comes to the conclusion that you're better off buying a Psion.

There is a PCW tradition that reviews are written on the computer that is being reviewed. Being a stickler for tradition, it goes without saying that I had to write this piece on the Newton. Then the whole review had to be printed out and typed into a notebook, since the Newton connection software for the new 2.0 version of the operating system isn't ready. Either way, this must be one of the few PCW reviews to have been electronically handwritten rather than typed.

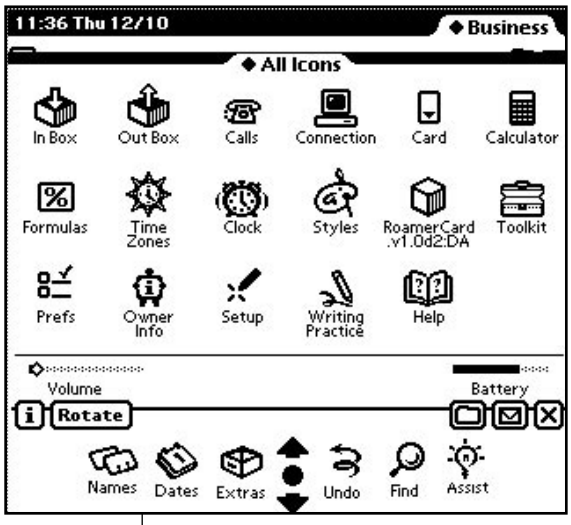
What makes this Newton special is that it represents a technological step backwards. When the first Newton was launched it was hailed as a technological breakthrough, because it could recognise joined-up handwriting. The new Newton still does this – in fact it does this better than the original – but has the advantage that it also supports printed text. The cursive recognition still tries to match scrawled words to the dictionary, but words printed letter by letter ignore it.

You should bear in mind that you may need to adapt your writing style to suit the Newton. The decision to include printed recognition came from Apple's realisation that owners were prepared to modify the way they wrote to use the machine. This is something of a blow for advocates of handwriting recognition who have been claiming that the technology will soon be able to cope for about five years. It took the success of a third party program called Grafitti.

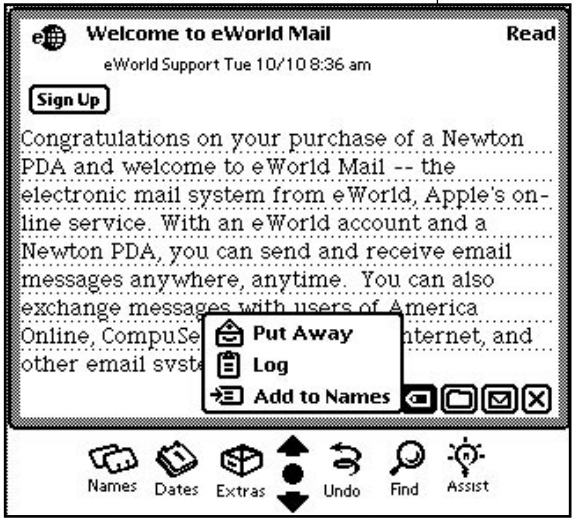
Apple has designed the new OS to be more flexible, recognising that the real market for the machine is in vertical applications, and extending to suit the needs of third-party developers. The press information says that there are now better links to PC and Macintosh machines, although this didn't seem evident when we actually wanted to do it, a problem exacerbated by compatibility problems between the new and old OS. Even PCMCIA data cards which have been formatted under the old OS cannot be written to on the new machine, although they can be read; the best way to get data from a new Newton to an old one is to beam it using the infra-red link. The manual is easy to read cover to cover, but looking anything up is frustrating, particularly if you use PC terminology.

The link to a digital mobile phone works very well – once you tackle the errata which takes you round the houses – and faxing a single page works well, but multiple pages are cut short. The best thing about using a data card is that it allows you to plug your Apple into your Orange.

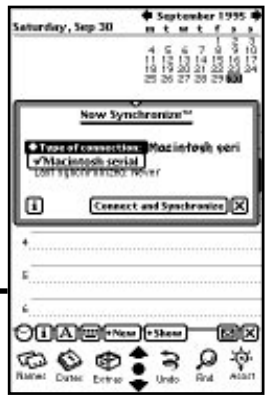
For all the improvements, the Psion Series 3a still has the Newton beaten. It's too expensive, and the recognition is too slow. The basic machine costs £424 plus VAT with generous and comprehensive discounts for people who have older Newtons and versions of the OS.



Left *The checklist document*
Below *The Newton gets the message*



Above *The landscape view makes the Newton 2.0 different*
Right *The link to PCs won't be available for a while*



PCW Details

Price £424
Contact Newton Customer Hotline 0181 730 2048
Good Points Excellent technology.
Bad Points Still not ready for the market.
Conclusion Buy the Psion.

HARDWARE

Conner E-IDE tape backup

Goodbye, backup anxieties; by Nicola Kingsley.

The Conner TapeStor drive should fulfil most capacity requirements, storing up to 2Gb in native uncompressed form or 4Gb with compression. Each cassette costs around £15, giving a reasonable Mb/£ ratio, and is fully compatible with the QIC-3080 standard, transferring up to 54 Mb/minute. Insert the supplied dedicated controller card, slot in the tape unit in a spare 5.25" bay, load the software (Backup Exec for DOS or Windows from Arcada Software), and initialise the drive. After manually resolving a brief interrupt conflict, the system finds the drive, performs a quick self-test on to the tape and is ready to go. No device drivers are required in your configuration files.

The first full back-up is easy to perform, and from then on only differential or incremental backups are required. These save space by only adding newly created or amended files.

What makes this Conner so interesting is that it is the first E-IDE tape drive. In theory, you should be able to connect it to a spare E-IDE channel on your controller, thus sparing a precious slot and interrupt. Unusually, Conner prints a disclaimer in the manual to discourage this route, but I went ahead with a Promise EIDE 4030 Plus VL cacheing controller (£89 from Datrontech). My two IDE hard drives were daisy-chained as master and slave of one channel, while the Conner was set as master of the other. I even managed to fit a six-speed E-IDE CD-ROM drive as a slave device on the same channel as the Conner. All four drives worked perfectly under the single controller, although a little trial and error was required on the master and slave settings. All in all, the Conner drive is an excellent device, particularly since it can be fitted to an existing E-IDE controller, and even daisy-chained with an E-IDE CD-ROM drive.

PCW Details

Price £495
Contacts Conner 01628 777277
Datrontech 01252 303500

Good Points Large capacity and can be fitted to an existing E-IDE interface.
Bad Points Lower capacity solutions much cheaper.
Conclusion Ideal choice if you've got E-IDE and want large capacity.

HARDWARE

Diamond Multimedia Edge 3D

Wavetable audio has the edge here; by Gordon Laing.

Coming soon to a PC near you are the next breed of do-it-all video cards. They'll boast hardware-accelerated 3D graphics facilities rarely found outside arcade machines and high-end games consoles. Most, including the Diamond, will also offer software MPEG playback under a fast Pentium. Diamond's Edge 3D 3240XL may indeed have the edge over the others, boasting wavetable audio and support for Sega PC games.

The wavetable audio does not exist on built-in ROM, where the samples are downloaded into your PCs RAM instead. You can choose 1Mb of compressed sounds or 6Mb, but the latter noticably slows a 16Mb system. Both sound banks support General MIDI, but neither sounded as good as a dedicated ROM-based wavetable sound card. DOS game support was varied, and although we got General MIDI music under Doom and Descent, we failed to get sound effects outside the supplied games.

Despite fitting all the circuitry on a single half-length PCI card, Diamond ran out of room on the blanking plate. It managed to squeeze on the video port, three sound connectors and a telephone jack port, with adapter for a standard joystick. Interestingly another blanking plate is supplied with ribbon connectors to the main board, offering two Sega Saturn control pad ports — you'll have buy pads at around £20 each, since none are supplied.

The Edge 3D comes with three CD games which make use of the 3D acceleration. Virtua Fighter remix from Sega PC is slower than the Saturn console version, but still the only 3D fighting game on the PC. Nascar racing is alright, but sadly Descent: Destination Saturn was not included as promised.

As a video card the Edge 3D is good, although the picture is slightly soft. Four versions are available: 1Mb DRAM £229, 2Mb DRAM £279, 2Mb VRAM (reviewed here) £359, and 4Mb VRAM for £499. All will work under Windows 95.

The Edge 3D is certainly a highly capable and fully-featured card but there are some oddities. Before buying, we'd recommend you check out the forthcoming round-up.

PCW Details

Price £359
Contact Datrontech 01252 303500

Good points Jack of all trades.
Bad points Master of few.
Conclusion Compare to competitors before buying.

HARDWARE

Wacom UltraPad A5 Graphics Tablet

So you want to paint like Picasso with the ease of an Etch-a-Sketch? Take Wacom's tablet and, like Nicola Kingsley, release the artist in you.

Roll up all you budding artists — here's a graphics tablet that makes drawing on to the screen as easy as ABC. Having said that, if you are feeling creative, then this new model from Wacom is able to stretch to most professional demands. At the reduced price of £329 (formerly £389), it starts to look even more attractive.

The UltraPad A5 package includes the tablet, with an active 21 x 15cm A5 area, pen, small 12V transformer, 9-pin serial connector with 25-pin adapter, and driver software. The power supply plugs into the serial connector at the back of the PC, leaving one quite flexible cable to the actual tablet. Because the pen is light and cableless, and the tablet weighs in at 880g (1.9lbs) with a thickness of 13.9mm, it feels neat and convenient to use, even on your lap.

Installing the tablet is as quick and easy as installing a mouse, and if you use a spare serial port you can have both running at the same time. But you must remember to switch on the pad before launching Windows, or it will not load the drivers. With its pressure-sensitive features, the tablet enjoys compatibility with a wide range of art packages, including Photoshop, FreeHand, Painter, CorelDraw and AutoCAD.

The first difference between a mouse or trackball and the pen is absolute positioning. The cursor does not need to be wheeled across the screen, each position on the tablet corresponds to one on-screen. This is actually a little tricky at first for mouse-users but the new technique is acquired soon enough. The tablet can still see the pen up to about 5mm from the surface, enabling you to draw onto a sheet of paper placed on top, or to trace a printed design directly on to the screen.

The tablet is supplied with Wacom's UltraPen Eraser, an improved version of the UltraPen Classic. The Eraser tip can be used either as an eraser or a second tool. There are other pens available, the UltraPen Pencil and Ink, for example, if you prefer the feel of lead or ink on paper, but still want to draw on-screen.

Trace over your favourite pictures with the pressure-sensitive option

With 256 pressure levels, it's possible to produce quite natural-looking brush strokes, pencil/pen lines and eraser strokes of varying thickness and shade. Drawing and sketching in graphic packages becomes far more fluid and enjoyable, with smooth curves and free sweeps of the brush. The tilt-sensitivity of the penenables you to change the thickness of your line by moving the pen from a vertical to a more horizontal position.

The Wacom control panel software allows optimisation of the UltraPad for specific software applications. User-programmable macros and functions and various customisable settings can be set up and accessed from a row of buttons at the top of the tablet, giving you control of the application and preventing all that tiresome switching from tablet to screen toolbar.

This is a good fun graphics tool. It makes drawing and sketching on-screen more natural and realistic, and offers an admirable range of features for the price.

PCW Details

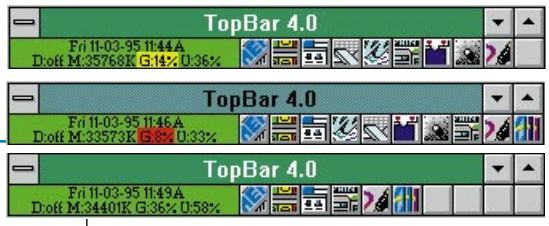
Price £329
Contact Computers Unlimited
0181 200 8282

Good Points Supports tilt, pressure and eraser.
Bad Points Some may want a larger active area.
Conclusion Excellent tool for the computer artist

SOFTWARE

MoreMem and TopBar 4.0

Windows memory manager; by Eleanor Turton-Hill.



TopBar sits in the corner of the screen and continually monitors your resources. The traffic-light colour code works as a warning when resources deplete

If you've been using Windows 3.x for any amount of time (like about five minutes), you'll be familiar with the following error message: (mem.gif)

One of the fundamental weaknesses of Windows 3.x is its dependence on DOS for handling resources. It doesn't matter how much memory you have on your system, Windows is still limited to the 640Kb restriction imposed by DOS. Windows uses a device driver called HIMEM.SYS, to access all the memory on your system but this does not solve the basic problem that certain low-level operations like interrupt handling need to use the area below 640Kb. The problem is not helped by the fact that some software loads DLL files needlessly into this area.

MoreMem is a utility designed to solve this problem by ensuring that only essential files are loaded into conventional memory. It works by breaking up free DOS memory into many small compartments, so that DLL files cannot physically fit into any given area. DLL files are then forced into extended memory thus freeing up space under 640k for essential files.

MoreMem is easy to install and can be configured to make the most of your particular combination of applications. When you load Windows, MoreMem automatically executes and provides you with a resource monitor and task switcher called Topbar. Topbar keeps you informed of any changeable data on your system including the time and date, as well as more important aspects of your system like DOS memory, system memory, GDI resources, and USER resources. As memory levels fall below user-defined thresholds, Topbar changes its background colour from green to yellow to red.

You may well be wondering why anyone should invest in a memory utility for Windows 3.1 when they could just go out and buy Windows 95. After all, Win95 has superior resource handling and costs only £59. The problem is that Windows 95 requires a much higher specification PC than Windows 3.x, and ultimately, the cost in hardware upgrades is substantial, especially if you're a reasonably large organisation with 100 or more PCs to upgrade. So, utilities like MoreMem will find a market for some time to come.

PCW Details

Price 1-user licence £40
10-99 users £35
100-499 users £30
Contact Accurate Technology
01734 773889, fax 01734 771260
Internet: info@accurate.co.uk

Good Points It works.
Bad Points None worth mentioning.
Conclusion An invaluable utility for anyone still using Windows 3.1

HARDWARE

Mannesmann Tally T7010T

Looks aren't everything; by Dylan Armbrust.

Have Tally will travel. This would describe the Tally T7010, Mannesmann's recent portable printer offering. It looks good. Measuring 30cm(w) x 13cm(d) x 6cm(h) and weighing less than 1.5 Kg or 1.8kg with NiCad battery, it is one of the smallest portables around. But beauty is only skin deep. Signs of trouble came when I lifted the cover and extended the paper support arms, only to find they popped off with little effort. However, with the supports firmly back in place, the sheet feeder can hold up to 15 sheets. There are three function buttons and LEDs on its operating panel to control the printer and display the varying printer states.

Portability is accomplished by the use of a special ten AA battery pack that comes standard with the T7010. If you're willing to spend and extra £50 or £100, Mannesmann will supply you with a NiCad or Ni-MH battery respectively — no lithium ion option however. The AA or NiCad battery packs will print about 80 pages each, while the Ni-MH will do about 140. Mannesmann also offer a fast-charger/conditioner for £140, allowing recharge in 40 minutes. Otherwise, you can recharge the battery in the printer by plugging in the AC/DC adapter and setting the recharge function.

The T7010 managed to pass our tests, but only with a helping hand. Nine times out of ten the review model had a paper jam when expelling its paper, unless I intervened and pulled it out. No amount of fiddling would rectify this. Calling the technical support line only yielded the supremely unhelpful observation that "there was a problem with a printer" (tell me something I didn't already know). This aside, it's average print speed was 2.23ppm. The quality of printed text was clear and very readable but the T7010 came up short on the graphics side.

It comes with its own drivers for Windows 3.1x or higher or you can use an HP DeskJet 500 driver. The Tally T7010 is an adequate printer, as long as you ensure it ejects its paper properly, but I'd carefully consider your printing needs before going with this portable.

PCW Details

Price £249 (RRP), £199 (Street)
Contact 01734 771688

Good Points Quick, clear text printing.
Bad Points Poor paper feed and expensive batteries/charger.
Conclusion Good for straight text, but not much else.

HARDWARE

SMS Link for Psion Series 3a

Have Psion, go Orange; by Simon Rockman.

There are 200,000 people with Psion Series 3a organisers in the UK. There are 300,000 people with Nokia GSM 2110 or Nokia Orange mobile phones. A good number of people have both. Psion and Nokia have produced a system which allows the Series 3a to be plugged into either Nokia phone, to send short messages using the SMS facility of the phone. Short Message Service (SMS) is part of the international specification for mobile phones. It uses the signalling channel to send and receive messages through the phone, even if you are talking at the time. The limitations are that it is slow — a message can take up to a minute to send, and messages are limited to 160 characters.

Some phones allow you to compose messages by typing them in using the letters on the numeric keys. The Psion link offers a number of advantages. The 3a is smaller than a desktop but its keyboard is considerably better than the hunt and peck system of a mobile phone. You can compose several messages, then plug the phone in to send them. You can also set up bulk mailing lists and send messages to a number of people. Received messages are read back into the Psion and can be edited or replied to.

We tested the link with Vodafone GSM and Orange networks, both seemed to work equally well. Orange phones need upgrading. It is not possible to send messages from one network to another — although this is technically possible, the UK networks don't have the necessary agreement. Using the Vodafone system it is possible to send messages to users of some overseas networks.

Vodafone charges 10p a message while Orange charges £2 a month to have the ability to send plus 10p a message. Both networks have a bulk message tariff, but the systems are still in their infancy and all messages are uncharged – you should check regularly to make sure no charge has been implemented before sending lots of messages.

Prices have not been set in stone, but Psion expects to charge about £60 for the cable with the software on floppy disk and £80 for the cable with the software on flash ROM.

PCW Details

Price £60 cable and software on disk, £80 cable and software on flash ROM
Contact Psion on 0171 258 7368

Good Points Cheap email.
Bad Points Limited users.
Conclusion Great potential.

HARDWARE

Hewlett-Packard LaserJet 5Si

Filling the gap left by its predecessor; by Simon Head.

The HP LaserJet 5SiMX is the new network printer from Hewlett-Packard. Like its predecessors, the 5Si is available in two versions, the 5Si, which is PCL only, and the 5Si MX, which is both postscript and PCL. Somewhat surprisingly, the printer has no infra-red capability. One of the ideas behind infra red was that you would find a spare printer and point your IRDA equipped notebook at it to print documents.

The paper trays are an improvement over the previous range of HP printers because they are adjustable to take any size of paper, rather like the trays in a photocopier. HP no longer expect you to purchase a new paper tray for every size of paper. The printer has two paper trays, each capable of a 500-sheet capacity. The top tray can do sizes up to Letter and Legal. The bottom paper tray can handle paper sizes up to A3.

The engine is rated at 24ppm and because the paper is fed through the printer in a landscape orientation, the same engine can print on both A3 and A4. An internal duplex paper tray is availalble for double-sided printing and other options include and internal hard disk, a high capacity paper feeder and a multiple output bin mail sorter.

The printer's front panel is a two-line LCD display. The name of the .EXE file that sent the print job is displayed when the job is being printed. If your .EXE file has a meaningful name like WINWORD.EXE, this can be useful.

The HP LaserJet 4Si has been in need of a redesign for some time and the 5Si certainly fills the slot left by the 4Si. While this printer is not groundbreaking in the way previous versions of the HP LaserJet have been it does signal HP's entry into the high-end network printer market. Coupled with HP's JetAdmin software the only feature the printer lacks is the 1200x1200dpi capability that is available on the Lexmark Optra range.

PCW Details

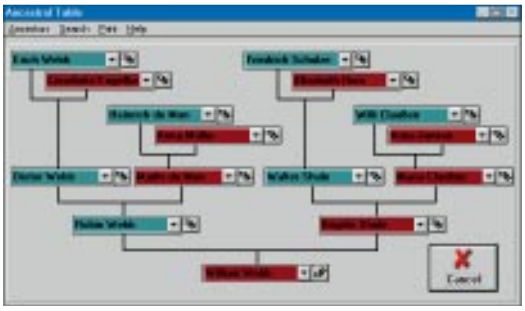
Price 5Si £ 2,779
5Si mx £4,049
Duplex £494
High Capacity Feeder £955
Contact Hewlett-Packard 01344 360000

Good Points A big improvement over the HP 4Si providing 24ppm network printing.
Bad Points Not able to print at 1200x1200dpi and no IRDA infra -red port.
Conclusion Not groundbreaking, but worthy successor to the ageing 4Si.

SOFTWARE

Data Becker Family Tree

Paul Begg branches out and looks at an inexpensive genealogical database.



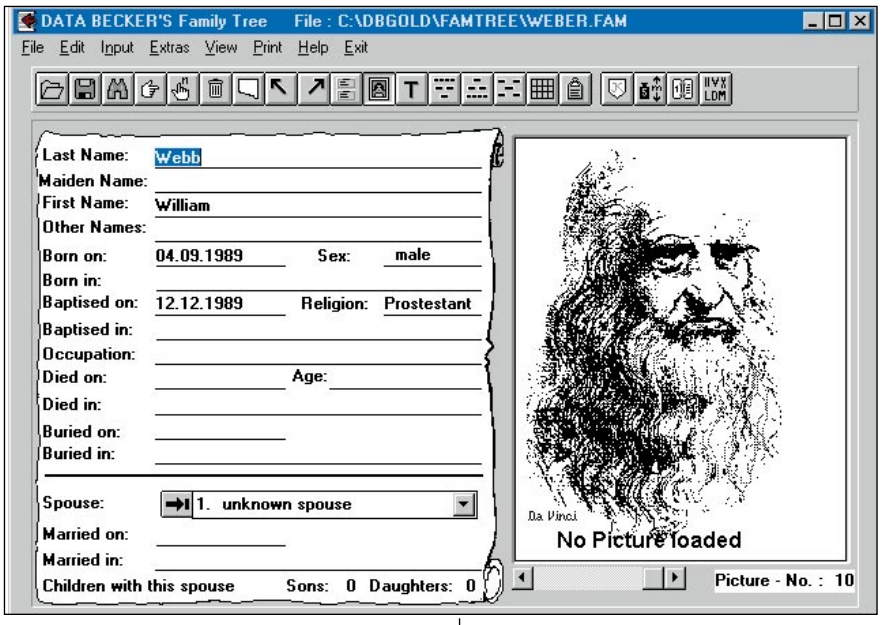
Shareware offers a wide variety of excellent programs which you can try-before-you-buy, and there are several superb commercial packages . Into this highly competitive field — and to some extent bridging the gap between shareware and commercialware — comes Data Becker with a low-cost starter program called Family Tree.

The first thing I checked was whether Family Tree supported GEDCOM. If it hadn't, this evaluation would have stopped here. GEDCOM (Genealogical Data COMmunication) is the standard for transferring genealogy data between different software packages. This is important, because the chances are that as your research continues, you'll need to move to a more powerful genealogical database.

You won't want to copy all your data manually from one software package to another (and risk mis-entering details in the process), so GEDCOM will save time. GEDCOM also enables you to supply data on a floppy disk to someone else, or vice versa, and it is essential if you want to use the International Genealogical Index and Ancestral File material of the Church of Latterday Saints (LDS, otherwise the Mormons). Family Tree does support GEDCOM, so off we go...

Family Tree's opening screen is deceptively simple. There are places to enter Christian and surnames, second names, and maiden name. Plus the place and date of birth, baptism, death, and burial. The date format is 03.09.1967. You can also enter sex, age at death (though both are entered automatically) and occupation. I was irritated by the occupation field allowing only one occupation. Many people change occupations and are successful at all of them — would you define James Herriot as a vet or an author?

You can add up to four spouses, which should be sufficient for most people, but could turn out to be a limitation, especially when in this case "spouse" includes parents of illegitimate children. In the past it was not uncommon for a man to have married perhaps two or three times when young wives died in childbirth, or for a woman to be widowed at least twice and sometimes more often.



***Top** An ancestral Table — see where you came from*
***Above** A simple data chart accompanied by a photograph gives Family Tree a "family album" look*

An icon bar along the top of the screen gives access to some neat add-ons. You can add notes to each entry. You can also add text and links into your own word-processor — there are no fields provided for recording source information. This is essential, as it is common to find several birth years for a single individual born before the introduction of birth records; an age provided on a marriage certificate can suggest a year of birth different from that indicated on a death certificate and both might differ from the birth year indicated by the age a parent gives when registering the birth of a child.

You can display and print an ancestor chart, descendants chart and a family chart — printing a section of a tree or the whole tree on separate pages which can be stuck together to produce a chart — and also display sortable lists of the individuals on the database.

There's a list of forenames and their meanings, an excellent, if rather short, list of old terms and measures, a calendar from 1699 to 2199 which gives you the day on which someone was born, the phase of the moon and the astrological sign. One particularly brilliant idea is the utility for converting Roman numerals to numbers — MCMXCVI to 1996. Add all this to a list of useful UK addresses and other helpful advice and information hidden away in the Help files, and Family Tree emerges as an excellent beginner's package.

PCW Details

Price £14.95
Contact Data Becker 01420 22707, fax 01420 22807

Good Points Has GEDCOM, good basic data entry, some nice add-on features.
Bad Points One will almost certainly outgrow it as one's research goes further back.
Conclusion Well-priced, thoughtfully put together. A good choice for anyone embarking on the constantly growing hobby of genealogy.

Newton Keyboard

If you're impatient with the handwriting recognition of the Newton and fancy a faster means of input, then how about the keyboard pictured here? Designed specifically for the Newton, you can now bang out those reports and emails in no time.
It costs **£79**, so call the **Newton Customer Hotline** on **0181 730 2048**. Check out the review of the new Newton operating system on page 72.

Sharp ZR-5000

The ZR-5000 personal communicator (called the Zaurus outside Britain) is Sharp's answer to the world-beating Psion 3a. It has 750,000Kb of available memory, an infra-red port, and a PCMCIA slot that can take a dataphone card. The ZR-5000 has a keyboard but it will also take pen input via an icon-driven interface; there is no handwriting recognition.
It costs **£399** from **Sharp** on **0800 262958**. See next month's *PCW* for a full review.

Gyrations GyraPoint Desk

Gyrations' GyraPoint Desk pointing device can be used on a flat surface like a standard mouse, but since this is *PCW*'s Gadgets page, it may come as no surprise to find that you can pick the mouse up and continue pointing and clicking with a natural wrist motion. It all works thanks to Gyrations' patented mini gyroscope, and is in no way a flash in the pan. Not only is it extremely comfortable to use in a computer environment, and ideal for presentations particularly in the radio version, but look out for it in virtually every TV remote control of the future.
Phone **Ideal Hardware** on **0181 286 5000** with **£119** ready.

Chinon ES-3000

Digital cameras which once were esoteric are now commonplace. How about this groovy model from Chinon, which along with a 3X zoom lens and the usual auto everything, features a PCMCIA slot for removable flash memory cards — no more image capacity problems. The 1Mb built-in memory can store five images at 640 x 480 with the minimum compression, 10 at medium, or 40 at 320 x 240 with the maximum compression.
Chinon's UK dealer is **NBA** on **01483 301970**.
The ES-3000 costs **£749**.

Gadgets

PCW Gadget Photography by David Whyte

Long term tests

PCW How You Can Contribute To The Long Term Tests Section

We welcome contributions from readers for our Long Term Tests section. If you've been using a piece of hardware or software intensively for some time, just write a 450-word article (for hardware) or a 750-word piece with screenshot — GIF format — for software and send it on disk, in MS Word (Mac or PC) or ASCII format, to: The Editor, *Personal Computer World*, VNU House, 32-34 Broadwick Street, London W1A 2HG. Mark your envelope clearly "Long Term Tests". We'll pay for any contributions we use.

HARDWARE

Canon BJC-600

1 YEAR TEST

Canon's first colour bubblejet isn't Speedy Gonzales, says Andrew Dornan, but it's a damn good solid workhorse

The BJC-600, an old bubblejet that won't let you down

Canon has been making inkjet printers for several years now, based on 360dpi bubblejet technology. The BJC-600 is the first bubblejet to print in colour.

Unlike many colour-capable inkjets, this printer has four separate ink cartridges (yellow, magenta, cyan and black) so it can print pure black and colour simultaneously. The print head is designed to hold five cartridges, not four, but there is a special high-capacity black cartridge to fill the extra space — a good idea since most people use black a lot more often than the colours.

The three colours mix to give full-tone blue, red and green, with dither patterns for more exotic shades. The printer's 100-sheet feeder can hold plain paper, envelopes, business cards or transparencies, though Canon recommends special coated paper. This produces nice results, but after a few sheets the coating can lubricate the feed mechanism and let the paper slip. The only cure is to clean the small claws which drag the paper in — an awkward and fiddly procedure. A line-feed button would give more control here, but as it has pretences to be a page printer, the BJC-600 doesn't have one.

Canon's claimed speed is 2ppm, but this only applies to "draft" at 180dpi — fine for Arial text, but very messy with DTP documents. The standard 360dpi mode produces adequate letter quality, taking about a minute to get through each page. Printing speed is no faster in monochrome than colour mode, though the Windows driver does take noticeably longer to rasterise colour images on a slow PC.

Drivers are supplied for Windows and a few DOS applications, but everyone else has to rely on emulation: the Epson and IBM standards, and previous bubblejets. These all supported monochrome only, so Macintosh users wanting colour will be disappointed.

Earlier bubblejets used a very expensive integrated ink cartridge and print head, prompting several companies to sell cheap-and-dirty refill kits. This time, the cartridges are just small bottles of ink which Canon has done its best to make impossible to refill. The manual says the print head itself need be replaced only once during the printer's life, but declines to estimate how long this might be.

An initial problem is that the print seems very dark: blue looks almost black under indoor light. However, the driver can reduce the concentration of ink sprayed on to the page. This prolongs cartridge life as well as making colours more vivid, but it's only possible under Windows.

After its first appearance in February 1994, the BJC-600 was upgraded in March 1995 to the BJC-600e, which is identical except for new "smoothing" technology. This has now been superseded in turn by the BJC-610, reviewed in this month's *First Impressions*.

PCW Verdict

Useful and reliable.
Price £449 RRP, for its current version, the BJC-610.
Contact Canon 0181 773 3173

SOFTWARE

TurboCAD 2

2 YEAR TEST

TurboCAD 2.0 for Windows has served FRK Jarvis well. Clear, user-friendly functions make it accessible, it's fast for a low-spec drawing package, and at under £100 it won't break the bank.

Early in 1994 I bought the then new TurboCAD 2.0 for Windows to run on my 486SX25 with 4Mb of RAM and Windows 3.1, a decision I have never regretted. Version 2 was superseded by 2.03 in November 1994, and this was issued as a free upgrade to all registered users. The new version increases speed dramatically and turns a workmanlike package into one that really flies.

The quickest way to learn is to produce your own drawings, and this is helped by the simple and intuitive icon-driven functions. The uncluttered screen has a typical Windows layout, with well-defined toolbar buttons which change the palettes to provide the required detail for the chosen tool. Snap functions and drawing mode tools are down the left-hand side, and there are line style and symbol buttons at the foot of the screen.

All technical drawings, whether on paper or screen, start with the choice of paper size and scale, and the same is true of TurboCAD through the options menu. The printer parameters are set up through File print/Plot setup, and having made these simple settings, the screen shows the print area superimposed on the drawing area. The rulers and edit bar show the units you have chosen, and from here on it is very much like producing a full-size drawing with all work carried out in real-world dimensions. A grid can be used to help and there is a choice of arrow or cross-hair cursors, although the latter does slow it down.

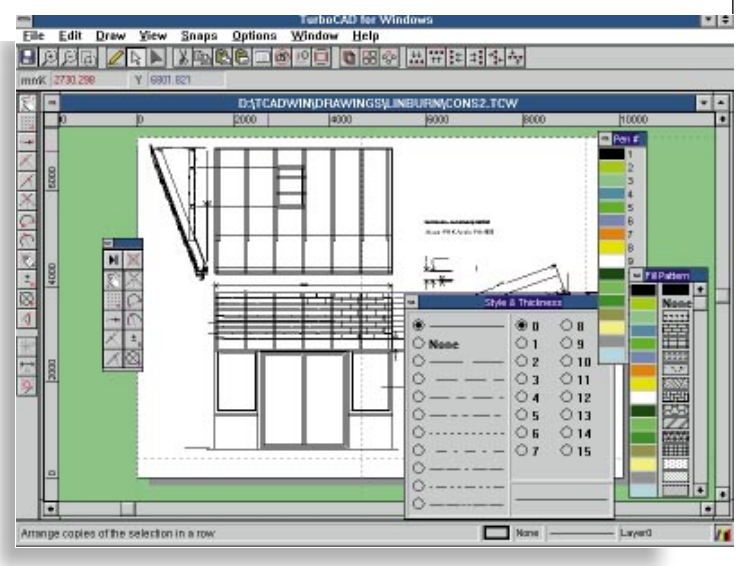
Drawing is straightforward and intuitive, and you can draw on up to 256 layers. Right-clicking brings up a floating toolbar of the most commonly used snaps for the next operation only. Right clicking on some tools brings up a dialogue box for parameter setting. It's all very obvious and easy to use, and there are several keyboard shortcuts as well.

Version 2 of TurboCAD introduced handle-based editing, which is accessed via the Select Edit button. Using this, it is simplicity itself to align parts of the drawing, group or ungroup, move lines around or delete them. The Edit facilities are also excellent, and Trim to Line and Line Meet are particularly useful. The Associative Dimensioning works well too, and printing is a doddle.

You might well ask if there is a down side to all this enthusiasm: unfortunately there is. You must remember, for example, to turn off the Ortho switch when trying to move objects. The largely redundant zoom tools could be replaced by two levels of the more frequently used Restore Previous View, which at present is in the View menu.

One potentially useful feature that is not so well documented is the ability to incorporate bitmaps in the drawing. There is no advice as to how to scale such a bitmap, and the handle-based edit function does not work on them. It takes a while to rescale the bitmap file by trial and error to get it to fit. Printing the bitmap is also a somewhat hit-and-miss process.

TurboCAD 2: workmanlike in use and professional in quality



You are asking a lot if your system is as restricted as mine, and the program slows noticeably as a drawing becomes more complex, particularly if there are large areas of fill. After all, it is not only recording the parameters of all the vectors you are drawing, but is keeping a record of past transactions to support multiple-undo.

Sometimes the scroll bars seem to forget where you are and scroll only a part of a drawing — a sure sign that things are clogging up. But it is an easy matter to save your work and exit, to clear all this cargo. Beware also of the dreaded tcwxxx.tmp files clogging your Windows directory, and make sure you periodically clear them out.

To help increase productivity, the relatively cheap symbol libraries provide easy access to ready-drawn components, which are a real boon, but you have to remember that they are based on US practice and don't include standard metric features.

To sum up: TurboCAD 2.03 is incredibly good value for money at the current street price of about £99.95. You will not often find yourself waiting about, which is remarkable considering the lowly spec of the machine it will run on. It is easy to learn and use, full of useful features, and can be used to produce professional-quality drawings. Watch out for the CD version.

PCW Verdict

Good value for money, excellent manual and easy to manipulate.

Price £99.95 for version 2.03. New version soon to run under Windows 95 and with 3D capability. *No price as yet.*

Contact IMSI 0181 581 2000

Sound and Vision

The Enhanced CD — the interactive album — after years of waiting, it's finally happened. But is it the ultimate pop-culture novelty, or is it just the record industry's wanabee? George Cole is your juke box jury as he assesses this new medium and judges some of the Enhanced CDs soon to be on offer.

There is more to some music CDs than meets the ear. Coming soon to a record store near you is a new generation of Enhanced CDs — compact discs designed to play on both audio CD decks and CD-ROM drives. Pop an Enhanced CD into an ordinary CD player and you hear music; put the same disc into a CD-ROM drive and you'll see pictures, video, text, lyrics and other information related to the artist.

The music industry is keen to reach the growing number of consumers with home PCs, and some see the Enhanced CD as a good way of doing it. Some record companies already have Web sites where fans can get the latest news and gossip on their favourite artist, as well as merchandising information. Now, record companies are planning to put Web browsers onto Enhanced CDs, giving users access to their Internet sites.

For some, the Enhanced CD is the most exciting development since the launch of the CD, while for others it's a technical dead-end like CD Video and the three-inch CD single. The jury's still out, so we looked at the latest releases to see just what's what.

Sarah McLachlan
The Freedom Sessions

A Track One title from Canadian singer Sarah McLachlan, The Freedom Sessions includes eight new versions of music tracks with a running time of around 30 minutes.

The disc played normally on my ageing Philips CD audio deck, which ignored the data in track one. The disc is easy to set up and use on a Macintosh: just pop it into your CD-ROM drive, click on the disc icon and you're in. If you haven't got QuickTime 2.0, you just drag the folder to your Extensions folder and re-boot. As usual, Windows 3.1 users go via the File Manager to start things moving. Navigating around the disc simply involves clicking on various on-screen pictures and icons, and there are "easter eggs" you can click on to reveal surprises. There's a help icon if you're not sure what to do.

There is plenty of extra material on the disc, including a multimedia presentation of McLachlan's trip to Cambodia and Thailand with the World Vision charity.

One of the best sections is the CD screen where you can click on an album cover and see track listings, or click on a song title to hear it. On some tracks you can even view a video clip. The touring guide shows a map of the places the band visited on their US and Canada tour, while Sarah gives us her feelings about the different places. You get to meet the band, watch QuickTime video clips of songs, and go to a merchandising

Take a trip to Cambodia and Thailand with Sarah McLachlan

section where you can order CDs, posters and other goodies.

PCW Verdict

Nicely put together, with good sound and graphics. It's easy to install and use. Pretty good value, especially if you're a Sarah McLachlan fan.

Price £18.99
Contact BMG Interactive 0171 973 0011

The Cranberries Doors and Windows

This is one versatile disc: use it on an ordinary CD deck, Mac or PC CD-ROM drive or a CD-i player. If your CD-i deck has an MPEG digital video cartridge, you'll get full-screen video on some material.

Doors and Windows is a Track One title and I tried it on a music CD player, a Mac CD-ROM drive and a CD-i player and had no problems with any of them.

The disc has five music tracks by this Irish band; around 20 minutes' playing time. The title, Doors and Windows, refers to the way you navigate the disc, so the opening screen shows the band members sitting on a couch behind which are doors and windows you can click on to enter. You can "interview" the band, watch video footage of the band's performance at Woodstock 94 and look at song lyrics, tour video footage shot by the band, and photo albums. There's a complete discography, too. The screen shots look great, and every so often a band member magically appears on screen and makes a remark.

The disc has obviously been made to very high production standards and everything looks and feels classy. Mind you, there's very little in the way of on-screen guidance, and it's really a question of pointing-and-clicking your way around the program. It's a good way of getting to know the Cranberries at both a personal and musical level.

The Freedom Sessions clicks, in the value for money stakes

PCW Verdict

A great concept, and a disc that gives you a good idea of what the interactive medium can offer. Cranberries fans will love this disc, but they'll have to pay a fairly high price premium for it.

Price £19.99
Contact Island Records 0181 910 3333

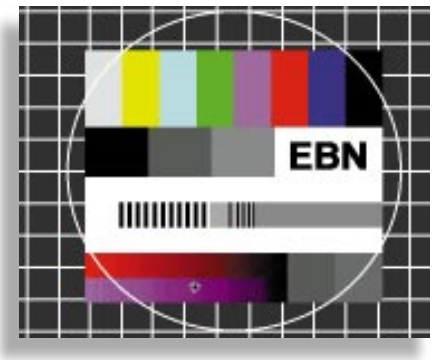
EBN Telecommunication Breakdown

EBN calls itself a multimedia group and has a reputation for making off-the-wall, audio/video presentations; they made the puppet-like George Bush sing "We Will Rock You" on U2's Zoo-TV tour. This CD is no exception and features lots of scratch video taken from thousands of hours of US TV broadcasts.

Telecommunication Breakdown is nicely packaged in a long gatefold sleeve, and there is even a Macintosh floppy for buyers without a CD-ROM drive; a nice touch. This is a Track Zero disc, so there is no track one data to worry your music CD player. The CD-ROM data can be played on Mac or PC drives and QuickTime is the preferred software video format.

The audio tracks last for over 70 minutes and the CD-ROM data includes an interactive video wall and three videos. The video wall consists of a matrix of 16 tiny TV screens on which you can click to see a full-screen presentation (Bill Clinton makes a guest

Above *Every so often, a Cranberries band member magically appears on screen and makes a remark*
Left *The Cranberries — sitting comfortably but fairly expensively on Doors and Windows*



Left *The (thankfully) sax-less Bill Clinton on Telecommunication Breakdown*
Bottom left *If you've got nothing better to do, why not sit in front of the EBN test card?*
Below *An invitation from Day At The Beach Productions*

appearance in several of them). There's a good help guide and it's very easy to find your way around.

The music is best described as ambient/techno. The video presentations are fast-moving, in-yer-face productions. You'll either love it or hate it, but you certainly won't be able to ignore it.

PCW *Verdict*

A good package and an interesting concept. The price is very reasonable and a lot of care has gone into the production. No UK distributor has yet been announced.

Price $14.99
Contact TVT Records 001 212 979 6410

Various
Don't Play Track One

No prizes for guessing what type of Enhanced CD this disc is. Don't Play Track One features music from ten new artists ranging from ambient, to classical, to reggae.

The disc is designed for PC CD-ROM drives and the installation process is quick and easy. The disc uses Video for Windows 1.1, which you can install on to your PC from the CD-ROM. You can also use a test screen to check whether your system is correctly configured for digital audio, CD sound and graphics. There's the option of preloading graphics on to your hard drive to save time when playing the disc, which is a good idea because the installation process takes several minutes on average (a snail icon crawls across the screen as the graphics are being loaded).

The graphics take over 20Mb of hard disk space but there's an option to auto-delete them after play, or save them. The opening screen consists of a circle of icons on which you click to select a song. Unfortunately, there's no guide to tell you what song you've selected, so it's a case of suck it and see. The interactive graphics vary in quality and interest, and some offer more interactivity than others.

PCW *Verdict*

A nice idea and, not surprisingly, a bit of a mixed bag. Well worth checking out if you're feeling adventurous.

Price £19.95
Contact Day At The Beach Productions 0171 233 9924

The Durutti Column
Sex and Death

A confusing disc, this one: the Mac version is a Track One disc, but the Windows version uses the CD Plus format. This is because Apple's CD Plus authoring software wasn't ready in time, so rather than hold back, Factory Too decided to push ahead.

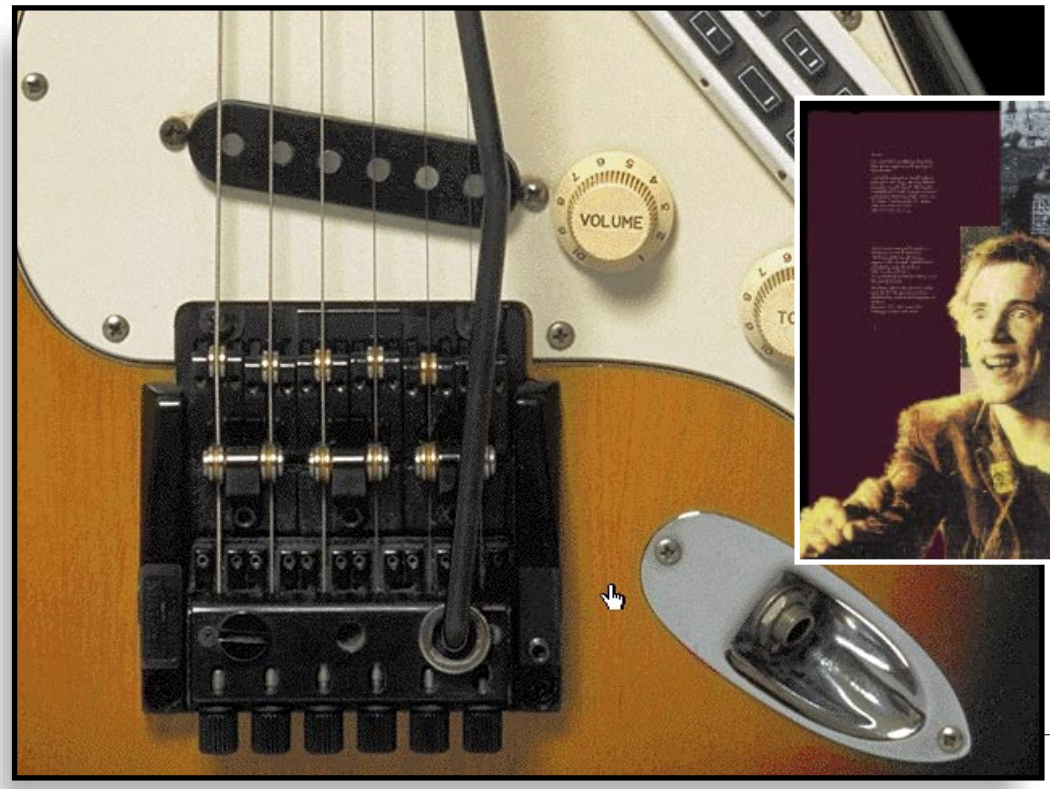
Like all music CD audio/CD-ROM discs, you need a fairly powerful machine to get the best results. Factory recommends a minimum of 8Mb RAM and 35Mb hard disk space for the interactive portion ("the virtual sleevenotes"), which runs much smoother from the hard drive.

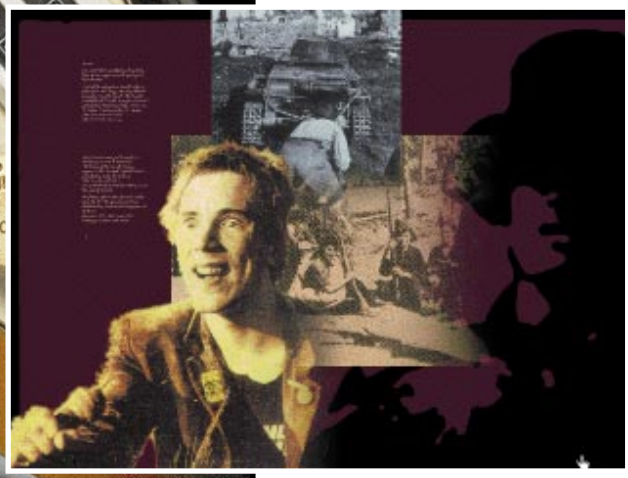
This is a nice package; you get ten music tracks, which will play on any audio CD deck, plus a nifty little screensaver which uses only 128Kb of RAM and can be used to control music CDs played on your CD-ROM drive as well. The graphics look good, due to a combination of Photo CD, and Adobe's PhotoShop and Illustrator.

The home screen presents you with a track listing which you click on to call up further information. This includes a text description plus brief commentary from composer/guitarist Vini Reilly. Most of the screens have hotspots which you can click on to see pictures, video clips or read more text.

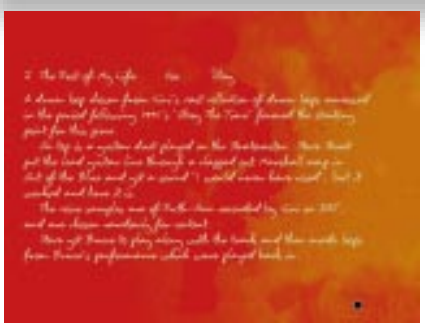
For me, the most interesting snippets were Vini's description of the various drugs he's been prescribed to tackle anxiety and depression, and the on-section Fender Stratocaster, where you can "strum" the strings and discover what the various controls do.

There are plenty of hidden surprises on the disc, but you never feel lost thanks to a very effective navigation system which makes it easy to return to your last spot, or go back to the home page.





Strum your Stratocaster, assume a wild stare and revel in the hidden surprises awaiting you on Sex and Death



PCW Verdict

A good example of how CD Plus should be used. The music comes first, but fans will appreciate the amount of thought that has gone into the interactive portion, too.

Price about £14.99
Contact Factory Too 0161 834 4440

Mike Oldfield
The Songs Of Distant Earth

Best known for his mega-selling Tubular Bells, Mike Oldfield's The Songs of Distant Earth is inspired by the Arthur C Clarke book of the same name.

Oldfield was given a copy of the game, Myst, and this seems to have inspired him to enter the world of Enhanced CDs. The disc consists of 17 music tracks lasting over 55 minutes and Track One data designed for Mac CD-ROM drives. The extra data consists of a short, animated program (around three minutes long) which uses the first two songs: In the Beginning, and Let There Be Light.

The animation appears to have been made with Autodesk's 3D Studio, or similar package, and looks great: you are sucked inside a giant spacecraft and transported to a futuristic city; a strange creature metamorphoses into a chair. There's very little in the way of interaction — you just sit back and enjoy the show. The visuals really do add to the music, and apparently there are plans to develop a longer version.

PCW Verdict

Not much in terms of interactivity, but this isn't always a bad thing. A nice little bonus for Oldfield fans.

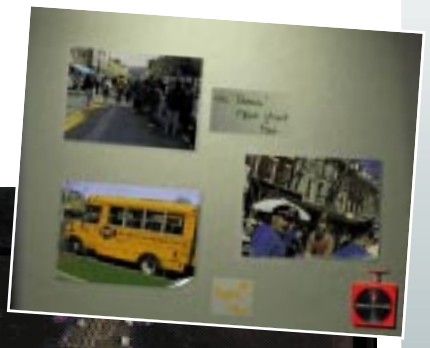
Price £15
Contact Warner Records 0181 997 7571

Right *Nyack from New York: so good, they named it… once*
Below *Play Mysty for me? Inspiration for Mike Oldfield*

Nyack
11 Track Player

This disc has the distinction of being the first CD Plus title to be launched in the UK — on sale only days after the official release of the Blue Book standard.

11 Track Player consists of 55 minutes of audio followed by an interactive guide to the band. Nyack is a new indy band from, unsurprisingly, Nyack in upstate New York. I had problems using this disc because my CD-ROM drive didn't have



Left *Eight-ball in the corner, Fast Eddy*

Bottom (left) *Nyack waxes lyrical*

the appropriate driver software. However, the disc's developer, multimedia company Wild Tangent, kindly came to my rescue. The data track is designed for both PC and Mac CD-ROM drives and is ignored by the CD player. With Track One discs, it's possible to play the data track on your audio player accidentally, by using track search in reverse mode, but my efforts to fast forward past track 11 and into the interactive program were thwarted.

The interactive section, devised by Nyack, consists of a scrapbook of photos and videos shot by members of the band. There are song lyrics, performances and a tour of Nyack itself.

The production seems rough and ready (Wild Tangent describes it as "garage multimedia"); it's far away from the polish offered by The Cranberries' disc. But this fits well with the band's image and you don't have to pay over the odds for the CD-ROM portion.

PCW Verdict

A good introduction to Nyack. It's not a state-of-the-art production, but three cheers to Echo for not charging a price premium for the interactive program.

Price £12
Contact Echo
0171 229 1616

Editor's Choice

So will the Enhanced CD take off? In many ways, its success is in the hands of the record companies. Many music fans would probably be willing to pay an extra £3-£5 for an interactive guide to their favourite artist, but what if you don't want to know the name of the singer's dog, or don't own a CD-ROM drive? And, how many people would want to take an Enhanced CD out of their hi-fi system, run upstairs, boot up their computer and then use the interactive program?

Even so, the Enhanced CD is certainly more marketable than a music CD-ROM such as Peter Gabriel's Xplora 1, which costs around £50, may only be used a few times and then consigned to the back of the CD collection. With an Enhanced CD, if the worst comes to the worst and you get sick of the interactive element, you can use it just to play the music.

The biggest problem is compatibility. Audio CDs are buy-and-play items — you slip the disc in your audio CD deck, press play, and away you go. CD-ROMs are not so simple to install and use. They can be fiddly to set up and you may find that your drive isn't compatible with the disc. For these reasons, our Editor's Choice is the Cranberries' Doors and Windows. Not only does it offer high-quality sound, graphics and video, but it will play on a PC and a multimedia player attached to your TV. Nice disc, shame about the price.

Expect to see many more Enhanced CDs from companies such as Sony (artists lined up include Bob Dylan, Michael Jackson and Mariah Carey), Atlantic, EMI and Microsoft, and from artists such as Squeeze, Fleetwood Mac, Santana, The Beastie Boys and The Rolling Stones.

The technology

Enhanced CD is the generic term for a CD designed for both audio CD players and CD-ROM drives. Music artists such as Prince, David Bowie and Peter Gabriel have launched CD-ROM titles, but these are not Enhanced CDs because they won't play in ordinary CD decks. There are three main types of Enhanced CD:

Mixed Mode (aka Track One)

These put CD-ROM data on the first track, followed by music data, which plays on any audio CD player. The system works well, although some older CD decks may try and play the CD-ROM data, resulting in a blast of white noise through the speakers. For this reason, most Mixed Mode CDs have a warning sticker telling audio CD users to skip the first track.

CD-ROM Ready (aka Track Zero)

CD-ROM Ready is designed to avoid the Track One problem. It works by hiding the CD-ROM data in the pre-gap, which comes just before the first track. The pre-gap is normally around two seconds long, but CD-ROM Ready discs extend this to 30 minutes or more. Several systems use the pre-gap, including Ardent Records' AudioVisual CD, Aix Entertainment's i-trax and Active Audio, developed by PAMS and BMG.

Another advantage of CD-ROM Ready is that CD-ROM owners don't need additional software to use it, although some CD-ROM drives, notably those from NEC, can't read this type of disc.

CD Plus (aka Track Two)

CD Plus has been developed by Philips and Sony, with help from Apple and Microsoft. The CD Plus standard, known as the Blue Book, is a mix of CD audio (Red Book), CD-ROM (Yellow Book) and multisession (Orange Book) standards.

A 50-60 minute music CD has around 200Mb of spare data which can be used for pictures, text, sound and software-based video like QuickTime or Video for Windows.

The system works by recording music data in the first session and data in the following one(s). Music CD decks simply play the music and ignore the CD-ROM data, while CD-ROM drives play the extra information. However, only around 65 percent of the world's CD-ROM drives are multisession-compatible, and those that are may need additional software drivers to play the discs.

Microsoft has made Windows 95 compatible with CD Plus, and Apple's latest CD software also recognises the new discs.

Other Discs

Rainbow CD
A Track One disc, developed by Philips and designed to play on audio CDs, PC and Apple CD-ROM drives, and CD-i decks.

Video CD Plus
Developed by OmniMedia, it mixes interactive programs with a linear video programme. The video plays on any Video CD deck, and the extra data can be seen on a PC with an MPEG card and CD-ROM drive. Some Video CD Plus titles will contain software-based MPEG-1 video and a Web browser.

CD-i Ready
A format that mixes Red Book tracks, which play on any music CD, and Green book tracks, which are read by a CD-i player.

CD Plus Graphics (CD+G)
Part of the original Red Book audio CD standard, it uses spare subcodes to display teletext-type words and pictures on a TV screen. Mainly used in Japan for karaoke.

Beating the Odds

Dominic O'Brien is a man with a memory — and then some. Memorising whole packs of cards, he was able to make about £1,000 a day from playing blackjack. Not satisfied with this, O'Brien soon devised a way to get his laptop to take care of the hard work, and now the sky's the limit. Michael Hewitt meets a bit of a wild card.

PCW **Illustration** by Stephen *Caplin* **Card Rosette** Photography by David *Whyte*

Three years ago, World Memory Champion Dominic O'Brien began playing blackjack seriously. Since then he's been barred from almost every casino in the UK, and a good number in the USA. There seems little doubt when he starts touring Europe early next year, the story will be repeated. It's not that he has any objectionable personal habits or gets drunk and abuses the dealers. As far as the casinos are concerned, it's far worse than that: O'Brien keeps winning. His strategy was developed in part using a computer.

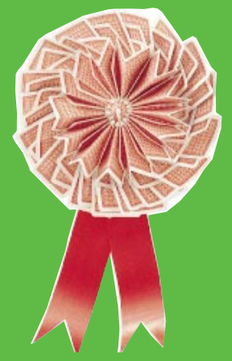
"When I won the World Memory

Championships a few years ago, friends suggested that I put my skills to use in the casinos, playing blackjack," he said. "Here, a trained memory can help you beat the system. One of the commonest methods, and the one that I employ, is card counting. You assign a value to each card as it's dealt and memorise it. In this way, you get to know what sort of cards are left in the pack, and so can alter your bets accordingly." (See panel "Playing Blackjack", page 100.)

O'Brien, who holds the world record for memorising cards, can recall an entire pack in 45 seconds. His system is mnemonic, based around various journeys. To memorise 52 playing cards, he imagines a journey comprising 52 individual stages. It could be around his house, his home town, or both. Stage one — the first card to be dealt — is his bedroom. Stage two — the second card — is his landing. Stage three — the third card — is the stairs. Eventually, the 52nd card takes him to somewhere on the outskirts of town.

"Once you've got the journey sorted out, you imagine each card as a person. In my case the king of clubs is Saddam Hussein. The queen of diamonds is Margaret Thatcher, while the four of diamonds is my bank manager, and so on. The cards always represent the same person. So if the first card is the king of clubs, I imagine Saddam Hussein standing in my bedroom. If the second card is the four of diamonds, it's my bank manager standing on the landing."

Initially, O'Brien had to work out various counting strategies. The way blackjack is played, and therefore the method of counting, can vary from casino to casino. The game can be affected by factors such as the number of players and the number of decks. O'Brien's first



piece of serious R&D hardware was his kitchen table. He explained:

"I dealt out around 100,000 hands of blackjack on to the table and analysed each one. In this way, I became very proficient at card-counting and started to develop various strategies. But dealing manually was very time-consuming. However, I then got hold of a computer program called the Universal Blackjack Engine. This can deal and analyse 100,000 hands in under a minute. Using this, I was able to easily prove or disprove different counting theories. I ended up with a bunch of statistics and with these in hand, went out with the intention of making a killing on the tables."

And for a short time, he did. O'Brien toured casinos in the Midlands and on the south coast, lightening their banks to the tune of up to £1,000 a day. Alarm bells soon started to ring however, and the casino "jungle telegraph" went into action. Before long, O'Brien found himself to be *persona non grata* all around the country.

When the tables turn

"They were on to me almost straight away. The trouble with playing casinos in the UK is that they're all private clubs, so you have to be a member. In the time it took me to apply for membership, they'd passed my details among themselves, so my membership applications started getting turned down."

So it was time to move on. Fortunately for O'Brien, the Americans have rather more liberal gambling laws. In the USA, as in Europe, you can walk in off the street and get a game if you feel so inclined. O'Brien got together with friends and raised £15,000. With money in one bag and laptop in the other, he headed Stateside and visited casinos in Connecticut, Mississippi and Nevada, including of course, Las Vegas.

"Every evening in my hotel bedroom before I visited each casino, I'd program the playing conditions into my computer. So, for instance, if the casino played a two-deck game with three players at the table, I could just push a button and see what would happen over a million separate hands. From this, I could determine both the counting strategy to use, and whether or not a game was worth playing."

A brilliant disguise

With the constant threat of getting caught hanging over him, O'Brien adopted various subterfuges to put the casino management off the scent. He attempted to disguise himself by progressively shaving off his beard. On other occasions, he worked with another player. Card-counters typically start to raise their stakes after playing low. But if you have a partner, he can do the counting, signal to you when the deck looks favourable, and you can then move in and place a high bet. This only works for a short time, however. In total, O'Brien visited 46 US casinos and managed to get barred from 13.

"Mostly it was very polite. I'd get a tap on the shoulder and be told: 'Thank you, Mr O'Brien, but I'm afraid you're a bit too good for us.' There was one occasion, though, when a manager came up to me and said: 'Have you heard of route 66 [the road out of town]? Take it. There'll be trouble if you try to get back in.'"

Nevertheless, by the end of his visit, O'Brien had managed to add $10,000 to his £15,000 stake — a profit of over £6,000. ("Not a fortune, but I'd proved I could beat the system.") The casinos of Europe now beckon, O'Brien hopes to repeat his success there.

"I'll have my laptop with me and so be prepared for every eventuality. It's a very valuable tool. In my opinion, every serious card-counter should use a computer in this way."

Playing blackjack

In blackjack, both the player and the dealer attempt to score as close to 21 as possible without exceeding it or, to use the parlance, "busting". The card suits — spades, hearts, diamonds or clubs — aren't significant. All that matters is the value of the card. Two through nine equal face value, while tens, jacks, queens and kings have a value of ten. An ace counts as either one or 11, at the player's discretion.

Play is as follows: First, the deck is shuffled and cut. Then, all the players make their wagers, laying down a chip, or cash, on the table. Next, working clockwise round the table, the dealer deals one card to each player, face-down, and one card to himself, face up. This is repeated a second time until everyone has two cards.

The idea is to beat the dealer's score. So at this point, if the player's two cards exceed the value of those of the dealer, he usually "stands" — sits smugly. If, on the other hand, he's only got, say, a two of diamonds and a two of clubs, but the dealer has a queen and a five, the player will sometimes ask for additional cards, or a "hit". He can ask for as many hits as he wants, provided their total doesn't exceed 21. If it does, he "breaks", and the dealer wins. But if he's got, say, a queen and a four — total score 14 — he may decide to risk it and ask the dealer for an additional card, hoping that the value of that card is no more than seven.

He may be lucky and get, for example, a three of spades, taking his total score up to 17. Most likely he'll stand. At this point, the dealer has to ask himself if he's feeling lucky. Should he risk drawing another card in an attempt to exceed 17? If he does, and it's four or below, he wins. If it's five or more, he goes bust and the player wins. And so on to the next hand.

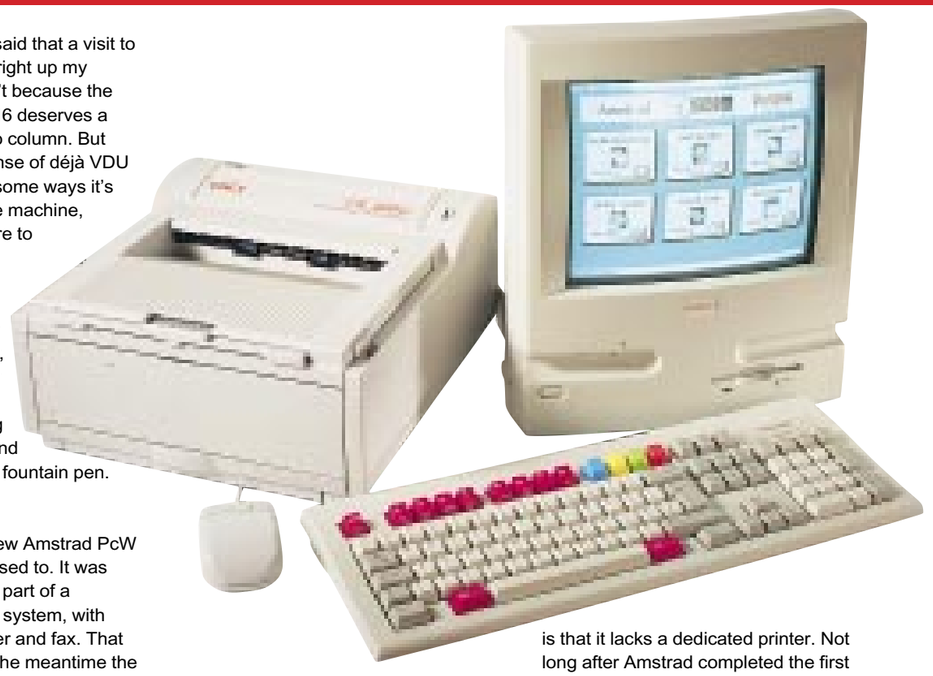
There's obviously a large element of chance in blackjack, but players can adopt certain strategies to give themselves an advantage. Card counting is the best known. Here, the player memorises the cards as they're dealt. In this way he can work out the value of the cards that are left in the deck as play goes on, and amend his gambling strategy accordingly.

If, for instance, all the picture cards are dealt early on in the game, this means that the pack comprises mainly low-value cards. Generally speaking, the advantage is likely to be with the dealer, so a seasoned gambler will only bet low stakes at this point. If, however, the low value cards have all been dealt out and high value cards remain, the advantage is likely to be with the player. In this position, a pro will start to increase the size of his wager.

AMSTRAD PcW 16

Generation gap

The idea behind the Amstrad PCW 8256 was maximum simplicity, and it was amazingly successful. But in the age of the notebook and the Pentium, does the new PcW16 take the "back to basics" idea too far? Simon Rockman takes a stroll down memory lane.



When the Editor said that a visit to Amstrad was "right up my street", it wasn't because the Amstrad PcW 16 deserves a place in the Retro column. But there's a very strong sense of déjà VDU about the new PcW. In some ways it's very much an up-to-date machine, but one which owes more to William Latham Sholes than to Charles Babbage. While Babbage was the father of the modern computer, Sholes was the inventor of the typewriter which was lambasted for being heavier, harder to use and altogether inferior to the fountain pen.

Simply does it

The simple feel of the new Amstrad PcW 16 takes some getting used to. It was originally intended to be part of a complete "Home Office" system, with adjacent bubblejet printer and fax. That may yet happen, but in the meantime the "Home Office" moniker spawned a codename. Since the Home Office is in Queen Anne Street, the machine is known as "Anne". Its predecessor, the Amstrad PCW8256, was called "Joyce", after Alan Sugar's secretary — he wanted a machine so simple even Joyce could use it. Anne is designed to be even simpler than Joyce. It succeeds.

The insides are simple too, with monochrome, a Z80 processor running at 16MHz, and 2Mb RAM. The machine is named after the clockspeed. Standalone Z80s are not available at this clockspeed, but they are as part of a larger ASIC (application specific integrated circuit) and there is talk of a 20MHz version – still a far cry from the 120MHz Pentium, but remember that the Anne ASIC only uses 0.8 micron fabrication. This is also primitive compared with the 0.35 micron technology of the latest Pentiums.

The ASIC is capable of Sinclair Spectrum-like attributes — there is an option to change the background colours. But the monitor on the first model is monochrome; a colour screen would double the price. Before condemning this as crude, bear in mind that the Amstrad PcW16, complete with software, is cheaper than a copy of Microsoft Office.

Software

For simplicity's sake, software is held in flash memory. There is a single 1Mb chip on the motherboard, with space for a second megabyte. The code is written in assembler, so while Office may take 100Mb on a PC hard disk, the PcW software takes a few hundred kilobytes. The software is loaded into the machine on the production line, so that the machines always have the latest release when they leave the factory. The flash can be upgraded and Amstrad expects there will be a newer release of the software to add significant features after it ships.

My biggest surprise about the PcW 16 is that it lacks a dedicated printer. Not long after Amstrad completed the first PCW project, the company was rumoured to be looking at an all-in-one DTP machine which would allow pages to be made up with columns and pictures and would print out to a built-in printer. With one lot of RAM, the machine cost could be brought down significantly. At the time it was rumoured that the project had been nixed by the cost of laser printer engines, and this is confirmed by the new PcW. It appears that Canon won't sell the raw engines, and neither will any of the other manufacturers. While the PCW8256 had the electronics for its dot-matrix printer in the main ASIC, the PcW 16 uses a conventional printer set-up with an off-the-shelf printer plugged into a centronics port. Although the Amstrad direct pricing for the Canon BJ30 and OKI GDI LED printer is amazingly competitive, it's not the integrated engineering solution Amstrad has adopted before.

In many ways the forerunner of the PcW16 was not the Joyce but the NC200, the notepad computer with the codename "notepad". This uses built-in software and garish buttons, both of which grace Anne.

The PcW16 is a desktop machine which, like a television, stays on all the time. There is a standby button which puts it into low power mode, alarms can wake the machine or flash a LED on the keyboard. Alan Sugar once said he builds computers for "the lorry driver and his wife", and the PcW16 fits the bill: like an Amstrad tower system hi-fi, it looks the part but behind the façade it's very basic.

Operating system

The PCW8256 used its own operating system, written by Locomotive Software, but offered CP/M (the operating system we all used before DOS and then Windows), so there was a vast amount of software for it. The PcW16 uses its own operating system from Creative Technology (a small UK-based company which first came to Amstrad's notice through a competition in *Amstrad User* magazine). The new OS offers no CP/M compatibility — although this may emerge later — but CP/M was long in the tooth back then, so there won't be much mileage today. There is context switching but no multi-tasking, so if you are doing a long mailmerge and want to look up someone in the database, you will have to pause the printing. The overwhelming feeling generated by this machine is that it's been simplified for the developers at the expense of the users.

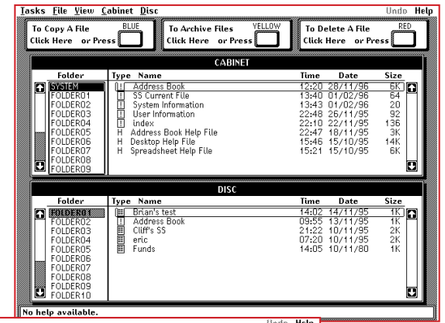
There is a 3.5in disk drive (disc in Amstradese). This is PC-compatible and will read and write DOS and PCW9512 disks, but also has its own file format which handles 32-character filenames. Files on the floppy disk can only be read from the root of the disk. Files can also be stored in flash RAM, so Windows 95-style 256 character filenames were deemed excessive. Files are spread over the flash memory to even out the use and the area purged when a program has problems saving. The user is warned when the flash RAM is 85 percent full. For Amstrad PCW8256 owners, there will be a version of the Locolink software. External programs are loaded into flash RAM and run from there.

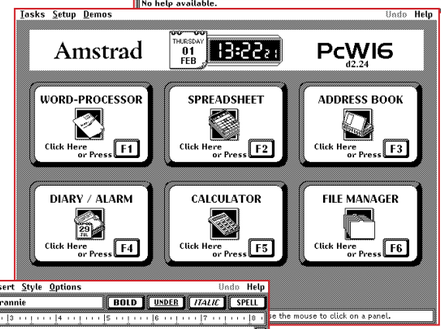
Buying cheap, feeling cheated

Even if you keep reminding yourself that this isn't aimed at the Microsoft Word power-user and that it is exceptionally cheap, you can't help feeling cheated.The PcW 16 may have a mouse and a graphical user interface, but the word processor does not support graphics. This is planned for a later release of the software but it seems a rather glaring omission. The review software was a long way from completion, so it was difficult to tell what will and will not be implemented.

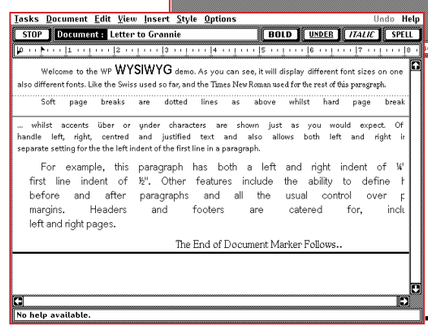
Text cannot be put into multiple columns. There is a 50,000-word spellchecker, import in Locoscript 1, 2 and 3 formats, ASCII, and a subset of RTF. There is no toolbar or macro language and the print preview only shows a page at a time. There is a line of help along the bottom of the screen, and help files, but no searching for subjects or hot-links between topics. The software is due for a major speed-up and is forecast to reach "Windows on a 386-type speed". As it is, menus don't fill in until after they drop down.

The software uses its own font formats. Holding fewer fonts releases space for documents, which is all very





Above *The file manager is an improvement on DOS, but limited to root files*



Above *The front screen provides a simple introduction, reminiscent of Microsoft Works*

Left *The word processor. This is the core application: it can read LocoScript files but looks better on screen*

What's on board

well, except some of the font handling is crude. Printing is even cruder.You get what fits on a sheet, no more, no less, and the formatting is limited. The PcW spreadsheet is quick but a little basic: it will import and export .CSV and import .DIF format, which means with a bit of jiggery-pokery you can import Excel files, but this does rather go against the grain of an easy-to-use machine. There are full scientific functions, but only one level of undo and no graphing in the first release.

The database is fixed format, flat file; you can't even edit the headings, so multiple phone number headings stay as number 1 and number 2 — there's no room for Home, Work, Fax and Mobile. The only file formats supported are .CSV and NC200, but Amstrad says it will handle big files. The database is a stubborn beast, presenting the information it wants in the way it wants to. Printing is done through the word processor. There is a simple Windows-style calculator and a file manager. If a hard disk is fitted, this will have to be upgraded to cope with subdirectories.

Some time spent reading the manuals supplied with grown-up software might have helped the designers. There is a strong overall feeling that not enough time was spent on anything.

A step back

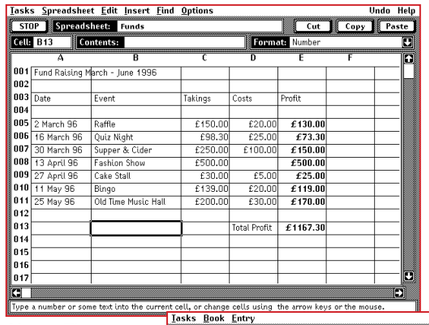
The Amstrad PcW16 represents a significant enhancement on the PCW8256. It's much easier to use and has very much better print quality. It is also very cheap. But this is 1996, not 1986, and times have changed.

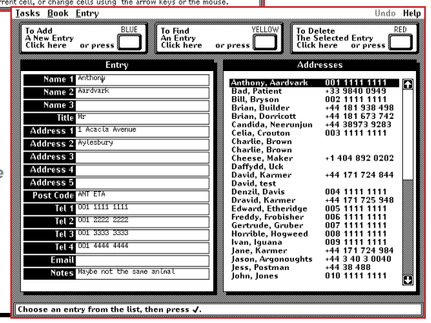
It's impressive to see that file sizes can be 4Kb instead of the 20Kb taken up by a Word document. It's also good to see that assembler language programming is not dead — this adds weight to the argument that if modern programs were hand-crafted in assembler rather than bolted-together objects they would not need gigabytes of disk space.

There is still a market for a typewriter replacement, but it needs to be simple. And this is not the same thing as having few options. Over the last few years we've seen great strides in usability — before Microsoft ships a new program, the denizens of Seattle are invited into the company to test the software for themselves. Amstrad has paid lip-service to usability with a pretty front-end, but overall, the PcW16 seems untested. Usability ideas which might seem a good idea to the programmers and designers will not necessarily be practical in the field.

The operating system and software are less sophisticated than that built into a Psion Series 3a. Amstrad has never produced exciting machines but deep down, the CPC and the original Amstrad PCW were sound. They employed solid engineering — down to a price — but usually succeeded in avoiding the problems of cutting corners too fine.

The PcW 16 is too little, too late. If this is the swansong for Amstrad's computer development, it's a sad way to bow out.





Above *The spreadsheet is simple, but not necessarily simple to use*

Right *Despite the simple buttons, the address book can be confusing. You need to press stop to exit the edit mode*

PCW Contacts

Amstrad PcW 16
Price £299 (plus £100 for an inkjet or £200 for an LED laser-quality printer)
Contact Amstrad 01277 228888

Personal Computer World

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PCW AWARDS 1996

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Six go Pro

We test half a dozen of the latest PCs to incorporate the Pentium Pro — the fastest 32-bit Intel processor on earth. Dylan Armbrust reveals all on these desktop flyers.

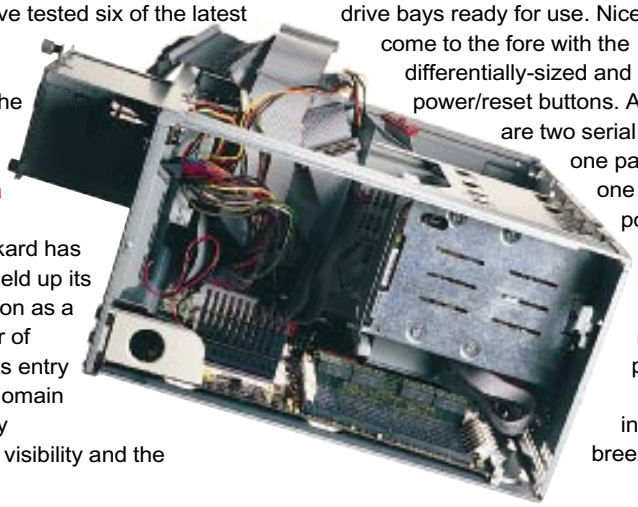
PCW **Pentium Pro** Photography by Bruce *Mackie*

As surely as night follows day, so too had Intel to produce the successor to the Pentium processor. And it has. The newest Intel chip off the old block is the Pentium Pro, and this month saw the first wave of desktop machines to make use of it.

The Pentium Pro is not, as some may think, an extension of the current Pentium line but a new chip altogether. With the introduction of "dynamic execution" and an on-chip L2 256Kb cache, the Pentium Pro is the fastest 32-bit Intel processor available.

Most manufacturers are expecting the first Pentium Pro workstations to be used for CAD/graphics, finance, and 3D animation purposes and this is where the marketing effort is directed. But with the price for a 150MHz chip starting at £625 (almost the price of a full DX4-100 system) it ain't cheap.

Here, we've tested six of the latest desktop machines to incorporate the new chip.



HP Vectra XU 6/150

Hewlett-Packard has once again held up its solid reputation as a manufacturer of PCs. Since its entry into the PC domain it has steadily increased its visibility and the Vectra XU 6/150 dual processor is its newest high-profile, high-powered participant.

The HP is housed in the same stylish mini-tower case as that of the Vectra XU 5 series. Up front, a Sony quad-speed SCSI CDU76S CD-ROM fills a 5.25in bay, leaving one 3.5in and two 5.25in drive bays ready for use. Nice touches come to the fore with the differentially-sized and recessed power/reset buttons. At the rear are two serial sockets, one parallel port, one SCSI-2 port and two mini-DIN keyboard and mouse ports.

Getting inside is a breeze. Two

PCW Details

HP Vectra XU 6/150

Price £5,167 (RRP); £4,133 (expected street price)

Contact Hewlett Packard 01344 369222

Good Points On-board SCSI-2 controllers with high-performance graphics and network cards included.

Bad Points Adaptor cards are a tight fit and quite close to the inside of the casing. No monitor is included in the package.

Conclusion A high-end machine, intended for high-end use and offered at a high-end price.

flicks of a latch and a pull, and you're in. The first thing you notice is the eye-popping size (1.5in) of the Pentium Pro's heat-sink.

The HP is a dual-processing model, although our review machine had only one CPU and as a result there is a dedicated second fan with a moulded air channel that keep the chips well ventilated.

The fact that HP uses its own motherboard contributes substantially to what it offers. The motherboard incorporates the Intel 82450KX (Orion) chip set but HP has opted to use its own 168-pin, 72-bit wide, ECC Dual Inline Memory Modules (DIMMs). Our unit had 32Mb of RAM but with eight DIMM slots the HP can upgrade to 256Mb. A Creative Labs Vibra 16S on-board sound chip is included, too. The presence of the on-board Ultra-SCSI adaptor combined with the Quantum Fireball 1080S 1.2Gb SCSI-2 hard drive and CD-ROM show that this model is meant for high-end use.

There are three PCI, one PCI/ISA and three ISA slots. An HP 10/100VG selectable PCI network card and Matrox MGA Millenium PCI graphics card with 2Mb WRAM (WindowsRAM) fill two of the PCI slots. Although there is plenty of room for full-length cards, the end slots place the cards a bit close to the metal casing for our liking.

Its list price made the HP the most expensive of the group but the expected street price is lower, of course.

Regrettably, we didn't have the HP in the labs long enough to be able to complete our battery of tests, so we are unable to provide a fair and accurate comparison with the other machines. Nevertheless, the HP returned 30.39fps (frames per second) on the Doom 2 test and achieved the highest score in the group. Other test results indicated performance equal to, or above, the IBM's. The presence of on-board SCSI controllers and its 72-bit DIMMs appear to have made their mark.

IBM PC 360 S150

This machine stands out, pure and simple: pure in its processing speed and simple in its design.

The PC 360 S150 comes in a new, no frills, durable mini-tower. The front exterior has one 3.5in floppy drive and three 5.25in bays — one is occupied by the CD-ROM.

PCW Details

IBM PC 360 S150
Price £3,965
Contact IBM 0800 919929

Good Points It's fast, has lots of room for expansion, and a strong warranty.
Bad Points Expensive, and little extra offered in the way of hardware.
Conclusion A fast, solid machine but a bit on the expensive side.

Keyboard and mouse are standard IBM fare, although IBM erroneously supplied us with a US keyboard. A padlock loop at the rear allows you to secure the case but it's a bit thin so we'd view it more as a deterrent than as real security. The I/O ports consist of two serial and one parallel, and that's it.

The interior is by far the most accessible in this group; just remove two screws and slide off a side panel. The inside of the case is wonderfully clear of cables with plenty of space for expansion cards and room for an extra hard drive. IBM uses an Intel motherboard and PCI chipset so there are less extras on offer than the HP model. Two of the four 72-pin SIMM slots are filled with 32Mb of ECC RAM and can be upgraded to a maximum of 128Mb.

The subsystem, consisting of a Quantum Fireball 1.2Gb hard drive and Teac CD-56E six-speed CD-ROM, is controlled via the on-board EIDE interface. A Matrox MGA Millenium graphics card with 4Mb of WRAM fills one of the three dedicated PCI slots, leaving another shared ISA/PCI and two ISA slots ready for use.

As with most Pentium Pro machines, there are two cooling fans on the inside. One sits directly over the CPU while a second draws air in from the front to cool the motherboard and expansion cards.

The IBM did very well in our tests, coming in first in the overall ratings. It performed 11 percent faster than the lowest-scoring PC in the group (see page 129).

Our review unit, with 32Mb of RAM, came loaded with Windows NT 3.51 rather than OS/2, but IBM gives you the choice of either at no extra cost. In terms of affordability, the IBM sits in the middle of the pack but that's for the computer only.

The IBM has a three-year BTB (Back to Base) warranty and is a strong contender in its class, but for its price it lacks the extras offered with other models.

Dell Dimension XPS Pro 150

The Dimension XPS Pro 150 is Dell's contribution to the Pentium Pro line of currently available PCs. Featured as the top system in Dell's Power Platforms, it came in at fourth place in our overall test

PCW Details

Dell Dimension XPS Pro 150
Price £3,934
Contact Dell 01344 728000

Good Points A 17in monitor, 2Gb HDD, and sound card are part of the package.
Bad Points Messy interior with awkward access to SIMM slots.
Conclusion All-in-one system with solid performance and value for money.

results, with a normalised benchmark of 0.91. It also managed a reasonable Doom 2 test score of 20.52fps (see page 129).

The XPS Pro 150 is housed in a mini-tower and is not a desktop Pentium Pro model in the true sense of the word. It comes with one empty 5.25in and one 3.5in expansion bay. The I/O ports are the same as that of the other Pentium Pro machines using the Intel ATX motherboard. A Nokia D1728 17in SVGA monitor comes with the Dimension XPS Pro 150 package, although it wasn't included with our review unit.

Removing the case cover from the Dell was easy; all you need to deal with is one thumb screw and two pinch latches. Once inside, we found that Dell differentiated itself from the rest in the group by dint of being the messiest interior of all. There was ribbon and power cabling overflowing well onto the motherboard and the positioning of the hard drive rendered access to the RAM difficult — this is due primarily to the small interior space of the unit compared with the other mini-towers in the group.

A second, more interesting difference in the Dell was the makeup of its sub-system. This was the only machine not to have a Matrox MGA Millenium graphics card. Instead, it carried a Number Nine Imagine 128 PCI card with 4Mb of RAM. Also present was a Creative Labs SoundBlaster 32 AWE ISA sound card.

PCW Details

Olivetti M6-950 Suprema
Price £4,027
Contact Olivetti 0181 785 6666

Good Points Nice-looking case, clean interior, comes with a monitor.
Bad Points Skimpy warranty.
Conclusion A solid mid-range performer.

Our review model came with 32Mb of ECC RAM, expandable to a maximum of 128Mb. A Seagate ST32140A 2Gb EIDE hard drive and Teac CD-56S six-speed CD-ROM rounded off the Dell's internals.

Dell has positioned itself well for the first wave of Pentium Pro machines. Considering its price, the 2Gb HDD, sound card and 17in monitor, it offers just that little bit more than its competitors in this group. An added bonus is that it performs well and comes with an adequate warranty.

For those seeking an all-in-one, ready-to-go, power machine, the Dell Dimension XPS 150 is worth a look.

PCW Details

Viglen Genie Pro 150
Price £3,969
Contact Viglen 0181 758 7000

Good Points Compact design, easily accessible SIMM and expansion slots.
Bad Points Small monitor in a standard package.
Conclusion A good buy for early adopters or entry-level power users.

Viglen Genie Pro 150

If you're looking for good price/performance value in the Pentium Pro range, you'll find Viglen one of the most competitive brands around.

Our review unit was a pre-production model so the external case wasn't final, but all else was as it should be by the time we went to press. A CD-ROM and 3.5in floppy drive fill two of the machine's drive bays, leaving an extra two bays available for future upgrades. A Microsoft Mouse and Viglen keyboard complete the externals.

Because Viglen uses the Intel ATX motherboard and Orion chipset it has the same configuration of I/O ports, PCI/ISA expansion and SIMM slots as the other Intel users. Our review model came with 32Mb of ECC RAM filling all four of the memory slots, but it can be upgraded to 128Mb. A clear interior with neatly bound cables allowed for unfettered access to all expansion and SIMM slots — this is helpful as it provides space for full-length cards, despite its small interior.

With its subsystem, Viglen has opted for a Western Digital 1.6Gb Caviar 31600 hard drive and Toshiba XM-5302MB six-speed CD-ROM. Similar to the other Pentium Pro machines is Viglen's use of the Matrox MGA Millenium graphics card with 2Mb WRAM. An interesting feature of the Genie Pro is that there isn't a spare

bay for another internal hard drive.

Although our model came with an Envy 17PE 17in colour monitor, this isn't part of Viglen's regular offer. An Envy 15P 15in SVGA monitor is standard with the Genie Pro range but this seems a bit small considering it's meant to be a high-end PC.

In our lab tests, the Viglen had a high overall result of 0.96. This put it in second place, just behind the IBM and slightly ahead of the Olivetti, showing that this little machine packs quite a punch.

This PC is directed at the entry-level workstation market. With few expansion bays available it seems best suited for CAD and DTP rather than as a potential server. It comes with Windows NT for Workstations 3.51, a one-year parts and labour warranty, and lifetime technical support. For those business users wanting a Pentium Pro machine, the Genie Pro is definitely a budget buyer or early adopter model.

Olivetti M6-950 Suprema

What a smart-looking machine this is. Olivetti calls the Suprema a tabletop tower box, but we call it a mini tower. Its price places it fourth in the pack but it came up third in our lab tests, marginally behind the Viglen — not so remarkable considering it had an almost identical hardware and BIOS configuration.

The Suprema has a very simple exterior design. A CD-ROM and 3.5in floppy drive occupy two of the forward expansion bays. A free 5.25in and 3.5in expansion bay and a single recessed power button are all that remains at the front. Olivetti's keyboard is nice, with rounded keys and a gentle travel action. An Olivetti DSM 50-172 17in colour monitor was supplied with our review model.

You open the case in the old-fashioned way and undo six screws. Having cleared this hurdle, one faces the subsystem which is similar to that of the Viglen. With the Intel ATX motherboard, one finds the same I/O, SIMM and expansion slot availability as most of the others in the group. Olivetti has opted to use an E-IDE Quantum Fireball 1280A hard drive and Matrox MGA Millenium PCI graphics card with 4Mb of WRAM to reinforce its high-end workstation status.

Oddly, Olivetti has only supplied a Matsushita CR-581 four-speed CD-ROM with the Suprema, as opposed to the six-speeds found in most of the other Pentium Pro models. For hard drive expansion there's a 3.5in bay and all four SIMM slots are filled with 32Mb (expandable to 128Mb) of ECC RAM.

One noticeable feature of the Olivetti is the spacious interior design: no problem exists with loose cables, inaccessible SIMM slots or cramped space for expansion cards. Access to all of the above is completely free of obstruction. For the next batch of Supremas, Olivetti will be adding a swing-out hinge feature for the motherboard that will make access and upgrading even more of a breeze.

From a performance perspective the Olivetti did well, achieving a consistent third place in the group. With an overall result of 0.92 it was the mid-performer of the pack. It managed a rating of 19.62fps against the unofficial Doom 2 benchmark.

The Suprema comes loaded with Windows NT for Workstations 3.51 and toll-free tech support but has only a one-year cost-free warranty.

PCW Details

Fujitsu ICL Ergo Pro 660/150
Price £4,695
Contact Fujitsu ICL 01344 472000

Good Points 2Gb SCSI HDD, 17in monitor, strong warranty.
Bad Points Slow performance, cheap keyboard and messy interior.
Conclusion A disappointment considering Fujitsu's reputation.

Fujitsu ICL Ergo Pro 660/150

The Fujitsu ICL Ergo Pro is built like a tank: having an identical case to the IBM, except for the front plate, it's hard to describe it any other way.

The exterior is an example of pure utility: one floppy drive, three 5.25in expansion bays and a power button with attitude, are all that face the user. The back of the PC holds the same Intel ATX motherboard I/O configuration: two serial, one parallel and PS/2-style keyboard and mouse ports. The keyboard is a bit cheap and thin and we had to reinsert its space bar when we set up. Fujitsu also included an ErgoPro 172P 17in colour monitor.

A look inside the PC proves to be more interesting. Having removed the side panel and waded through the forest of loose cables you see that Fujitsu has high expectations for the Ergo Pro. A Seagate ST32550 2Gb hard drive and Sony CDU76S quad-speed CD-ROM (ErgoPros are now shipped with six-speeds) are run from an Adaptec 2940 PCI SCSI controller. The Ergo Pro is further complemented by ICL's own ErgoGraphix 664 PCI graphics card with 4Mb RAM and a Creative Labs SoundBlaster AWE 32ve full-length ISA card.

Additionally, our review model came with 32Mb of ECC RAM filling all four SIMM slots, although 16Mb is the starter level. There's space for an extra hard drive and, like all Pentium Pro PCs, the Fujitsu uses the Orion PCI chipset. On the upgrade side, two PCI and two ISA slots were left vacant for expansion. Only one fan cools the whole system but it is positioned directly over the CPU.

The Ergo Pro is the second most expensive machine in the group but this isn't surprising considering its subsystem. With 32Mb RAM, SCSI hard drive and an ErgoGraphix graphics card its price should relate to performance, but oddly this wasn't the case. The Fujitsu came in last of the pack, scoring 0.89 compared to the IBM. In the Doom 2 test, the ErgoPro came in last with a meagre score of 18.6fps.

The Ergo Pro 660/150 standard package includes Windows NT for Workstations 3.51, 16Mb RAM, a 17in monitor, and a three-year warranty (first year on-site and second and third-year BTB), one of the best of the group.

Editor's Choice

The phrase "seen one, seen 'em all" comes to mind having reviewed these Pentium Pro machines. With the exception of the HP, they all used the Intel motherboard. This uniformity was reflected in the results, as the margins between the first and last place machines was only 0.50 in relative performance.

Another common trait in our review models was the dominance of the Quantum Fireball hard drive and Matrox MGA Millenium graphics card. Creative Labs was also a familiar brand used for those machines that incorporated sound capability. Over 50 percent of suppliers used these state-of-the-art components to give their machines that extra boost necessary for a high-end workstation.

Oddly, one feature that wasn't present (but was expected) in most of the models we reviewed, was SCSI. Only HP and Fujitsu included SCSI capability, although it didn't make a difference to the Fujitsu in terms of overall performance.

It was a close contest, though, and the Editor's Choice goes to the Dell Dimension XPS Pro 150. It wasn't the fastest machine in the group but its combination of extras made it the obvious choice. It has all the bells and whistles you'd expect of a power machine. The sound card, six-speed CD-ROM, monitor, graphics card with 4Mb, plus its low price, pushed Dell above the line.

PENTIUM PRO TABLE OF FEATURES

Manufacturer Model Name	Dell Dimesion XPS Pro 150	Hewlett Packard HP Vectra XU 6/133	IBM PC 360 S150	Olivetti M6 950 Suprema	Viglen Genie Pro 150	Fujitsu ICL ErgoPro 660/150
Tel No	01344 720000	0990 474747	0345 727272	0800 447799	0181 758 7000	0345 441122
Fax No	01344 723198	0171 735 5565	0345 727272 (fax back)	01908 203464	0181 758 7080	01344 473333
Price (excl VAT)	£3749	£5167	£3965	£4027	£3969	£4695
Expansion Bus						
Free PCI only slots	2	1	2	2	2	2
Free ISA only slots	2	2	2	3	3	2
Free shared PCI/ISA slots	1	1	1	1	1	0
Motherboard Manufacturer	Intel	HP	Intel	Intel	Intel	Intel
"No. of spare 3.5"" bays"	1	2	1	1	1	1
"No. of spare 5.25"" bays"	1	3	2	1	1	2
Hard disk						
Manufacturer	Seagate	Quantum	Quantum	Quantum	Western Digital	Seagate
Size	2Gb	1.2Gb	1.2Gb	1.2Gb	1.6Gb	2Gb
Interface	E-IDE	SCSI	E-IDE	E-IDE	E-IDE	SCSI
RAM and Secondary Cache						
Main RAM	32Mb	32Mb	32Mb	32Mb	32Mb	32Mb
Max RAM	128Mb	256Mb	128Mb	128Mb	128Mb	128Mb
SIMM Type (pins)	72	168 pin DIMM	72	72	72	72
Multimedia						
CD-ROM Speed	6 speed	4 speed	6 speed	4 speed	6 speed	4 speed
Sound Support	●	●	❍	❍	❍	●
Graphics						
Graphics Card Manufacturer	Number Nine	Matrox	Matrox	Matrox	Matrox	Fujitsu ICL
Graphics Card Model	Imagine 128	MGA Millenium	MGA Millenium	MGA Millenium	MGA Millenium	ErgoGraphix 664
Graphics Card RAM/Max RAM	4Mb/4Mb	2Mb/8Mb	4Mb/8Mb	4Mb/8Mb	2 Mb/8Mb	4Mb/4Mb
Monitor Included	●	❍	❍	●	●	●
Other Information						
Windows NT for Workstations 3.51	●	●	●	●	●	●
Standard Warranty	1 year BTB	1 yr on-site/2 yr BTB	3 years BTB	1 year on-site	1 year BTB	1 yr on-site/2&3 BTB
Toll free tech support line	❍	❍	●	●	❍	❍
						

KEY ● Yes ❍ No

How we did the tests

Pentium Pro systems differ fundamentally from earlier PCs not only in their CPU, but also in the expected system software. There is very little point in running a partially 16-bit operating system like DOS or Windows 95; Pentium Pro can only hasten 32-bit code like NetWare, Windows NT, OS/2 and Unix. For this reason, all the systems submitted were configured with Windows NT Workstation 3.51 and 32Mb of RAM.

With a change not only in the hardware but also in the operating system, Pentium Pro scores are clearly incomparable with previous test results — even though the test operations themselves have not altered. The greatest performance improvement we measured was attained by 32-bit Excel running on the IBM. This managed to complete the recalculation and graphing tests at roughly six times the speed of our reference 486 DX4/100 and ran the entire Excel test suite about 3.5 times faster overall. The slowdown for the overall figure stems mainly from disk access. 32-bit Word for Windows also had new skates fitted; across all the tests it ran 5.6 times faster on the Olivetti than on the reference machine. So 32-bit applications at last have a worthy hardware platform, and the performance side of Moores Law is going as strongly as ever.

Several of the older 16-bit Windows and DOS programs gained extra speed from the test systems, but we are not convinced that the speed gains are entirely down to the Pentium Pro chips. Database access tests, for example, ran like a shot. But all the review machines were fitted with 32Mb of RAM, and all but two were using the NTFS file system whose superior cacheing is designed to deliver faster disk access for disk-intensive programs.

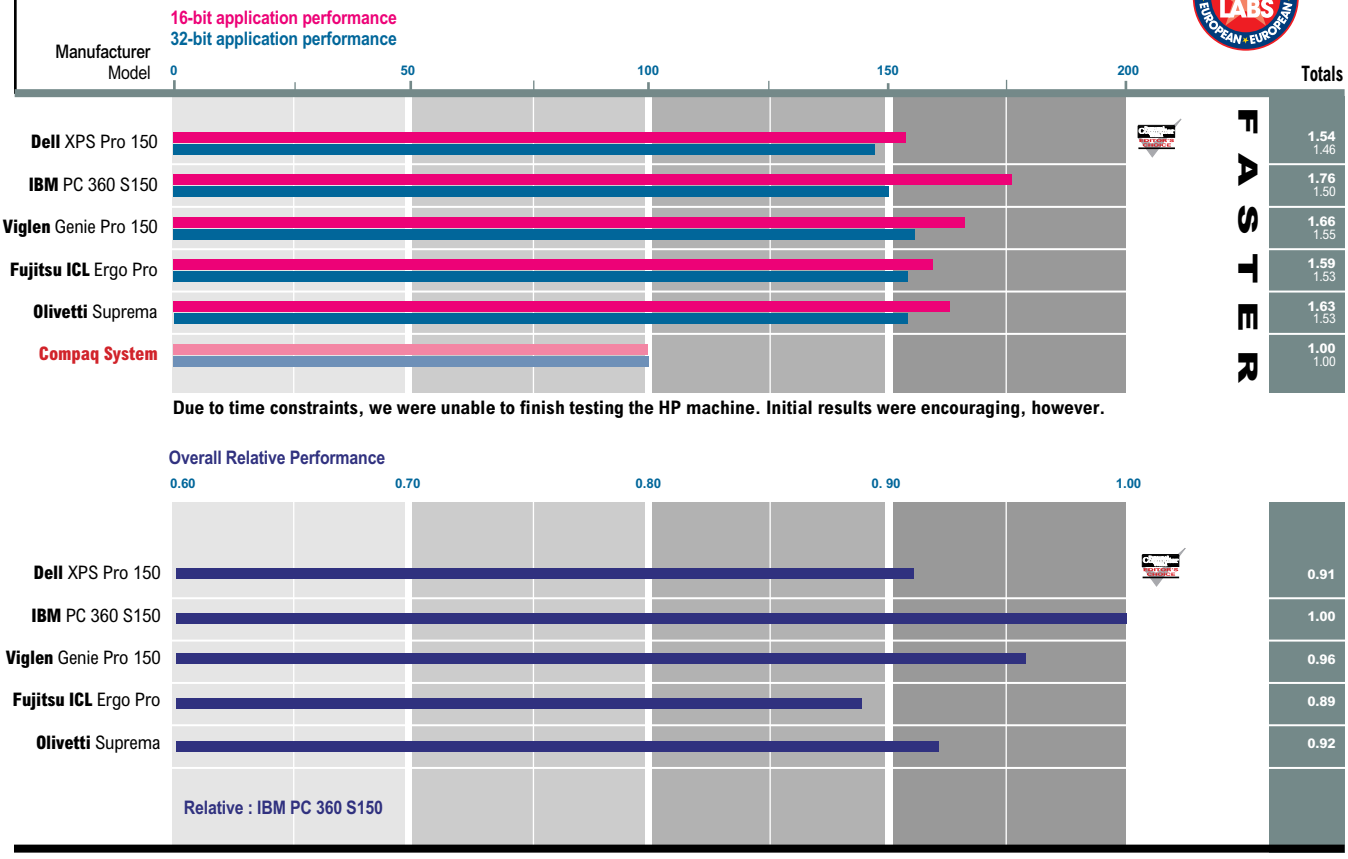
Despite the speed increases, Windows NT's Win16-on-Win32 architecture always muddies test results for DOS and Windows 3.x applications. Firstly, our evaluation systems would not run the WordPerfect for Windows tests. The current version of Windows NT Workstation and WordPerfect 6.1 for Windows have certain compatibility problems, and so the WPWin test was weighted out of the reference score that was produced on a Windows 95-based Compaq system. Novell is still investigating the cause of the problem. The other important factor is that 16-bit Windows support in Windows NT carries a fairly heavy overhead, so that although all the scores are "good" (i.e. nobody would complain about application performance), the relative improvement is probably not worth the expense and disruption of an upgrade. Keep in mind that although the 16-bit Windows application scores accurately represent performance, they are not doing justice either to Windows NT or to the Pentium Pro chip.

Windows NT itself is subject to several factors that influence overall performance. Some of these are under the user's control (such as the choice of NTFS or FAT file systems) but others are influenced by the hardware itself. Although several of the systems we examined were built around the same motherboard, there remained differences in performance that are down to differences in the system firmware, video BIOSs and so on. NT and other 32-bit operating systems may benefit from a system BIOS that contains the BIOS-32 extensions. IBM's BIOS provides a good BIOS-32 implementation, the end result of which was the IBM's slight lead in running the 32-bit application test.

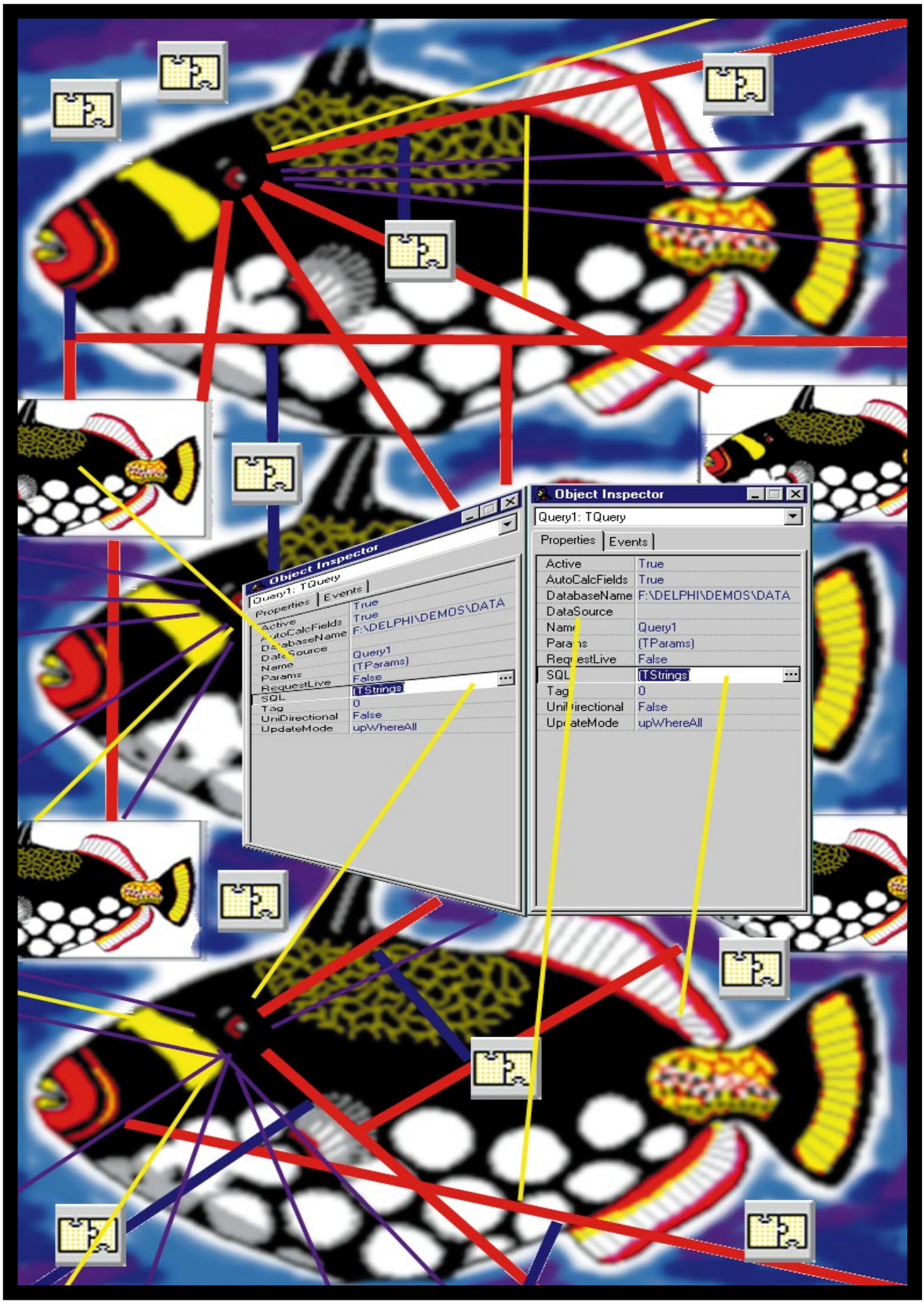
One further note on the IBM BIOS; we needed to install a flash upgrade to solve, apparently, random crashes generating the blue NT "Stop" screen. The upgrade completely fixed this problem and all shipping machines will be supplied with the stable version. With this exception, the systems were tested in the state in which the manufacturers supplied them.

Julian Evans

Performance Results



Due to time constraints, we were unable to finish testing the HP machine. Initial results were encouraging, however.


Object Inspector
Query1: TQuery
Properties
Events
Active True
AutoCalcFields True
DatabaseName F:\DELPHI\DEMOS\DATA
DataSource
Name Query1
Params (TParams)
RequestLive False
SQL (TStrings)
Tag 0
UniDirectional False
UpdateMode upWhereAll
Object Inspector
Query1: TQuery
Properties
Events
Active True
AutoCalcFields True
DatabaseName F:\DELPHI\DEMOS\DATA
DataSource
Name Query1
Params (TParams)
RequestLive False
SQL (TStrings)
Tag 0
UniDirectional False
UpdateMode upWhereAll

VISUAL PROGRAMMING TOOLS

Once there was Visual Basic. Now, visual development tools are everywhere.

Tim Anderson surveys the scene and tests leading contenders.

Visual is the development tool buzzword of the nineties. Microsoft, IBM, Borland, Computer Associates and others have rushed to slap a "visual" tag onto their programming products. It's marketing, since there is an association between "visual" and "easy" in the mind of the public. With a few clicks of the mouse, your in-house order entry system or shrink-wrap home accounts package is complete and ready to run. The reality is different. Most visual tools do not represent visual programming as defined by the academics. True visual programming implies a language with a visual syntax, where the whole flow and detail of an application is expressed visually. Commercial examples are Novell's AppWare and IBM's VisualAge. But this kind of programming is still uncommon. To most people, visual programming implies a graphical design tool for creating a user interface, along with some graphical utilities for the programming environment itself. The bulk of the programming behind the user interface is good old-fashioned textual code. This is no bad thing, since few developers are ready to abandon their language skills in C, C++, xBase, Basic, Pascal or others. In any case, the jury is still out on whether a truly visual language can achieve the concise efficiency of well-written textual code. To prove the point, Novell's genuinely visual AppWare has not been taken up widely, while hybrids like Microsoft's Visual Basic and Borland's Delphi have been storming successes.

VISUAL PROGRAMMING CONTENTS

Seeing the object

Even hybrid visual tools are not just about interface building. Visual developers cannot escape objects, since visual programming and object orientation are profoundly linked. One reason is the natural correspondence between a interface element like a button or a text box, and an equivalent class in an OO language. Another reason is that both visual programming and OO are all about reusable code. Every visual environment gives you this in some degree, since the visual interface hides underlying code which has been written for you. But early visual development tools were not very open: you could only work with the built-in objects supplied when you bought it. Visual Basic introduced the Visual Basic Extension (VBX), add-on objects which appeared in the toolbox and could be used just like native controls. VBXs were an enormous success and spawned a whole new product category. They made VB a highly productive environment, increasingly so as vendors came up with more and more packaged solutions to common problems.

Did I say object orientation? The snag here is that Visual Basic's OO, especially in versions 3.0 and earlier, is a fake. A VBX is just a Windows DLL which hooks into the VB environment, and almost all VBXs are written in C or C++. Visual Basic developers cannot write their own language extensions without resorting to

a completely different tool. Second, the VBX is an extension to VB, no more and no less. It became obvious that truly useful objects should be portable between environments, so that what you develop with one tool can be seamlessly integrated with another. VBXs are quite unsuitable for this, although some products like dBase for Windows, Delphi and some C/C++ compilers have come out with VBX compatibility by emulating Visual Basic's low-level support. In the meantime computing academics and technical purists have torn their hair out over VB's success, since it has popularised a form of development which is closed and which respects few OO principles.

Good though it is, the VBX era is drawing to a close. The next generation of visual development tools must deliver a broader range of benefits. Here are some of them, listed in order of increasing difficulty:

- You should be able to create your own custom objects, both visual and non-visual.
- The creation of custom objects should support basic OO principles such as inheritance and encapsulation.
- Objects should be portable and accessible to other applications and programming tools.
- Objects should be distributable over a network.
- Objects should be portable and accessible to other computer platforms and operating systems, even in real time across the internet.

None of the systems in this group test meet all these requirements. There is also an unresolved standards war *(see panel, above)* which makes it hard for vendors wanting to implement universal components. But it is already clear that the best systems will be those that are open and extensible, while those which use only proprietary visual and non-visual components will look increasingly unattractive.

Visual Programming and Databases

The main focus of this group test is on general-purpose visual development tools. If you are developing database applications, you need to take note of the many specialist database products that also feature visual development. General purpose tools like Visual Basic and Delphi also major strongly on database support, so bear in mind that all these distinctions are blurred. In this section we've summarised some of the leading contenders.

PowerBuilder

Powerbuilder is a well-established rapid application tool specifically designed for creating client-server systems. It was developed by PowerSoft, now part of Sybase, but is designed to work with all the leading server databases using native drivers or ODBC. Watcom is also part of PowerSoft, so Watcom SQL comes as part of the package. Even so, it is best seen (like Gupta's SQL Windows) as database-independent software for building client-server front ends.

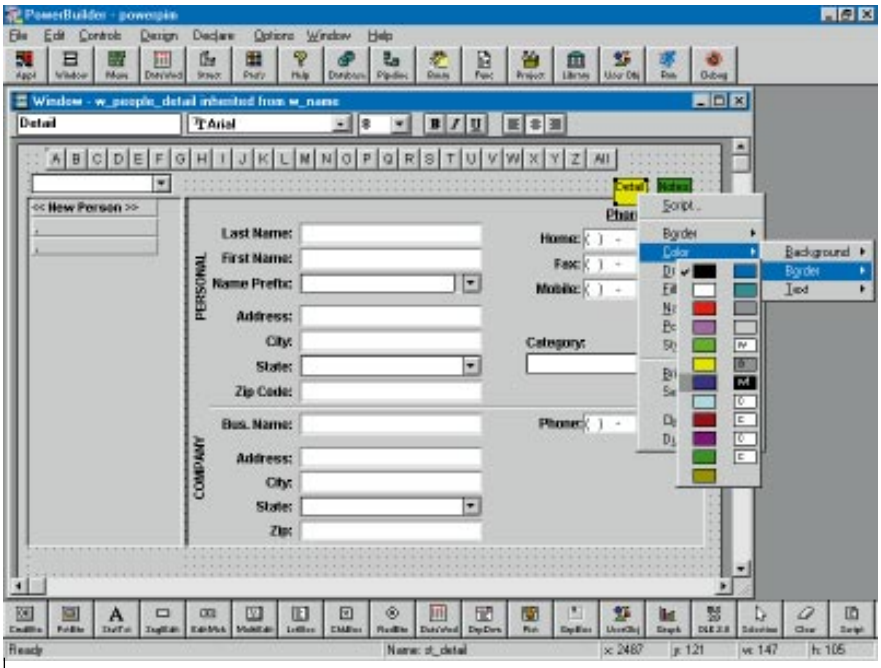
PowerBuilder adopts a modular approach to application development. PowerBuilder components are called objects, and examples include the Application object, DataWindow object, Function object and Window object. Each of these object types has an associated design tool called a Painter. To build an application, you create objects using these painters, and link them together either visually or with scripts. PowerBuilder objects are stored in libraries, and these can be shared between applications, enabling code reuse. Encapsulation, inheritance and polymorphism are supported making PowerBuilder an effective object-oriented tool. VBX controls can be used in the 16-bit version, and PowerBuilder is an OLE automation client.

There are several attractions. PowerBuilder's modular design encourages well structured applications. It is designed from the ground up for client-server work, so has excellent features to handle transactions, security, validation and SQL generally. PowerBuilder works well with ODBC, but also supports native drivers. Speed of execution is only fair, and PowerSoft are working on a tool that will convert application code to C++ to improve performance. PowerBuilder 5.0 will introduce support for remote objects, the aim being to enable client applications to use business rules running on the server.

Object Wars

The prospect of universal objects is enormously enticing to vendors who would have the widest possible market. Naturally, the biggest players want to go one step further and to control the standards themselves. Hence the creation of an industry-wide Object Management Group (OMG) to define object interoperability standards such as the Common Object Request Broker Architecture (CORBA). A related initiative is OpenDoc, a universal object container that might replace the traditional application/document process with an empty canvas into which any compliant object could be placed. Successfully implemented, OpenDoc could bring many of the benefits of visual, drag-and-drop programming to end-users who have no programming skills whatsoever, since in one sense every OpenDoc document is a custom application. A key supporter of CORBA and OpenDoc is IBM, whose System Object Model (SOM) is CORBA compliant. As yet the technology is mostly future promise; for example, there are no commercially available OpenDoc containers as far as we are aware.

Unfortunately the OMG and CORBA is on collision course with Microsoft, who have near-control of the PC desktop. Rather than support the OMG, Microsoft would rather develop extensions to their existing OLE technology, which it is claimed can bring the same benefits. On the face of it, Microsoft's initiative should have little chance against a standard supported by the rest of the industry. But the advantage of independence is that progress can be made without the lengthy and delicate business of reaching agreement in standards committees. OLE is steadily progressing. Its latest achievement is the OLE control or OCX, which with the release of Windows 95 and Visual Basic 4.0 has become a practical and widely supported proposition. Unlike the VBX, OCX controls use standard OLE protocols and have potential both as programming components and as objects which users insert into documents. An example of this flexibility is Microsoft Excel, which can be opened as an application in its own right, or used as a document component in Word, or used as a programming component with its own properties and methods in Visual Basic. Opponents of OLE point out that not only is it proprietary and Windows-centric technology, but it is also an impure object model based upon the principle of containership rather than inheritance. But OLE is not going to go away; it is here and it works. Both OLE and CORBA are important standards, and there will be an uneasy co-existence before a clear winner emerges.



PowerBuilder is a modular system based on different types of object. Objects are customised with tools called painters. This shows the Window painter, with the painter toolbar along the bottom of the screen. The main toolbar at the top is mainly used to open other types of painter

PCW Details

PowerBuilder
Price £195 Desktop, £3,295 Enterprise
Contact PowerSoft 01494 555555

Good Points Database management, object-orientation
Bad Points Slow at times; quirky interface.
Conclusion Worth considering for database work.

Power Objects

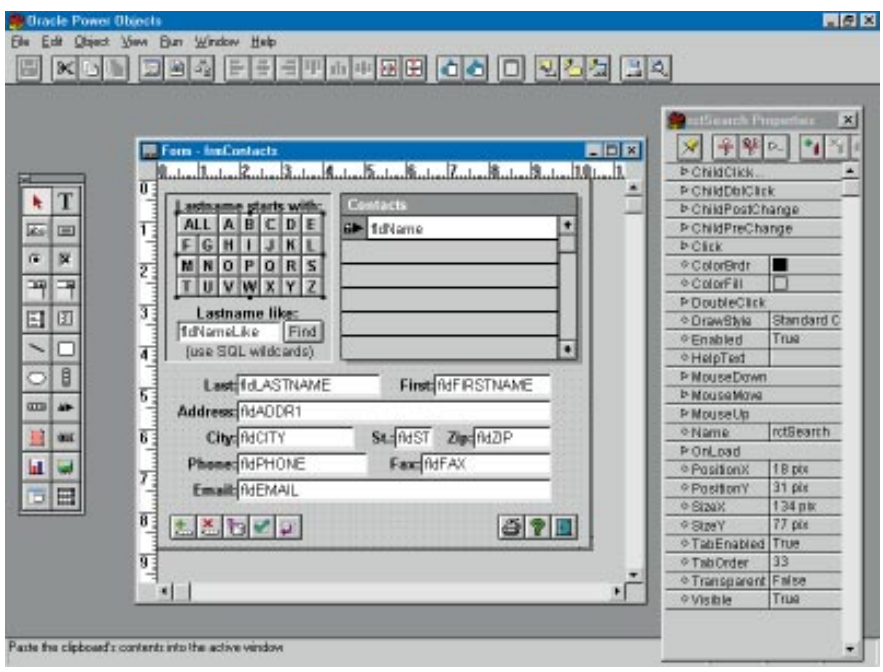
Part of the fallout from Visual Basic's success was that server vendors like Oracle found their customers using VB client applications. Oracle's response has been to produce a brand-new visual development tool tailor-made for their databases.

Power Objects is the result. It combines a VB-like language with simple but tidy object-orientation implemented with visual tools. For example, to add a user-defined method to a form, you enter its type and arguments onto a grid, and then drag it onto the form's property sheet. Click the method and a code window opens for editing.

Power Objects supports inheritance and user-defined classes, which you can store in libraries. It is also an OCX client, although only 16 bit at the time of writing. A local SQL database called Blaze is bundled with it, along with native drivers for Oracle or SQL Server. Blaze is rather slow, but is handy for prototyping. As you would expect, there is a particularly rich set of database methods and events, making data validation and transaction handling much easier than in Visual Basic. Another advantage is that parallel Windows and Macintosh versions exist, ideal for mixed environments.

Oracle's Rob Bruce claims that, "the market needed a really easy to use client server tool. Visual Basic is a not designed for client server. It is a general purpose tool." But he is hoping Power Objects will not steal the thunder of Oracle's high-end Designer 2000, which includes a forms and reports generator. Instead, Oracle plan a facility to import Power Objects forms into Designer 2000.

Power Objects is interpreted, but can create standalone executables which include the runtime libraries. Performance is the same either way: rather slow. Nor is is as flexible as Visual Basic. But what it does have is one of the neatest visual implementations of object-



PCW Details

Power Objects
Price £345 standard, £1675 client-server
Contact Oracle 01344 860066

Good Points Elegant design, more OO than VB, Mac version.
Bad Points Slow, limited drivers.
Conclusion Useful for quick Oracle solutions.

Oracle Power Objects uses a version of Basic very like VB, but unlike Visual Basic is intended only for database development, and is fully object-orientated. The property sheet at the right includes both properties and methods. Custom properties or methods can be added with a couple of mouse clicks

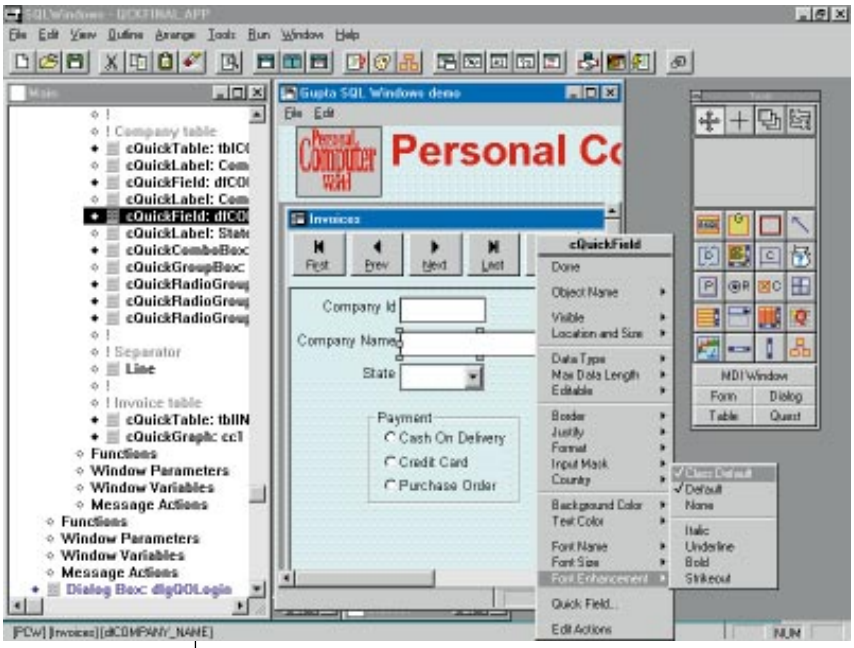
orientation around, and on the Mac as well as Windows. If you're connecting to Oracle, it's worth checking out.

SQL Windows

Gupta is an independent company specialising in client-server database software. The company offer a suite of products, with the flagship being SQLWindows, an object-oriented visual development tool. A distinctive characteristic is the outline window, which displays a tree view of your application, updated as you build it. Objects are placed on forms using a VB-like tool palette. Right-clicking displays the Customizer, broadly equivalent to VB's property list. SQLWindows has its own language, called SAL, which includes the ability to call DLL functions. An irritation is that SAL is case-sensitive.

SQL Windows has several strengths. First, it is (like PowerBuilder) totally geared for database development, unlike more general purpose tools such as Visual Basic or Delphi. Second, it is highly customisable, letting you build your own visual or non-visual classes and even supporting multiple inheritance. Third, it is well integrated with a range of client-server tools, including the Quest query builder, Team Windows repository for version control and project management, native database drivers for all leading servers, and the SQLBase PC database server for local networks.

The performance of SQL Windows front-end applications is only fair, although there is now an option to convert some parts to C code for compilation into a DLL, with corresponding speed improvements. Version 5.0 supports VBXs, but OCX and/or OLE automation will have to wait for the Windows 95 version in preparation.

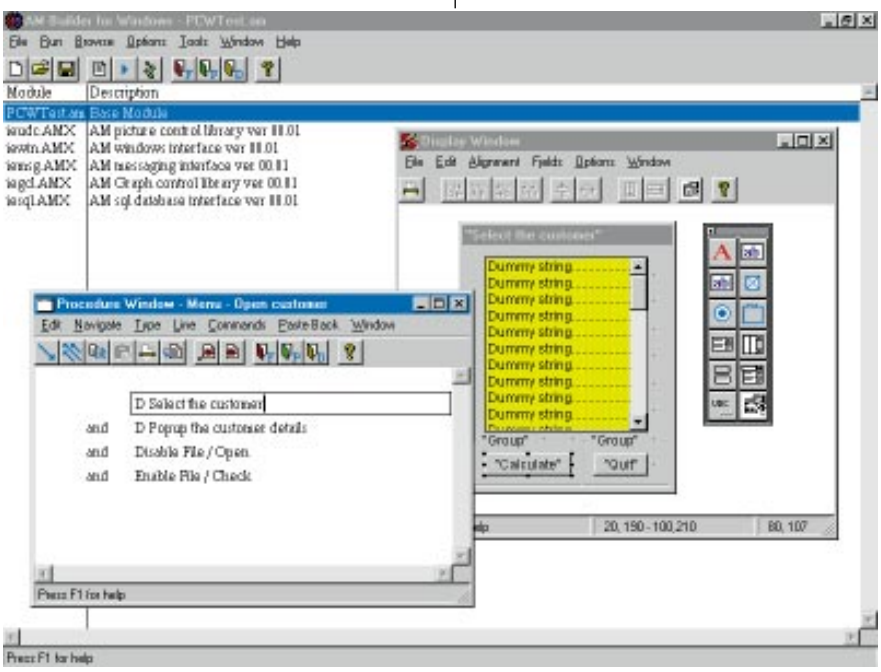


SQLWindows is a well-established visual development tool for database work. Applications can be navigated using an innovative outliner, seen on the left of this illustration. Forms are designed with drag-and-drop from a toolbar. Right-click an object to open the Customizer, in this case for a QuickField object

AM for Windows and OS/2

AM is an established tool for building front-ends to OS/2 client-server systems. The limited success of OS/2 on the desktop and the emergence of 32-bit versions of Windows prompted the release of AM for Windows 95 and NT. Chief Executive Dr Laurence Shafe explained, "We're very committed to OS/2. But People now starting projects are using Windows NT." AM has an innovative hierarchical interface in which you navigate a project from a list of procedures and modules, which can be expanded for editing as required. AM therefore encourages a logical and highly structured approach. A window painter, data dictionary, function list, and several

AM takes a hierarchical approach to application building. The primary window lists all moduels and libraries. Modules contain procedures, which can be opened for editing as required. Including the function ":Display Window" opens the window painter for visual design



PCW Details

SQL Windows

Price: £695 Desktop, £3495 Corporate
Contact: Gupta 01628 478333

Good Points: Full range of tools, useful outline view.
Bad Points: Steep learning curve, proprietary language.
Conclusion: A versatile client-server tool.

PCW Details

AM for Windows and OS/2
Price £195 AM Builder; £3,500 AM Enterprise
Contact Intelligent Environments 01932 772266

Good Points OS/2 and Windows versions.
Bad Points Limited, proprietary language.
Conclusion Good for mixed OS/2 and Windows environments.

wizards assist development. Data access is with native drivers or ODBC. Where AM's HyperLogic language is insufficient or too slow, functions can be written in C and made available to AM through AMX component libraries.

The AM approach combines plenty of hand-holding with a sound structure and good database integration. There is no support yet for OLE automation or OCX components. The main difficulty faced by AM is in persuading developers to learn a new, non-standard language (HyperLogic), and to be willing to turn to C to plug any gaps they find. AM is not object oriented, a disadvantage for those who are coming to expect object technology. It is also interpreted rather than compiled, so performance will not match Borland's Delphi. In some respects AM is reminiscent of TopSpeed's Clarion, with its own language and some excellent ideas, but likely to remain a niche product.

Visual FoxPro

It is hard to imagine a more procedural language than the old xBase, as seen in dBase III, for example. All that has changed, with the two leading xBase vendors, Borland and Microsoft, both releasing visual, object-oriented versions of their products.

Microsoft's Visual FoxPro does lots of things right. Once a poor cousin to Visual Basic as an interface builder, the new version is in many ways superior. There is OCX support, a visual class builder, and a comprehensive range of built-in classes. The xBase file format has been smartened up, to include engine-level referential integrity, triggers, and tying DBF tables into a proper database structure. In addition, migration to client-server using a Visual FoxPro front-end is made feasible with a range of connection tools using ODBC. Finally, and unlike Visual Basic 4.0, FoxPro has a properly object-oriented language featuring encapsulation and inheritance.

Where Visual FoxPro comes unstuck is in its heavy system requirements, or put another way, its poor performance on typical PC systems. The database engine is nearly as fast as before, but the interface is sluggish unless a Pentium with 12Mb or more is available. Another snag is that years of adding new features and language components, while taking none away, have made the package unwieldy and intimidating for newcomers.

Can this really be xBase? Microsoft's Visual FoxPro lets you set referential integrity rules at table level. It also has full object orientation and a superb range of visual tools. The price is very heavy system requirements

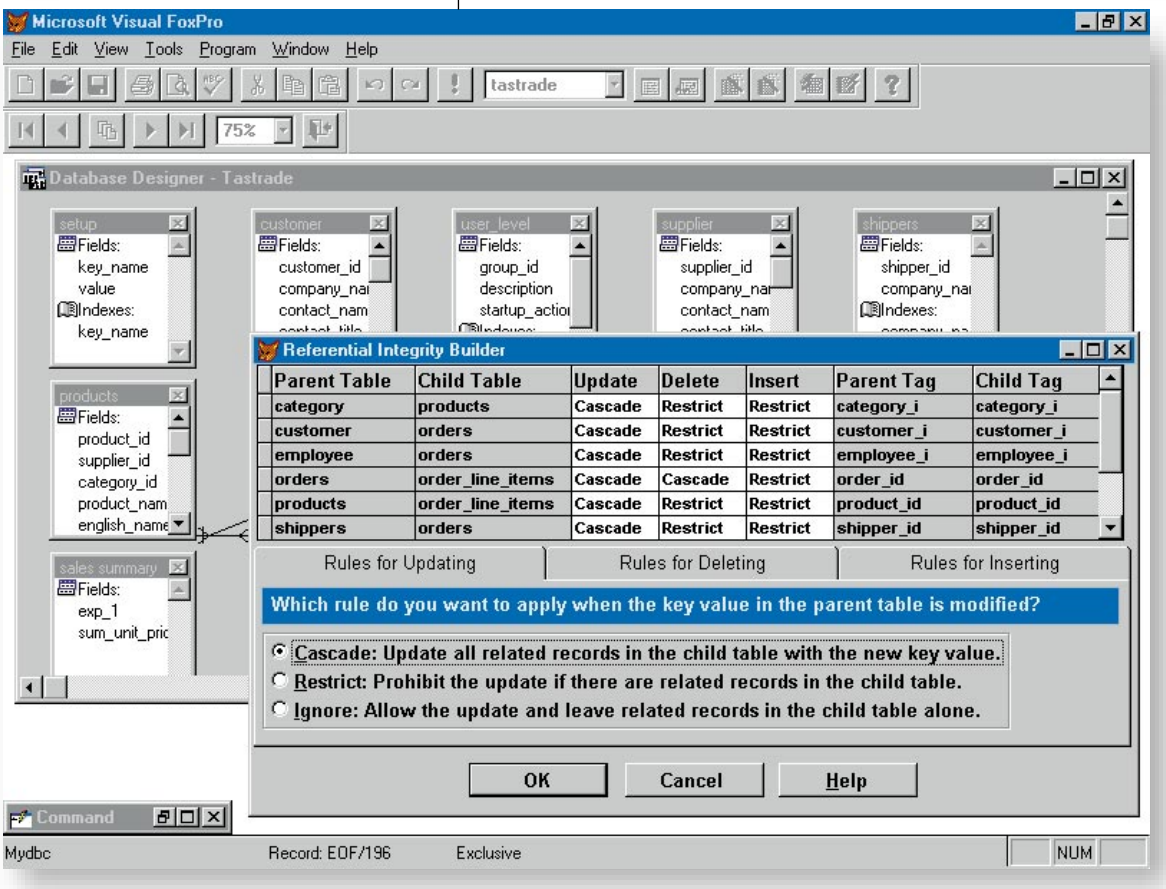
PCW Details

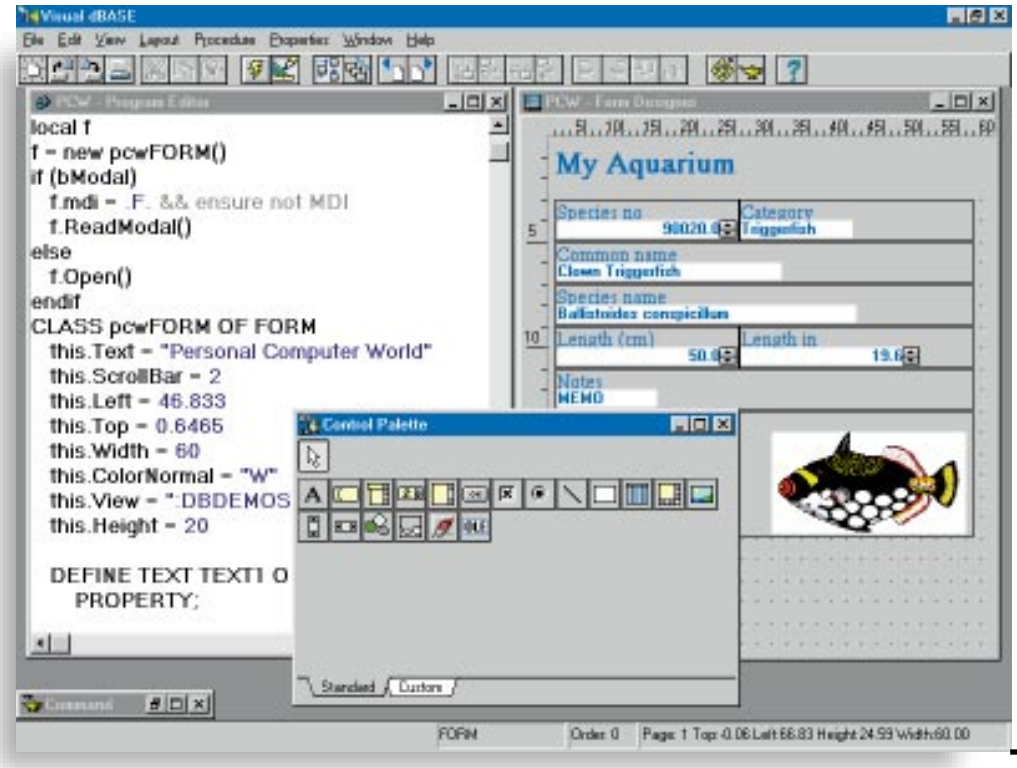
Visual FoxPro
Price £159 standard, £349 professional
Contact Microsoft 01734 270001

Good Points OO, fast database engine, improved DBFs.
Bad Points System requirements, bloated language.
Conclusion Great if your hardware can cope.

Visual dBase 5.5

Borland's visual version of xBase addresses the same problems as Microsoft's effort, but solves them by a





With Visual dBase, Borland has at last delivered an excellent xBase Windows product. While probably too late to make a great impact, there are some great features like the "two-way tools" illustrated here. You can switch between editing the code which defines the form (left), or doing visual development (right), giving the developer the best of both worlds

different route. After an unsatisfactory first attempt with version 5.0, Borland have evolved Visual dBase into a highly capable product. The database engine is the same as that used in Paradox and Delphi, which means that dBase developers can if they wish use the superior Paradox table format, or connect to server databases via IDAPI drivers or ODBC. There is good object-orientation including visual classes, and impressive "two-way tools" that let you switch between writing code and developing visually. The interface is snappier than that found in FoxPro, and the product performs well in 8Mb.

Visual dBase does have weaknesses. It is less comfortable than FoxPro with very large databases, although arguably these should be handled by a SQL server engine in any case. The report writer is merely a bundled Crystal Reports. It is a 16-bit product with VBX but not OCX support. But the main problem with Visual dBase is not the product itself, but its history. Many xBase developers have deserted to FoxPro, Access or other products, and newcomers see it as a language for legacy systems. There is also tough competition from Borland's own Delphi, which uses the same engine but with a faster, more flexible language.

Getting at data

A high proportion of software development is either database software, or needs to connect to a database as some part of its functionality. As a result, all visual development tools offer some database support, some have complete database engines built in, and others exist solely to build workstation applications for client-server systems. Many traditional distinctions have become blurred as PCs have become more powerful and more often networked. For example, desktop favourites like Paradox, dBase and FoxPro can function as client-server front-ends, while server databases like Oracle, Interbase and Watcom SQL can be used as PC desktop databases. A lot of tools now support ODBC, the Microsoft-sponsored standard for database connectivity, and despite much groaning about inconsistent standards, poor drivers and version control problems, its use seems to be growing. A properly set-up ODBC installation can perform very well; but there are plenty of pitfalls. Whatever method is chosen, the golden rule is to be sure that satisfactory performance is possible on the intended target system before adopting a specific solution.

This is particularly important when evaluating vendor's performance claims. For example, Borland's Delphi and TopSpeed's Clarion compile to native machine code and therefore execute your code faster than alternatives. That does not mean that database searching and updating is necessarily faster, as that depends on the performance of the network and of whatever database drivers and engine are being used. Since database drivers and engines are invariably compiled to machine code, these should perform equally well with a compiled language like Delphi, or an interpreted language like Visual Basic. Another factor is that under Windows any application spends much of its time calling the Windows API, and these functions execute at the same speed irrespective of which application calls them. In most (but not all) applications, wresting good performance from the back-end database is more important than the execution speed of the client front-end.

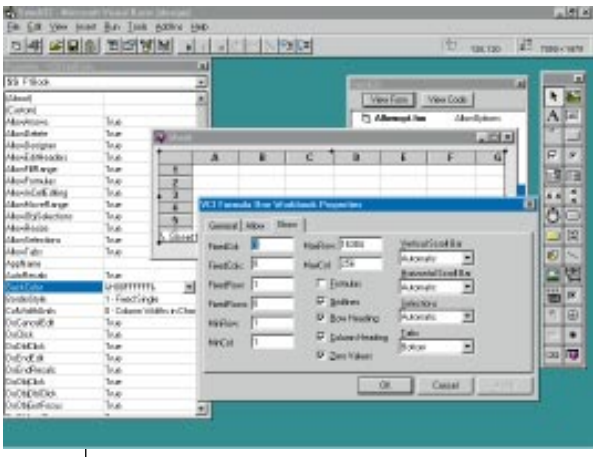
PCW Details

Visual dBase 5.5
Price £169
Contact Borland 01734 320022

Good Points Two-way tools; works in 8Mb.
Bad Points Crystal Reports; slower than Delphi.
Conclusion The best dBase yet.

Visual Components

Until recently, visual component meant VBX, and there is a huge number available. Since the launch of Visual Basic 4.0 in September 1995, the VBX has given way to the OLE control, OCX standard. But OCXs are of limited use under 16-bit Windows. Some applications, such as Microsoft Access 2.0, do support the 16-bit OCX, but Visual Basic 3.0 does not, thereby greatly reducing the market. Many Windows users have not yet upgraded to Windows 95 or NT, and many VB users are (justifiably) staying with VB 3.0 for 16-bit development. Realistically, VBX remains the standard for the Windows 3.1 installed base, with OCX the 32-bit format. Both categories are well supplied, with hundreds of add-ons available. Here, we look at a key example, along with comments from component vendors themselves about how they see the future.



Top *Formula One does a very passable impression of Excel*
Above *Right-click an OCX control, and it displays a property sheet through whch it can be customised*

Formula One

Ever since Visual Basic 3.0 was released with a feeble bundled grid control, the add-on market has been bursting with replacements. Of these, Formula One is currently the best. The newest version 3.0 release is OCX-only, but does come in both 16- and 32-bit versions. One of its most important features is support for the Excel 5.0 file format, making it more or less compatible with Excel 7.0 as well. Not all Excel's features are supported: charts, VBA modules and function arrays, for example, are ignored by Formula One. Care is needed, since if your application reads an Excel file, changes it and writes it back, any unsupported elements in that sheet are lost for good. But partial compatibility is better than nothing.

Using Formula One is a matter of installing it into your application and then setting its properties. In most environments, right-click on the control to display its property sheet. This also gives you access to a workbook designer, essentially a mini spreadsheet application that allows you to create and design worksheets.

Formula One has a particularly strong range of formatting options. Its real power lies in 130 built-in functions, which your application can use to analyse data.

One feature of Formula One will lose as many friends as it gains. It will no longer connect to a Visual Basic data control, and instead connects directly to any ODBC source. Visual Components have their eye on the broader range of OCX containers, and have chosen to adopt this more universal solution to data access. But VB developers will miss the ease of use offered by quick connection to a data control. It also means that distributed applications will need a correctly configured data source, a process notorious for its many pitfalls.

Formula 1 costs £195, from Visual Components Europe on 01892 834343

Component vendors speak

Tim O'Pry is President of MicroHelp Inc, a leading creator of add-on components. "The VBX design never was open. It was solely for Visual Basic, and Microsoft were surprised by its growth. Although other vendors started supporting it, Borland for example, the market was always 90% VB. Developers in other languages did not embrace it — its performance wasn't good enough.

"OCX, on the other hand, is pretty good. It does carry a lot of baggage, and OLE on a 16-bit operating system is not practical. It runs better on Windows 95. With NT on a Pentium OLE begins to make real sense. My opinion is that it will be two or three years yet before it really catches on. Until then, the VBX is not dead, and those still writing for 16-bit will continue to use it."

Tim has mixed feelings about Visual Basic 4.0. "They've got to get rid of all the overhead. Executables need a minimum of 1Mb in runtime add-ons. I would like to see a native code compiler — there's no technical reason why not." Even so, he doesn't see VB losing out to rivals. "Delphi is interesting and neat, but I don't see it supplanting C++ or VB." Microhelp will not therefore be producing Delphi VCLs. What about SOM and OpenDoc? "OpenDoc is very interesting. But it doesn't have the staying power, because the people behind it can't make it stick. Novell is backing away from OpenDoc. I don't think it has much of a chance. Distributed OLE is the wave of the future, but it will take a while yet."

David Whitehead runs Contemporary Software, part of Intersolv and a leading component distributor in the UK. He agrees that the OCX market has been slow to get going. "A number of people haven't the hardware to use OCX, but are unwilling to user VBX controls. And the OCX standard changed a few times right up to the release of VB 4.0." Despite the popularity of Delphi, David does not see much market for VCL components. "Crystal have built a VCL control, but others are hoping that Delphi will follow the OCX standard. Borland will have to go to OCX."

Case Studies: Real-world Visual Development

Delphi Rules

Mark Smith is a contractor and independent consultant. "Compared with Visual Basic 3.0, I find I can deliver Delphi applications in about 60% of the time. The environment and toolset is richer and more reliable. The components that one gets to use within Delphi generally offer more features, and work better than in Visual Basic. And a Visual Basic application gets slower and slower as you add bound controls. With Delphi, this doesn't happen. The controls don't have the same overhead. I've used C++ as well but Delphi is a great deal easier to program. As for Visual Basic 4.0, I'll have a look at the Enterprise edition. But the next version of Delphi offers more, with enhanced 32-bit capability."

Mark also likes the Borland Database Engine. "I'm happy with it. Access people say it doesn't offer updatable queries. But you can have a query running, and bind a table to it, to give the same results. And it is fast." Mark's main frustration is with Delphi forms. "I would like to be able to wrap up forms as components. For example, a generic database form that other order entry forms could inherit from. At the moment you can't do proper subclassing with forms."

Visual Basic

Nick Marsh leads the development team at NBI Information Management Services, creating software for document management and workflow systems. "We're writing client-server front-ends, with various servers including Oracle, SQL Server and Ingres. Visual Basic is a good all-round tool, extensible through VBX controls. It is widely accepted by our clients, and it's easy for us to recruit staff. We do write some code in Visual C++. But we need rapid application development, and for that C++ takes too long and requires a greater skill level."

Nick's main problems are with the links to server databases. "In order to get performance, we've had to use the SQL passthrough option which to some extent negates the advantage of ODBC, in that your SQL has to be different for each back-end database. There are also limitations on using the data control, so you lose out on some of the benefits. In this respect VB doesn't compare so well with development environments where access to the back-end database is more tightly integrated, like Gupta's SQL Windows or Oracle's Power Objects.

"We looked briefly at Delphi and loved the development environment. I'm not sure about the database engine. Also, we've got an investment in Visual Basic code and tools, and it would be hard to make a jump to another language and environment. It may not be the best in every way but you can achieve good results."

Combining Visual Basic and C++

Brian Syme is a software engineer at Conic Systems, producing geographical information systems (GIS) software for the Ordnance Survey and local authorities. "The front-end is Visual Basic, but the GIS engine is in Visual C++. It's a 5Mb VBX! I like the separation between VB which keeps it simple, and hiding the complex stuff in a VBX written in Visual C++." Given this separation, Brian is happy with VB's performance. "A Visual Basic compiler would be a complete and utter waste of time. If you want that kind of performance, use Visual C++.

"We use OLE heavily. OLE automation is how we talk to our code engine. You can't give a VBX 500 properties, so instead we create an OLE object which you can control from VB. We had to roll our own interface classes. Now that we have OCX controls, it's all a bit out of date. But we don't plan to support OCX yet, maybe in six months."

Given OLE's mixed reputation, is performance a problem? "Excel on an 8Mb PC is always going to be slow; but there are other snags that are not so obvious. For example, the OLE compound file that is provided by default in the OLE DLLs is very slow. So we've created our own file format. In fact, Microsoft themselves have fudged it in Word 6.0 for the same reason.

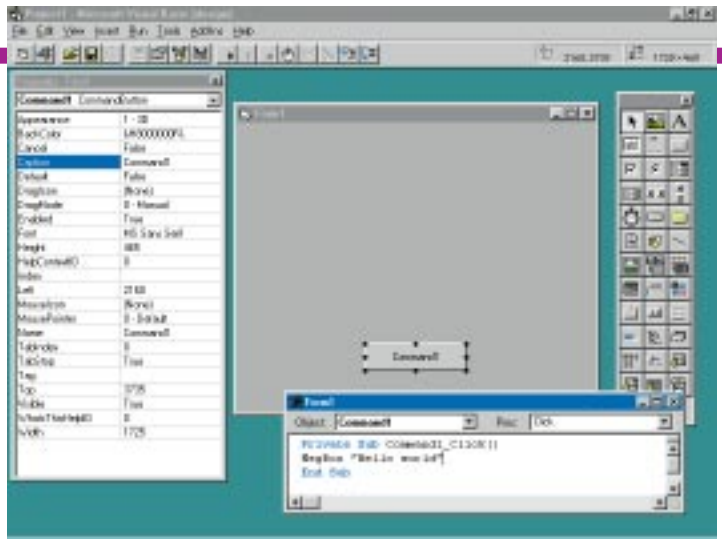
"I like Visual C++ but in other ways I tolerate it. I started with Microsoft C7 and wasn't much impressed. Borland C++ was much better. But it was MFC that I liked, much better than the Borland library. We tried the Watcom compiler but found a significant advantage in Visual C++. There are problems, for instance with the standard libraries. The memory allocator is hilariously slow. But Microsoft produces a release of VC++ every three months, and the other vendors can't keep up. It's not that they're anti-competitive, they're just competitive."

Visual C++

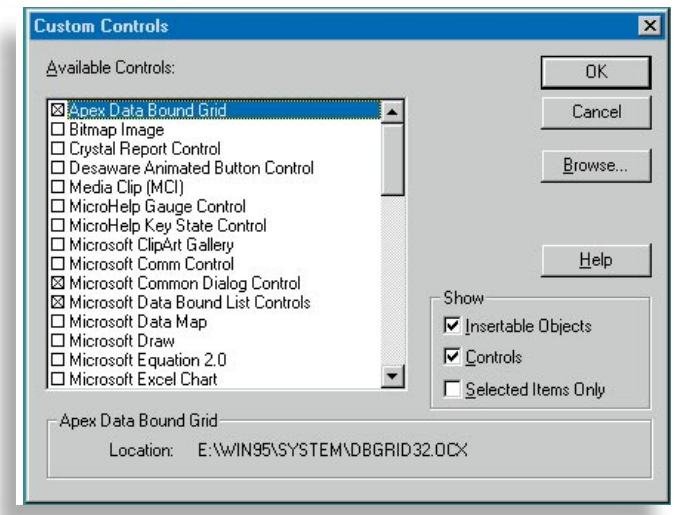
Gary Pearson is Development Manager for Tele-Connect Systems, producing a scriptable Windows toolkit for the tele-marketing industry. He uses Visual C++ exclusively. "First, it's the nature of the telephony industry. You have lots of C-level APIs. Second, MFC is the market leader in windowing class libraries. We did evaluate others, Zinc for example. We found that because they deal with several different platforms they implement a lowest common denominator approach. MFC is a thin layer over the Windows API. It's very easy for us to extend it. Others, like Borland's OWL, constrain you into their view of the universe.

"We view OLE 2.0 as key to Microsoft's future. It has pains from a development point of view, with the COM model yet another flavour of the OO paradigm. But once the architecture is in place, it does pay dividends." Gary doesn't think SOM is likely to take off. "We're driven by customer demands, and they tell us it must be Microsoft and OLE." Would he consider Delphi? "There are a glut of C++ programmers in the world, and not many Pascal. And C++ is still the best of the breed."

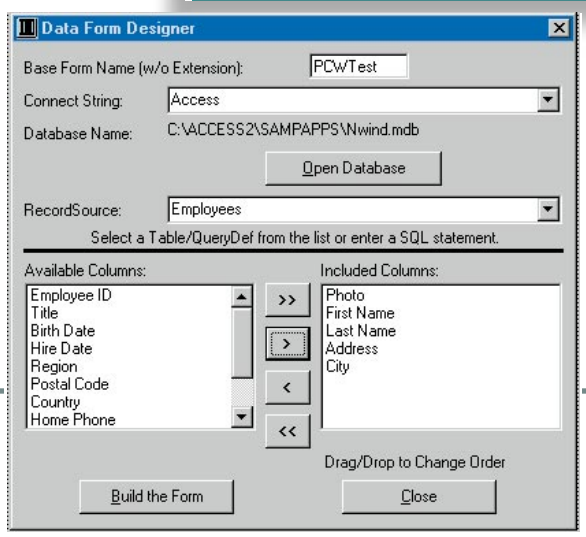
Visual Basic 4.0



First steps in Visual Basic



In Visual Basic, any OLE insertable object can be used as a custom control



One route to fast application development with VB is to use the data form designer, an add-in which creates database applications

Visual Basic is a modern classic. This is the language that brought Windows programming within reach of mortals. This is the tool that created a new market in add-on components. VB is the product that even IBM seems to see as an industry standard, to the point where it is implementing its own equivalent. So Visual Basic has a glorious past; but what of the future? A few months on from the release of Visual Basic 4.0, and amid intense competition, it is not yet clear whether it will maintain its position.

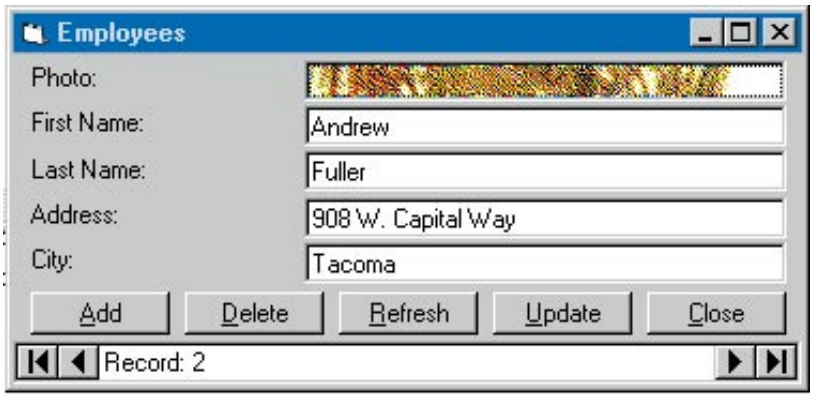
Microsoft has released VB in three separate versions. The Standard is aimed at hobbyists, the Professional for general development, and the Enterprise for implementing client-server databases. The language interpreter is Visual Basic for Applications, the common macro language also found in Excel 5.0 and above, Access 7.0 and Microsoft Project. In due course it will migrate to Word as well. VBA is an excellent general-purpose language, although not fully object-orientated. Version 4.0 does allow you to create class modules that give the benefits of encapsulation, but not inheritance. A common complaint among power users is over the lack of pointers or callback functions; others argue that such would endanger VB's ease of use.

All the standalone VB packages come bundled with the Jet database engine, the same as that used by Access. The professional version comes with additional custom controls and full programmatic database control. Version 4.0 has greatly improved these database features, which are equal to those in Access itself including administration of security, users and groups. Enterprise adds a remote data control for faster access to database servers, and the Visual SourceSafe team development manager. Note that the entry-level Standard version only works on Windows 95 or NT, so to obtain 16-bit Visual Basic 4.0 you need the Professional or Enterprise edition.

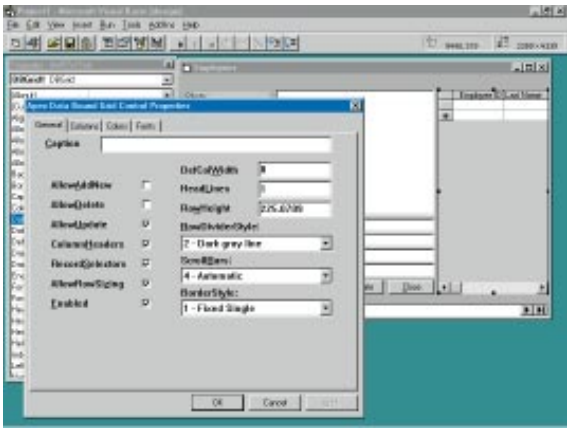
The essence of Visual Basic is its simplicity. Drag controls from the toolbox onto a form; set properties; write custom code in Basic; then click run. To distribute an application, it can be compiled into an .EXE file, usually of modest size. The target PC will also need one or more runtime libraries, along with any needed OLE controls, and there is a setup wizard that automates the creation of installation disks. It sounds delightful; but what if your application is complex? The answer is that Visual Basic is highly extensible. You can call functions in any Windows dynamic link library, including the Windows API itself. You can use OLE automation to draw on the resources of other applications, although this may not be suitable for applications that need to be distributed. Finally, you can include

OCX components (or VBX in the 16-bit version), add-ons which are generally written in C++ and which fit seamlessly into the Visual Basic programming environment.

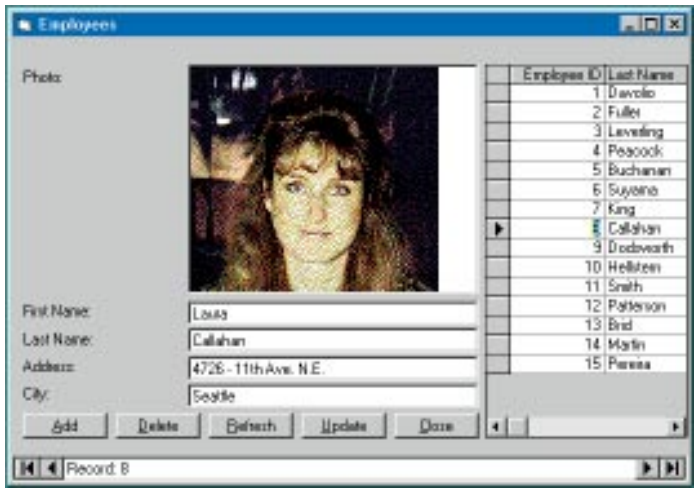
Does VB enable code re-use? It sort-of does. Class modules can be designed for re-use. Another option, in the Professional or Enterprise editions, is to compile VB code into an OLE server DLL, where it can be used not only by VB but by any OLE client application. Finally, OLE Controls are a great example of code re-use, and Visual Basic is their prime container even though it cannot create them. Therefore, careful use of Visual Basic alongside other tools can enable you to re-use code. But the counter argument is that VB makes it easy to write sloppy code that is hardly maintainable, let alone re-usable. In the end, it is skilled programming that makes the difference.



Above *Hmmm. VB has done a fair job, but the photo doesn't seem quite right*



Right *Back in VB, it only takes a moment to resize the bound OLE control containing the photo field*



Left *The revised application runs fine, and so far not a line of code has been written. Examples like this make a good demonstration, but real-world database apps are not so easy*

VB's split personality

It seems that Visual Basic has three distinct roles. The first is for instant *ad-hoc* applications, a role it fulfils admirably. With the right custom controls and a smattering of Basic knowledge, handy utilities can come together very quickly. All the same, one has a niggling suspicion that Visual Basic 3.0 was just as good for this, with the added convenience of running on just about any PC that runs Windows. VB 4.0 is much more demanding, especially when OCX controls or data access objects are used.

Second, Visual Basic is the macro language of Windows. Here it excels, particularly as more applications emerge with OLE automation support. With VB you can surf Windows, getting data from one application, processing it in another, and sending it to yet another for printing or presentation. The new OLE server capabilities open up still more possibilities, letting you create applications which any client program can easily access. Again, the only worry here is the heavy system demands of this kind of programming. If that is not an issue for you, VB is great.

Third, you can use Visual Basic for serious application development, especially database work. Although it lacks the database-specific language of, say, xBase or PowerBuilder, VB's general-purpose nature brings better flexibility. JET is a good database engine, which, combined with ODBC and the remote data control in the Enterprise version, makes VB a real contender for this kind of work. But if a company is investing the professional skills of a programming team in a major project, why use a semi-OO interpreted Basic which will run out of steam when asked to do intensive processing? All too often, large VB projects turn out to be performance slugs since the language is being pressed beyond its natural capability. Microsoft's answer is to use Visual Basic alongside other code written in C or C++, and some do like to work that way. The obvious counter is that if you need to use C++ at all, why not go the whole way and use it exclusively?

The arguments will run and run. Visual Basic is still a good package, but for many projects no longer the obvious choice.

PCW Details

Visual Basic 4.0
Price £69 standard, £329 Professional, £649 Enterprise
Contact Microsoft 01734 270001

Good Points Ease of use; range of add-ons; OLE automation.
Bad Points Heavy system requirements; needs to be mixed with C for best performance.
Conclusion Still a good tool for fast development or prototyping.

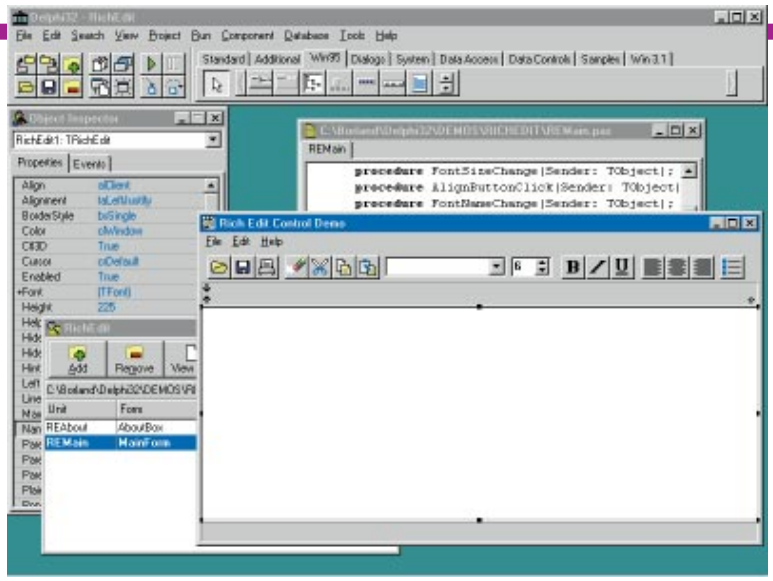
Delphi 2.0

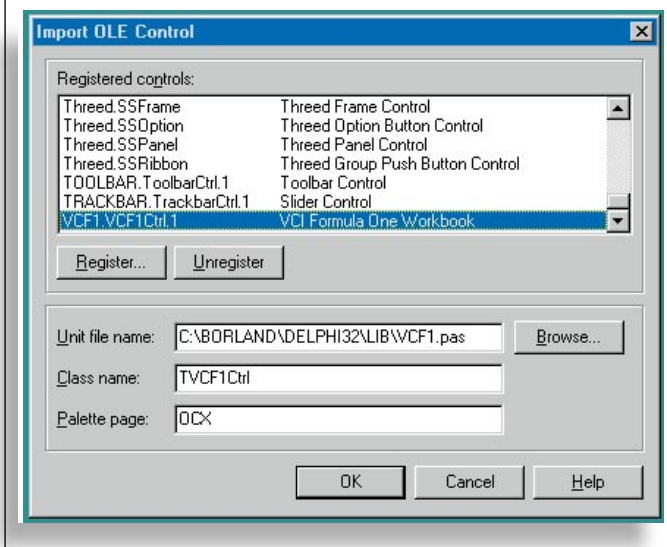
Delphi is a visual programming tool which falls between Visual Basic and the C++ products. A highly innovative product, Delphi combines an Object Pascal compiler with a class library and an integrated development environment including a form designer. A 16-bit version of Delphi has been available for some time, but for this test we used a beta version of the new 32-bit Delphi. Although this adds useful features, it is not radically different in use or in appearance.

Delphi does visual development through an interface superficially similar to Visual Basic. Components are dropped on forms from a palette, their properties set from a property window, and the application tested by clicking a run button. But internally Delphi works in a different way. There is a direct link between the Object Pascal class library and the components you place on forms, and as you build the interface, Delphi generates object-orientated code. You can seamlessly switch between visual and textual editing, making for quick development. When you run the project, Delphi does not use any runtime interpreter but simply compiles and executes the application. Borland's compiler is much faster than most others, so not too much development time is spent waiting for it to finish.

The language of Delphi is Object Pascal, based on standard Pascal but so much extended and developed by Borland that it is effectively proprietary. Delphi applications are not easily ported to other environments. But Object Pascal is genuinely full-featured, at the low level of pointers and memory allocation as well as the higher level functions more common in rapid application development. It also compiles to native code, bringing lots of performance advantages. The new version of Delphi has eased a source of irritation, by creating a new Pascal string type of unlimited length. This is compatible with the old-style string type, but can also be freely typecast to C-style strings. Borland has also introduced a variant type primarily for use with OLE.

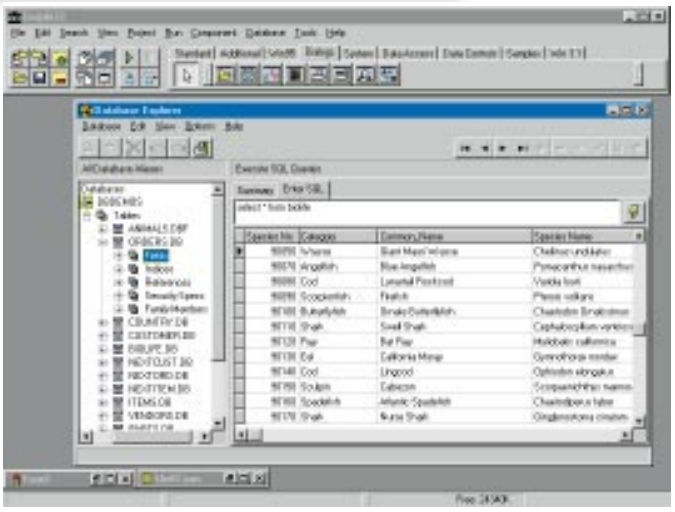
The real benefits of Delphi come over the long term. Because Delphi is written in itself, it is totally open and extensible. You can create your own components, install them on the component palette, and use them in the same way as those originally supplied. These can be modified versions of standard components. Another advantage is that Delphi structures code into units. These are code modules with a public interface section, for the variables and functions that are available to your application, and a private implementation section to





Above *The main elements of Delphi are shown here: object inspector, code editor, form designer, project manager, toolbars and menus*

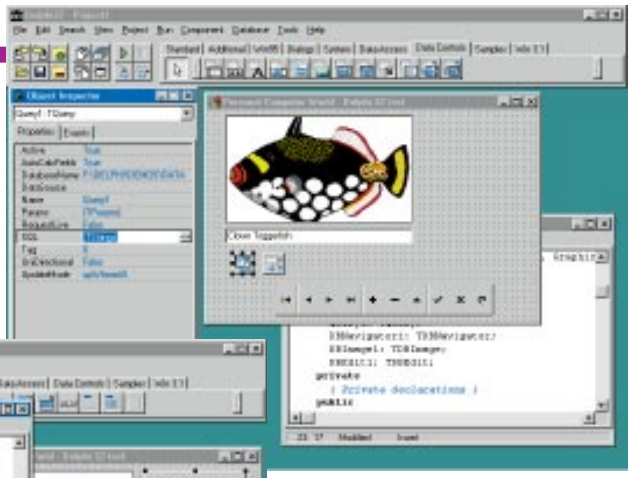
Left *From this dialogue you can import OCX controls into Delphi*



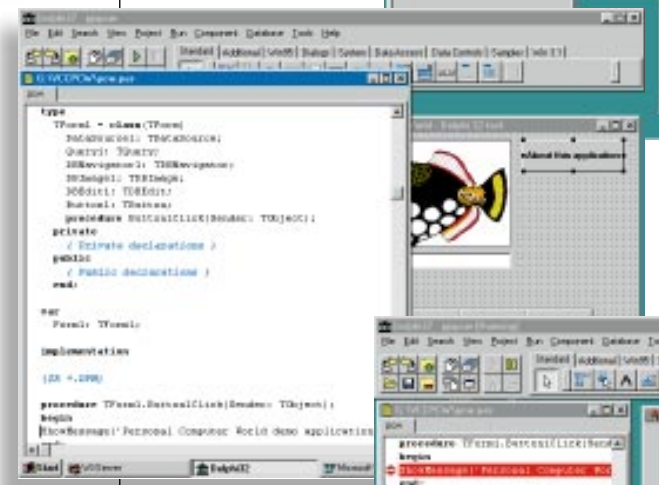
Right *The new database explorer lets you browse through available databases, both local and server*

contain code that actually implements those functions. The advantage of this is that it encapsulates your code in a bullet-proof wrapper, especially valuable if you want to use the unit again in another project.

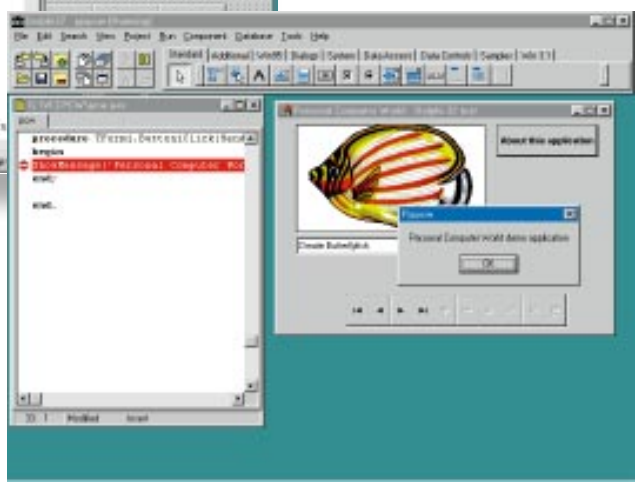
Delphi comes with the Borland Database Engine, and Borland emphasises its potential for creating client-server front-ends. The client-server version comes with drivers for a variety of databases along with a local version of Borland's own Interbase server, now a 32-bit product. The ReportSmith report engine is bundled into the package to make it a complete database solution. In assessing Delphi, it is important to separate these elements. For example, ReportSmith is no better than the widely-used alternative, Crystal Reports. The database engine gives good performance, but it is a large runtime .DLL in the same way as Microsoft's JET engine. In other words, Delphi's language and compiler are ahead of the pack, but its database and reporting elements are more directly comparable to the competition.



Right *Simple database applications are easily constructed in Delphi*



Left *Delphi generates code on the fly. Here, a button has been added to the form and double-clicked to open its default event procedure*



Right *Delphi's Run button compiles and executes the application*

Categorising Delphi

Delphi's quality has gained it an instant and enthusiastic following, and the 32-bit version brings it up to date with Windows 95, NT, and OLE. It's a natural choice for those who find Visual Basic too slow or restrictive, but are not ready for the rigours of C++. That said, it's not as easy for beginners as Visual Basic, nor is it as sophisticated and complete as the heavyweight C++ products. For database solutions the new version looks substantially improved, but you should check that the Borland Database Engine will do what you require before adopting a Delphi solution.

A problem is that native Delphi components, written with the Visual Class Library, are only useful within Delphi, unlike OCX components that are potentially universal. For this reason, third-party support for Delphi components is not extensive. Delphi can use OLE controls, but at the time of writing it is not clear whether Borland will implement an easy way of creating them. Delphi is already a successful niche product, just as Clipper used to be among DOS database developers, but must integrate fully with OLE and other Windows features to achieve widespread adoption. Another snag is that Delphi is Windows-only, offering no help to those wanting to implement cross-platform applications.

That said, Delphi has unique strengths and is the only rapid application tool that compromises neither performance nor flexibility. It therefore exposes the weaknesses of both higher-level languages like Basic and xBase, and the lower-level C and C++. Delphi is special indeed.

What's new in Delphi 2.0

The beta version of Delphi 2.0 available for this test was not quite feature complete. However, it already implements the following new features:

- 32-bit compiler and database engine. The compiler is now shared with Borland's C++ and creates smaller, faster executables.
- New data types for long strings, wide (unicode-compatible) chars, and variants.
- Support for Windows 95 common controls.
- Include OCX controls in your application.
- Create OLE automation clients and servers.
- Database explorer with interactive SQL.
- Visual form inheritance as with other controls.
- 16-bit projects can be imported and converted to 32-bit.
- Delphi 1.0 and 2.0 can share Pascal and form units, but not project or resource files.
- Multi-error compiler identifies all errors on first compile.

PCW Details

Delphi 2.0
Price Not yet available
Contact Borland 01734 320022

Good Points Fast, slim, OLE support, database connectivity.
Bad Points Pascal can be tiresome.
Conclusion Sets new standards for rapid application development.

Watcom C++ and Visual Programmer

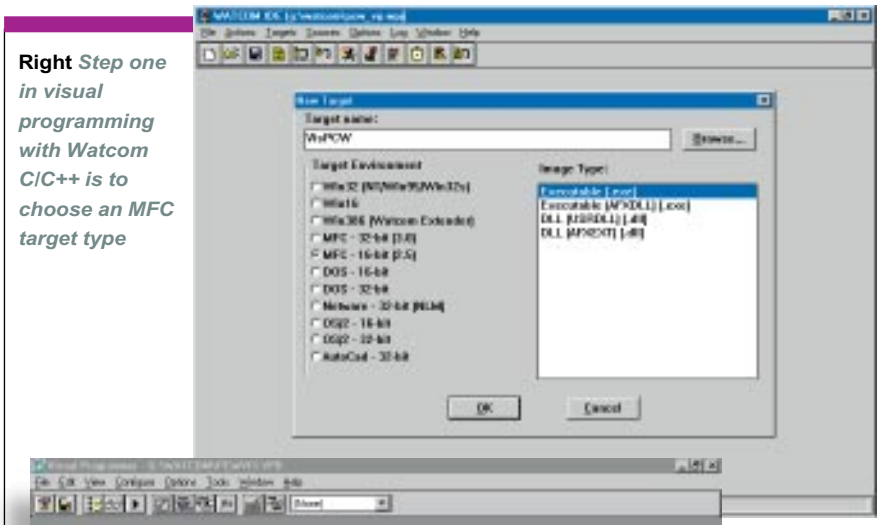
Watcom's compiler technology has always been highly regarded. Originally a Canadian company, Watcom is now part of Powersoft, itself a division of Sybase. The development of Watcom C/C++ has continued, and it is now at version 10.5, with a free upgrade to 10.6 and full Windows 95 compatibility promised to all registered users. In contrast to Microsoft, Watcom's clear focus is on the language and compiler, at the expense of the IDE and tools. Watcom's IDE is crude and hardly integrated at all with its code editor. It is not uncommon for Watcom developers to use their own editor and to compile from the command line. Watcom enthusiasts endure these rigours for the sake of fast executables and very flexible targetting: all varieties of Windows, DOS, OS/2 including Warp, or Novell NLM.

All this is hardly visual programming. But Watcom C/C++ now comes bundled with Blue Sky's Visual Programmer, a cut-down version of the high-end WinMaker Professional. WinMaker Pro costs around £1,200, which makes the Watcom/Visual Programmer bundle good value at about £200. Watcom has licensed MFC from Microsoft, and Visual Programmer generates MFC code, so you have all you need to create Windows executables visually.

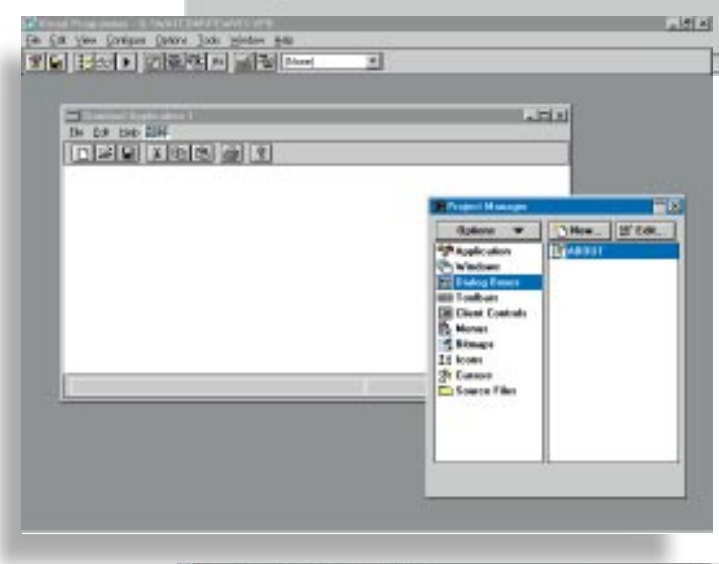
Visual Programmer has some impressive features. One is the Quick Run option, which enables you to test your application without compiling the code. Of course it will only run the parts that are auto-generated, and ignore any user-added code. But this is a great time-saver when creating an interface. Blue Sky has also addressed the problem of maintaining and improving an application after it is first generated. The code generator, called a Switch-it Module, generates its code in base classes and user classes. If you add user code, and then go back into the visual programming environment, the base classes will be updated while the user classes are left unchanged. As long as you are careful not to edit the base classes, it should be possible to continue to use Visual Programmer as your application grows. All the generated code is 16/32-bit portable, simplifying the job of developing for both old and new versions of Windows.

Most Windows development tools have a good dialogue designer, but that is no help if you decide to draw controls directly in a window's client area. One of the strengths of Visual Basic's form designer is that you can place controls in any kind of window. Visual Programmer finds a compromise solution which comes close to VB's flexibility. When you create a new window, you can choose a "client area controls" option. A client area control is a borderless dialogue which exactly fills the window's client area, enabling you to place controls anywhere within it. You cannot use client area controls in MDI applications.

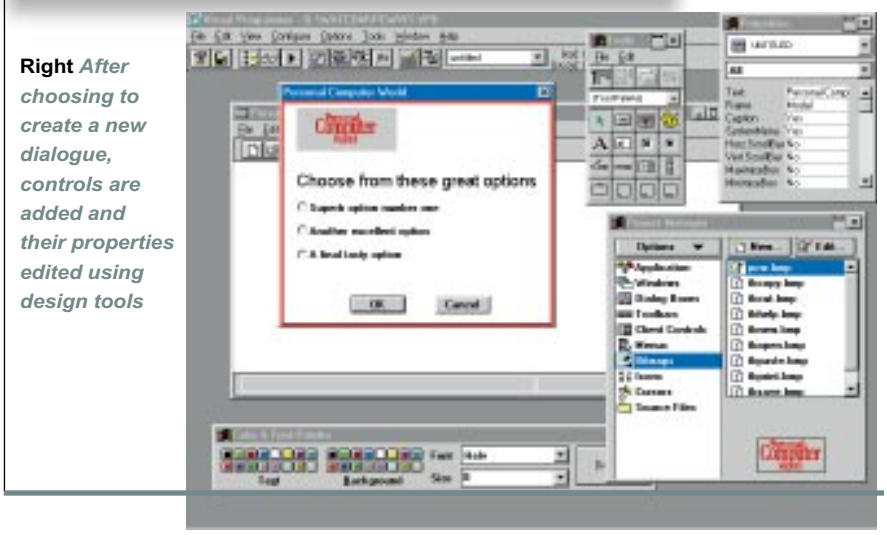
Visual Programmer has several additional features to further speed your



Right *Step one in visual programming with Watcom C/C++ is to choose an MFC target type*



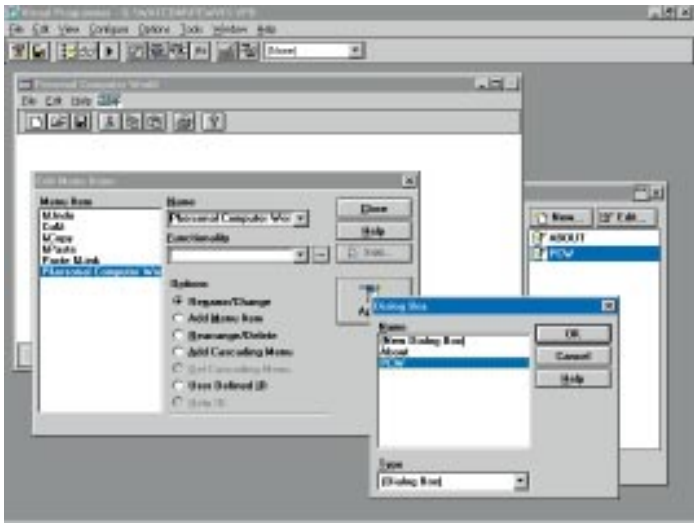
Left *From the Watcom IDE, select Visual Programmer and choose an application template*



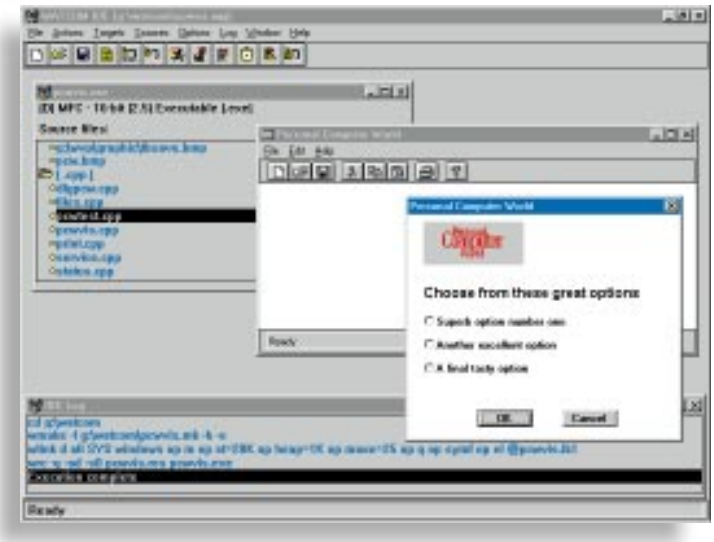
Right *After choosing to create a new dialogue, controls are added and their properties edited using design tools*

development efforts. One is templates, which can be used at several levels. For example, you can save any application as a template, in which case it can be used as the starting point for further designs. You can also create dialogue box, toolbar and client area control templates. Another possibility is to install Extended Functionality Modules (EFMs). These are extensions to Visual Programmer that generate code for common operations. For example, there are supplied EFMs to handle the Windows common dialogues such as Print and File Open.

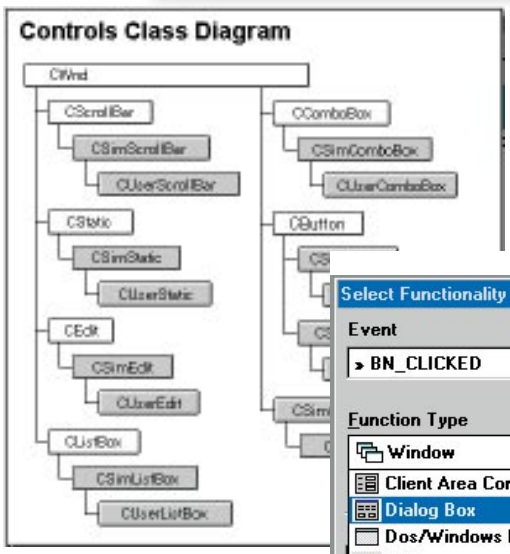
There are limitations to Visual Programmer. Some are deliberate, as Blue Sky presumably hopes that some Watcom users will upgrade to the full WinMaker Professional package. WinMaker Pro adds VBX and multimedia support, and generates code not only for MFC but also for Borland's OWL class library and other platforms. Other problems will not be so easily solved. For example, Visual Programmer supports only a basic range of controls, perhaps because of its cross-platform ambitions. If you decided to implement something like a tabbed dialogue box, you would have considerable coding to do, especially with the lack of VBX support in the cut-down version. It is not yet clear whether the 10.6 Watcom release will incorporate the Windows 95 common controls into Visual Programmer or not. To do so would mean replacing MFC 3.0 with MFC 4.0, a major change for a point release. But if not, Watcom can scarcely claim "full support" for Windows 95. And what about OCXs and OLE automation? Another disappointment is that Visual Programmer has no integrated database support, despite the ODBC classes that are part of MFC. That leaves a rather small niche for Visual Programmer, for developers who need an application builder that goes beyond what AppWizard in Visual C++ can do, but who are content with a simple, functional interface. It's frustrating, because there is potential here for something to bridge the gap between Visual Basic's ease of use and the performance of native compiled code, for those who prefer to code in C++ rather than Delphi's Pascal.



Left *Clicking the menu bar opens a menu designer*

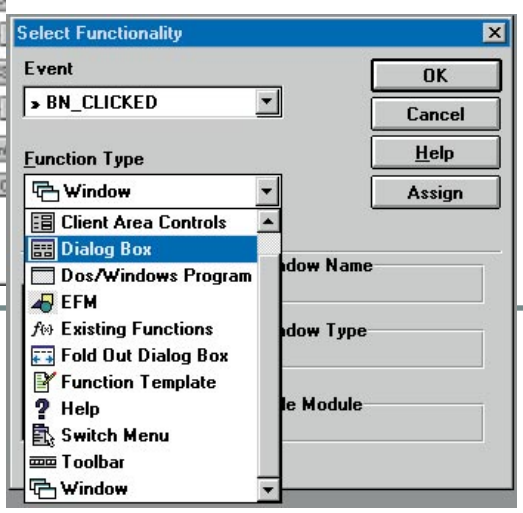


Right *Choosing "Save and Generate Code" in Visual Programmer automatically updates the Watcom project*



Left *This diagram shows how Visual Programmer achieves separation between generated code and user-defined additions*

Below *In Visual Programmer, you can automatically add functionality to controls without writing code*



PCW Details

Watcom C++ 10.5
Price £199
Contact Powersoft 01494 555555

Good Points Compiles for three platforms; includes Visual Programmer.
Bad Points Crude IDE, Windows features trail Microsoft.
Conclusion Great value but not the best.

Visual C++

It's C++ all right, but is it visual? That was the question many asked when the first version of Visual C++ was released. Fortunately for Microsoft, there is no clear definition of what it takes to call a product visual. Even so, Visual Basic coders who thought they should have a dabble with the similarly-titled C++ were in for disappointment. The dialogue editor looks passably like VB's form designer, but that's about where it ends.

Visual C++ is now in its third major version, called 4.0 to synchronise its number with the Microsoft Foundation Classes (MFC). It is substantially improved from version 1.0, yet many of those same observations still apply. Dialogue editor aside, there is no click-and-drag interface builder as there is in all the other products in this group test. Instead, what distinguishes this product is the use of visual elements to simplify and automate the handling of text-based C++ code.

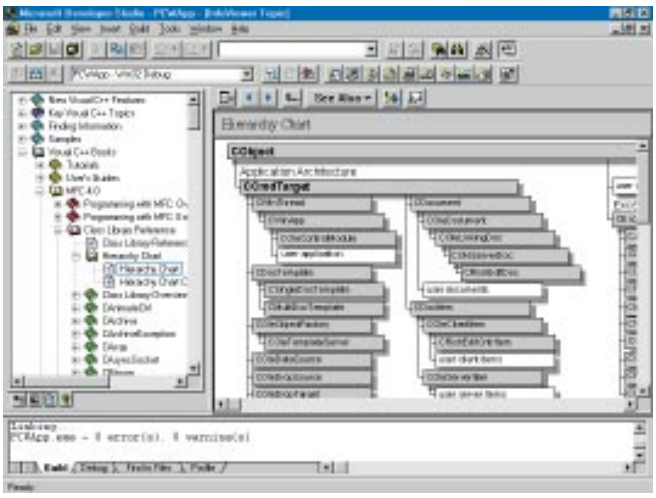
Here's a brief overview of what you get in Visual C++ 4.0:

• A C++ compiler which is capable although rather slow. Version 4.0 addresses compile speed by adding minimal rebuild and incremental compilation to the existing incremental linking feature. All these attempt to reduce the compilation effort by only redoing what has changed, and in combination they are effective. There are also new language features in this version, including namespaces, run-time type information (RTTI) and support for the Standard Template Library. These changes bring Visual C++ more into line with accepted C++ standards.

Visual C++ 4.0 compiles only for 32-bit Windows, although this does include the Win 32S extensions to Windows 3.1. It can only be hosted on Windows 95 or NT, and you would be foolish to run with less than 16Mb RAM, or 20Mb for NT.

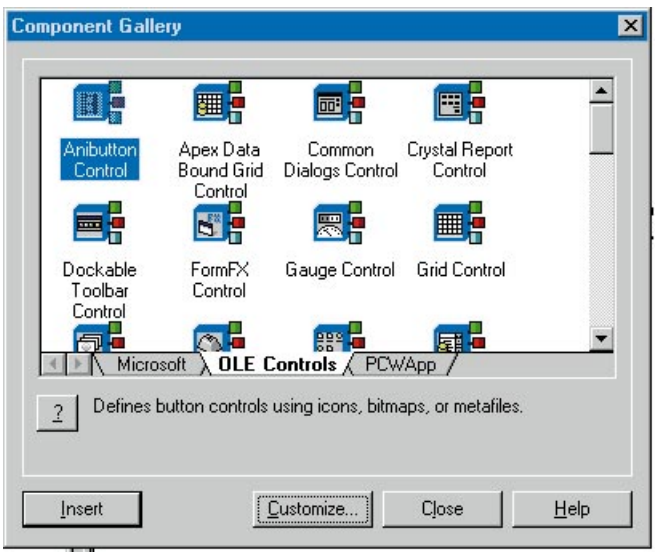
• The Microsoft Foundation Class Library (MFC). MFC aims to be a thin C++ wrapper over the Windows API, making it efficient although not as elegant as rivals like Borland's Object Windows Library (OWL). MFC is extremely popular, and particularly important when working with OLE in all its guises, which it greatly simplifies. The new versions of MFC and AppWizard make it easy to use OCX controls in your applications, as well as to create new OCXs of your own.

• A new integrated development environment called Developer Studio. This is an MDI application which must be one of the most customisable Windows programs around. Most windows can be "docked", in which case they behave like overgrown toolbars, left floating, or



Above *The Developer Studio splash screen leaves no doubt that this new IDE is intended to handle four separate products*

Infoviewer is fully integrated into Developer Studio and allows you to view all the online documentation as well as the Microsoft Developer Network CD, for those who subscribe to this additional service



The Component Gallery is a personal class library which makes it easier to use OCX controls or to re-use your own classes

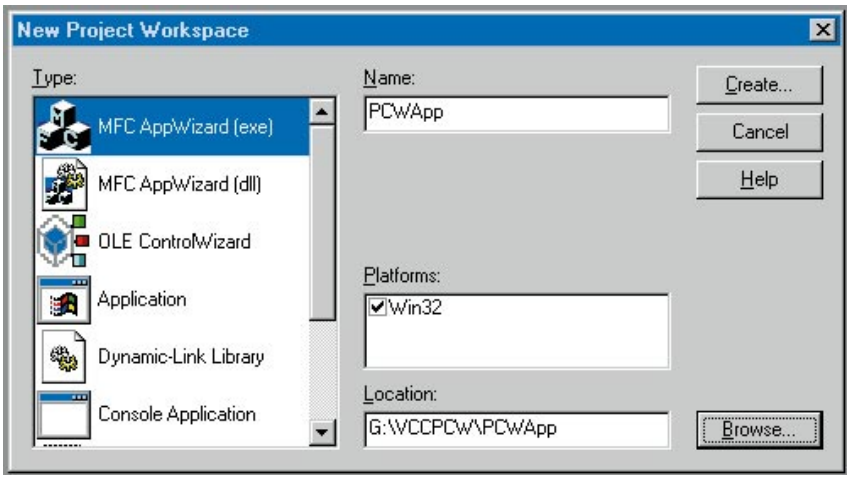
hidden altogether. Toolbars can be positioned anywhere or removed. The right mouse button is used extensively to display properties or activate functions. Editor, document viewer, class browser, debugging and output windows are all integrated, making a this a slick and comfortable programming tool. Be warned: a large monitor is strongly recommended.

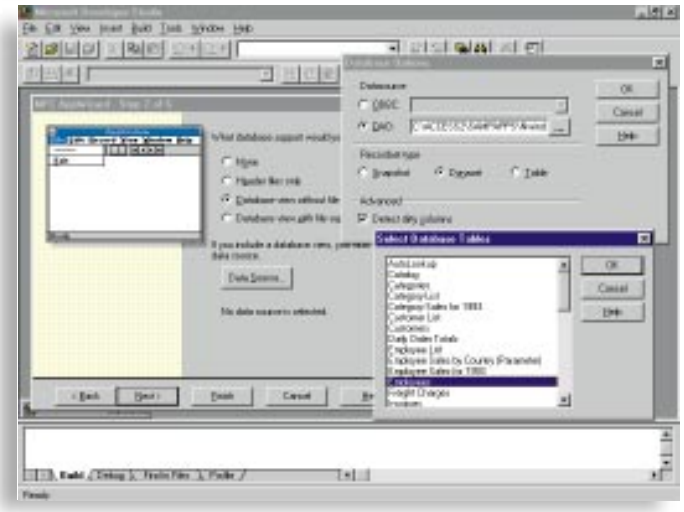
• A range of tools including AppWizard for generating skeleton applications, Class Wizard to edit class definitions, a resource and dialogue editor, a help workshop for creating Windows help files, InstallShield development kit for setup programs, and more.

• Visual C++ comes with two forms of database connectivity. There is continued support for ODBC. New in version 4.0 is Data Access Objects, a new set of classes which use the Jet database engine for accessing local or remote data. DAO give Visual C++ the same kind of database capability Visual Basic has had since version 3.0.

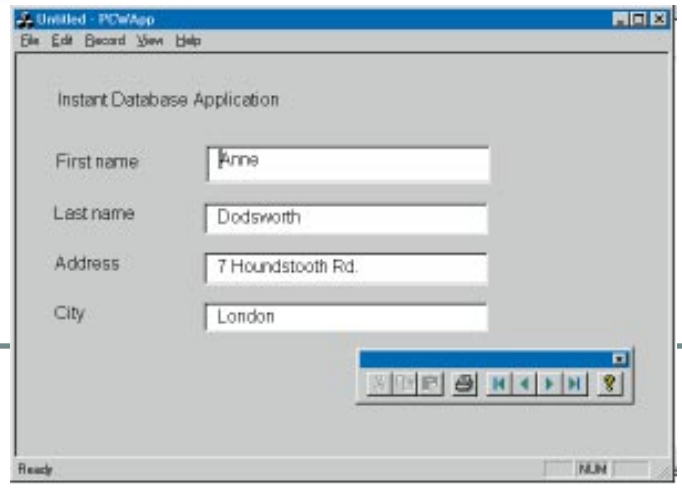
A lot has changed in version 4.0. One great new feature is the Class View tab in the Project Workspace window. Class View analyses your code (without needing to compile it first) and shows all the classes in a tree view, complete with colour coding and the use of small symbols to show whether member functions and variables are public, private or protected. Right-click is very powerful in class view. You can add functions or variables, set breakpoints, display definitions and references, and display derived or base class graphs. Overall class view makes Visual C++ substantially easier to use.

All those designers and usability testers at Microsoft must be doing *something* with their time, because Visual C++ 4.0 is extraordinarily well presented. It would be easy, but wrong, to assume that because the interface is state-of-the-art, so is the technology. In fact, Visual C++ must be reckoned a conservative product, more so than others such as IBM's VisualAge or even Microsoft's own Visual Basic. Even the new component gallery is not much more than a way to store C++ classes on disk and paste them into projects. One senses some deliberate caution here. A more abstracted class library, or more complete interface builder, would very likely cause more frustration than it saved. Here are all the tools you need to create up-to-date Windows applications, but there is no attempt to insulate you from the realities of programming a huge and complex API with a rather tortuous language. For that, Microsoft will point you towards Visual Basic. Visual C++ is for those who need a more complete and powerful development tool, and in version 4.0 it is better than ever.





Above *Creating an application in Visual C++ begins by choosing File-New and selecting Project Workspace*
Left *Choosing database support, using the new Visual C++ links to Data Access Objects driven by the Jet engine*



A finished Visual C++ application, complete with floating, dockable toolbar

PCW Details

Visual C++ 4.0
Price £350 subscription
Contact Microsoft 01734 270001

Good Points Superb IDE; latest Windows features supported.
Bad Points C++ is difficult; MFC can be convoluted.
Conclusion Hard to beat for Windows development.

VisualAge C++

VisualAge began life as a SmallTalk product. SmallTalk has an object-oriented pedigree second to none, but remains a minority taste in software development. All too often, rapid application development under SmallTalk is marred by the less than rapid performance of the resulting executables. Despite these disadvantages, VisualAge SmallTalk has enjoyed some success, particularly under OS/2 (it is also available under Windows). It offers particularly good code reusability combined with a visual development environment that is more than just an interface builder.

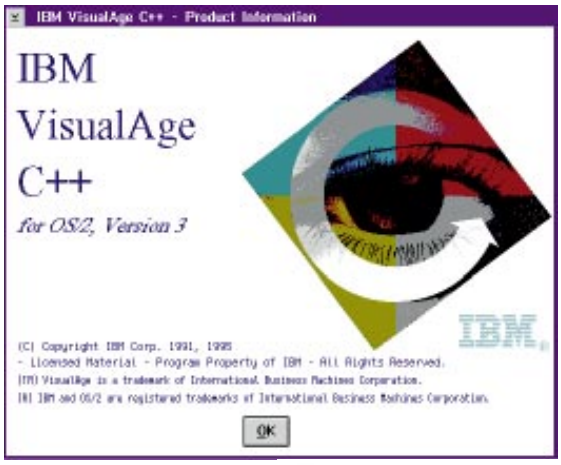
Enter VisualAge C++, which combines the visual builder and parts philosophy of the SmallTalk product with the respected compiler technology and class library found in another IBM line, C Set++. VisualAge C++ is OS/2 only, but with a Windows version just going into beta. Bucking the trend towards online-only documentation, VisualAge comes in a smart box with five manuals. Like other visual development tools, it is really a collection of components:

- Visual Builder for visual application development.
- "Project Smarts" templates for instant skeleton programs.
- Compiler and linker with Direct-to-SOM support for producing SOM objects.
- IBM open class library.
- WorkFrame customisable IDE.
- Editor, browser, debugger and testing tools.

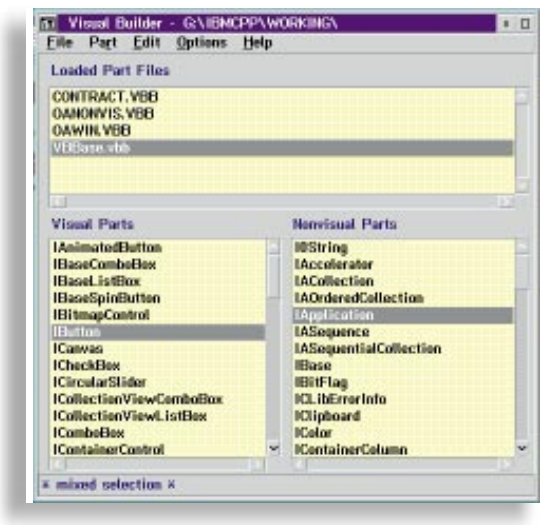
VisualAge C++ is a very competent C++ product which, as you would expect, is fully integrated with OS/2. But the real innovation is in the Visual Builder which enables C++ applications to be created visually. Visual Builder contains components, called parts, which represent C++ classes. A parts interface editor lets you edit three key features of each part:

- Attributes, which are the public properties of the part. For example, the text on a pushbutton.
- Actions, which are the functions a part can carry out. Examples might include opening a window or updating a database.
- Events, which are signals that can trigger actions in other parts. For example, pushbuttons have a click event.

When you edit a part's interface, Visual Builder knows how to generate corresponding C++ code. For instance, you might add a text attribute called Surname with functions to get and set its value. Visual Builder will add a private data member of type IString (part of the Open Class library). It will also add public member functions for GetSurname and SetSurname. This code is added to user source files that you can further edit without danger of losing code when you next generate the application. But for simple applications, you can leave all the C++ coding to Visual Builder. With Visual

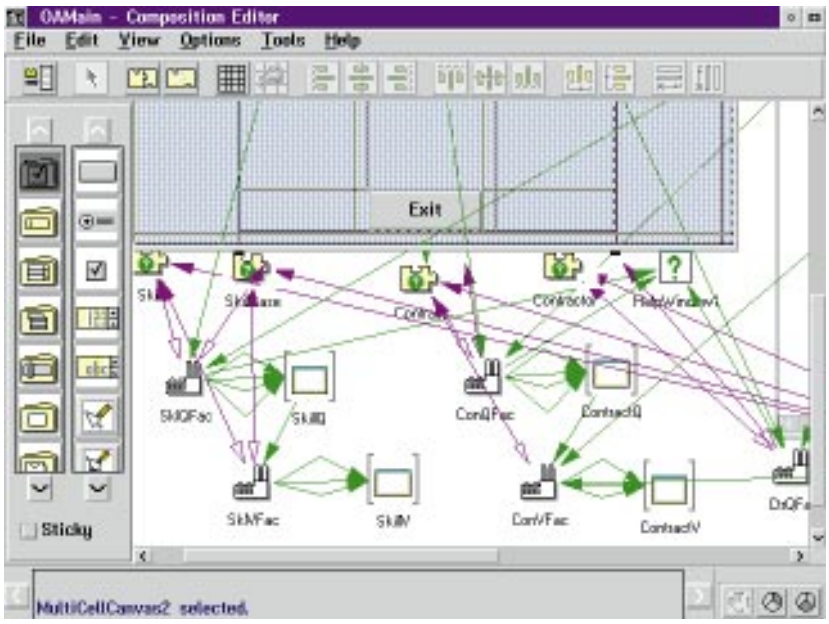


Left *Following on from a successful SmallTalk product, VisualAge entered the mainstream with the recent C++ version*



Right *A .vbb parts file can contain any number of both visual and non-visual parts. The Visual Builder lists the parts and allows them to be edited or included in an application*

Below *The trouble with visual programming... is that a screen full of lines and arrows can be just as confusing as a long code listing*

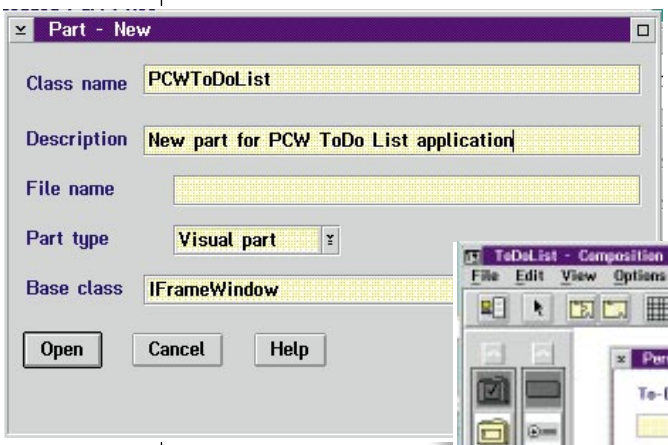


Builder's tools you can design both the interface and the functionality of your program.

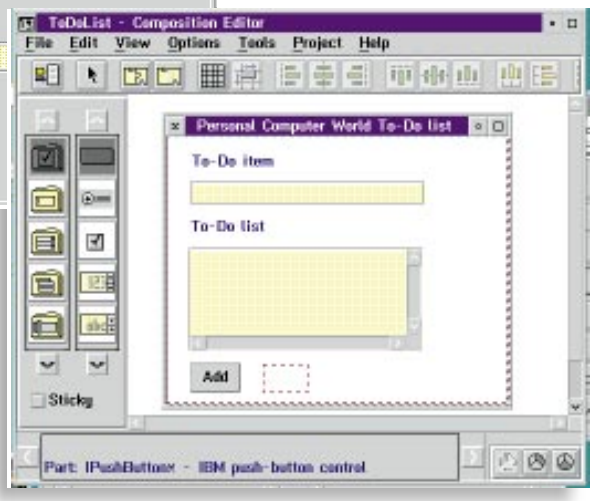
Because of the close correspondence between Visual Bulder parts and C++ classes, VisualAge avoids the restrictions imposed by classic code generators like the Visual Programmer in Watcom C++. You can even import your own pre-existing classes into Visual Builder so that you can use those classes as parts. Another advantage is that using Visual Builder forces you to use a true object-oriented design and not to slip back into procedural code that is harder to re-use.

This is real visual programming, integrated with the power of C++ and the performance of native code compilation. All this makes VisualAge C++ much more exciting in concept than, for example, Microsoft's Visual C++, AppWizard, and component gallery.

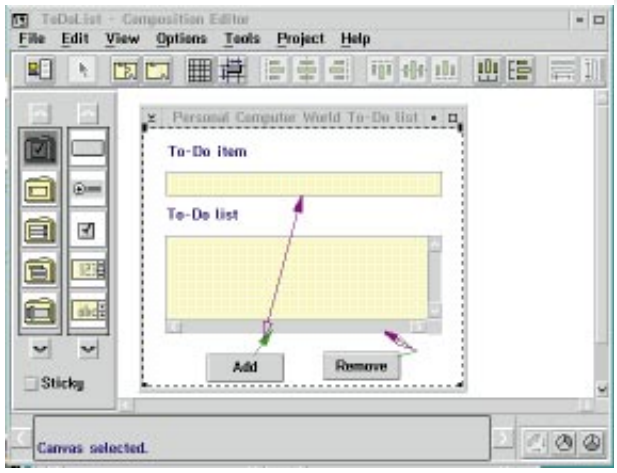
But there are some problems with VisualAge. First, it has huge system requirements, even more so than Microsoft's offering. IBM suggests a minimum of 24Mb, and even with this Visual Builder loads slowly and performs sluggishly. It is said to be written in SmallTalk, which may explain the poor performance. IBM, how about a rewrite in C++? Second, VisualAge hides its excellent technology behind an interface that lacks the slick ease of use and visual appeal of competing products. Third, VisualAge is IBM technology wedded to OS/2 and SOM (see "Object Wars", page 132). Like it or not, in the immediate future Windows, OLE and OCX are more important to most developers. VisualAge for Windows is now in beta, but a full implementation of these Windows features, alongside continued support for the SOM cause, seems too much to hope for.



Left *A Visual Builder project begins with the creation of a new part*



Right *In the Composition Editor, the new part is built up by selecting controls from a palette, drawing them in the work area and then editing their attributes*



Left *A complete VisualAge application. The arrowed lines indicate how the controls are connected*

PCW Details

VisualAge C++
Price £375
Contact IBM 01256 341036

Good Points True visual development with C++; parts re-use.
Bad Points Slow Visual Builder; heavy system requirements.
Conclusion Exciting concepts, but needs the Windows version. Great if OpenDoc ever takes off.

IBM's Visual Basic killer

It has been known for some time that IBM is working on a Visual Basic competitor code-named Bart. We asked Skip McGaughey, marketing manager for IBM's VisualAge family, to explain what it is. "If a person is comfortable with Visual Basic, they will be comfortable with Bart," he promised. "But it is significantly different. It is focused around parts interoperability using the underlying architecture of OpenDoc. The language will be Basic with object-orientated extensions. There is a client-server emphasis. It will be a cross-platform product, including support for OS/2, AIX and Windows."

Underlying VisualAge, whether SmallTalk, C++ or Basic, is a complete strategy for re-using code. "You will be able to create parts in one environment and use them in another. You can create parts in VisualAge C++ which, with SOM technology, run plug-and-play in SmallTalk. You can include parts from other vendors. Customers want to choose their language, platform, and vendor. It's an open environment." Another factor is team development. "We have an integration layer called Team Connection, a repository, which will be available soon. Combined with better visual programming and more design tools, it's a powerful and complete environment."

Bart might, just might, be the development tool many OS/2 users are waiting for. Of course it may not deliver, and it may be too late. When will we see Bart? Skip would not be drawn, but the product is apparently already in limited technical beta. Look for availability in mid-1996.

VISUAL PROGRAMMING TOOLS TABLE OF FEATURES

Product	AM Intelligent Environments	Delphi 2.0	Power Objects 1.0	PowerBuilder 4.0	SQL Windows 5.0	Visual Age C++
Supplier	AM Intelligent Environments	Delphi 2.0 Borland	Power Objects 1.0 Oracle	PowerBuilder 4.0 Powersoft	SQL Windows 5.0 Gupta	Visual Age C++ IBM
Telephone	01932 772266	01734 320022	01344 860066	01494 555 555	01628 478333	01256 341036
Price (approx)	£195 AM Builder. £3500 AM Enterprise.	To be announced	£345 standard, £1675 client server	£195 Desktop, £3295 Enterprise	£695 Desktop, £3495 Corporate	£ 375
Language	Hyper Logic	Pascal	Basic	PowerScript	SAL	C++ (Smalltalk also available)
Built-in database	None	IDAPI (Paradox, dBase)	Blaze	Watcom SQL	SQLBase	None
Database connectivity	Native and ODBC	Native, IDAPI and ODBC	Native drivers	Native and ODBC	Native and ODBC	DB/2
Compilation	P-code	Native code	P-code	P-code	P-code with C conversion option	Native code
Platform	OS/2, Win 32	Win 32	Win 3.x, Macintosh	Win 3.x, Win 32, Unix	Windows	OS/2 3.x,Windows in preparation
Component support	AMX	VBX, VCL	OCX, Power Objects	VBX, PowerBuilder Objects	VBX, Quick Objects	Parts, SOM
OLE automation	None	Client and server	None	Client	None	N/A
						

Product	Visual Basic 4.0	Visual C++ 4.0	Visual dBase 5.5	Visual FoxPro 3.0	Watcom C 10.5 with Visual Programmer
Supplier	Microsoft	Microsoft	Borland	Microsoft	PowerSoft
Telephone	01734 270001	01734 270001	01734 320022	01734 270001	01494 555555
Price (approx)	£69 standard, £329 Professional, £649 Enterprise	£350 subscription	£169	£159 standard, £349 professional	£199
Language	Basic	C++	xBase	xBase	C++
Built-in database	JET (Access)	JET (Access)	IDAPI (Paradox, dBase)	FoxPro DBF	None
Database connectivity	JET and ODBC	JET and ODBC	Native, IDAPI and ODBC	JET and ODBC	ODBC (MFC)
Compilation	P-code	Native code	P-code	P-code	Native code
Platform	Win 3.x, Win 95	Win 32	Win 3.x	Win 3.x, Win 32	OS/2, Win 3.x, Win 32
Component support	VBX, OCX	OCX, C++	VBX, dBase	OCX, FoxPro	VBX, C++
OLE automation	Client and server	Client and server	Client	Client	None
					

Editor's Choice

Integration. Reusability. Portability. Object orientation. Connectivity. Standards. These are the key words in real-world visual development tools, to which should be added the old assets of performance and ease of use. Our group test shows that all vendors are trying to implement these concepts, with varying degrees of success. It is also clear that the underlying language used by each product has become less important than these other factors. One product which meets all but one of these objectives is Borland's superb Delphi. Delphi is Windows-only but it is a supreme example of scalability, allowing a newcomer to put together a working application in half a day, but with the low-level language features that developers need for major projects. What brings it all together is the very fast 32-bit compiler which creates native-code executables for fine performance. Reusable code is achieved through the clean structure of Delphi units, support for OCX controls and OLE automation, and the ability to create Delphi components and install them into the development environment. For rapid development without compromising performance, Delphi is unbeatable.

Also ahead of the pack is Microsoft's Visual C++, which receives equal Editor's Choice alongside Delphi. Objectors may note that Visual C++ is neither as visual nor as easy as other products in this group test. That is true, and those products exist for that reason. But with OLE finally beginning to deliver, Visual C++ 4.0 is the best product to exploit its potential. The IDE is hugely improved; database connectivity is good; and the language itself has been brought into line with industry standards. Quarterly updates will keep subscribers up to date with new features of Windows. While not really a cross-platform product, there is a Macintosh cross-compilation option, and versions of Visual C++ for other Windows platforms like Alpha and Power PC. For a high-end Windows development tool, look no further.

These two are the best for now, but what of the future? Both Delphi and Visual C++ are fundamentally conservative products, leaving a nagging sense that more can and should be done with visual development. Although it is not yet fully realised, IBM's VisualAge C++ points the way forward. It is built on a far-reaching object-orientated strategy and includes a successful attempt to integrate true visual programming with traditional C++. When the Windows version arrives, and if it gets to support Windows technologies like OCX and OLE, and with the rough edges ironed out of the interface, it promises to be a winner.

alphabet souper

The ABC GraphicsSuite, from Micrografx, is great for home and small business use, slurps software gourmet PJ Fisher as he serves you up his ABC-Z assessment of this mid-range integrated package.

Integrated software suites have become popular during the last few years. The idea of buying a full kit of parts in one box has proved attractive to buyers, with the promise of lower overall purchasing costs and seamless integration between component applications. Microsoft, of course, has led the way with its Office 95 suite.

Micrografx has updated its ABC GraphicsSuite to take advantage of Windows 95 and fully integrate functionality with Microsoft Office 95. As its name implies, the product is aimed at home and small business users who wish to produce smart printed material, quickly and easily — but it's not a package for professional designers and publishers.

The idea behind GraphicsSuite is to use the individual modules to build one or more attractive business documents. For example, you can edit pictures and graphics in Picture Publisher, create a flow chart in Flow Charter and then import all the elements into Designer to complete the job.

The software ships on a CD-ROM and you get two extra CDs stuffed full of high-quality clip-art, giving you a choice of over 30,000 pictures and images. Without doubt this is an exhaustive supply and the average buyer would have their work cut out to use all these up in a hurry.

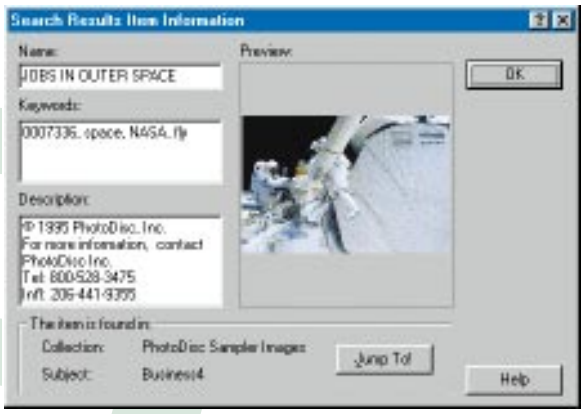
It's a bit of a surprise to find that the manual is a slim affair which barely covers the breadth of features found in the three packages. What looks like the manual serves as a reference to the images available on the clip-art CD-ROMs!

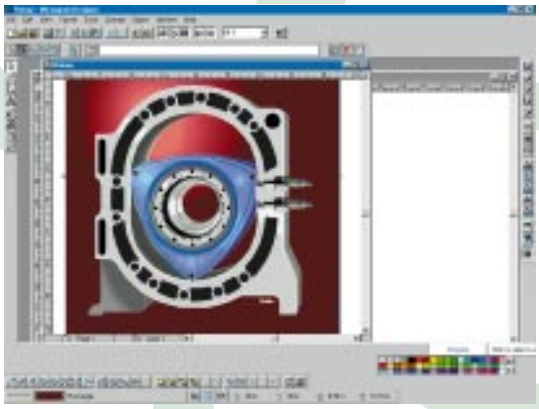
Help is at hand

Instead, Micrografx has built an excellent online help system in standard Win95 Help which provides exhaustive help and information. It takes a while to get used to online help systems but, along with CD-ROM, this must be the way to go for future software delivery. It saves packaging, saves weight, saves cost.

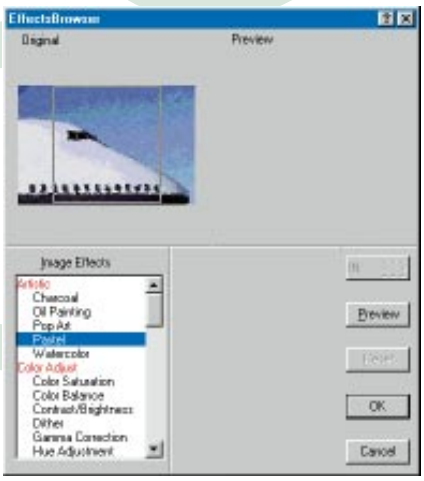
Searching & Previewing

Lost in space? Confused by clip-art? Let Media Manager find the pictures you desire, complete with preview and drag-and-drop capabilities





Work on complex page layouts with Micrografx Designer



A large number of image effects are available in Picture Publisher, but take a look at the preview before you commit yourself

And with a 32-bit OS behind it, online help is fast, too.

One program promised on the box, Instant 3D, turns out to be an offer only, for which you have to send off a voucher (enclosed). This is a pity, as it looks intriguing but it's a way of getting users to register. Briefly, Instant 3D is an Office 95 compliant package that allows you to create instant 3D text, and to drag and drop over 200 3D objects into any of the Micrografx programs or Office 95.

But enough of the added value. What do you get to load on to your PC? There are three main applications: Picture Publisher, Micrografx Designer and ABC FlowCharter. The first is an image editing application, while Designer creates page layouts and illustrations, and ABC FlowCharter provides easy creation of flow charts and is a cut-down version of the Micrografx standalone application of the same name.

For all three you are going to need a minimum of 30Mb disk space (45Mb maximum) and 8Mb RAM although 16Mb would be better. The clip-art is best left on the CDs.

There is a fine tool included called ABC Media Manager. This is available to all three main applications (and Office 95) and works as a search engine to source images, either on one of the two included CD-ROMs, or on other drives. It provides a floating window through which you can browse clip-art and images before placing them into documents. Like everything else it is fully Win 95 compatible and allows drag-and-drop placement of images into open documents.

Fishy business

Although small, Media Manager is surprisingly sophisticated. Double-clicking on an image in Media Manager brings up a full preview.

You can "add" files to the database but to access them, the original source, such as the CD, must be inserted. If you try to place a graphic without the CD it can cause the program to crash.

The search itself is efficient. Typing in the keyword "fish", for example, Media Manager came up with four results including a picture of the Tsukiji fish market in Japan.

You can choose where to search for pictures on any networked drive or local disk. Using Media Manager in Word for Windows worked but was appreciably slower in operation. Despite this, Media Manager is a highly useful application in its own right.

Picture Publisher

Picture Publisher is the "Photoshop" part of the package, although in no way should it be seen as a competitor. It does have some high-end controls, such as a monitor adjust control, but I doubt many potential users would want to utilise these.

Although entry-level there is a fair deal of learning to do in Picture Publisher. If you are not familiar with terms such as "Masking" it is worth spending some time with the online help so as to familiarise yourself with techniques. But even then, it can be confusing.

The first time I tried to merge two images it took 15 minutes of fiddling with buttons and boxes before it became obvious how to perform the trick. But once learnt, the results were smooth and easily exportable.

The standard tool set provides you with masking, fill, line drawing and text tools in a simple window. Frustration was experienced with the magnification tool, which doesn't stay selected, so you have to keep returning to it to increase magnification on an image. Poor.

Retouching tools are not comprehensive but do provide a finger "smudging" device and airbrushing with

varying thickness. But there is just enough here for the product's intended market who are most likely to bring pictures in, crop them, add effects and then export them.

The filter tools are not really filters but more a way of painting with a pre-defined pattern such as checkerboard or marble option.

Web designers will be pleased to see a GIF facility that automatically makes backgrounds transparent so they image as outlines on Web pages, and can set GIFs to interlace automatically.

The effects browser is a definite highlight. This was not only fast to load but fast in applying effects to bitmap images, too. It was so much fun that there was the danger of getting carried away with manipulating images. It's not in the Photoshop class but there's definitely enough choice and sophistication to create interesting images for your publications and documents. This outstanding feature would be further improved if Micrografx could add some add-on plug-in filters *á la* Photoshop.

There's a scratchpad, as well, which is useful for trying out colours, filters and styles on a blank area before applying them to images.

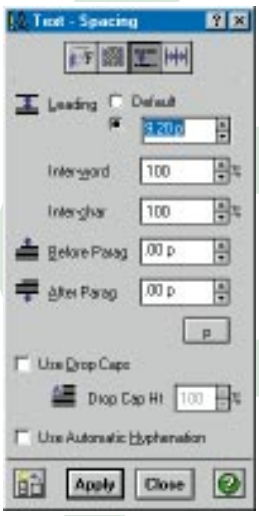
Those who are into automation will be pleased to see a macro facility which works simply by recording mouse clicks and other movements until you tell it to stop. This worked seamlessly when required to perform single tasks but fell over badly when it tried to run batch macros, where it would otherwise be most useful.

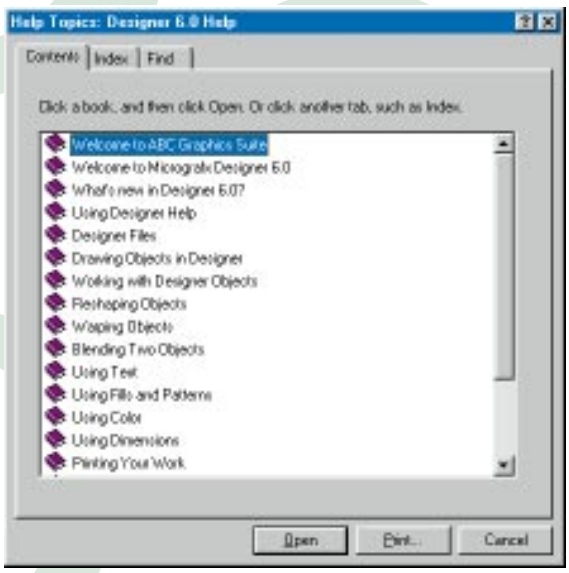
Picture Publisher proved to be an effective and fun way to edit images. It supports all major bitmap file formats (even Macintosh PICT), is mostly well written and has some surprisingly advanced features.

Dialogue Boxes & Palettes

Right *Whose unit is it anyway? ABC GraphicsSuite offers a huge array of units to work in, even yards*

Below *Not as accurate as Quark XPress, but there are still extensive and capable text spacing options*





Right *Minimal paper documentation is made possible by the superb on-line help offered throughout ABC GraphicsSuite*

Micrografx Designer

Opening Micrografx Designer proved to be a daunting task. While the object of Picture Publisher was quite straightforward (i.e. to edit bitmapped graphics), Designer confronts you with an array of buttons and options. It is a page layout package with some sophisticated drawing tools built-in (including bezier curve support) and it doubles as a tool for creating slide shows from completed pages.

When looking at any page layout or illustration software, a measure of its sophistication can be taken by looking at its typographic tools; Designer doesn't disappoint. For a package of this type there is an awesome amount of control here with, for example, page measurements enabled in any unit from Didots to yards — perhaps a little over the top but at least it's there should you need it.

At first look the typographical specifications seem limited, but like many programs Designer hides refined control behind buttons in initial dialogue boxes. Hit Font from the Format menu item and a neat dialogue appears complete with preview box. This immediately applies font, size and style to text but other buttons give kerning, wordspacing and leading controls. Not to 1,000th of an em (*come in, Quark Xpress!*) but to a degree that's fine enough for most people's eyes. There's an instant drop cap control, too.

A minus point for Designer is that there is no way of setting text styles, so these must be applied each time which could be especially tedious on "ambitious" publications.

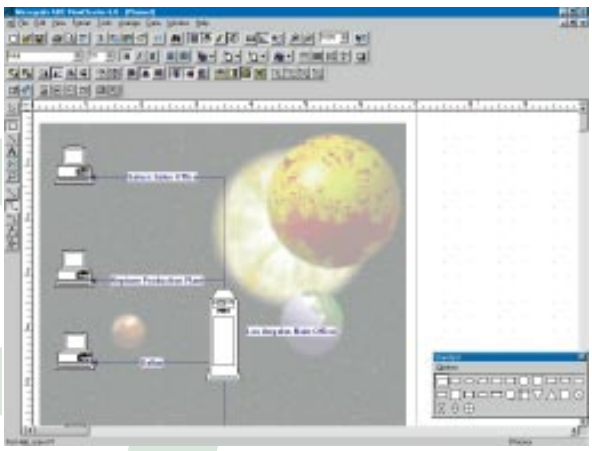
On the other hand, If you wish to create complex publications on a regular basis, you might be better off looking at a dedicated DTP package (PageMaker, for example).

Those who have used PageMaker or Quark XPress will be surprised and intrigued at Designer's method of handling text. Once entered, text can be constrained in a bounding box which can be pulled, rotated, stretched and even twisted. This may not be typographically sound but it is an easy way of shaping text blocks. If you make a mistake it can easily be undone with the universal multiple undo feature.

If you want to change the style of the text, simply click into the body text. By combining the text block tools and text

ABC Flowcharter & Designer

ABC Flowcharter is the most basic element in the package. It's a cut-down version of Micrografx' full-blown charting package, but is still good enough for simple diagrams and flowcharts



Designer offers fairly sophisticated page layout facilities, including buttons for everything and even bezier curve tools

formatting you can come up with some seriously bad typography.

Text can additionally be edited in a story editor which imports Microsoft's default spell checker; a useful example of how application integration can work.

Although Designer is heavily biased towards single-page document creation, you can add extra pages (individually, or multiple) and a page browser view makes it easy to swap pages around by dragging and dropping.

Page setup is not as comprehensive as with the leading DTP packages but you do get the chance to set custom page sizes, and to use previously setup documents.

Importing text is easy, although there were glitches when importing from Word — a surprise, considering the effort involved in integrating this suite with Office 95. Word files came in with some garbage which had to be removed with the text editor.

Graphic files can be imported to Designer, although EPS files will only display as greyed-out areas. Other supported formats include JPEG, GIF and Illustrator EPS. Double-clicking on any image should immediately launch Picture Publisher to edit the image but this proved to be flaky in operation and often the whole application would crash. Whether this was a Windows 95 problem, or the application itself, was difficult to divine and nonetheless frustrating.

The drawing tools themselves are, perhaps, over-sophisticated — how many users will really use bezier curves? Perhaps it would have been better to position Designer purely as a page layout program. That said, Designer proved itself adept at creating line drawings using pen and drawing tools and fill objects. If there is one feature which should be singled out for special mention, for being truly unique and downright useful, it's the Print Specified View. Choose this, drag over an area of your document, and that area alone will print out. The area is scaled (magnified) to fit the default printing area of your page. An excellent proofing tool and something that other graphics packages would do well to emulate.

Page Designer, then, is an accomplished drawing and page layout tool which mixes a combination of advanced and more mundane tools. The learning curve is not steep and online help and hint boxes help you pick it up quickly. While it cannot compete with high-end packages, it would stand in good stead as a layout and drawing tool for the middle ground.

ABC Flowcharter

After all the excitement of manipulating images and laying out pages, ABC Flowcharter brings you down to earth with a bump. It's a cut-down version of Micrografx' full-blown flowcharting package, so I suppose you should expect basic flowcharting tools — and, in a nutshell, that is exactly what you get.

You can use Flowcharter simply as a way of drawing out problems by manually placing boxes and links between them (no auto linking here). There is a reasonable number of creative tools so you can add shadows and colours to boxes as well as change their shapes. Using the mouse, text and fills are easily applied to boxes.

Finished flowcharts can be imported as a graphic, directly into Page Designer. The screenshot alongside shows an example of what can be achieved. But really, there isn't much more in this adaptation of ABC Flowcharter that you couldn't do in Designer itself.

All in all

Taken as a whole and considering the price (which is likely to be discounted), ABC GraphicsSuite makes for a compelling package. By itself, Micrografx Designer could easily compete against the leading packages in the DTP market. It runs well under Windows 95, takes relatively little hard-disk space and integrates strongly both within its constituent parts and to Office 95.

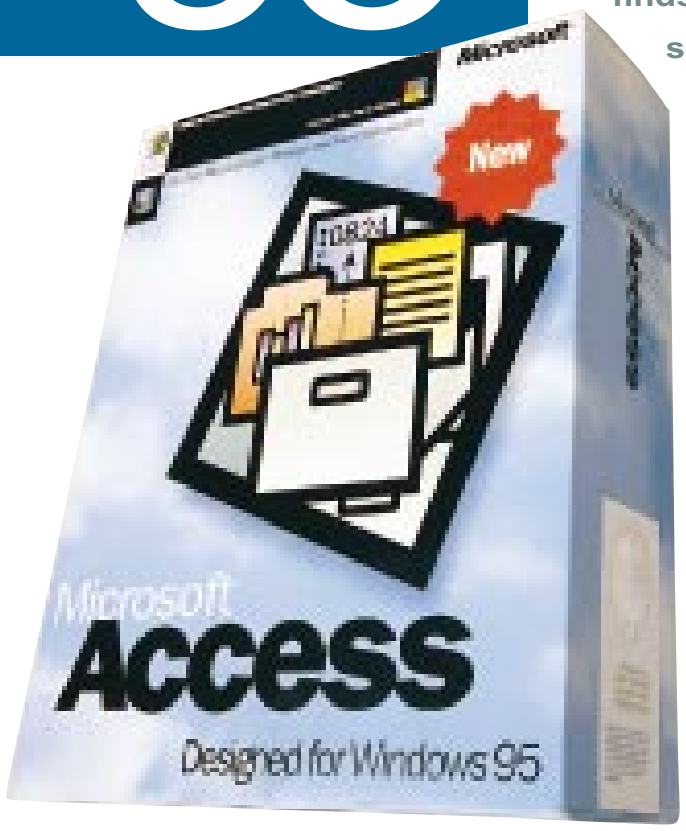
If I were looking for a mid-range graphics package, would I buy Micrografx? Yes. This is an excellent package which contains many strengths, some unique features, and weaknesses that can be ironed out. Altogether it is capable of high-quality results while remaining easy to learn. Add to this the high-quality clip-art on two CDs (plus a free 3D software offer) and you have exceptional value for money. Highly recommended.

PCW Details

Micrografx ABC GraphicsSuite
Price £250
Contact Micrografx 0800 626009

Access 95

The recent confusion over memory requirements for Access 7.0 was unfortunate because this version has lots to offer. No cosmetic upgrade, this, says Eleanor Turton-Hill as she reviews the package and finds several major improvements; there's something here for all levels of user.



The first thing to strike you about Microsoft's new version of Access for Windows 95 is its incredible hardware requirements. A typical installation will need a minimum of 12 megabytes of memory and 42 megabytes of hard disk space — the maximum custom installation takes up a stupendous 54 megabytes!

These system requirements caused something of a furore in the press a couple of months ago when Microsoft was forced to admit that Microsoft Access Version 7.0 for Windows 95 will not stand up on 8 megabytes of memory, as originally stated. A £99 refund has been offered to anyone who invested in Microsoft Office Professional during the early stages and now finds themselves with a version of Access they are unable to use.

The confusion over memory requirements has made the upgrading process something of a shambles for many users, and this is unfortunate because Access 7.0 has lots to offer. As well as being the first Windows 95 (and full 32-bit) version of the software, there are several important new features and enhancements: this version is more integrated with the Microsoft Office Suite, more accessible to a wider variety of users, and in many other ways a more fully-functioned application.

Starting up

If you know Access well, then it's the Windows 95 "look and feel"-type features you'll notice first. This version of Access, like Visual dBase, has a healthy scattering of Windows 95 GUI features such as tab dialogues, option group buttons and the new-style check boxes.

Some of the utilities have been designed so that their functions integrate with features in the operating system. There's a Database Properties dialogue box, for instance, which displays the properties of individual databases, and this makes files easier to locate via the Windows 95 Find File feature.

Access 7.0 supports the more obvious Windows 95 features such as long filenames and the ability to create shortcuts to individual applications, by dragging and dropping them onto the desktop. But some of the more familiar interface features have also changed, to provide consistency with the operating system. The database container, for instance, is modelled on the Windows Explorer (Windows 95's alternative to File Manager) allowing you to view files as large icons or small icons, as a list, or with full details.

Improvements for the end-user

Access has always provided excellent features for the end-user; it is this aspect of the produt which has made it so successful. Access 7.0, as you might expect, has more than a smattering of new end-user facilities including a variety of intelligent Wizards, each dedicated to a particular aspect of database design and maintenance.

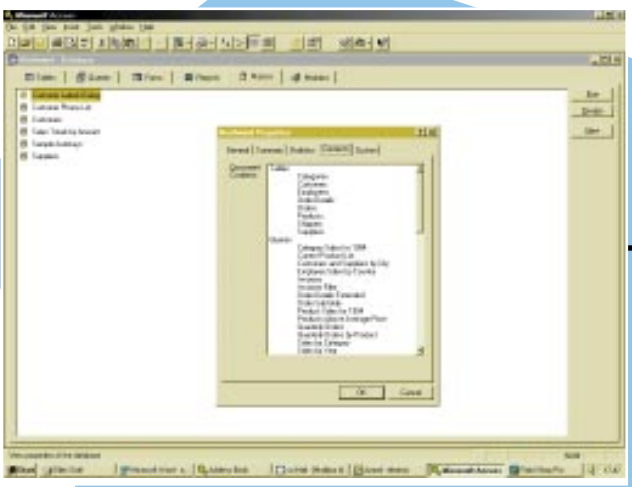
● Pre-designed applications

Databases can be intimidating to novice users; the effort required to set up even the simplest of systems tends to put most people off the idea fairly quickly.

Lotus Approach has got around this problem fairly simply in the past, by supplying a whole selection of pre-prepared databases. To the uninitiated this makes a lot of sense; you simply go into the File menu, choose New, and then choose from a series of sensible titles like "Address Book" or "Recipes".

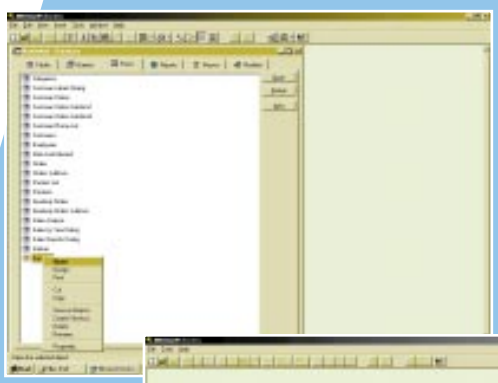
Access 7.0 offers a similar selection of ready-made solutions. There are systems aimed at the home user with titles such as "Video Collection", "Recipes" and "Wine List", as well as some more sober and sensible offerings like "Expenses", "Order Entry" and "Contact Management". These are the type of simple systems which people create and recreate time and time again, so it makes sense that users should be spared the effort.

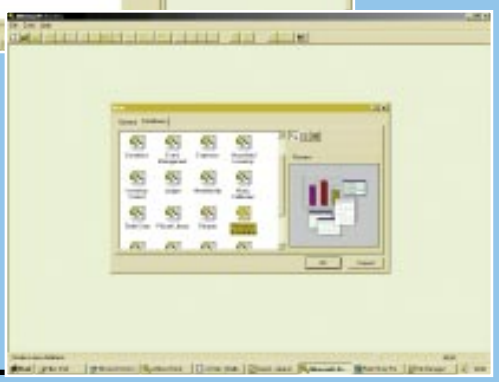
Unlike Approach, where a pre-prepared database can be edited after creation, Access provides a Database Wizard which creates the system to your



The Database Properties dialogue box keeps an ongoing record of all the items in your application

The central database container is modelled on Windows 95's Explorer with context-sensitive right-click menus





Access 7.0 has a whole selection of ready-made solutions

specification, prompting you with questions and allowing you to pick and choose the fields you want. Pre-designed forms and reports are provided as well as a few records of sample data.

● The Table Analyser

One of the most impressive features of this new version of Access is the Table Analyser, designed to aid the process of converting flat files to relational databases. This has never been an entirely simple task, even for experienced database developers, because files created in spreadsheets lack the data integrity which a relational database enforces. So when it comes to converting spreadsheet files, data has to be thoroughly cleaned and restructured.

Huge spreadsheets built up over years, which have been added to and maintained by a hotch-potch of different people cause the worst kind of problems.

In order to get rid of redundant or duplicated data, the file must be broken up into sensible parts and inconsistent syntax corrected. A geographical area, for example, might be entered as "The North East" by one person, "Nrth East" by another, or simply spelled incorrectly by someone else. To turn the spreadsheet into a relational database, each geographical area would be put into a look-up file and presented to the user as a drop-down list.

The Table Analyser Wizard in Access 7.0 performs this process for you. It's able to look at a wide variety of flat-file formats, intelligently decipher inconsistencies in record entries and split the file into a set of related tables. The Wizard makes recommendations about your data (which you can either accept or reject), explaining the consequences of duplicating data and giving complete guidance at each stage in the process. This renders the Analyser Wizard suitable both for novice users who want to create a working system quickly and easily, and developers who want to build a quick prototype of a system from an existing flat file.

● The Performance Analyser

Another intelligent tool included in this version is the Performance Analyser Wizard which examines your database and recommends different ways of improving application performance. In the past, improving the performance of a database has always involved low-level tinkering and intimate knowledge of the database package you're using.

The Performance Wizard examines your database and recommends changes such as a new index or relationship, or changing a data type. These changes can be implemented manually or automatically by the Wizard.

This tool is invaluable for beginners as it allows them not only to speed up badly designed systems, but also find out exactly what it is that may be making their system grind to a halt.

● Briefcase replication

The new replication facility in Access 7.0 is made possible by the Windows 95 Briefcase. When you drag an Access database to the Briefcase, a replica is created which can be moved to a floppy disk or laptop machine, thereby allowing users to continue with the database, away from the office.

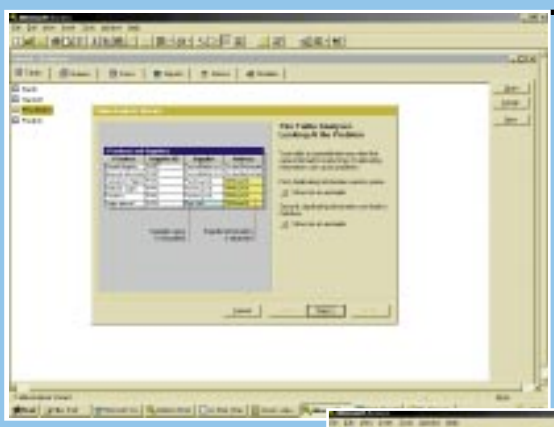
For a replication facility to be useful, there must be some way for replicas to communicate: otherwise, they never synchronise; they start to grow independently. When you bring laptop copy back to the office, the Briefcase synchronises changes in replicated data with the master database. It can also replicate modules and forms, which allows developers to propagate design changes made on the master file to all replica files.

This is a really useful tool when it comes to managing remote changes to data, as well as versioning and distributing Access applications. In addition, it's easy to use and highly configurable. There are different ways of replicating and synchronising data, and the necessary arguments can be specified in code. Those users of Windows NT who have no Briefcase functionality still have a replication tool, provided in menu form.

● Changes at the high end

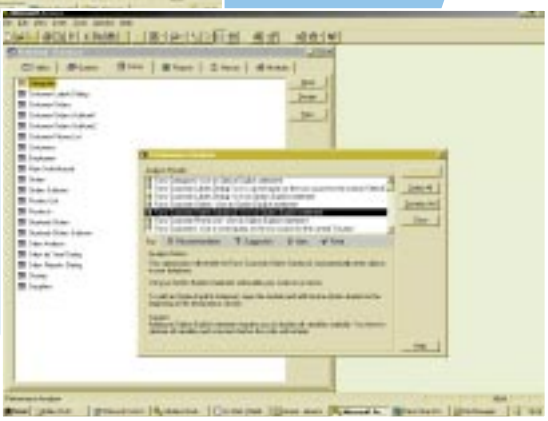
For developers, the most major change is in the programming language, Access Basic, which has now been replaced with Visual Basic for Applications (VBA). This provides a consistent scripting language for building solutions across the whole of Microsoft Office, making it possible for code written in Access to be used in Excel or Visual Basic (VB4).

Another major relief for developers is



Left *Before analysing the nitty-gritty of your data, the Table Analyser first explains the problems caused by duplication, and even gives examples*

Below *The Performance Analyser studies the minutiae of your application and advises you on how to make it run faster*



the provision of a "startup" tool which lets you "package" your application to look like a professional piece of software. In the past, this has always been a difficult process involving autoexec macros, but in Access 7.0 you can control exactly how a database is opened by specifying a title and icon for your system as well as specific menu bars and forms to use on startup.

OLE (object linking and embedding) automation has been drastically improved in this version, too. Access 2.0 was able to act as an OLE Automation Controller, making it possible to control other applications, but Access 7.0 goes a step further, making itself available as an OLE Automation server. This means the application as a whole can be manipulated by OLE Automation Controllers such as Visual Basic, Visual C++ and Excel.

In summary

Access 7.0 is no cosmetic upgrade; it is 32-bit from top to tail and full of major improvements which boost its functionality for all types of user.

For novice users, Access is now a far more manageable tool. It is possible for total beginners to create professional-looking applications, complete with sensible reporting facilities, without having to get bogged down in all kinds of unfriendly database jargon. For many users, the strengthened integration with the rest of Office 95 will render the upgrade almost automatic.

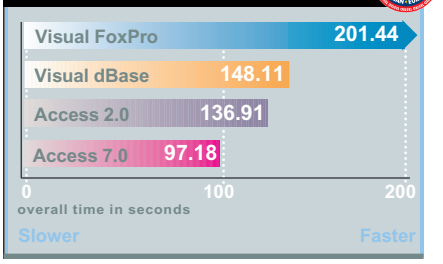
For businesses, the replication facility will be a big selling point. Many organisations have an increasing number of mobile workers and the need to keep multiple file copies in sync with each other has, for a long time, created difficulties. Access provides a workable and user-friendly solution which will be welcomed across the board by all sorts of companies.

Access 7.0 runs on Windows 95 and Windows NT 3.51, but not on Windows 3.x. It will run most Access 2.0 files but there are some compatibility restrictions, and once you've converted files to Access 7.0 they won't run in version 2.0. This one-way compatibility can be a major problem, especially when your system is littered with different file formats during the transition process.

The major down side with Access 7.0 is its hardware requirements, and it's easy to see why Microsoft was forced into redefining this. Access will tentatively stand up on 8Mb, but you could hardly describe it as "running". On 12Mb (the current recommended minimum) things work much better, but if your application is reasonably complex and has lots of forms and reports you'll soon start to feel the need to upgrade to 16Mb. This strain on system resources was confirmed in our performance results which reveal a clear generation difference between Access 7.0 and Access 2.0 — let alone the massive disparity with Visual FoxPro.

If you're thinking of upgrading your current application to Access 7.0, you may well find that in addition to a memory upgrade you will need the extra boost of a Pentium processor as well. For many, this would render a move to Access 7.0 out of the question for some time to come.

Performance results



Stability and resource management in Windows 95

The improvements incorporated with Windows 95 offer several fundamental advantages to application building. Two things from which you will immediately benefit are the improved stability of the system when multitasking and better handling of system resources.

One of the fundamental weaknesses of Windows 3.1 is that all applications, as well as operating system code, share a single address space called the system VM (Virtual Machine). The single address space model is bad news when it comes to system integrity because applications are not protected from each other, and key portions of the operating system are left exposed to buggy programs which can cause the entire OS to crash.

Ideally each application should be run in its own independent session, or VM, where it is protected from other applications and will not jeopardise the OS itself. When an application fails, the effect of the failure should be limited to the session in which it is running. Effectively, what VMs do is to protect the system against crashes by ensuring that applications do not write to each other's address spaces.

Windows 95 goes some way towards sorting this out by providing private address spaces for Win32 executables. Unfortunately, Win16 programs still execute as a single process within a shared address space, which means that one faulty 16-bit app can still bring down the whole system.

Despite this, the new OS is generally a good deal more stable and Access exploits its multithreading capabilities by having the Jet engine, Access 7.0, and individual Access programs each running in their own independent threads.

PCW Contacts

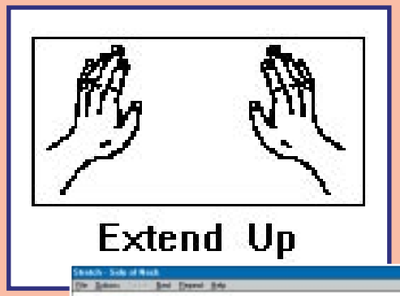
Access 7.0 for Windows 95
Contact Microsoft 01734 270000

RSI

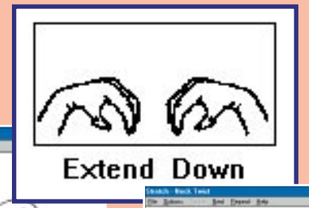
Aches mark the spot

Repetitive Strain Injury may sound like a pc (politically correct, not personal computer) excuse for not doing any work, but for sufferers it's a very real problem. RSI can cause severe discomfort, and even the inability to work. Nicky Glatter looks at what we can do to combat this industrial disease.

How to reduce the risk of RSI



Exerciser software (from IHSS) takes the user through a series of stretching exercises which should be performed before sitting down to any keyboarding activity



On 28th October 1993, in the case of Rafiq Mughal vs Reuters, Judge Prosser caused an outcry when he ruled that the condition of RSI (repetitive strain injury) did not exist and that it had no place in medical books.

Mughal, a former editor at the Reuters news agency, was filing damage claims for pain and loss of earnings resulting from computer-related work injuries. Thankfully, the case has not gone down as a legal precedent.

Judge Prosser was a circuit judge, deputising in the High Court, whose other claim to fame was ordering a 15-year-old rapist to pay his victim £500 "for a good holiday"; a judgement subsequently overturned by the Court of Appeal.

Repetitive strain injury, cumulative trauma disorders, work-related upper limb disorders… call it what you will, increasing numbers of computer users are reporting aches and pains attributed to their work environment or computer hardware. It's not a new phenomenon, neither does it affect computer users only. The list of those affected includes musicians, chicken process plant workers, Rubik's Cube addicts and factory workers. Ironically, the workers on computer assembly lines are as vulnerable as the computer users themselves. Leather beaters in Ancient Egypt are believed to have suffered, and in 1713 "severe writer's cramp" was recorded in Italy. New technology took the rap then as now; in the eighteenth century the introduction of the steel nib was blamed.

But it is the rise of computer-related illness that has caught the public eye. In the early eighties, an epidemic in Australia caused widespread hysteria over what was nicknamed "kangaroo paw". The estimated cost to Australian industry in the years leading up to 1989 was half a billion Australian dollars — roughly £220m.

In the US, a group of children is reportedly gathering arms for an attack on gaming-related injuries, while in the UK the problem was highlighted when it hit the publishing industry; at one point 130 journalists on the Financial Times were found to have been displaying symptoms. The Health and Safety Executive now estimates there are seven million computer users in Britain; the largest number of workers susceptible to a single industrial injury.

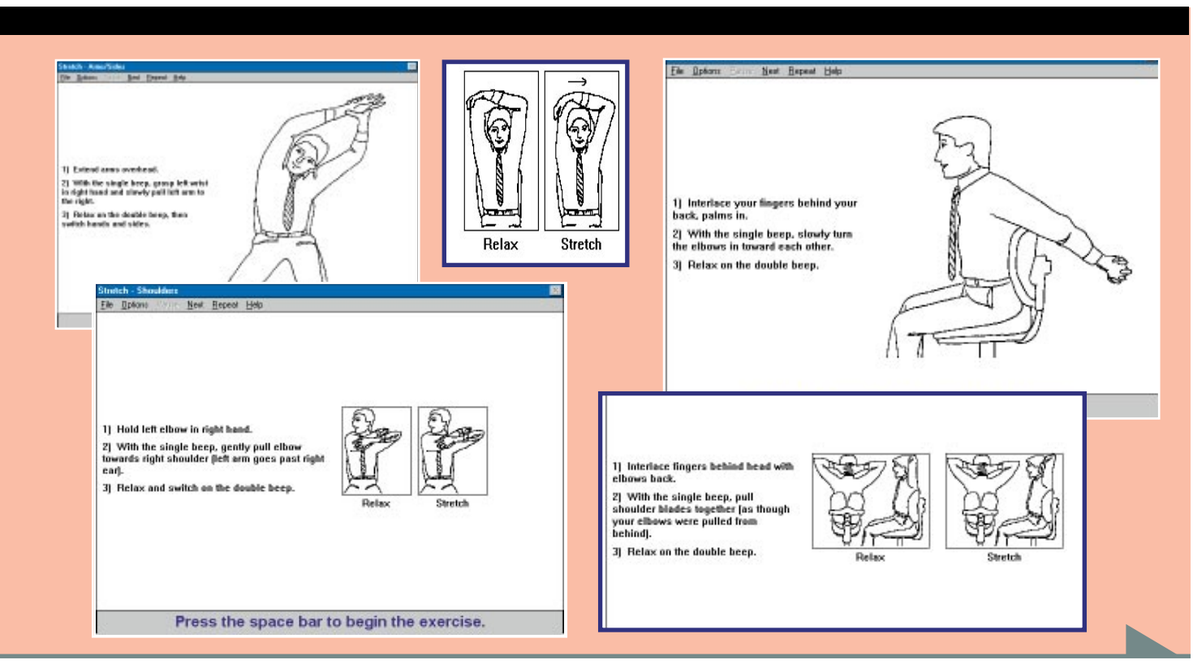
Why RSI?

Dr Edward Huskisson, head of rheumatology at St Bartholomew's, describes RSI as: "A condition, usually occupational, characterised by pain which arises in a particular area, usually the hand and forearm. It is the result of repetitive muscle activity, responding at first to rest but not to treatment appropriate to other types of soft tissue rheumatism such as tenosynovitis, tennis elbow or carpal tunnel syndrome." In other words, there's no obvious part which is damaged.

According to Dr Huskisson, symptoms start with deep burning pain, pins and needles, cramps and fatigue. They are aggravated by work, bad weather and stress. Side-effects include disturbed sleep, headaches, irritability and depression.

The key to any form of RSI (or work-related upper limb disorders as many ergonomists now call it) is the "repetitive" factor; incessant keyboarding or mouse work requires continuous repetition of the same small movements. As any marathon runner will testify, prolonged use of any muscle group will damage the muscles and small tissues surrounding them. Stop using the muscles and the pain will disappear.

Wendy Chalmers-Mill is a consultant physiotherapist and ergonomist with Interact, a pro-active human resource consultancy. She has found that upper limb disorders begin



in the back and upper neck, which refer pain to the lower arm. The single most important factor, in her view, is postural abnormality which overloads the muscles. “Just to sit is more dangerous than to stand or walk,” she says. “It allows the spine to become a weight-bearing structure.”

With that disadvantage already in place, correct use of your equipment is essential: “If your screen is on the left-hand side of your desk and the mouse on your right, you end up with a shortening of the muscles on the left-hand side and a lengthening of those on your right. This results in overall muscle strain in your upper body.” So anyone who regularly uses a keyboard *and* has their phone cradled between their shoulder and neck, is asking for problems.

The Health and Safety Commission went some way towards addressing the problem when, on 1st January 1993, it introduced six sets of regulations under directives from the European Commission, designed to provide a safe and comfortable environment for employees who “habitually work with display screen equipment” (European Directive 90/270/EEC). The regulations include: adequate workspace and lighting; a clear, low-radiation tiltable screen with a separate keyboard; an adjustable chair; and software suitable to the task. The regulations apply to any new workstation implemented, while those in place before 1st December 1992 will have to comply by the end of 1996.

But equally important, say the experts, are stress elimination, a positive outlook and a healthy body. The equipment you use is less important than a balanced posture; if your muscles are weak your body has to work that much harder just to sit correctly.

Research at Interact underlines the importance of stretching exercises before long periods of keyboarding or game playing. It recommends Exerciser software which runs the user through a number of exercises designed to relax the muscles and eyes (see *How to reduce the risk of RSI*).

Game players should be vigilant too. According to Chalmers-Mill, games are generally safer than “work” because the stress factor is removed (although those who come home from work and play Doom until 2am, pounding the Control key, may disagree). However, she considers that proper use of equipment is just as important in games as it is in spreadsheeting. If you’re sitting on the floor with your Playstation gamepad, staring up at the TV, you’ll be lucky to escape without neckache.

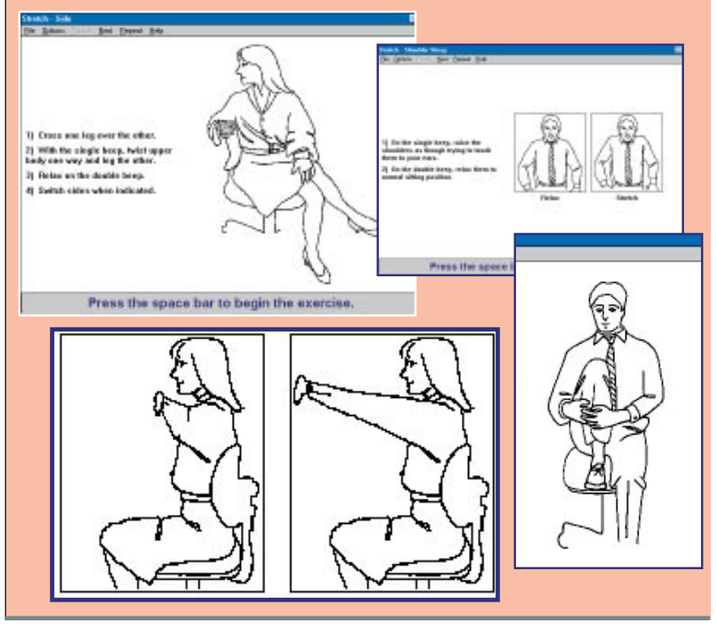
Taking the strain: ergonomics

Ergonomics is the study of the relationship between humans and machinery. The manufacturers have to agree on this because it’s a dictionary definition. They also speak with one voice on the ideal workstation; a swivel chair on five castors, with your feet flat on the floor and your arms at a 90 degree angle over the keyboard. If the desk is too high, the most simple remedy is a footrest. Any pointing device should be within comfortable reach and a document holder is recommended for touch-typing.

Beware of anyone who attempts to accessorise the Utopian workstation. Opinion is divided on what is the best keyboard/mouse/trackball and there is a frightening number of so-called “ergonomic” products on the market. Sales reps back up claims about their own devices’ efficacy with pages of complicated graphs and statistics — there is none higher, they proclaim, as they rattle on about pronation, myoelectric activity and ulnar deviation. Mention the competitors and they give it to you straight; all other ergonomic products are dross. Any ergonomics consultant will insist on putting the individual first. What feels comfortable to one person won’t always suit another.

The best advice is to try before you buy. It’s like buying a pair of trainers: you should never buy them without jumping around in the shop first. If a mouse feels too clunky, don’t let anyone talk you into buying it even if it does come in your favourite colour.

How to reduce the risk of RSI (continued)



The appliance of science

It’s a sad fact, but with every technological breakthrough comes a potential threat to our physical well-being. The celebrated transition from manual typewriter to electronic keyboard no doubt increased efficiency but it eliminated the need to remove the hands from the keyboard for carriage returns, paper changing or even typo correction, rendering keyboarding as a more repetitive task.

While relatively little research has been undertaken into the pointing device, modern thinking fingers the mouse as the villain of the piece. Time was, in DOS days, when you could accomplish every task from the keyboard. Then came Windows, DTP and drawing packages and the mouse took up its station on the desktop. But the device comes with its own set of

problems: using a standard mouse involves tipping and twisting the hand; putting pressure on the nerves that run through the wrist.

As Chalmers-Mill explains, the further you have to extend and elevate your arm to reach the mouse, the greater the leverage on the complex shoulder joint. If you can use a keyboard without a numeric keypad, the mouse can sit closer to the home keys and the risk is immediately reduced.

There is an alternative; the trackball. The jury is still out on whether or not this is more ergonomically friendly, but Chalmers-Mill would recommend it to users already experiencing problems. Most PC manufacturers bundle a mouse rather than a trackball (probably for reasons of cost), but the advantage of a trackball is that it stays in place — no more scrabbling around to locate a dirt-ridden mouse and then stretching to navigate it around a cluttered desk. Many new designs incorporate a built-in wrist rest, too, and a large ball, designed to keep the wrist flat (in "neutral" position) and to extend the fingers rather than encourage the cramping grip often experienced with a mouse. (See *Taking the Strain,* page 192).

Miniaturisation must also share in the blame. If a standard keyboard cramps the wrists, a notebook keyboard will aggravate the problem. And "laptop" users, often encumbered by bulky overcoats, struggle to keep these small wonders perched on their knees or tiny fold-down tables while travelling, hunching over them to see the screen while cramping their shoulders and upper arms. "Notebooks are a nightmare," says Chalmers-Mill. "It's impossible to sit correctly and see the screen."

Another pitfall is that as notebooks become multi-functional, CD-ROM drives and PCMCIA slots are often fitted beneath the keyboard, exerting further pressure on the wrists as you tilt your hands to reach the keys, which can end up higher than they would otherwise be the case with a standard keyboard.

Doom and gloom?

No-one yet knows exactly why some users are more predisposed to upper limb disorders than others. There is a "Princess and the Pea" side to the story. As a VP of one computer peripherals manufacturer puts it: "It's a

Avoiding RSEye problems

Jonathan Chapple is on a crusade: the otherwise unassuming 55-year old chairman of Equanet, a corporate computer reseller based in Chessington, wants nothing less than to protect the eyesight of every middle-aged computer user in the UK. Many opticians need educating too, he says. They are prescribing expensive, general purpose or "progressive" lenses designed for normal distance vision, which not only fail to meet requirements for computer users, but are tiring and uncomfortable.

Chapple began researching the issue of eyestrain due to computer use because he was getting "very annoyed bumping into people who had bought expensive glasses which simply didn't do what the opticians said they would. I, myself, had previously bought a £200 pair of spectacles, which the optician had recommended for use with computer screens. Not only did they not work, but within weeks I was suffering serious eye-strain, and that led to headaches."

Progressive lenses

As you get older the lenses in your eyes become less flexible. This normal ageing process leads to presbyopia; a condition which means you have difficulty adjusting the eye to near vision. And, as you grow older it gets worse. You will suffer eyestrain unless you get correctly prescribed glasses, because your eyes will be unable to focus properly on your display.

The most popular glasses prescribed for computer users have Progressive lenses. These provide a continuous change in power from distant to near vision, and all the products are adequate for the occasional computer user. But it's a different matter for heavy user of computers: if you are over 40 years old and need spectacles for general use and for work, you will almost certainly need two pairs; one for work and another for leisure.

Progressive lenses are designed either for general or task-specific use. The trouble is, many opticians are prescribing unsuitable general purpose lenses for computer users. "There is no scandal" says Chapple, "just ignorance which needs to be addressed."

General purpose Progressive lenses are properly used for driving, sport and leisure. But typically, the middle distance viewing band is very narrow, which means that the wearer has to tilt his head backwards to bring the computer screen into focus and must turn his head to read across it — all very tiring.

Presbyopic computer users need task-specific glasses because of the way they work. "Remember, the majority of computer users perform a variety of tasks in addition to working at the screen," notes a document published by lens manufacturer American Optical. "Most read print-outs, use the telephone and write notes."

The typical computer workstation also has very specific viewing requirements, according to American Optical: "The centre of the screen is usually located 10-20 degrees below straight-ahead gaze. The desk and keyboard are 25-30 degrees below straight-ahead gaze."

The recommended distance for a monitor is between 22 and 25ins from your eyes. This requires intermediate viewing and is much further away (as far as your eyes are concerned) from hard copy reading material, which is typically around 14 to 16ins away from your eyes. As you get older, it gets more and more difficult for your eyes to automatically adjust to both reading distances and it is a struggle, which causes eyestrain and visual fatigue.

Task-specific lenses

Which leads us to task-specific Progressive lenses. The first product ergonomically designed for computer use is manufactured by American Optical's Truevision Technica. These glasses are distributed in the UK by UK Optical and are available through the Specsavers chain of opticians. Typically, they cost around £100.

The Truevision Technica brings the whole screen into focus with minimal head movement, by relocating both the viewing zones and unwanted astigmatism. It provides for distance viewing and full width vision intermediate and near-viewing zones.

Chapple is a firm fan: "Eureka! They work. This is the only solution which allows the older user to work steadily," he proclaims. "With the head held steady, one should be able to scan the entire screen area, without distortion, using normal eye movements. Looking down, one should be able to read papers on the desk without having to remove one's spectacles." However, the small distance viewing area of the lens makes it unsuitable for general use.

Chapple is so taken with Truevision Technica that he has recommended it in a newsletter sent out to his customers and he is negotiating with a chain of opticians to offer discounts to corporates. "Spectacles are said to be a grudge purchase" he says, " but the need is clearly there. Because there is not much demand for task-specific lenses, they are seldom offered by opticians — few of whom seem to know very much about the issue."

Chapple has no financial interest in Truevision Technica, so why the hullabaloo? "It's simple," he replies. "I want to raise consumer awareness of task-specific Progressive lenses. And I want to promote a healthy working environment by educating companies and their staff to ensure that they know how to minimise eyestrain when using computers."

Drew Cullen

A few of the best accessories

● One product which makes use of your existing peripherals is the Proformix Keyboard System; a result of the Cornell/Honeywell study undertaken in the US. The study makes much of the "neutral" typing low-risk posture. If you allow your hands to fall naturally into your lap; where they land is the ideal typing position. The Proformix system takes the form of a hinged tray attached to the underside of your desk. Whatever your desk height, you can adjust your seat so that your feet are flat on the floor and then move the tray into a comfortable position. The tray accommodates both keyboard and mouse and slopes gently away from the user, avoiding any unnecessary wrist deviation.

● Many "ergonomic" keyboards work according to one principle; angling the two halves of the main keypad to allow the elbows to rest in a more natural position. Apple's Adjustable Keyboard has a wide, gently sloping wrist rest, and splits down the middle, enabling the user to find the most comfortable typing angle. It has a detachable numeric keypad so the user can position the mouse closer to the alphabetic keys. Cherry Electrical sells a similar split keyboard for the PC.

The keyboard which sells in the largest volumes (and is one of the cheapest) is the Microsoft Natural Keyboard. This also separates the keys into two halves and its undulating design is claimed to accommodate the natural curves of the hand.

● The popular Maltron keyboard is a rather curious looking device with two large wells on either side, designed to fit "the shape of hands and the different lengths of fingers, to reduce movement and tension". It is pricey, but the company claims this has knocked RSI on the head for many sufferers.

There are special designs for single-handed use, for data entry, and for single-finger or head/mouth sticks. The company also sells the chunky Sicos Colani mouse, again designed to fit the hand more comfortably. Other mice making claims to be ergonomically acceptable include the Microsoft Ballpoint Mouse and the Logitech.

Left *The Maltron keyboard*
Below left *Microspeed's PC-Trac*
Below right *The Proformix Keyboard System*

If you prefer a trackball to a mouse, Microspeed sells a model with a large trackball and sloping wrist rest, as does Logitech. (Microspeed also sells its own brand of mouse, keyboard and notebook trackball for PC and Macintosh.)

● The trend with notebooks is to follow the acclaimed Apple PowerBook design; a large wrist rest to the front of the keyboard with an embedded trackball. Usually, the smaller the notebook the smaller the keyboard, but IBM's new Butterfly notebook features an extending keyboard which unfolds when the notebook is opened, giving a full-sized typing surface.

bit like smoking; some people who smoke all their lives will end up with lung cancer, while others won't be affected." But ergonomists agree that a healthy workstation and body should keep most people out of danger. Regular breaks are recommended, and if you can eliminate the time you spend at your screen, so much the better. The EEC Council Directive states: "The employer must plan the workers' activities in such a way that daily work on a display screen is periodically interrupted by breaks or changes of activity, reducing the workload at the screen." We all know that's a bit of a pipe dream, but just leaving the office on a coffee run is a start.

If you are unlucky enough to experience symptoms, the first step is to seek help from a doctor or physiotherapist as early as possible. According to the individual complaint, treatment can consist of massage, ice packs, hydrotherapy or stretching exercises, plus a thorough assessment of the sufferer's workstation in order to prevent a recurrence of the symptoms. Surgery is considered a last resort and painkillers should be used with caution; numbing the body to pain negates its natural capacity to alert you to problems.

As we have seen in the Mughal vs Reuters case, people do lodge compensation claims against employers for work-related injuries, but these are expensive and have been known to cost people their jobs. The RSI Association recommends keeping a diary if you are seriously considering a claim, as well as contacting a lawyer specialising in injuries and obtaining specialist medical assessment.

There are two things to bear in mind: one, computers are safe if properly used; two, the vast majority of cases are treatable. If you want to leave it in the lap of the gods then fine, but if you're just beginning to enjoy Windows 95, a little attention now should guarantee your enjoyment of whatever Bill Gates et al care to throw at you in the future.

PCW Contacts

Apple 0181 569 1199
(Apple Adjustable Keyboard £170)
Chartered Society of Physiotherapists
0171 242 1941
Cherry Electrical 01582 763100
Health and Safety Executive
0171 717 6000
HMSO 01142 892345 (EC regulations)
IBM 01256 343000 (Butterfly notebook)
IHSS 0171 221 7848 (Exerciser software from about £20 for a single copy)
Interact 0171 242 2709
London Hazards Centre
0171 267 3387 (for books and advice)
Maltron 0181 398 3265 (dual-handed keyboards from £375)
Microsoft 01734 270000 (Natural Keyboard £69, Ballpoint Mouse £69).
Microspeed 00 32 2 716 5007 (PC and Mac trackballs from £51.95, notebook trackballs from £46.95)
Rowley Ashworth 0181 543 2277
(law firm with experience of RSI)
RSI Association 01895 431134
(for information and advice).
Sven Christiansen 01483 302728
(Proformix Keyboard System)

Modems à la mode

V.34 modems have become good value for money and make the older, V.32bis technology seem passé. Geoff Marshall reviews the 15 V.34s in our group test: giving you the fax, summarising the advantages of fax modems, and providing guidance on whether your PC will be able to cope with the faster speeds.

PCW Modem Photography by David *Whyte*

Modem prices in the UK have fallen to a reasonable level and the low prices of some of the latest V.34 (28,800bps) modems tested here, make the older V.32bis technology look like poor value for money. Fax functionality at 14,400bps (V.17) is now taken for granted and it's almost impossible these adays to find a modem without fax on sale in the shops.

Advantages

Using a modem for fax, rather than a fax machine, has many advantages.You can fax directly from any Windows application and broadcast personalised faxes. If you print out a document and then feed it into a fax machine, you're wasting paper, your own time, and telephone charges — it's inevitable that a fax machine will get blemishes on its scanner mechanism and thus transmit streaks and other unwanted marks.

But because fax transmission standards use special algorithms to compress the image, a perfectly clean image is transmitted in less time than a blemished one — thus saving telecom costs.

When receiving faxes, a fax modem saves paper because you may not need to print out any, or all, faxes. However, if you wish to publish your fax number, you will need to leave your PC switched on all the time for receiving faxes. Many people feel uncomfortable about leaving a PC on permanently, but there really is little need for concern: PCs are now so reliable that leaving them switched on doesn't shorten their lives and the power consumption is less than 30W if you switch off the monitor.

Will there be anything faster? — in terms of speed over the analogue PSTN network (Public Switched Tekephone Network) the answer is almost certainly, yes. Although it is becoming increasingly difficult to stretch technology further as theoretical limits get closer, modem designers keep finding ways of squeezing more throughput out of the available bandwidth. Data rates of up to 33,600bps are already available using proprietary extensions to V.34 in the AT&T and Cray modems tested here. The ITU-T is presently considering extensions to V.34 with DCE speeds of 31.2Kb/sec, 33.6Kb/sec.

MODEMS CONTENTS

Is your PC fast enough for V.34?

V.34 data-compressing modems raise issues of whether your PC can communicate with the modem at these new faster data throughput speeds of up to 115,200bps.

The PC's serial port is driven by a Universal Asynchronous Receiver Transmitter (UART). National Semiconductor has made UARTs for use in personal computers ever since the first IBM PC came out.

The first PCs used a UART known as INS8250-B. Although this could receive and transmit data at speeds of up to 56Kb/sec, it had a slow access time which was adequate in the days of 4.77MHz bus speeds and serial printers. When the IBM-AT came along a new UART was required because of the increase in bus speed and the fact that the bus was now 16 bits wide. This new UART was known as INS16450 and its CPU read and write cycles were over five times faster than its 8-bit predecessor.

Overrun error

In an AT/ISA-bus machine, all serial data transfers are handled by the CPU and each byte must pass through the CPU registers to get to memory or disk. This means that access times must be fast enough to avoid read overrun errors and transmission latency at higher bit rates. In fact when the IBM-AT came out, the performance of the INS16450 was adequate because the speed at which data was routinely transmitted through the serial port was not as high as that which is now possible with V.34 modems.

To understand the limitations of the INS 16450, it is necessary to recognise how the serial port interrupts the CPU which has to finish its current task, or service a higher-priority interrupt, before servicing the UART. This delay is the bus latency time associated with servicing the UART interrupt request. If the CPU cannot service the UART before the next data byte is received (by the UART from the serial port), data will be lost.

This condition is known as overrun error. At low bit rates the AT system is fast enough to read each byte from the UART receiver before the next byte is received. The higher the bit rate at the serial port, the higher the strain on the system to transfer each byte from the UART before the next is received. Higher bit rates cause the CPU to spend increasing amounts of time servicing the UART, thus making the whole system run inefficiently.

FIFOs

To attack this problem, National Semiconductor developed the NS16550A UART. This has been used in all IBM Micro-channel Architecture (MCA) PS/2s. The 16550 overcomes the previous problems by including First In First Out (FIFO) buffers on the receiver and transmitter. Each of these FIFOs can store 16 bytes. The 16550 facilitates DMA transfers over the Micro-channel bus by special circuitry, although the FIFOs provide benefits in all architectures.

The size of the receiver FIFO ensures that as many as 16 bytes are ready to transfer when the CPU services the UART receiver interrupt. The receiver can request transfer at FIFO thresholds of one, four, eight, 16 bytes full. This allows software to modify the FIFO threshold according to its current task and ensures that the CPU doesn't continually waste time switching context for only a couple of bytes of data received.

The transmitter FIFO ensures that as many as 16 bytes can be transferred when the CPU services the UART transmit interrupt. This reduces the time lost by the CPU in context switching. However, since a time lag in servicing an asynchronous transmitter usually has no penalty, CPU latency is of no concern when transmitting, although ultimate throughput may suffer.

It's worth pointing out that these FIFOs are not automatically

CONTINUES ON PAGE 201

Is your PC fast enough for V.34?

CONTINUED FROM PAGE 199

used. The 16550 is pin-compatible with the 16450 and a direct replacement may be carried out on an existing PC. Therefore the 16550 defaults to emulating a 16450. The FIFOs have to be switched on by software but not all software supports this feature.

Alternative

Replacing the 16450 UARTs in your PC can be difficult if they are soldered rather than socketed. An alternative is the Hayes Enhanced Serial Port (ESP) which occupies a card slot in your PC and provides a 16550 to service an extra serial port.

Hayes ESP implements DMA technology too, providing your software supports it. Basically, ESP offloads the task of servicing the serial ports from the CPU, and provides an additional 1Kb of buffering between the serial port and the bus. If you use Microsoft Windows the issue of software supporting the 16550 UARTs does not arise with the ESP card, as Hayes supplies Windows drivers which work with any Windows comms package.

Do you need a 16550?

How do you know when you need a 16550? Well, in any multitasking situation such as OS/2 or Windows, you certainly need one to use anything like the potential of V.34.

Using DOS, if the processor is dedicated to a comms task you may not need one unless you're handling highly compressible files and therefore wish to use DTE (data terminal equipment) speeds above 38,400bps.

However, it's not quite that simple. For instance, any file transfer over the serial port is likely to use a protocol like Zmodem which is very processor-intensive because of the CRC checking that it does, so you may encounter problems due to the processor continually being interrupted by the UART and performance will suffer. It is important to be aware that if you get an overrun of the UART buffer you will get errors, even using an error-correcting modem. An error-checking protocol like Zmodem will discover these errors and request re-transmission of the data, resulting in sluggish performance.

Many other factors affecting the load on the CPU may lead to the necessity of fitting a 16550. In one case the presence of two disk controllers, one SCSI and one IDE, on the same bus precipitated serial comms errors until a 16550 was fitted.

AT&T Paradyne Comsphere 3810 Plus

AT&T is the largest telephone company in the US and through its aquisition of the Paradyne Corporation it has become a significant player in the modem marketplace.

The Comsphere is housed in a fairly large grey plastic case with a row of 13 LEDs on the steeply raked front panel. There are some touch buttons on the front panel as well, and an LCD panel for manual configuration — it may also be configured using AT commands via the computer interface. The power supply is in a comparatively large black plastic housing, halfway down the mains cable.

The modem is based on AT&T's own digital signal processor (DSP) chipset and the Motorola 68302 CPU. Connectors are provided at the back for a network management interface, a V.24 serial interface, a telephone instrument and the telephone line itself. The 3810 Plus model we tested supports dialled and 2-wire and 4-wire leased lines. There is a rack-mounted version, too, which provides the same functionality for modem nests.

For improving the reliability of analogue cellular data links, AT&T has its own protocol called Enhanced Throughput Cellular (ETC). Naturally this is only effective if supported at both ends of the link, but if you use AT&T PCMCIA modems you will benefit from this technology when calling Comsphere modems at your own base, via analogue cellular services. Remote configuration and various security options are featured as standard.

This modem has proprietary extensions to V.34, allowing DCE speeds of up to 33.6Kb/sec which may yet become ratified by the ITU-T as an extension to V.34. It supports all slower data modulation schemes including AT&T's proprietary V.32terbo, but excepting Rockwell's proprietary V.fast Class. There was no fax functionality in the unit tested but fax is promised for the next Flash firmware upgrade.

AT&T Paradyne Comsphere 3810 Plus
Price £795 (street)
Contact AT&T 01753 515000.
Fax 01753 550011

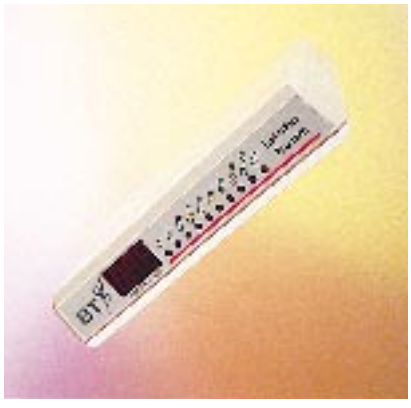
Verdict A top quality corporate-class data modem with network management and enhanced cellular features.

BT Prologue V.34EX

Another product based on the Rockwell chipset; it is obviously manufactured to BT's specification by the Swedish modem manufacturer, Intertex, whose products we have tested before. The standard Intertex specification has been cut down somewhat by the removal of synchronous DTE working, which is rarely required by the average PC user.

This modem offers compatibility with V.fast Class modems but not V.32terbo. All other slower ITU-T modulation standards are supported plus MNP10, Class 1 and Class 2 fax.

The desktop housing is quite small. It has ten LEDs and two push buttons on the front panel and features remote configuration, dial-back and password security. Delrina's fax and data software

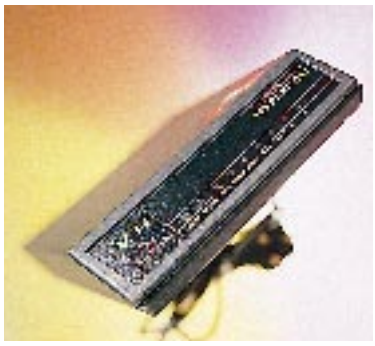


BT Prologue V.34EX
Price £199 (RRP); £175 (street)
Contact BT 01784 421976.
Fax 01784 421910

Verdict A compact fax/data modem at a very reasonable price.

Cray Quattro SM288
Price £995 (RRP); £595 (street)
Contact Cray 01923 258000.
Fax 01923 210200

Verdict A high-end data modem with network management and security features aimed at the corporate marketplace, but its present lack of fax facilities will limit its wider application.



Dataflex HyperGem
Price £249 (RRP); £225 (street)
Contact 0181 543 6417.Fax 0181 543 7027

Verdict A simple-to-use fax/data modem, which performed well in our tests.

is bundled.

Cray Quattro SM288

This is the only modem in this group test which uses the Cornell chipset and therefore has a slightly unusual AT command set. It is housed in a very strong-looking light-grey ABS case with eight LEDs and six push-buttons on the front panel. The mains power supply is entirely internal.

There is a separate command port to enable commands to be entered, or calls monitored while the modem is online. It may also be connected to a modem management system to form part of a managed network of modems in a larger company. The Quattro supports all slower ITU-T modem standards but not the proprietary V.32terbo or V.Fast Class.

Although the Cornell chipset supports fax operation, the review sample had no fax facilities but it is expected that these will be added soon. Three levels of security control are provided. Level 1 security requires keys and passwords to be exchanged before a data link is established. Level 2 differs from level 1 only in that it allows external validation of keys and passwords by a central controller card at the central site. Levels 1 and 2 are transparent to the authorised user as they are managed by the modem firmware. Lastly, dial-back security allows the central site modem to verify incoming calls against a list of passwords and then dial the caller back using a telephone number corresponding to the password given. Remote configuration is also supported and is subject to security control.

Dataflex HyperGem

Based on the Rockwell chipset, this modem offers compatibility with V.Fast Class modems but not V.32terbo. All other slower ITU-T modulation standards are supported, together with all EIA fax standards, as well as MNP10 which is particularly good over poor phone lines and cellular links. The Dataflex desktop unit is housed in a black plastic case, with nine LEDs which indicate all the usual functions. One gives a positive indication that fax mode is in use — a useful but uncommon feature of modern modems. There are no manual controls and the mains adaptor is entirely internal. Both Class 1 and Class 2 fax modem standards are supported for Group 3 fax communications at up to 14,400bps. Other features include dial-back security, caller validation via a password, and remote configuration.

Dataflex offers a portable version in the well-known Dataflex pocket modem housing, a PC internal card, and a PCMCIA. All versions should perform identically as they are based on the same firmware and chipset. Additionally, Dataflex has a desktop modem with voice functionality known as the Comms Office for customers requiring answering machine functionality as well as data and fax.

Dynalink 1428 VQE Orion Speedcom Pro External

The Dynalink and Orion modems in this review are strikingly similar: the user manuals are the same size, written in the same way with the same typography and neither has a brand name on it. They have the same row of nine LEDs on their front panels although the plastic cases are slightly different. At first we thought that this was a classic case of badge-engineering, so we expected identical performances. We couldn't have been more wrong.

Both performed well on one-way data traffic, but the Dynalink was severely bottle-necked when data was flowing in both directions simultaneously. The Dynalink simply stopped working during four separate two-way data tests and had to be turned off and then on again. Two of these failures were to do with compressible data, and the other two with incompressible data. This indicates a problem within the modem's CPU in handling large data throughputs. It would be fair to say that this would not affect most users unless the application is LAN bridging, but the Orion is clearly more generously powered on the processor front.

In fact, the modems are totally different inside. The Dynalink is based on the standard Rockwell chipset and includes V.fast Class as well as MNP10, but lacks V.32terbo. The Orion is designed around the AT&T DSP chipset and therefore supports V.32terbo but not V.fast Class.

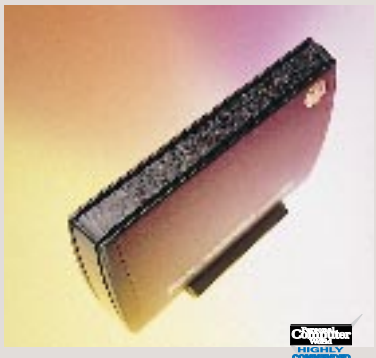
Dynalink includes with its product a fast 16550 serial port card for optional installation inside your PC, and Delrina software. Orion bundles Cheyenne's software suite which includes voice, fax and data functionality. The Orion product tested did not include voice functionality but this feature will be available, at extra cost, by the time you read this.

Dynalink 1428 VQE
Price £169 (RRP); £139 (street)
Contact Dynalink 01252 727711.
Fax 01252 727733

Verdict Disappointing performance, yet the same price as the superior Orion product. Not recommended.

Orion Speedcom Pro External
Price £139 (RRP); £139 (street)
Contact Orion Technology
01252 838393.
Fax 01252 834881

Verdict Good performance at an amazingly low price.



Electronic Frontier XL
Price £149 (RRP); £149 (street)
Contact Electronic Frontier 01734 810600. Fax 01734 811600. Web http://www.elecfron.com

Verdict Very good performance combined with an astonishingly low price.

Electronic Frontier XL

Electronic Frontier's modem is presented in a black aluminium housing with a very solid feel to it. It has nine LEDs and is supplied with a stand which allows the modem to be used either horizontally or vertically.

Although based on the standard Rockwell V.34 DSP, it uses its own data pump rather than Rockwell's and this results in excellent thoughput figures.

Like other Rockwell-based products it supports V.fast Class but not V.32terbo. Delrina's fax software is bundled, along with Comit data comms software.

Hayes Optima 288 V.34/V.FC + Fax

The Hayes modem is simple to use, with no front panel switches or buttons. It has eight LEDs on the front panel and an on/off switch on the back panel. The case is of a solid-feeling bright aluminium construction. It offers backward compatibility with V.Fast Class but not V.32terbo, in common with other Rockwell-based V.34 modems.

Hayes modems have an unusual feature which is handy for synchronous users: using Hayes proprietary AutoSync mode, the modem can provide buffering between an asynchronous serial port on a PC and a synchronous protocol like SDLC. This can be very useful for applications requiring IBM 3270 and 5250 terminal emulation, such as remote access to IBM AS/400 and mainframe computers. For such synchronous applications it can provide a very economical solution by avoiding the need for a synchronous serial port.

The bundled software includes Hayes Smartcom LE for Windows and Hayes Smartcom Fax for Windows package. For a modem which lacks remote configuration, security features and network management facilities, it is slightly expensive.

Lasat Safire 288

LASAT is a Danish company specialising in modems and ISDN adaptors. Founded in 1982, LASAT has only recently begun marketing outside Denmark and Scandinavia. Its UK office opened in October 1993. The parent company is now 35 percent owned by Olicom (as the result of a deal in October 1994). Although not yet well known in the UK, LASAT ranks 18th in Europe in the high-end modem market, above Andest, Pace, Psion Dacom, and Sonix, according to Dataquest.

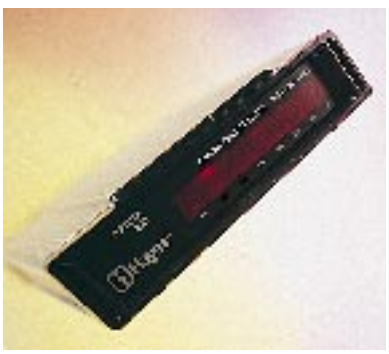
LASAT products carry a ten-year warranty. The Safire 288 must be the smallest desktop modem on the market — and it's finished in a most unusual colour; purple. No bigger than a packet of 20 cigarettes, its wedge-shaped casing was designed by Jacob Jensen (who designs for Bang & Olufsen hi-fi). To complete the designer look, the sloping front panel has three tiny red indicator lamps.

The three LEDs are for indicating power on, Data Terminal Ready (DTR), and Data Carrier Detect (DCD). The rear panel is equally simple, with just three connectors: one for power input from an external mains transformer, a second for the serial interface to the computer equipment, and thirdly the telephone line connector.

Motorola 3400 Online

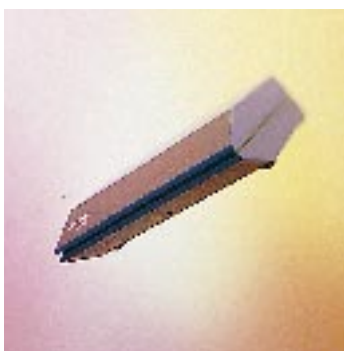
The Motorola modem is housed in an ivory-coloured desktop case with eight LEDs. Designed around the latest Motorola 68356 integrated circuit, which combines DSP and data pump in a single programmable chip, it supports V.34 and all relevant ITU-T standards but not the proprietary V.32terbo or V.fast Class, and has Class 1 fax functionality at up to 14,400bps.

Three levels of security are provided. Firstly, a password may be demanded of the remote user before the data communication proceeds. Secondly, callback security may be added to the simple password request and a maximum of two pre-arranged callback numbers may be stored — each user password may be associated with one or other of these call-back numbers. Thirdly, the highest level of security requires that the password be re-entered following the password-callback sequence to the user, thus guaranteeing that the caller is actually at the designated callback number. A disadvantage of enabling any



Hayes Optima 288 V.34/V.FC + Fax
Price £499 (RRP); £400 (street)
Contact Hayes 01252 775577. Fax 01252 775511. Web eurosales@hayes.com

Verdict An easy to set up fax/data modem which performed well on test.



Lasat Safire 288
Price £299 (RRP); £199 (street)
Contact Lasat 0181 899 1765. Fax 0181 899 1711

Verdict An unusually designed modem; pocket-sized and reliable.

Motorola 3400 Online
Price £170 - £199 street price (RRP n/a)
Contact Motorola 01293 404343. Fax 01293 404372. Web http://www.mot.com

Verdict A full-featured modem with good security features which achieved excellent throughput figures in our tests.

of these security features is that the fax functionality becomes unavailable for both incoming and outgoing faxes.

There are two versions of the product on sale, simply depending on whether or not Internet software is bundled. We tested the Internet version, called 3400 Online, which comes with Trumpet Winsock, Mosaic World Wide Web browser and a licence to download Vocaltec's Internet Phone software. Instructions are included for getting on to the net immediately by registering online with IBM's Global Network. The version which lacks the Internet software is called 3400 Pro and is about £10 cheaper.

MultiTech MT2834 ZDX

This modem is based on AT&T's digital signal processor (DSP) chipset and supports V.32terbo but not V.fast Class. It supports all other relevant ITU-T standards as well as possessing Class 2 fax capabilities up to 14,400bps. It is housed in slim plastic case with an external mains transformer. Ten LEDs provide comprehensive information on the status of the connection.

Performance was good, although not excellent when compared with some other modems in this feature, for two-way data throughput. This is due to the not-so-generously powered Zilog data pump processor, which is nevertheless adequate for one-way data streams. However, two-way throughput is important only if LAN bridging is required and this modem is not aimed at the LAN market anyway.

MultiTech bundles its own MultiExpress Fax and Data comms software.

MultiTech MT2834 ZDX
Price £299 (RRP); £165 - £199 (street)
Contact MultiTech 01344 891266. Fax 01344 891215. Web http://www.multitech.com

Verdict A good, general-purpose fax/data modem.

Pace Linnet 34 fx
Price £299 (RRP); £180 (street)
Contact Pace 01274 532000. Fax 01274 537029. Web http://www.cityscape.co.uk/users/et30/pacehome.htm

Verdict Good value for money for a fax/data modem with additional security features.

Pace Linnet 34 fx

The Linnet is housed in a dark-grey desktop case and the mains power supply is entirely internal. There are six LEDs but no manual controls. Like other modems based on the Rockwell chipset, the Pace offers compatibility with V.fast Class modems but not V.32terbo. All other, slower, ITU-T modulation standards are supported as well as MNP10 and all fax modem standards.

Password and dial-back security are included with a 20-entry dial-back store holding 20 combinations of password and dial-back phone numbers. Password security may be used without dial-back and a password-protected remote configuration facility is provided. Pace additionally offers a pocket modem and a PCMCIA modem, based on the same chipset and firmware.

Tricom Tempest 34 Plus

Tricom markets under its own name in the UK, the products of the US company Microcom which developed the MNP standards for modem error correction and compression.

MNP5 and MNP10 are now commonly licenced to other modem manufacturers by their inclusion in the Rockwell chipsets. MNP10 is optimised for high throughput and reliability over poor telephone lines, including cellular links, and includes MNP5 data compression.

Microcom's own implementation of MNP10, included in this Tricom product, is superior to those versions available in the Rockwell chipsets. In particular, Microcom's MNP10 products overcome one of the difficulties experienced with Rockwell-based modems: that is, the

Tricom Tempest 34 Plus
Price £399 (RRP); £299 (street)
Contact 01494 483951. Fax 01494 485213

Verdict A fast, reliable, modem but its higher price can only be justified if the advantages of the parallel-port interface and its superior performance over poor telephone circuits are important to you.

V.42bis is a better algorithm than MNP5 for compressing highly compressible data, and there is no standard way to automatically negotiate the best compression algorithm for the data. So to get the best throughput with Rockwell chipsets, you have to disable MNP10, thus losing the advantages of operation over poor telephone circuits.

By using a combination of Rockwell and Microcom-proprietary chips, this modem allows MNP10 to use V.42bis compression rather than MNP5, leading to the best of both worlds. The only downside to this is that it only works if the modems at both ends of the link have the Microcom proprietary technology. Even Tricom's cheaper Tempest 34 lacks this feature as it is based on pure Rockwell chipsets. Only the Tempest 34 Plus and the higher-end Tornado and Traveller products from Tricom have this superior MNP10 technology.

Another unique feature of Tricom/Microcom products is the parallel-port interface which allows much higher speeds than would be possible via a serial port. Up to 300,000bps is claimed under Windows but this is not evident in our results because all our tests were carried out under DOS, and there are parallel port drivers for Windows only. In other respects the modem is a fairly standard plastic box with eight LEDs, and the usual Rockwell limitation of lack of support for AT&T's proprietary V.32terbo modulation scheme.

US Robotics Sportster 28,800

The Sportster is housed in a small, white, plastic case with seven LEDs. On the underside of the modem is a list of

US Robotics Sportster 28,800
Price £199 (RRP and street)
Contact US Robotics 01734 228200. Fax 01734 695555; Web http://www.usr.com

Verdict Good performance from one of the modem industry's top-selling brand names.

all the DIP switch settings which are useful for forcing certain operating conditions. Naturally, these conditions can also be set using AT commands.

Because US Robotics licensed the V.fast Class protocols from Rockwell, rather than using the Rockwell chipset, this modem supports V.fast Class as well as V.34, but not V.32terbo. The DSP chip is USR's own design manufactured by Texas Instruments. An NEC data pump provides a reasonable amount of processing horsepower.

The documentation is exceptionally good and it was nice to find Macintosh users (as well as PC users) thoroughly catered for in the handbook. The bundled software is Quicklink II fax and data.

Zoom V34XE

The Zoom modem is another Rockwell-based unit. It is well engineered, with attention having being paid to effective screening of its internal components. Its light grey plastic casing displays fifteen LEDs, the more unusual being to distinguish a V.fast Class connection and to indicate fax operation.

It supports both Class 1 and Class 2 fax standards and MNP10 data protocol. Delrina's fax and data software is included.

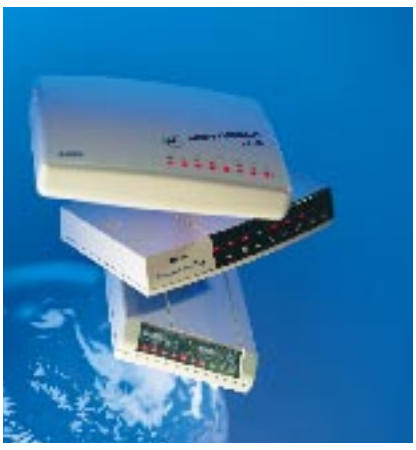
Zoom V34XE
Price £169 street (RRP n/a)
Contact 01784 421123. Fax 01784 421910. Web; sales@extech.demon.co.uk

Verdict A quality product at a very attractive price.

How we did the tests

The data functionality was tested using simulated telephone lines via a Telephone Network Simulator to guarantee that the every modem would be tested under exactly the same conditions. For the data throughput and fax tests, we simulated a good quality telephone line with no impairments. — telephone lines in the UK are now so good that we felt it would be irrelevant to test performance over severely impaired lines.

Delrina's WinFax Pro software was used, running under Windows 3.1, to send and receive a multi-page document using a single example of each modem communicating with a real fax machine (a Canon L-785).

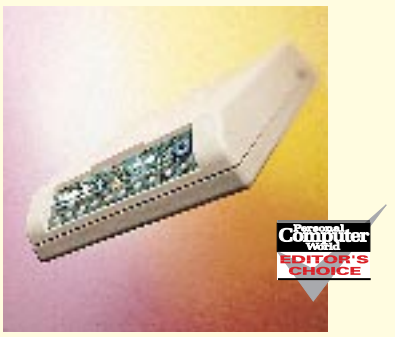


Modems were tested for data throughput in identical pairs using a Dell 486/66MHz machine with two Hayes Enhanced Serial Ports (ESP) installed. Dedicated software was used to automate and time the throughput tests which were done under MSDOS 6.22. This allowed a DTE speed of to 115,200bps to be used for all the throughput tests. All the V.34 products tested supported 115,200bps.

Two file types were used for throughput testing: a bit-mapped graphics file, and a compressed archive file. The first was highly compressible — certainly above 4:1; the second was incompressible. Separate file transfers were timed using one-way and two-way data flows. With a two-way data flow both modems send data at the same time, over the same telephone line.

The results are shown in the table on page 213 with compressible and incompressible file transfer speeds being kept separate. It is interesting to see that some modems appear to be bottle-necked by an underpowered processor when doing two-way data transfers, while others (such as the Motorola) are more generously powered. However, it's fair to say that most modems would not be used for two-way traffic unless used for something like LAN bridging.

Editor's Choice



Value for money plays a big in part in deciding which modem you should buy. With modems ranging in street price from £139 up to £795, it is hard to assess value for money because the more expensive modems have many more features that would be attractive to corporate users. Only the user can decide which features are desirable for his application and what he is prepared to pay for them.

The Editor's Choice is the Motorola 3400 Online for delivering a rich set of features, together with excellent performance for a V.34 fax/data modem, and at such a reasonable price. It should be possible to buy the Pro version, without Internet software, for as little as £160 by shopping around.

The Electronic Frontier XL is Highly Commended. It came very close to the Motorola in performance and makes few compromises to achieve its exceptionally low street price of £149.

Glossary

AT command A de facto standard, started by Hayes Microcomputer, for issuing commands such as auto-dialling etc to modems, via an asynchronous serial port. Unfortunately, little standardisation is apparent regarding commands specific to anything later than V.22bis. This problem includes error correction and data compression commands. It has the disadvantage of being unusable with synchronous protocols where V.25bis is more appropriate.

Autobaud The ability of a serial port on a modem to automatically determine the asynchronous data rate by sampling incoming data from the PC.

AutoSync Provides buffering between an asynchronous serial port on a PC and a synchronous protocol like SDLC or HDLC used by IBM. This saves the additional cost of a synchronous serial card for the PC and allows the use of AT commands to configure the modem.

baud The rate at which data symbols are transmitted. Note that in general a data symbol may consist of more than one bit depending on the modulation scheme used. Often confused with bps (bits per second).

Class 1 fax An EIA standard for fax software compatibility with fax modems which requires the fax software running on the PC to do most of the work of fax image preparation and negotiation with the remote fax machine.

Class 2 fax An EIA standard for fax software compatibility with fax modems which delegates negotiation with the remote fax machine to the fax modem. Fax image preparation is still carried out by the PC.

DCE Data Communications Equipment is the apparatus used to exchange data with the communications network, such as the PSTN or ISDN.

DTE Data Terminal Equipment is the computer system, or a dumb terminal, connected to the DCE for the purpose of sending and receiving data.

EIA/TIA The Electronic Industries Association/Telecomunications Industry Association which sets US national standards which are frequently adopted by other countries. Examples include the Class 1 and 2 fax standards, and the serial port standard RS-232.

fall-back The ability of a modem to select a slower transmission speed if the telephone line is of poor quality. (See also; fall-forward).

fall-forward The ability of a modem to select a faster transmission speed if the telephone line quality improves during the progress of a data call. (See also; fall-back). ITU-T International Telecommunications Union, formerly known as the Consultative Committee on International Telegraph and Telephone (CCITT). This body sets international standards in telecomunications. Its standards are not mandatory, rather they are recommendations.

LAP-M An error correcting protocol used in V.42.

MNP Microcom Network Protocol has become a de facto standard in error correction and data compression. Important versions are MNP2 to MNP4 which implement error correction by requesting that the data block be re-transmitted. MNP5 has become a de facto standard in data compression using Huffmann coding. MNP7 is an improved data compression algorithm which never became a standard, due to the success of V.42bis. MNP10 enhances fall-back negotiation, allowing fall-back from V.32 to V.22 but is proprietary.

PSTN Public Switched Telephone Network is the network we all use every for voice and modem calls.

PTT Postal, Telephone and Telegraphy administration. A generic title for an organisation which provides telecommunications services on a national basis.

UART Universal Asynchronous Receiver Transmitter is an integrated circuit used to interface a computer to an asynchronous serial port.

V.8 An ITU-T standard for the automatic negotiation of the optimum modulation mode for two communicating modems. It also provides a way of distinguishing between voice, fax, and data on incoming calls if the calling device also supports V.8. Modulation modes supported include: V.17, V.21 V.22(bis), V.23, V.26bis, V.26ter, V.27ter, V.29, V.32(bis), V.34, and V.42(bis).

V.17 An ITU-T standard for communication at 14,400bps. Primarily used for fax transmission.

V.24 An ITU-T standard for the hardware interface of a serial port. It is electrically equivalent to the EIA standard, RS-232-D. It defines which pins of the standard 25-pin D-connector are used, and for what.

V.25 An ITU-T standard for automatic answering of telephone calls. It defines calling tones used to identify incoming telephone calls from modems and fax machines. If the calling device sends V.25 calling tones, auto-answering equipment can determine whether the incoming call is voice, fax, or data and then handle or route the call appropriately.

V.25bis An ITU-T standard for issuing commands for auto-dialling in a similar way to the Hayes AT command set. It is much more limited in scope than the AT commands, but has the advantage of working with synchronous protocols.

V.27ter An ITU-T standard for communication at 4,800bps with a fall-back speed of 2,400bps. Primarily used for fax transmission.

V.29 An ITU-T standard for communication at 9,600bps. Primarily used for fax transmission.

V.32 An ITU-T standard for data communication at 9,600bps, with fall-back speeds of 7,200 and 4,800bps. Uses QAM with trellis coding.

V.32bis As V.32 but offering enhanced speed of 14,400bps with an additional fall-back speed of 12,000bps.

V.32terbo AT&T's proprietary extension to V.32bis offering an enhanced speed of 19,200bps with an additional fall-back speed of 16,800bps.

V.34 An ITU-T standard which allows speeds of up to 28,800bps using new techniques to improve noise immunity. Fall-back speeds are defined in increments of 2,400bps right down to 2,400bps.

V.42 An ITU-T standard for error correction using requests for re-transmission; a method of correction. (Also known as LAP-M).

V.42bis An ITU-T standard for data compression using Lempel-Ziv encoding. More effective than MNP.

V.FC V.Fast Class is a proprietary standard developed by Rockwell for data communications at 28,800bps. V.FC is technically similar to, but incompatible with, V.34.

THROUGHPUT: TABLE OF RESULTS

File Type / Manufacturer	Compressible one-way	Compressible two-way	Incompressible one-way	Incompressible two-way
Zoom	111.69	64.78	33.68	28.93
US Robotics	111.30	86.49	33.72	33.72
Tricom Tempest 34 Plus	114.49	81.63	34.46	30.64
Pace	113.68	91.43	33.68	33.68
Orion	113.57	111.11	34.48	33.86
Multitech ZDX	114.08	75.83	33.61	32.37
Motorola 3400	114.70	114.49	34.17	33.81
Lasat	111.89	64.13	33.68	28.23
Hayes Optima	113.27	111.89	34.48	34.48
Electronic Frontier	114.49	112.48	33.47	33.47
Dynalink	112.08	64.97	33.68	29.01
Dataflex	109.03	62.08	33.68	27.87
Cray	106.49	69.64	32.80	28.85
BT Prologue	112.48	68.16	33.67	29.73
AT&T	114.70	105.61	33.16	33.14

V.34 MODEMS **TABLE OF FEATURES**

Manufacturer Model	AT&T AT&T Paradyne Comsphere 3980	BT BT V.34EX	Cray Cray Quattro SM 288	Dataflex Dataflex HyperGem (desktop)	Dynalink Dynalink 1428 VQE	Electronic Frontier Electronic Frontier XL	Hayes Hayes Optima 288 V34/VFC+FAX	Lasat Lasat Safire 288
Supplier	AT&T Paradyne	Telecom M'tg & Dist.	Cray	Dataflex	Dynalink	Electronic Frontier	Hayes	LASAT
Telephone	01753 51500	01784 421976	01923 258000	0181 543 6417	01252 727711	01734 810600	01252 775577	0800 136331
Fax	01753 550011	01784 421910	01923 210200	0181 543 7027	01252 727733	01734 811600	01252 775511	0181 899 1711
MNP Level 5	●	●	●	●	●	●	●	●
MNP Level 10	❍	●	❍	●	●	❍	❍	●
V.21	●	●	●	●	●	●	●	●
V.22	●	●	●	●	●	●	●	●
V.22bis	●	●	●	●	●	●	●	●
V.23	●	●	●	●	●	●	●	●
V.25bis	●	●	●	❍	❍	❍	❍	❍
V.25	●	●	●	●	●	❍	●	●
V.32	●	●	●	●	●	●	●	●
V.32bis	●	●	●	●	●	●	●	●
V.32terbo	●	❍	❍	❍	❍	❍	❍	❍
V.fast class	❍	●	❍	●	●	●	●	●
V.34	●	●	●	●	●	●	●	●
V.42 error correction	●	●	●	●	●	●	●	●
V.42bis data compression	●	●	●	●	●	●	●	●
Autosync	❍	❍	❍	❍	❍	●	●	❍
Synchronous DTE working	●	❍	●	●	●	●	●	●
Max DTE working (bits/sec)	115200	115200	115200	115200	115200	115200	230400	115200
Max DCE speed for data	33600	28800	32000	28800	28800	28800	28800	28800
Remote configuration	●	●	●	❍	●	❍	❍	❍
Number of factory default configurations	7	2	12	1	2	1	1	2
No. of user conf.	3	2	4	3	2	2	2	2
No. of Security callback	1	20	30	0	0	4	0	0
No. of user tel. no.s	20	20	30	10	4	4	0	4
V.17	●	●	❍	●	●	●	●	●
V.27 ter	●	●	❍	●	●	●	●	●
V.29	●	●	❍	●	●	●	●	●
TIA/EIA Class 1	●	●	❍	●	●	●	●	●
TIA/EIA Class 2	●	●	❍	●	●	●	❍	●
Chipset	AT&T	Rockwell	Cornell	Rockwell	Rockwell	Rockwell	Rockwell	Rockwell
Which fax S/w supplied?	None	Delrina	None	SuperFax	Delrina	Delrina	Smartcom FAx	Trio
Which data S/w supplied?	None	Delrina	None	SuperFax	Delrina	Comit	Smartcom LE	Trio
Internal speaker	●	●	●	●	●	●	●	●
Power on/off switch	●	●	❍	❍	●	●	●	❍
Phone handset connectors	●	●	❍	❍	❍	❍	●	❍
Number of indicators	13 plus LCD	10 plus 3 digit display	8	9	9	9	8	3
Firmware in flash memory	●	❍	●	❍	❍	❍	❍	❍
REN	1	1	1	1	1	1	1	1
BABT approved	●	●	●	●	●	●	●	●
Dimensions	56 x 190 x 300	25 x 130 x 180	220 X 225 X 52	50 X 150 X 250	120 x 150 x 28	122 x 175 x 30	43 x 140 x 244	89 x 94 x 23
Weight (grams)	1130	280	1750	1000	280	450	870	125
List price £	795	199	995	249	169	149	499	299
Street price £	795	175	595	225	139	149	399	199
								

KEY ● Yes ❍ No

V.34 MODEMS TABLE OF FEATURES

Manufacturer Model	Motorola Motorola 3400 Online	MultiTech MultiTech MT2834ZDX	Orion Orion Technology SpeedCom Pro	Pace Pace Linnet 34 fx	Tricom Tricom Tempest 34 Plus	US Robotics US Robotics Sportster 28,800	Zoom Zoom V34XE
Supplier	Motorola	MultiTech	Orion Technology	Pace	Tricom	US Robotics	Express Technology
Telephone	01293 404343	01344 891266	01252 838393	01274 532 000	01494 483951	01734 228200	01784 421123
Fax	01293 404372	01344 891215	01252 834881	01274 537 029	01494 485213	01734 695555	01784 421910
MNP Level 5	●	●	●	●	●	●	●
MNP Level 10	❍	❍	❍	●	●	❍	●
V.21	●	●	●	●	●	●	●
V.22	❍	●	●	●	●	●	●
V.22bis	●	●	●	●	●	●	●
V.23	❍	●	●	●	●	●	●
V.25bis	●	❍	❍	❍	❍	❍	❍
V.25	❍	●	●	●	❍	●	❍
V.32	●	●	●	●	●	●	●
V.32bis	●	●	●	●	●	●	●
V.32terbo	❍	●	●	❍	❍	❍	❍
V.fast class	❍	❍	❍	●	●	●	●
V.34	●	●	●	●	●	●	●
V.42 error correction	●	●	●	●	●	●	●
V.42bis data compression	●	●	●	●	●	●	●
Autosync	❍	❍	●	●	❍	❍	❍
Synchronous DTE working	❍	❍	●	●	❍	❍	❍
Max DTE working (bits/sec)	115200	115200	115200	115200	115200	115200	115200
Max DCE speed for data	28800	28800	28800	28800	28800	28800	28800
Remote configuration	❍	●	●	●	●	❍	❍
Number of factory default configurations	1	1	1	1	1	2	1
Number of user conf.	2	1	1	2	4	1	1
Number of Security callback	2	0	0	0	40	0	0
Number of user tel. no.s	9	2	0	4	9	4	4
V.17	●	●	●	●	●	●	●
V.27 ter	●	●	●	●	●	●	●
V.29	●	●	●	●	●	●	●
TIA/EIA Class 1	●	❍	●	●	●	●	●
TIA/EIA Class 2	❍	●	●	●	❍	●	●
Chipset	Motorola	AT&T	AT&T	Rockwell	Rockwell/Microcom	USR	Rockwell
Which fax software supplied?	Delrina	Multiexpress fax	BitWare	SuperFax	Delrina	Quicklink II	Delrina
Which data software supplied?	Delrina	Multiexpress Comms	BitWare	SuperFax	Delrina	Quicklink II	Delrina
Internal speaker	●	●	●	●	●	●	●
Power on/off switch	●	●	●	❍	●	●	●
Telephone handset connectors	❍	❍	●	●	●	❍	❍
Number of indicators	8	10	9	6	7	7	15
Firmware in flash memory	❍	❍	❍	❍	●	❍	❍
REN	1	1	1	1	1.5	1	1
BABT approved	●	●	●	●	●	●	●
Dimensions	163 x 135 x 38	114 x 142 x 25	150 x 110 x 30	160 x 250 x 35	162 x 110 x 25	95 x 165 x 35	157 x 41 x 22
Weight (grams)	300	224	270	805	282	224	350
List price £	No RRP	299	139	299	399	199	No RRP
Street price £	170 to 199	165 to 199	139	180	299	199	139
							

KEY ● Yes ❍ No

Laser lights

Eleanor Turton-Hill puts three low-cost personal laser printers through their paces, cutting through the issues surrounding laser technology and explaining both traditional and GDI designs.

Many technologies have been developed over the years for setting ink to paper, but it is the laser printer which now dominates the PC industry, and there's one undeniable reason for its popularity: value. For around £300, you can now buy yourself a reliable laser printer which will happily churn out gorgeous 300dpi text and graphics at a decent speed of four to six pages per minute (ppm). You'll get consistently good quality output, mechanical reliability, and office tranquillity into the bargain.

As the market for lasers printers has developed, competition between manufacturers has become increasingly fierce, especially at the budget end. Prices have fallen as manufacturers have found new, inventive ways of cutting costs. The most obvious is to use a slower engine, but it is possible to skimp on lots of other elements as well, including memory, PostScript options, network compatibility, and paper handling features. The result is that each model has a slightly different balance of components. For the consumer, this has made the printer market into a minefield of confusing options.

Some manufacturers have chosen to use GDI (Graphical Device Interface) technology, which further cuts down the cost of production using an innovative printing method which greatly simplifies the design of the printer. Although GDI technology has considerably reduced the price of lasers, it has also served to increase the confusion. Here, I'll be attempting to unravel some of the issues which surround laser technology in its various forms, with particular reference to three new printers on the market: the Canon LBP-460, the Sharp JX-9210 and the Epson EPL-5500.

GDI Design

Canon LBP-460
Sharp JX-9210

Canon's new printer, the LBP-460, and Sharp's JX-9210 both use GDI technology. The printing process works in a different way from traditional methods.

Instead of an application converting a document from its own language to a printer language and the printer then converting this to a bitmap, the document is sent to the printer using Windows' native GDI code. Normally, the printer would have a whole load of complex electronics built into it to process incoming data, but in a GDI printer all this work is done on the PC. One of the major benefits of this method is an increase in performance gained by cutting out the intermediary translation process, which most printers use.

Printer manufacturers implement GDI technology in different ways, and this has caused a great deal of misunderstanding of the advantages and disadvantages of the GDI approach. The new Sharp JX and Canon LBP use the Microsoft Windows Printing System (WPS), a standard developed by Microsoft to create a universal architecture for GDI printers. Not all GDI printers are developed in collaboration with Microsoft, but as the technique has become more popular, there's been an increasing need for standardisation.

Some GDI printers are designed in such a way that they are heavily dependent on the host processor. The Windows GDI language is converted into a bitmap on the computer and the bitmap is then sent to the printer. In such cases, the speed of a print job depends on the speed of your processor; if you have a fast processor, you will have fast printing. But processor-dependence cuts both ways; if you've got a slow processor, you will have slow printing.

The WPS works differently: it enables Windows' GDI language to be converted to a bitmap while printing. Under this system, the image is actually being rendered during the printing process, which greatly reduces the amount of processing power required from the PC.

Both the Canon and the Sharp are Windows 95 compatible, which means their drivers have been optimised for running under the new operating system.

PCW **Printer** Photography by David *Whyte*

Canon LBP-460

Like most GDI printers, both come with bi-directional drivers, which makes installation easy. The two-way communications system automatically configures the PC with the correct settings on installation, and it keeps you informed on the progress of each job while you're printing. Any kind of problem which occurs in the printing process is reported on-screen as well, with an accompanying voice message like "Out of paper" or "Paper jam".

The bi-directional feedback built into the GDI system takes much of the painful troubleshooting out of the printing process, and generally, both printers gave excellent feedback during testing.

Design-wise, the two printers are very different: the Canon LBP-460 is built like a large breeze block with the input tray carved into the rear and output at the base of the front.

Setting it up is a simple procedure as the whole of the front panel opens out and everything inside is easily accessible, so the printer cartridge slides in with no problems. One drawback is that paper output is directed straight onto the desk space in front of the printer — if you haven't got much room, this can become highly annoying.

Another niggle with the Canon, which is typical of GDI printers, is that it lacks an on/off switch or even a light to show that the power is on. This is not a major problem, but it helps to know at a glance whether the printer is correctly powered up or not, especially if you're trying to identify a fault.

The Sharp JX-9210 is a much smaller model, with a footprint of 11.8in x 11.9in and a more convenient output tray which stacks finished documents. Again, there's no on/off switch, but there is a light to confirm that the power is on. The design of this Sharp demands a U-shaped paper path, which precludes the use of thick paper and card, so there's an alternative paper path provided via a flap at the bottom of the machine. When this flap is opened, output is automatically diverted to a straight path and documents appear at the front, face up.

Both printers produced excellent quality text and graphics, but in the final analysis the Sharp JX-9210 had the edge on quality due to its far superior 600dpi resolution. Photographic images came out much smoother in comparison with those of the Canon, and blocks of black appeared more solid, too.

Either of these "Windows 95-ready" printers are available for around the £300 mark. Although the quality and performance results from both printers came out well in our tests, there is one restriction you should know about if you want to buy a GDI printer: it will operate only under Windows. You can print from DOS applications but only if they're running in a window, and then only with additional emulation (PCL4 is provided with both printers). Not all DOS applications will run happily under Windows, so bear in mind that you cannot print from DOS native mode.

Sharp JX-9210

Traditional Design

Epson EPL-5500

Having used two Windows 95 GDI printers, Epson's new EPL model seemed slightly outmoded at first. The driver is set up using a single install.exe program. There's no automatic configuration or bi-directional messaging, so you have to do your own thinking at each stage. Being a traditional printer, the EPL-5500 has its own internal processor and circuitry, and 1Mb of memory as

Epson EPL-5500

standard (upgradable to a maximum of 32Mb).

Despite the absence of any bi-directional help on installation, I found this Epson easy to set up and use. Once installed, there is a "bi-di" option in the driver which can be activated but in practice the messaging is highly confusing. When the paper has run out, for instance, a message appears to tell you that the printer is not switched on or that it is offline, and meanwhile a red light flashes on the control panel. If you add more paper, nothing happens until you press the continue button.

As far as design goes, there is a certain solid squareness about it and more than its fair share of straight lines and right angles. Unusually, the input tray juts out of the base of the machine and printed documents stack onto an angular fold-out tray on top.

Where this printer really scores is on its high quality 600dpi output; particularly its crisp text and impressively smooth grey tones on photographic images. These gave it the edge over the JX-9210 from Sharp. However, it falls down on performance — this was noticeable during testing. The formatting and rendering of the image on the print engine using the printer control language (PCL5e) had a noticeable impact on speed, especially for the first page of a print job.

On the plus side, it is possible to print quite happily on the EPL-5500 from DOS applications in native DOS mode. If you're a standalone user and you never use DOS applications, then this is no big deal, but if you're going to be using your printer in a small office with a mixture of old and new technology, it's a good idea to have the choice. The Epson EPL-5500 has an expected street price of around £355, so you're only paying about £55 more than the cost of a GDI printer, for more functionality and superior output quality.

Conclusion

Technically, GDI makes a lot of sense. Windows provides all the software mechanisms required to display text using all manner of different fonts, typestyles, sizes and orientations. Windows also has the added bonus of displaying bitmap and vector graphics.

Because Windows is a graphical operating system, it requires a reasonably powerful PC with a fair amount of memory and hard disk space — exactly those characteristics required of a printer controller. For manufacturers, the great advantage of the GDI printer is that it is less complex — and, more to the point, it's cheap to produce. It uses the sophistication of the machine already on your desk rather than building in intelligence of its own.

Microsoft claims that the Windows Printing System does not require an especially high-end PC. The company recommends a minimum 386SX/16. It's true that the WPS is not as demanding on your system resources as some other GDI printers, but you will still need enough processing power and memory to carry out the rendering and communications process while continuing to support the user environment. On one hand, the older your system, the more likely it is that you'll want to print from DOS native mode. But on the other hand, your GDI printing system will get faster as a direct consequence of upgrading your computer.

A low-cost laser running on a 486SX (or higher) will create bitmaps from the Windows GDI at a good speed. Technically speaking, it makes sense that changes in software should be dealt with on the computer rather than in the printer. As computers become increasingly powerful, GDI looks like being the printer technology of the future. But I'm not yet convinced that the whole world is ready for GDI, and the mixture of technologies currently on the market shows that the industry is moving very slowly.

Small businesses tend to have motley collections of PCs — some very high end systems and others that are three or four years old, so in this situation you need equipment which can cater for all circumstances. Some users, especially those home users with PCs powerful enough to run the current generation of software, will not need the same kind of flexibility in a printer so a GDI model will probably fulfil their needs. But at this point in time, it is definitely the Epson 5500 which provides the most flexibility, best quality of output and the best overall value for money.

PCW Details

Canon LBP-460
Price WPS £349; Street £300
Contact Canon 0181 773 3173

Sharp JX-9210
Price 300 x 300dpi £429; Street £300
Contact Sharp 0800 262958

Epson EPL-5500
Price PCL5e £479; Street £355
Contact Epson 0800 220546

PUTTING IT IN A WHOLE

Getting at Data

Delphi was made for databases. In the fourth and final part of his tutorial **Tim Anderson** tells you how to build a database application, taking an everyday CD collection as his example, and explains how Delphi's data-aware components fit together.

Borland markets Delphi as a database tool, but it's an excellent general-purpose language, too. Database work is handled by the Borland Database Engine (BDE), a set of DLLs which are also used by Visual dBase and Paradox. The BDE can access remote server databases too: via a set of native drivers called SQL Links, or through ODBC (the Windows standard for database connectivity).

The database is well integrated with Delphi, and can normally be treated as part of the language. But it is a separate component that can be configured outside Delphi and used by other, non-Delphi applications.

A first Delphi database

In this tutorial you will build a simple, relational, database application. The example is based on a CD collection, with the data stored in Paradox tables (see *Fig 1*). You need to create the data before starting to build the application, or take it from the cover CD. Alternatively, you can adapt the example to work with other data.

To begin the application, start a new project: click the Data Access tab on the Component Palette, and place a Table component on the form. Set the DatabaseName property to the directory where the data is stored, for example C:\MUSIC. Next, click the TableName property and drop down the list of tables in that directory. Choose TITLES.DB.

Now place a DataSource component on the form. The Table component simply encapsulates a database table, but the DataSource is less obvious. It is a link between data components such as tables or queries, and data-aware components which control and display the data. The DataSource has a DataSet property, which should be set to Table1.

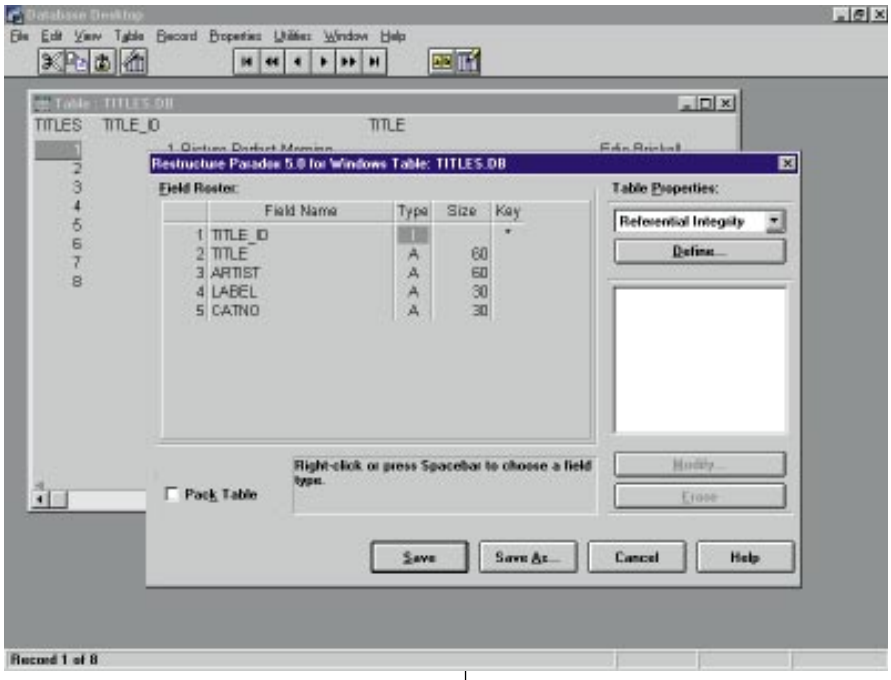


Fig 1 *The Database Desktop provides all you need to create and edit database tables. To build the tutorial data from scratch, choose File - New Table, and use the Paradox format. Then complete the details in this dialog*

Next, click the Data Controls tab, place a DBNavigator on the form, and set its DataSource property to DataSource1. Then, place a DBGrid and set its

DataSource in the same way.

To bring your work to life, select Table1 and double-click its Active property. Delphi will display data in the grid, even at design time. You can test the application by clicking Run to compile and execute it.

The DBNavigator has several useful functions. The first four buttons navigate the data, like video buttons. The next three add, delete or edit records. Two more buttons confirm or cancel changes being made, and the final button refreshes the data. This latter function does nothing in the tutorial database, which is single-user, but is useful for networked databases when the data on view can become out of date as other users change it. You can use the VisibleButtons property to hide this. Another tip is to set the ShowHints property to true, so that tooltips appear, describing the purpose of each button.

Preparing the data

The tutorial application uses two related tables: TITLES.DB and TRACKS.DB. To create these tables, you can use the Database Desktop.

```
TITLES.DB
TRACK_ID Long Integer Key
TITLE Alpha 60 Secondary index: TITLE_IDX
ARTIST Alpha 60 Secondary index: ARTIST_IDX
LABEL Alpha 30
CATNO Alpha 30

TRACKS.DB
TRACK_ID Long Integer Key
TRACK Alpha 60
TITLE_ID Long Integer

Referential Integrity
TITLE_ID in TITLES (Parent) = TITLE_ID in TRACKS (Child)
```

Get Related

Working with databases based on a single table is easy but often not very useful. The next step is to build a relational database, capable of showing a master record with one or more related detail records.

A common example is the relationship between a customer and their orders. For this CD collection, the information required is the tracks on each CD.

Each record in the TITLES table has a TITLE_ID field and the TRACKS table uses this to identify which title owns each track.

Here's how to build the application:

1. Place additional data access components on the form: another table, another datasource, and a query.
2. Edit the DatabaseName and TableName properties of Table2 to point to the data directory and the Tracks table.

Change the DataSet property DataSource2 to Table2.

3. Place a second data control below the DBGrid. Change the DataSource property of both the DBGrid and the second data control to DataSource2.

If you set Table2's Active property to True, you'll see a list of tracks in the grid.

4. Resize the form as needed and position five DBEdit controls above the grid. These will show the title details.

Set their DataSource to DataSource1 and the DataField to each field in turn. (See *Fig 2* for a suggested layout.)

5. Finally, you need to tell Delphi about the relationship between these two tables. Select the Table2 component and set its MasterSource property to DataSource1.

Next, click the MasterFields property to display the Field Link Designer. In the Available Indexes box, choose TITLE_ID.

Next, highlight TITLE_ID in both field lists and click Add.

Click Run to compile and execute the application. If no data appears, make sure the table components have their Active property set to True. As you navigate through the titles, the tracks for each title appear in the grid.

```
procedure TForm1.DBNavigator1Click(Sender: TObject; Button: TNavigateBtn);
var
  BtnName: string;
  lNewID: longint;
begin
  case Button of
    nbInsert :
    begin
    BtnName := 'nbInsert';
    Query1.SQL.Clear;
    Query1.SQL.Add('SELECT MAX(TITLE_ID) FROM TITLES');
    Query1.Active := True;
    lNewID := Query1.Fields[0].AsInteger;
    Query1.Active := False;

    inc(lNewID);
    Table1.FieldByName('TITLE_ID').
AsInteger := lNewID;

    end; {end nbInsert routine}
  end; {end case}
end;  {end procedure}
```

Fig 6

Making it work

It sort-of works — and without a line of code being written.

Unfortunately, this code-free application is hopelessly inadequate. When you use the data control to add a

Fig 2 *Using the Database Desktop, you can set up referential integrity to prevent orphaned data in your database — for example, tracks with no corresponding title*

title, you have to enter a unique TITLE_ID or it crashes. When you add tracks, Delphi automatically inserts the right TITLE_ID, but you need to dream up your own TRACK_ID.

Another way to crash the application is to start editing a new title, and then add a track before the title has been posted. The challenge of database development is to make applications bullet-proof, so that users cannot casually corrupt the data or crash the program. Here are some suggestions:

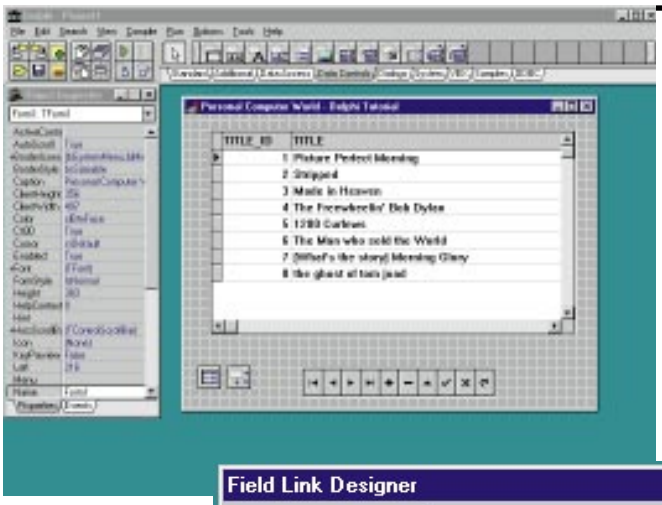


Fig 3 *Displaying a table in a grid can be done in a matter of seconds with Delphi. This example uses the TITLES.DB database from the PCW cover-mounted CD*

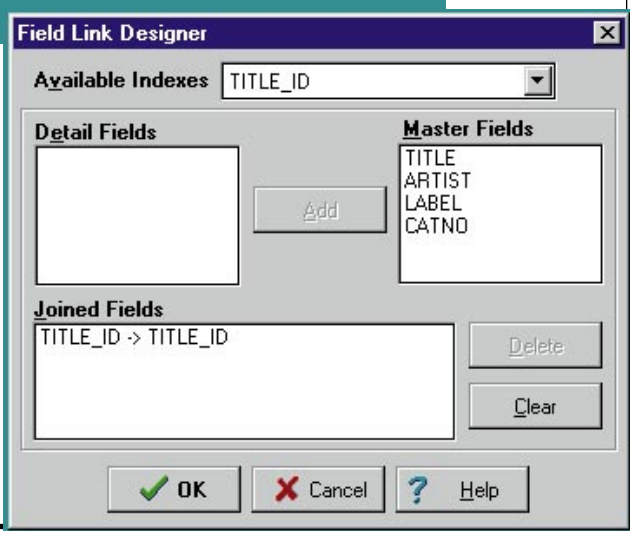


Fig 4 *In the Field Link Designer, you tell Delphi how to link two related tables. In this case, the TITLE_ID index in TRACKS is linked to the TITLE_ID field in TITLES*

● Finding a unique ID

Users should not need to worry about finding ID numbers. A simple, fast technique for finding a unique ID is to discover the highest existing number, and increment it by one. This is done by executing an SQL statement (see "All about SQL" on page 224). The code is in *Fig 6* (page 223).

Add this procedure by double-clicking the DBNavigator1 control. When the Insert button is clicked, it first adds a record to TITLES, and then edits the SQL property of a Query component to discover the highest existing TITLE_ID. Finally, it adds one to the ID and enters it into the new record. For additional protection, make the DBEdit control which displays the TITLE_ID read-only, or even hide it completely, to prevent accidental changes.

● Adding new tracks

You can use the same technique to find a new TRACK_ID when adding tracks. A good idea is to make the DBGrid read-only and prompt the user for a new track using the InputQuery function. Here's a fragment of code:

```
if DataSource1.State <> dsInsert then
begin
if InputQuery('Personal Computer World',
  'Enter new track',sNewTrack) = True then...
{else cancel the new record}
```

Note how the State property of DataSource1 is checked, to ensure that tracks are not added while a new title is being inserted. You can cancel the new track if necessary, by calling Datasource2.Dataset.Cancel.

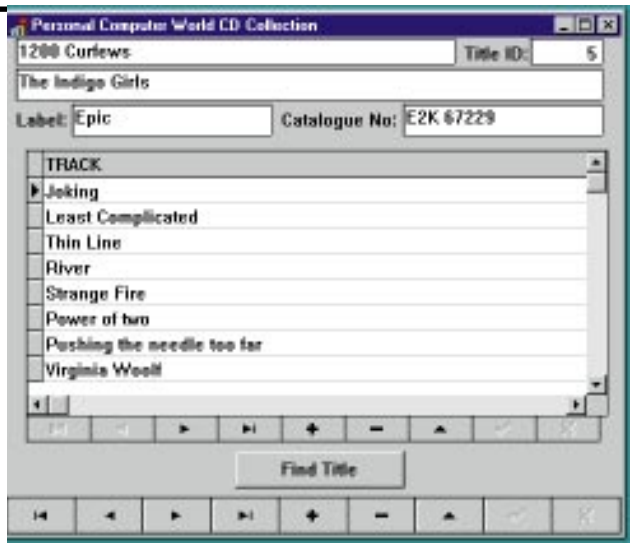


Fig 5 *The completed music application, complete with a button for finding a title*

● Deleting unwanted tracks

If you give away a CD you might want to delete it from your database. Since referential integrity is enforced, the BDE will not allow a title to be deleted while tracks exist for that title. The solution is to use the BeforeDelete event of the

All about SQL

Structured Query Language, or SQL (usually pronounced "sequel") is a specialised programming language for querying and updating databases. It is worth learning, since almost all server databases use it, and now most desktop databases as well. SQL is designed to extract or update small subsets of data from large databases. For example:

```
SELECT * FROM titles WHERE titles.artist  =
  'The Beatles';
```

would return all the titles by The Beatles.

Not all SQL statements retrieve data. Another type of SQL is designed to be executed, for example, to update or delete records.

SQL is complex and not well documented in general-purpose products like Delphi or Visual Basic. And there are variations between SQL as implemented by different vendors. Fortunately, books are available and one recent publication suitable for beginners is *Instant SQL Programming* by Joe Celko (Wrox Press, £27.99. ISBN 1-874416-50-8).

Revisiting the Space Monitor

● Thanks to Husein Roncevic and Mark Harrington, both of whom emailed me to point out flaws in the routine which formats the free space for display in a gauge and label. The routine given suppresses leading zeroes after the decimal point.

Husein suggests using the FormatFloat function which is an altogether tidier approach. There is a fixed version on our cover-mounted CD, and here is the corrected section of code. It also uses the technically correct value for a megabyte.

```
{update gauge}
form1.gauges[iDrivesFound].progress := round(100*((lDiskSize
-
  lFreeSpace) / lDiskSize));

sSpace := FormatFloat('######0.00',lFreeSpace / 1048576) + ' MB';
Form1.Labels[iDrivesFound].Caption := sDrives[iCurrDrive +1] + ': ' +
  sSpace;
```

● Alan D Ryder contacted me with another question. How can the space monitor be adapted to work with removable as well as fixed drives? The starting point is to check for DRIVE_REMOVABLE as well as DRIVE_FIXED at the two points where the Space Monitor calls GetDriveType. But there's more to it that that. Firstly, it is necessary to check that a disk is in the drive to prevent a nasty system dialogue when DiskSize is called. You can do this by calling the API function SetErrorMode. For example:

```
function IsDisk(iDrive: integer): bool;

var
iOldErrorMode: integer;

begin
{Prevent system dialog from appearing}
iOldErrorMode := SetErrorMode(SEM_FAILCRITICALERRORS);

if disksize(iDrive) > 0 then
Result:= True
else
Result:= False;

{Restore old error mode}
SetErrorMode(iOldErrorMode);
end;
```

But even that is not the end of it. It takes a long time to read a floppy drive, and the space-checking function is called repeatedly by a timer. What if the timer calls the function again, before a previous call has finished executing? A good question, and although not a problem in the space monitor as it stands, it could easily become one.

In 16-bit Windows, no system events will fire while an application is executing, unless it specifically yields control. This is not the case in systems with pre-emptive multitasking, such as 32-bit applications in Windows 95 or NT. Furthermore, in a longer 16-bit routine you might include the code:

```
Application.ProcessMessages;
```

which yields control to the system and would cause the timer to fire again.

You can prevent these problems by setting a flag; a variable which will indicate whether a function is already running. Here's an example:

```
procedure TForm1.UpdateForm;
begin
if bRunning = True then
exit; {Exits function without doing anything}
bRunning := True;
{body of function here}
bRunning:=False;
end;
```

Note that for this to work, the bRunning variable must be visible to the whole unit, so that its value will be preserved after the function exits. To do this, declare bRunning either in the interface section, or in the implementation section at the top, outside any c code blocks.

With these three techniques together, you can easily amend the Space Monitor to look at removable drives — if you really want to, that is.

```
procedure TForm1.Table1BeforeDelete(DataSet: TDataset);
var
iTitleID: longint;
begin
iTitleID := Table1.FieldByName('TITLE_ID').AsInteger;
Query1.Close;
Query1.SQL.Clear;
Query1.SQL.Add('Delete from TRACKS where TITLE_ID = ' +
  inttostr(iTitleID));
Query1.ExecSQL;
end;
```

Fig 7

Table1 component to do the job for you. The code is in *Fig 7*.

● **Adding search**

Data is of no practical use without a search facility. You can add a button to the application and write code to find a title. It is an indexed search, and requires the IndexName property to first be set to the appropriate index. (*Fig 8.*)

```
procedure TForm1.Button1Click(Sender: TObject);
var
sSearch: string;
sOldIDX: string;
begin
if inputquery('Personal Computer World','Enter first few
  letters of title:',sSearch) = True then
begin
sOldIDX := Table1.IndexName;
Table1.IndexName := 'TITLE_IDX';
Table1.SetKey;
Table1.FieldByName('TITLE').AsString := sSearch;
Table1.GoToNearest;
Table1.IndexName := sOldIDX;
end;
```

Fig 8

Making it better

Once you have the CD database working reliably, there are some obvious enhancements you could make. For example, you could select the order of the titles by changing Table1's IndexName property. Another idea would be to store artists in a separate table, linked by an ARTIST_ID field, so that each artist was recorded only once, perhaps with details about dates or musicians.

● *This is the last part of the Delphi tutorial, but Delphi programming is covered every month in the* Hands On Visual Programming *section of* PCW.

PCW Details

Contact **Tim Anderson,** with your comments and ideas, at the usual *PCW* address or email **freer@cix.compulink.co.uk**

CUTTING EDGE

All That Java

A programming language that allows you to pick and choose applets from the Internet, run them and dump them as you would an empty drinks carton — Sun Microsystems' Java has been credited with bringing true interactivity to networking. Jim Smith spills the beans on this hot stuff.

It started out as a project to make toasters smart enough to talk to the microwave next door, but it might just end up influencing the entire course of computing for the next 20 years. It is Java, Sun Microsystems' object-orientated, network-aware, architecture neutral, portable, multithreaded, dynamic language. Phew.

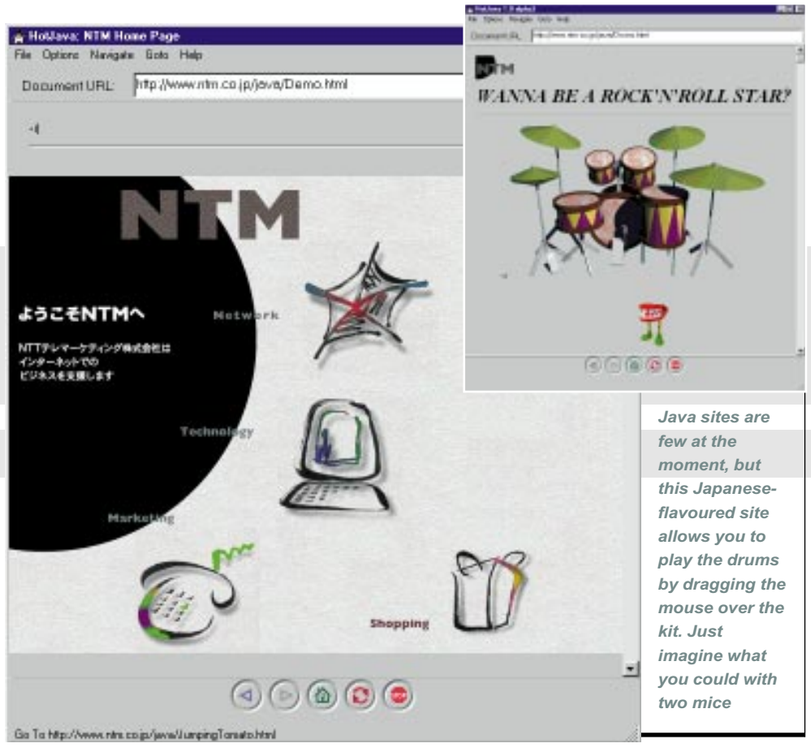
Java is creating an impact because it provides a way of seamlessly integrating small programs called applets into Web pages. Just load up a page containing a Java applet and the program will load and self-execute, and unless you specifically save it, flush itself away when you move on to a new page. Sample applets already on the Web include simple skill games, calculators and information-processing programs such as stock-market prices tickertapes.

The centre of attention

Hijacking the success of the Web was Sun's smart move. For something as prolix as a programming language only four years in development and not even at a full release, to create so much attention is unheard of. It took 15 years for C to even begin to find acceptance in mainstream software development. Sun Internet business development manager Matt Reid says that the move was necessary because it galvanised people's interest and added a much needed layer of functionality to the Web: "The catalyst was what it did for the Web — providing true interactivity. However, people are now starting to realise that it has potential far beyond the Internet." Indeed, Sun regards the Internet as being simply a staging post for Java, leading on to adoption in any area where network computing power is needed.

Java was never originally intended as a Web-friendly programming language. Its first incarnation was as Oak, a language-come-operating system for embedded systems — smart cars, toasters, whatever — and for set-top boxes. Sun got as far as demonstrating a PDA based around Oak, the *7 handheld. And it touted its multimedia-savvy technology around the TV companies until realising, or being forced to realise, that the Interactive Television was as "just around the corner" as when it was first proposed 30 years ago.

Instead, while the Oak team had been working on the proto-Java, another online interactive technology had appeared from virtually nowhere to offer a role for Oak. Rather archly, Sun lists the release of NCSA Mosaic 1.0 in mid-1993 as a key event in Java's development.



Java sites are few at the moment, but this Japanese-flavoured site allows you to play the drums by dragging the mouse over the kit. Just imagine what you could with two mice

It was at the same time that a trademark search felled Oak as a brand name. Java, however, was okay and so the name was adopted (possibly because of the cute HotJava name Sun could apply to the browser. In case you're still in the dark, Java is synonymous with strong coffee in the US, hence HotJava). There is no significance to the name Java beyond the fact that it was free in a trademark search. Having said that there was little significance to the Oak name either, it just happened to be the first type of tree project leader James Gosling saw when he looked out of the window.

Java is most closely related to C++, and it relies heavily on the object-orientated programmers' concept of classes. Classes can be predefined (and so can live in the Java engine in your browser) and can be modified easily, creating a sub-class while still inheriting the data and code from the original class (so you don't have to restate the whole of the class).

In fact, Java nearly was C++, as the team that developed it started out by using C++ but decided to develop its own language when it ran into insurmountable problems with memory handling. It's hard enough to manage memory with a single application. When you are trying to manage a network of smart consumer devices, each loading and quitting dozens of applets many times, the problem becomes many times harder.

The Sun development team wanted a language that would allow them to use the object approach of C++ but with the dynamic memory handling of a language like Lisp. Lisp allocates memory to itself as it goes, freeing the programmer to concentrate on more vital issues.

Being able to pick and choose from the features of C++ meant getting rid of another C++ bugbear, multiple class inheritance, which complicated variable handling, particularly in a multi-applet, network-orientated application. Java just

```
import java.awt.Graphics;
public class HelloWorld extends java.applet.Applet {
public void init() {
resize(150,25);
}
public void paint(Graphics g) {
g.drawString("Hello world!", 50, 25);
}
}
```

How to see and do Java

To view a Java Web page, you'll need a Java-aware Web browser. Currently, your choice is restricted to two: Sun's HotJava or NetScape Navigator. HotJava is available for 32-bit Windows (e.g. 95 and NT) and Sun Solaris, while Navigator's 2.0 release is currently Java-aware on 32-bit Windows, Solaris, HP-UX, SGI IRIX and SunOS. Mac OS versions are scheduled from both Sun and NetScape shortly, with the NetScape version probably arriving sooner than Sun's. To write Java applets you are currently limited to the development tools provided by Sun itself. The Sun Java compiler works on only Win32 and Solaris platforms. Developers' kits will roll out in the spring of 96 from Metrowerks (largely aimed at the Mac development community) and Borland (focused on the PC world). Borland's development environment, codenamed Latte, will have the full suite of visual tools needed to make creating Java applets a drag-and-drop process.

Web sites

The chief Web site for Java is Sun's own at java.sun.com, where you can download the HotJava browser, the developer's kit and view sample applets. The other licensees of Java technology can be found at the following:

Metrowerks (http://www.metrowerks.com/)
Netscape (http://home.netscape.com/)
Macromedia (http://www.macromedia.com/)
Borland International (http://www.borland.com/)
Oracle (http://www.oracle.com/)

The sites outside Sun with Java applets up and running are:

The MatriX Publishing Network http://www.mpn.com/
BASIS Inc. http://www.basisinc.com/
NTM Shopping http://www.ntm.co.jp/
Cybersight http://cybersight.com/
Embry-Riddle Aeronautical University http://www.db.erau.edu/index.java.html
Spinning Globe http://www.process.com/Launch/launchpd.htm
Sun Home Page http://www.sun.com:80/index.html
Better Bad News http://www.georgecoates.org/
HotWired http://www.hotwired.com/login/overview.html
Dimension X http://www.dimensionx.com/
NandO Times http://www2.nando.net/newsroom/nt/nando.html
Rolling Stones http://www.stones.com/javaindex.html

CUTTING EDGE

forgets about this inconvenience. It took four years of development, but the end result is something an experienced C++ coder could easily parse. The canonical Hello World applet is on the previous page.

This applet simply calls the relevant library from the internal Java libraries, creates a new class called HelloWorld based on the Java applet class, opens a raster window and displays the messager Hello World.

What it doesn't do is make the Hello World message appear on a Web browser page. To do that, you need to add the following to your HTML page.

```
<APPLET
  CODE="HelloWorld.class"
  WIDTH=150 HEIGHT=25>
  </APPLET>
```

This forces the browser to look in a subdirectory called Class for the HelloWorld applet and opens a space on its page for the applet to run in.

Browser power

The Internet differs from the set-top box environment in that the Internet is, unless you're lucky enough to sit on a T1 line, a low bandwidth network with a lot of intelligence at the receiving end in the form of personal computers and workstations. Set-top box type networks have relatively high bandwidth with dumb machines at the other end.

Oracle CEO Larry Ellison envisages his company's network machines as having little more than a bootstrap ROM preinstalled. Everything else comes from the network.

But the Web currently behaves as though the Internet was a high bandwidth network with the dumbest of dumb terminals at the other end. Web browsers do little more than display words and pictures. Processing tends to be deferred to the server end in the form of CGIs (Common Gateway Interface).

NetScape and Microsoft are both actively extending what you can do with simple HTML. NetScape Navigator 2.0 includes client-end image maps, which take a fiddly piece of Web server configuration away, and plug-ins to replace Helper applications, which will allow it to display inline Apple QuickTime video, MacroMedia Director interactive documents or Adobe Acrobat pages, should anybody want to do anything so time-consuming just to look at text in a different font.

Microsoft has extended its interpretation of HTML to include live video and audio by embedding the players in its browsers — a very Microsoft approach — and extending the type of media clip that can be called with the SRC command in the HTML source, but neither of these approaches really extends the browser beyond being a simple player utility. Java leaps over this limitation by being a full programming language interpreter. A Java-ready browser can do almost all the same things as a program written and compiled into executable object code using the full-blown version of Java.

By being an interpreter, the Java engine can be made cross-platform and Applets need only be written once to work across systems, further devolving intelligence into the end terminal.

Security concerns

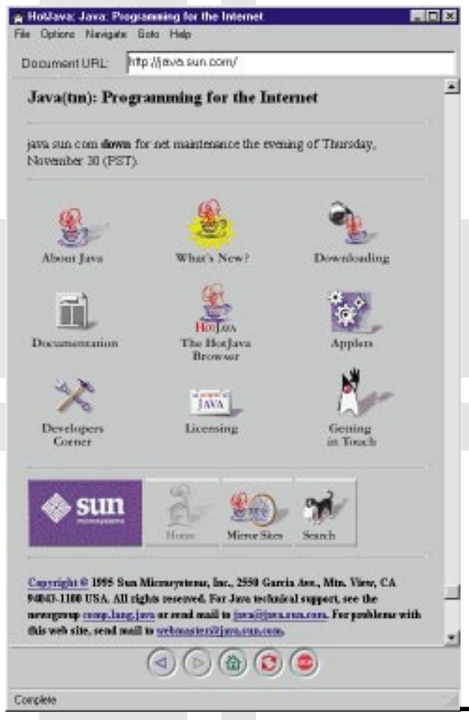
On learning the way Java works, most people ask anxiously how it handles security. After all, the notion of a program that automatically inserts itself into your computer, executes itself and then disappears into the night, sounds a little too like a virus for most people's comfort.

Naturally, the Java development team were aware of the security consideration from the very first: one of the minor problems with C++ was poor security, leaving pointers to variables, such as a credit card number, open to public inspection (Java invokes a special type of variable within subroutines that cannot be inspected from outside).

Java handles security through the Virtual Machine concept. Applets can only have direct access to the resources controlled by the Java engine in the browser, such as memory or hard-disk cache. Any attempt to access the operating system directly is intercepted by the Virtual Machine, which refers the request to the user. Only if the user gives the applet permission can it access a file or write a file to disk.

Put your trust in applets

Of course, in order to know that an applet has no bad intentions, one has to trust it, and trust the service that provided it. All Java-aware browsers automatically check that the applet they have downloaded is kosher by firstly making sure that it has been



Left *First port of call should be Sun's own Java site*

Above *An applet that zooms images in, leaving trails behind them*

compiled on an official Java compiler (the importance of which will become apparent later), and secondly, by performing a sophisticated version of a checksum routine to make sure that it hasn't been corrupted or tampered with during its Internet travels.

As well as checking that the applet is derived from an official compiler, the Virtual Machine can check that the applet comes from a previously used and trusted programmer. Ironically, although the language includes these and many other sophisticated tools for checking the provenance and integrity of an applet, it has no way of feeding usage information back to the author of the applet, or of tracking usage for billing purposes; both of which will become essential when we start buying our software as applets across the Internet rather than as full applications from traditional channels. Sun's Matt Reid says all that is needed is an enterprising programmer to add another class — "I guess the easy answer is it's a programming language and you can therefore write one" — and presumably earn yourself a small licensing fee on millions of applets too.

This is potentially the most important aspect of Java. Java is the first concrete example most of us will see of the much talked about move to component and distributed computing: one of the reasons that Oracle, home of the Network Computer, is one of the first licensees of the technology.

Sun envisages a new type of software environment in which software is truly task-orientated and usually disposable. You may be working on a document or spreadsheet detailing your tax expenditure for the year. Instead of writing your own macro to handle depreciation on your computer equipment, you simply log on to the Ernst & Young small business homepage, download the Depreciation applet, pay the $5 fee in NetBucks, run it and trash it.

Let's get radical

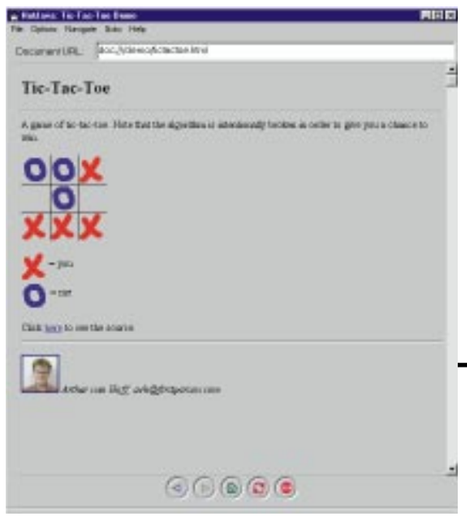
This promises a radical shift in the way we view software. At the moment, software is designed to behave almost like a computer itself. WordPerfect, Excel and Photoshop are vast programs which can handle almost anything you can throw at them within their respective fields of text processing, spreadsheeting and graphics.

What the component, distributed model says is all you really need is a way of displaying a document (such as a Web browser) and then you can bolt on functionality as required. In this respect, Java applets are not a million miles from the OpenDoc parts developed by CI Labs, the consortium of Apple, IBM and Novell that is trying to take those companies into the component era.

But where OpenDoc is not intrinsically network aware (rather like inventing the car, but assuming that you'll never have to take it further than the end of the drive) and relies on a rather obscure metaphor, Java obviously is. Because it has piggy-backed onto the Web, it has created a public awareness and market desire that OpenDoc may never achieve.

Matt Reid believes the development of Java will bring a true levelling of the software industry: "You have the same channel to market, whether you're an international corporation with ample resources, or sitting in the attic with an Internet connection and a Web page. Your way of marketing will be the same."

This is a dream that software developers have had for many years. Java and the Internet look like being the first real attempt to tap the can-do spirit of shareware, and turn it into something truly business-like. ■



It may be intentionally broken but you'll still lose most of the time

CUTTING EDGE

net.answers

Nigel Whitfield guides you through the Internet.

Q. We regularly transfer large Dbase III files (2-3Mb after compression) between offices as attached files on CompuServe. We would now like to transfer a similar file to someone who does not have CompuServe but does have Internet access via their local telecomms provider. To date, every attempt to send this file over the Internet as an attachment has failed — no error messages; the person receives the main body of the message but not the dbase file itself. Do you have any advice on how we could transfer these files successfully? We use the CompuServe Internet access package (Spry Mosaic etc) and the other party uses Eudora.

Q. I would like to know how you transfer a MS Word document say, between someone on CompuServe and someone on the Internet. I know it's simple if both ends are the same, so to speak, but I have not been able to do it successfully between the two networks. Is it possible?

A. If you're used to using closed services like CompuServe or CIX that allow you to send binary files to each other, it's very easy to forget that the Internet mail system wasn't originally designed to handle large binary files, and the people who run conferencing systems haven't shown much interest in making it possible to send files across the Internet via email.

This is partly because it's impossible to know in advance what sort of mail system the person you're contacting will be using, and without that information, you might not be able to attach a file to a message in a way that they can use when it reaches them.

There's another problem with sending files via email — the size. There are still many computers around that will just chop the end off messages when they reach a particular size — sometimes 64K, sometimes more. If you're sending a file that's a couple of megabytes long, there's no guarantee that it'll all arrive in one piece.

In the case of our first question, there's another minor (but easily surmountable) problem. The shareware version of Eudora has a limit of 32K on the maximum size of a message. Larger messages will be split up into lots of parts in your mailbox and will have to be read separately. Fortunately, you can save all the parts together by highlighting them all and selecting Save As... The commercial version of Eudora doesn't suffer from this kind of problem.

Of course, before your data reaches Eudora you must first attach it to a mail message, and that's where the real fun starts. There are two main ways of sending files via email: UUencoding, and Base64 encoding. Both are simply ways of taking the binary information and turning it into a stream of letters which can safely be sent through most mail systems. Using a decoder at the other end allows you to rebuild the file.

Of the two types of encoding, Base64 is the more efficient, and more robust — some mail systems will subtly interfere with UUencoded files, making them impossible to decode. Base64 is less widely used, but if you can find a program to do the conversion, it's well worth using.

Once you've encoded your file you can't just send it by email, unless it's fairly small. Instead, you'll have to split it up into chunks of under 64K and send each chunk as a separate email message. Remember to give each one a different subject line, so that they can all be joined together in the right order at the other end and decoded.

If you plan to send a big file, splitting it up by hand is going to be incredibly tedious, but fortunately there are some solutions, including programs that will take a file and perform both splitting and encoding in one operation, leaving you with all the individual portions ready for mailing.

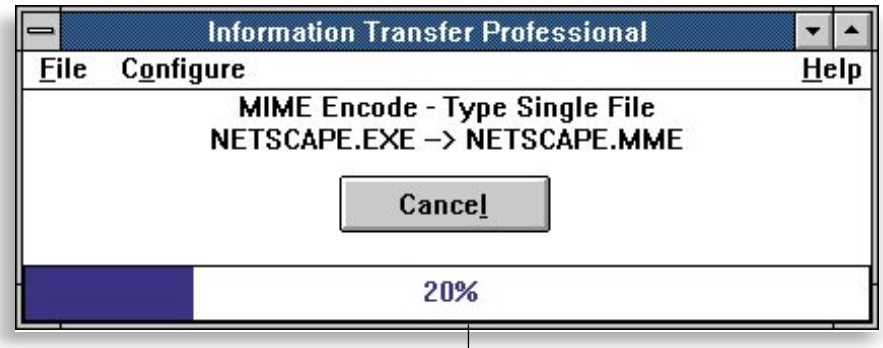
A selection of programs for handling Base64, UU and other types of encoding can be found on src.doc.ic.ac.uk in the packages/simtel-win3/encode directory. Of the programs available, XferPro (pictured opposite, above) is one of the most fully-featured, and is quite capable of handling multi-part messages, and working with the BinHex format used on Macintoshes.

On the Internet, all this can be handled automatically using a system called MIME, which usually uses Base64 encoding and adds extra headers to mail messages so that the attached files can be decoded automatically, even if they're split across lots of messages. In fact, Eudora will correctly

Just the fax, please

Q. I am considering buying a modem. I wish to know whether a modem is capable of sending and receiving faxes? If they are capable, do you need software to send them?

A. Most modern modems provide fax capabilities — look for phrases like "Group 3" or "v29" on the box, both of which are standards for fax transmission. Fax modems are usually described as "Class 1" or "Class 2", which describe the commands used to send faxes with them. You will need special software to send and receive faxes, but many modems are supplied with it, and it's included as part of Windows 95.



XferPro: this could be the solution if you need to send files between different systems via Internet email

decode MIME messages, so if both people use the program, you can just use the Attach File command.

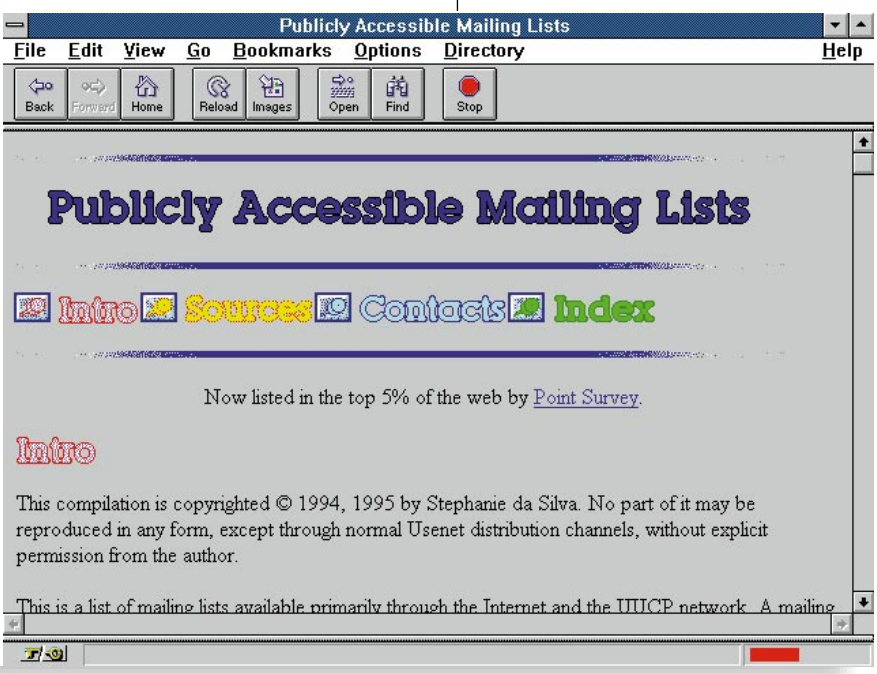
The Ameol program for CIX can automatically UUencode files to be sent outside the system, and Microsoft Network also UUencodes attachments for Internet mail, but with both you'll still run into problems with large files. The real solution would be for providers like CIX, CompuServe and MSN to pull their fingers out and implement MIME so that files can be sent across the Internet as easily as across their own system. Until then, I'm afraid, you're going to have to do it the old-fashioned way.

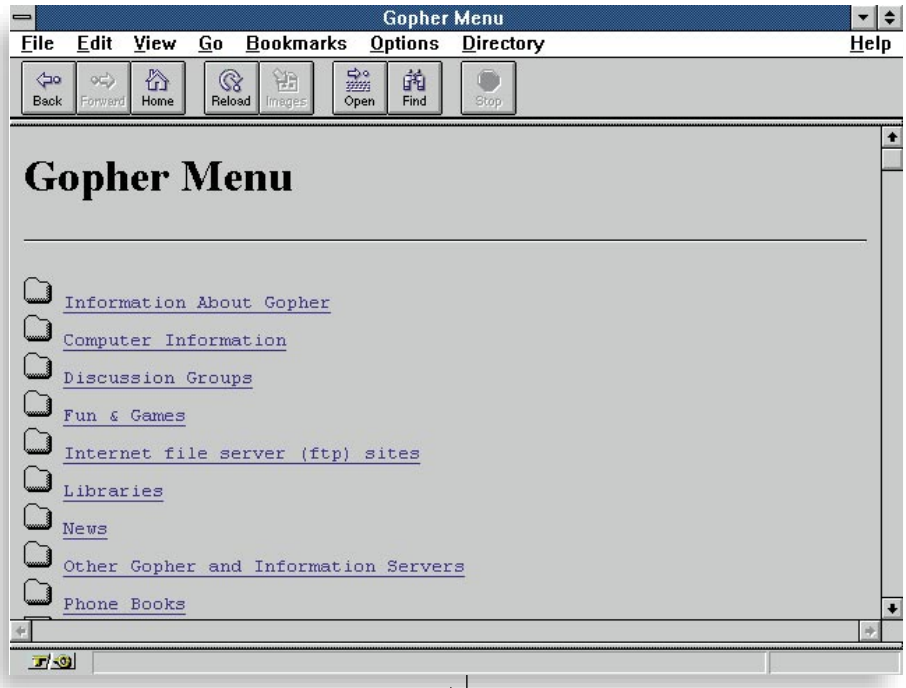
Q. I understand that when I connect up to the Internet, via Demon, I connect to their server, but where does Demon then connect to?

A. The Internet is a network of networks, all linked together at various points. Like all the major Internet suppliers in the UK, Demon has its own links to the US, as well as links to a hub in London called LINX. At LINX, information from one UK provider that is destined for a computer on the network belonging to another is passed on. The same process happens at connection points in the US — in the case of Demon, those links are made via two companies, called Sprint, and Agis.

To make matters even more complicated than they already are, each connection point has its own set of rules. To connect to LINX and exchange information with other providers, a company must have its own international links. Some connection points are restricted to certain kinds of traffic: some are used only for academic traffic, or else have other restrictions. Smaller providers like Pipex resellers, exchange traffic with the rest of the world under the

If you want to take part in discussion via email, the PAML is the best place to start looking for what you want





You can access gopher menus using any Web browser, or use a separate program instead

auspices of the people who provide them with their link. The Internet as a whole is the sum of the links between all the different networks, and now it's often political or commercial considerations which determine which Internet traffic takes which route.

Q. I've heard that there's an Internet mailing list covering a topic in which I'm interested. How do I join it?

A. The exact way you join a mailing list depends on how it's managed — some lists are run by a person who responds to all the requests, while others are run by software that responds to messages automatically. Before you try to join a list, you should find out how it's run — a good way is to look it up in the Publicly Accessible Mailing Lists list (PAML), which can be found on the Web at http://www.neosoft.com/internet/paml/

As a rough rule of thumb, if the address for mailing list ends in -request, there's a good chance that it's run by a real person. For instance, the administrative address for one of the lists that I run: campaigns@diversity.org.uk is campaigns-request@diversity.org.uk.

If you see an address of this format, send a politely worded request, rather than a one line "subscribe" message. If it turns out to be a machine, you'll usually receive an automatic response anyway, but at least you don't run the risk of getting off on the wrong foot with a list manager.

There are two main programs for running mailing lists, and you can usually tell which one is being used by looking at the address that you're told to use for subscriptions. If the address looks like "majordomo@..." then you can join a list by sending a message to majordomo containing a line like:
subscribe listname my_address@my.computer.co.uk

The address is optional — if you leave it out, you'll be added to the list at the address form which you mailed majordomo. The other list management program you're likely to find is ListServ, and its address will usually be "listserv@..." To subscribe to a ListServ mailing list, you use the command:
subscribe listname My Real Name

Messages from the list will always be sent to the address that you mailed from.

Before you subscribe to a list, find out if it's available in digest format, which is a single message containing all the other messages posted. On a busy list, you might find it much easier to deal with the digest than with 60 or more messages each day. If there is a digest version available, you can usually join it by using "listname-digest" in the subscribe command instead of just the name of the list.

Q. I plan to connect two or three computers together in some way so that they can all access shared resources i.e. a printer, a CD-ROM and a modem. I want all the computers to be able to access the Internet but I am unsure how to go about this without setting up separate accounts for each computer.

Data compression

Q. Can one assume that a provider with V.34 modems automatically supports V.42bis data compression — i.e. would it be able to use this to increase effective bandwidth to/from the provider? I refer specifically to Demon.

A. There are two ways of answering your question. Every V.34 modem we've ever seen incorporates data compression, so in that sense it's supported. Most Internet providers do use data compression on their networks, including Demon. In fact, the only network that we know of that doesn't offer data compression is the CompuServe network, though it does use V.42 error correction. However, if you want to use data compression, you should always check with the provider.

Do you know what is the best/cheapest way to connect the computers together with the least amount of hassle?

A. The simplest way to connect the computers together is to use their built-in networking facilities. For PCs, that means Windows for Workgroups or Windows 95; and for Macs, AppleTalk. There are other ways to network everything, but the built-in option will be cheapest.

That's the simple part. Allowing all the computers to access the Internet is somewhat harder. We've covered firewalls and proxies before, and while they could be used to give a small network access, there are a few caveats you should be aware of.

Firstly, to run a proxy Web server you'll need a decent operating system such as Unix or Windows NT. In the case of NT, this is the only proxy server that we know is a commercial product. You can also buy software for Novell networks that will allow all the PCs to connect to the Internet through the server. If you want to go down the low cost route, a PC running Linux would do the job, but you'll need more technical know-how to get it up and running.

Secondly, most standard accounts with Internet providers are for one machine. Your comments about not wanting more than one account suggest that this is what you're using. While it's technically possible to use a system of firewalls and proxies to hide all your computers and make them look like one, it's almost certainly against the terms of the contract you have with your Internet provider, and rather than risk disconnection you should investigate options for a network connection. This will provide what you want, albeit for a higher monthly subscription.

An alternative to using proxies and firewalls, to make your network look like one account, would be to use a shared modem instead with Internet access software installed on each machine. This would remain firmly within the terms laid down by most Internet providers, but would also mean that only one person in the office could access the Internet at a time.

This is probably not the answer you want to hear, but while it's technically possible to connect a whole network with a single-user type Internet account, it's not the sort of thing that you should consider lightly. If you want to connect a network of machines, you really should pay for a network account.

Q. I've been told that the information I'm after is on a Gopher server. What's is it and how do I get to it?

A. Gopher is a way of tracking down information on the Internet, and in some ways it's much easier to find things than by using the more common World Wide Web. Gopher presents information in menus, from which you can pick a choice, which will either lead to another menu or to a file that can be displayed or transferred to your computer.

You can access Gopher either by using a dedicated program — there are several available, for Macintosh, PC and Unix — or by using a Web browser, most of which can talk to Gopher servers giving you a menu to pick from, on the screen. A Gopher will usually be quoted as simply the name of the computer on which the server is running, such as gopher.tc.umn.edu. If you don't have a Gopher program, you can turn it into a URL for your Web browser by putting gopher:// in front of it, to give gopher://gopher.tc.umn.edu/.

The address we've quoted is one of the main Gopher servers. By working through the menus, it's possible to reach servers all over the world. Gopher may not be as glamorous as the Web but it's certainly no poor relation.

PCW Contacts

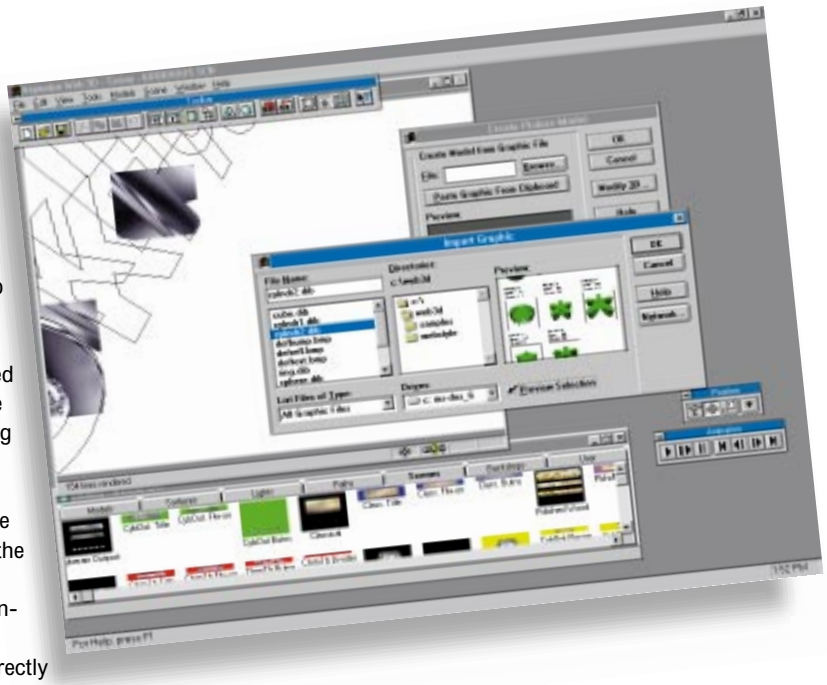
Nigel Whitfield is a freelance writer and maintainer of several Internet mailing lists. He welcomes comments via the address **nigel@stonewall.demon.co.uk;** If you have questions you'd like answered, please send them to **net.answers@stonewall.demon.co.uk.**

net.news

PJ Fisher rounds up the online occurrences.

WEB 3D

Those wanting to give the graphics on their Web sites and pages a professional map without employing a designer will be heartened to learn of a new easy-to-use Web design package announced at Comdex. This is not another WYSIWYG editor, but graphical 3D software called Web 3D from Asymetrix. Instead of struggling with numerous graphics programs, Asymetrix claims that Web 3D uses drag-and-drop techniques to create instant 3D Web graphics.



A range of preset scene elements and icons are included ready for use. A palette of 3D models can be applied to the scene, as well as 3D text based on TrueType fonts. Lighting and background effects can be added. A preview window displays the graphic as it is being designed. When the process is complete, the package automatically renders the scene, resulting in a 3D graphic ready to be referenced in the page's HTML code.

Other features include a number of sample buttons, banners and windows to drop into Web pages. Existing 3D models created in other packages can also be imported directly into Web 3D for inclusion. An animation feature allows more advanced Web designers to include 3D animations into Web designs.

Price: Introductory £129; thereafter £149.

Asymetrix 0800 716957

http://www.asymetrix.com

FaxBack

Intel spin-off FaxBack plans to make Web pages available to those without Net connections, with an extension of its FaxBack service. FaxBack is currently used by many publishers and companies around the world to add value to pre-printed material.

Now the same concept is coming to the Web. WebWindoW will allow Web site owners to offer faxed versions of Web pages to customers using ordinary phones and faxes. FaxBack will offer a complete hardware and software solution to companies interested in setting up a WebWindoW service. A special WebWindoW number would be given to companies wishing to use the service. Multi-page sites will have a unique phone number assigned to each page.

NetWare wades in to the Web

Novell released more details about its new NetWare Web Server at Comdex. This software allows NetWare 4.1 servers to be used as hosts for HTML documents, which can then be distributed via LANs or out to the Internet. NetWare Web Server is supplied and implemented as a set of NetWare Loadable Modules (NLMs).

Novell claims that the software takes only ten minutes to set up and install. Web Server supports forms, Remote Common Gateway Interface (R-CGI) and PERL script interpreters. Security controls — in the form specified IP address access controls — and NetWare Directory Services are claimed to give control over which documents and machines on a LAN are accessed, either internally or via the Internet.

A copy of Novell WordPerfect Publisher is included to create HTML-based Web documents, although any third party HTML tool is compatible.

Novell 01345 724000

http://www.novell.com

Students learn the Internet lesson

For nine months, The Southampton Institute has been pioneering new ways of learning via the Internet for students on its MBA courses. Now a fresh batch of students are about to reap the benefits of lessons learned in the first academic year on the Net.

The Institute claims that studying via the Internet has allowed students far greater flexibility in organising workload and time. They are becoming less tied to fixed class times and physical campus sites. It also believes that online discussion groups have encouraged more participation than traditional face-to-face seminar meetings.

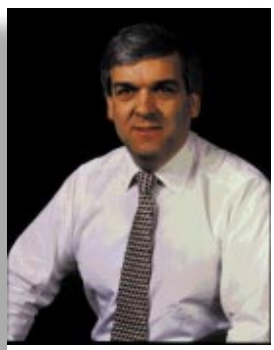
Support systems have now been developed for those who may feel intimidated by the Internet. Those suffering from "fear of publication" are also to be encouraged to participate, although it is claimed that even quieter students are accessing information and responding in their own time. Other improvements will include a new "café" site for the informal exchange of ideas, and photographs of students and tutors to bring a more human feel to the whole process.

Southampton Institute 01703 319822
http://www.cecomm.co.uk/sibs/sibs.html

Sonix ISDN price cut

In a bid to drive the market, 3Com Sonix is reducing the price of its Arpeggio ISDN networking products, by a third across the range. The price cuts have been made possible by Sonix's integration by 3Com last year.

Sonix MD Bob Jones hopes that this announcement will further encourage BT to reduce the installation charges of ISDN services. He believes BT are just tinkering with tariffing structures and that only real price cuts will boost the ISDN market.



Above *Bob Jones of Sonix*
Left *The Arpeggio Lite*

Currently, ISDN installations in the UK lag behind other major EU countries. Germany has 850,000 connections, France has 250,000, while the UK has only around 100,000. However, in both France and Germany the market is being driven by subsidised pricing structures from state-owned telecom companies, bringing ISDN connections closer to the cost of normal analogue installations.

Bob Jones also revealed that he believes it will be possible to put the equivalent of the Arpeggio Lite ISDN router onto a single PCMCIA card within 18 months.

Java au Latte

Borland is aiming to get people into Java fast with a set of Delphi-like programming tools using a visual rapid application development (RAD) environment.

A licensing deal with Java's creator, Sun Microsystems, has enabled development of the package, codenamed Latte. It is scheduled for release in the first half of this year. Latte will focus on developing Internet and Web applications using object-orientated techniques. The compiler is claimed to be one of the fastest in the world.

Java has the potential to change the way applications are developed, both for the Web and via the Internet for distributed enterprise computing. For more on Java see Focus, pp232-7.

Borland International 01734 320022
http://www.borland.com/Product/java/java.html

CallingAll cards!

CompuServe has announced a new service which allows you to log onto CIS without using a modem or PC. The new CallingAll card system uses a phone card which provides access via a touch-tone phone to various CompuServe services such as email, news and stock quotes.

Users will be able to select email on criteria set by themselves. Priority email, for example, will be sent to a CallingAll email box. A touch-tone phone can be set to preview email which can then be transferred to fax machine or personal pager for retrieval.

Other services will include faxmail, voicemail, weather and news reports. CompuServe hopes to expand voice capabilities in the future so that email will read to users. The CallingAll card will be customisable by users so that information can be customised for individual subscribers. The service will complement existing CIS services so that by logging onto CompuServe, users can check voicemail, email or faxes.

CallingAll is expected to be launched in the first quarter of 1996 in over 40 countries and will be issued free to existing CompuServe members. It will cost around 25 cents per minute to use. Twenty minutes of free access are included in the first month of use.

The service has been developed jointly by CompuServe, and Premiere Communications of Atlanta.

CompuServe 0800 000400

TV times

The latest buzz in Internet circles is Web access via cable and TV sets utilising set-top boxes. Forget modems, ISPs and PCs; all you need is a TV and a set-top box. But will it happen? Some doubts are emerging.

Philips has launched a CD-i player and a modem that provides access to email and news. Oracle is making noises about Web TV, said to be launching later this year.

But according to industry watchers Forrester, the idea of using the family TV as an Internet access point may be a non-starter. TV, says Forrester, tends to be used as a group device, while Internet content is geared to single users. Therefore, Web content will have to change before this could happen.

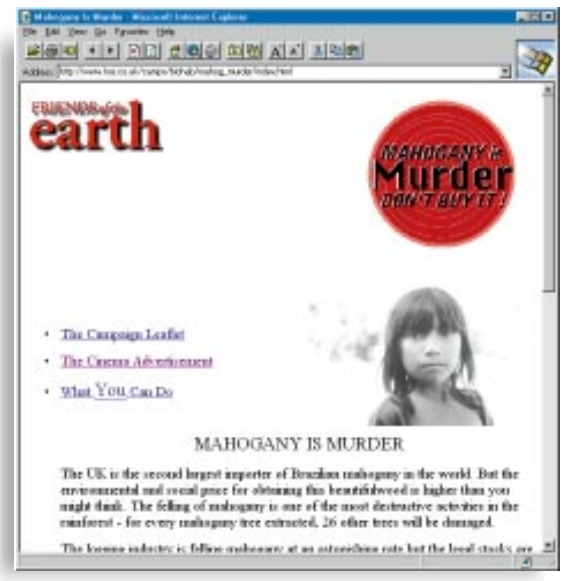
While not interactive, TV is a multimedia device with sophisticated sound, video and graphics. The Web has a long way to go before it can even begin to match TV. TV's are viewed from a distance; Web content is designed to be read up close on a PC screen.

Forrester cannot see online services such as CompuServe having enough clout to push hardware manufacturers into building Web TV devices while cable companies offering Internet connections have little expertise in writing Web content.

The only hardware manufacturers that can drive the market are too busy successfully selling games platforms to worry about delivering hardware Internet boxes. So it looks like the TV will remain safe for the likes of Jim Davidson for a while yet.

Friends of the Earth puts banned ad on the Web

Friends of the Earth has placed a cinema advert that was banned by the Advertising Standards Authority on its Web site so that people can download it to a PC. The advert in question claimed that 21 murders were a direct result of the mahogany trade in the



Amazonian rainforests. The ASA said that not enough evidence supported this claim and banned the advert from cinema screens.

By putting the advert onto the World Wide Web, FOE has neatly demonstrated how the Internet can evade national legislation and rulings. The ASA is aware of the situation, and is in discussions with the advertising industry and other regulatory bodies on how best to address growing use of the Web as an advertising medium.

A spokesperson for the ASA said it would not shrink from complaints made about advertising carried on the Internet. An example was for "free" software that actually incurred a delivery charge, contravening the ASA code of conduct. The ASA concedes, however, that Internet advertising that originates abroad would be difficult to regulate.

Friends Of The Earth
http://www.foe.co.uk

CompuServe to go ISDN

CompuServe are expected to deliver ISDN connections in the first quarter of 1996. Trials are already taking place in the UK and Germany with 90 access points established in Munich and 60 points in London. If successful, CompuServe subscribers can expect to benefit from enhanced access as plans include bringing ISDN to a further 22 cities in the UK.

Corel Mania

Corel is to launch into the crowding Internet suite market with its Internet Mania package, specially designed for Windows 95. It includes a number of software tools claimed to make exploring the Internet easier. The WebScan tool scans your favourite Web sites and, whenever they are updated, sends an alert message.

WebSearch uses a Windows 95 front-end to the Lycos database, which can be accessed from Find on the Start menu. Corel aims to make searching newsgroups easier with NewsScan, which puts a new icon into the task bar, alerting users to new messages in their chosen newsgroups.

Also included in Internet Mania are ftp tools, a simple Web server accessible from the Task Bar, and a Wizard that guides users through creating a simple home page. Internet Mania is expected to ship by the second quarter of 1996.

Free BT?

There are rumours that BT will be offering free local calls in 1996. But has anyone thought of the consequences this will have on Internet traffic and online charges? The rush to take advantage of free calls to the Internet could put ISPs under severe strain as thousands more hook up to the Net.

Meanwhile, the UK telephone market is about to receive a severe shake, as AT&T finally arrives on these shores. For the first time, BT has a global rival in its own backyard. Perhaps if AT&T starts offering ISDN connections at a reduced rate, it might just force BT's reassessing its own ISDN policy.

AT&T is already offering Internet connections to business users, and is selling an ISP service to homes in the US. It could follow suit in the UK.

net.surf

● If you're looking for a quick and easy way to create your own home page, try the WebWizard from Arta Software. It's available for download from **http://www.halcyon.com/artamedia/webwizard/**. This Windows 95-style Wizard guides you through creating a home page without using any HTML. You enter the text, graphics and links when prompted, and the Wizard then creates a HTML file

in the directory of your choice. You can only do it once and you are limited creatively, but you can edit the HTML file at a later date when you become more proficient. For sheer speed and ease-of-use, WebWizard is the best no-brainer Web tool I've seen. Version 2 will add background colours and bitmaps to the process.

INFOBAHN

● From Canada comes a new rival to Wired in the form of Infobahn, which promises to be "not just another magazine about the Internet" (oh no?). You can get a taster at **http://www.postmodern.com/issue1contents.g3.html** which also gives you the chance to receive a free copy.

● Back in Britain I recently discovered BT's excellent Web site on **http://www.intervid.co.uk/**. Inevitably called Let's Talk, it provides an overview of BT's activities worldwide including partnerships, BT laboratories (including a VRML representation of the lab) and BTNet. This, by the way, is BT's little known Internet access service, an elegant Web site stuffed full of information you should know about.

LINUX

● Linux is a cool Unix-based OS that is increasing in popularity among hardcore geeks. Why? Because it's cheap, small, fast and runs on 80x86 PCs. If you want to know more about Linux, keep reading Cutting Edge and check out the Linux International site on **http://www.li.org/linux-int/#Introduction.**

● While on the subject of cheap software, you might care to look at the Jumbo site at **http://www.jumbo.com/**. This is a huge resource of shareware that boasts no less than 24,582 programs, all free to download. Whether you use a PC, Mac or Unix box there's bound to be something here to load up. Every piece of software comes with full descriptions and a search engine provides fast access if you can't find what you're looking for.

● Finally, my very own Web site will be finished by the time this issue of PCW hits the stands. Find me on **http://horse.vnu.co.uk**.

BT Let's talk

net.newbies

Getting started on the Net

These pages are designed to be an easy-to-use reference guide to the Internet for the novice — or "newbie", as hardened netters will call you. Here's an easy-reference guide to the tools which will help you make the most of the Internet.

What is the internet?
The Internet consists of millions of computers interconnected in a global network. The number of users is difficult to measure, but those worldwide who can at least exchange electronic mail messages is estimated to be 30 million and this appears to be doubling each year.

What is the World Wide Web?
It is not the Internet. It is a service on the Internet which uses special software (usually available free) to give users access to pages of information with pictures and multimedia instead of just text. About 15 million people around the world have access to the World Wide Web.

What do I need to get on?
A PC of almost any age can be connected to the Internet as long as you can plug it into a modem. You don't even need to be able to view graphics on your machine to look around (although it helps).

A modem allows your computer to dial in to another computer with a modem and communicate with it. They come in different speeds, from 2400 baud to more than ten times that. When you are using the Internet, the speed at which things work is more likely to be limited by the speed of your modem than by that of your computer. Buy the fastest you can afford. An old 2400 baud "V.22bis" model is fast enough to exchange electronic mail messages, but to send and receive files, or use the more exciting services on the Internet, a modem which runs at a speed of at least 14,400 baud "V32.bis" is vital. Fortunately, these have plummeted in price over the past few years and now cost as little as £100. If you have the money, go for a 28,800 baud V.34 modem. Over time, you'll get back the added cost by reducing your phone bills.

Okay, I've got a modem. Now what?
For a modem to bring you information, it has to have a number to dial. This is where a "service provider" comes in — you have to subscribe to one if you want to get online. Whatever kind of connection you have set up, you will have to pay your phone costs on top of any subscription, unless you are lucky enough to get free local calls through a cable company. The bigger service providers will have the numbers you dial, PoPs (points of presence), scattered across the country so you only have to dial a local number.

If there's no company near to your home which offers Internet access, you may have to pay long-distance phone rates. Once connected, though, it doesn't matter where the information you are accessing is physically located: you are always charged at the same rate. A list of providers and telephone numbers is available in the panel below. For more details, have a look at the supplement banded with the January issue of PCW.

Typically, a subscription that only provides electronic mail costs around £5 a month and Delphi offers this. But full Internet access which allows you to use email and Internet services for any amount of time, limited only by the size of your potential phone bill, costs more, currently between £8.50 and £15 per month. There are dozens of companies offering this kind of Internet access, none of them big enough to dominate the market. The basic service being offered is largely the same, although some higher-priced providers may claim to offer a more personal service or a better selection of access software.

Online services: what do they offer?
Major online services like CompuServe or Delphi now offer Internet access and also have a large number of services of their own to which only their subscribers have access. These services include official technical support for hardware and software by electronic mail, online games, vast indexed software libraries and databases of business or consumer information. A monthly subscription tends to cost between £6 and £10 per month, plus a charge per hour if you are online for more than a set number of hours in that month. CompuServe is more expensive than the other Internet providers, but you get what you pay for — it's pretty foolproof.

Demon Internet is the best known and most popular of the standard Internet operators but doesn't cater too well for absolute beginners. Perhaps better for the raw newbie is Easynet (although it only has Pops in London and Edinburgh) or UK Online. UK Online is a special case, a cross between an Internet provider and an online service. For £8.50 to £12.75 per month it offers unlimited access to the Internet, partially "censored" to make it safer for children to browse, plus access to online magazines and other services.

Although programs like Windows Terminal can be used to access these services, it is normally easier to use specially-written online software. Any service provider should provide you with at least some of this software when you sign up, and if you want to choose something different, most of it can be acquired online, free of charge.

PCW Contacts

CompuServe 0800 289378
email:70006.101@csi.compuserve.com
Delphi 0171 757 7080
email: uk@delphi.com
Demon 0181 371 1000
email: internet@demon.net
email: sales@thenet.co.uk
UK Online 01749 333333
email: sales@ukonline.co.uk
Easynet 0171 209 0990

If you don't understand what's written here or have any suggestions, please let us know. Contact **Paul_Fisher@pcw.ccmail.compuserve.com**, or "snailmail" (Internet-speak for the post) to the *PCW* Editorial address on page 12.

CUTTING EDGE

Part 2: Playing tag

DIY Web pages made easy

In this second part of our series about creating your own Web pages, Nigel Whitfield shows you how to make your pages easier to read and more fun to use. He covers some advanced techniques, too.

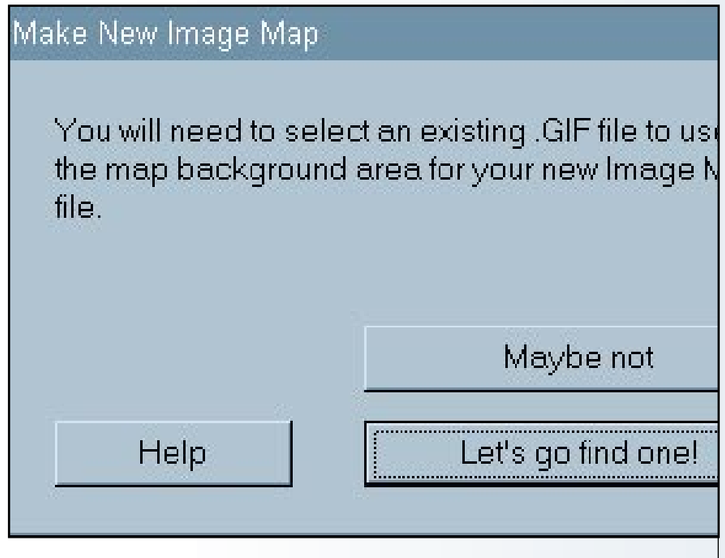
Last month we looked at how to create your own Web pages using basic HTML markup tags, and how to include images, links and headings in your documents. Take a look around the World Wide Web and you'll see there's still a lot more you can do with your pages, such as lists, images, or even forms that people can fill in with information.

This month we'll look at a few other ways in which you can make your pages easier to read and more fun to use, and take a peek at some of the more advanced things you can do if you have access to the right sort of Web server for your documents.

Ready to play

All the tags we've looked at so far have one important thing in common: they're all used to tell the Web browser that reads the page not how it should look, but which style to apply — very similar to a style sheet in a word processor. Change the style sheet, and everything using that style changes automatically.

Sometimes, though, that's exactly what you don't want. For instance, if you're giving detailed instructions to someone, you might want to move on to a new line at a particular place, rather than rely on their Web browser to do the choosing for you. For things like that you can use the <br> tag, just like you'd use the Return key in a word processor.



This is a simple home page, using only a few basic commands — you don't need to be an HTML wizard to get good results

But what if you want to do something a little more detailed, such as a table of prices and part numbers for a catalogue? There are two ways to do this. One is to use the table feature built into HTML — which we'll look at next month — and the other is to use "pre-formatted text", like this:

```
<pre>
This text
will appear
exactly like this
</pre>
```

Most graphical browsers use a fixed-space font (such as Courier) to display pre-formatted text, which means you'll be able to space words out using tabs and be sure that they line up properly. And even though the tag is for "pre-formatted" text, you can still use other tags within it. For example, you can use it to make column headings appear bold. If you wanted a table of prices and products, it could look like the example here:.

```
<pre>

<b>
Item     Cost
<b>
Roses    &#163;1.50
Poppies  &#163;0.75

</pre>
```

The £ is another special code that you can use in your Web pages. It tells the Web browser to display character 163; in this case, it's the £ symbol. You can include other special characters, either by giving their name or by using a special code. For example, &#lt inserts the "less than" symbol, which you can't type directly into your HTML as it starts each tag. The most useful symbols are listed in the panel at the end of the article (page 257).

A little list

Lists are another way of presenting information in an easy way, without having to use tables, which can be complicated to set up (see page 256). Lists are supported by all Web browsers and there are three different types to choose from, depending on whether you want them to be numbered for you, or to contain long definitions.

The simplest type of list that you can put on your Web page is called an unordered list. It's just that — a straightforward list with no numbers, in no particular order. You could use it, for example, as a list of other cool places to visit, or a table of contents for your own Web site.

If you're using a Web page editor, such as the Internet Assistant for Word for Windows, you can create a list just by typing all the items you want on separate lines, then highlighting them and clicking on the list button, just like creating an ordinary list in a Word document.

Creating a list by hand isn't much harder, either. An unordered list starts with the <ul> tag, and each item begins with <li>, for "list item." After the list item, just close the list with . You'll end up with something like this:

Handy Hints

Turning your words into HTML is the easy part of creating Web pages. Follow these hints to help save time designing your pages and make sure that they're easy for people to read.

- Work out what you want to do first. If you're going to have more than one page with links between them, draw a diagram so you can see which ones should be linked, otherwise you'll end up with a confusing maze of pages.
- Make your first page short and simple. People don't want to have to wait ages to download a large home page. Have a quick summary and some links to other information on more pages.
- Don't overdo the graphics. Pictures are very nice, but they take time and money to download. If you must have lots of them, make them small and make sure you use "alt" text for people who don't download the pictures.
- Don't use too many headings. If you have lots, it'll be hard for people to read the text.
- Try to avoid using special features that rely on people using a particular Web browser. They may not work at all if people use a different program to read your pages.
- If you have a long document, break it up into sections and make a miniature index so that people can jump to anchors at useful points.
- When you give the names of files in links or "img" tags, don't give the full path; just say where they are relative to the file that you're reading, so they'll still work if everything is moved to another drive or directory.
- Always remember to use Unix-style forward slashes "/" in file paths, rather than DOS-style backslashes.
- If you're using Netscape to view pages, you can drag your HTML file into the Netscape window to view it.
- Save HTML files with the ".htm" extension on a Windows system, or with a name that ends in ".html" on a Macintosh — some Web browsers and servers prefer files to have names that end that way.

```
<ul>
<li>This is the first thing on my
    list
<li>And this is the second. List
    items can be as long as you like
<li>Here's the next item
</ul>
```

If you want the things on your list to have numbers, all you have to do is swap the <ul> tags for ordered list tags — . Each item in your list is just like any other piece of HTML code, so it could include a link, or a paragraph, or even another list, which will be indented automatically. Of course, the point of a list is to be easy to read, and if you start to include lots of text, you'll quickly find that it's actually rather difficult to work out what's going on.

To get around this problem, there's a third type of list called a "definition list". Unlike the other two types, there are two parts to each entry of the list, a title and a definition. When the list is displayed, the title of each item will appear, with the definition indented below it. Here's an example:

```
<dl>
<dt>Personal Computer World
<dd>A monthly magazine published by
  VNU. Probably the most popular
  computer magazine in the UK.
<dt>Nigel Whitfield
<dd>A freelance computer journalist,
  who has written for a wide range of
  magazines including <i>Personal
  Computer World</i>.
</dl>
```

By using lists carefully, you can make it easy to find links on your pages, and easier to keep them up to date — it's much simpler to find the link you're looking for when everything is neatly arranged in lists, rather than hidden in the middle of paragraphs.

In fact, if you write your own Web pages using a text editor, it's worth remembering that you can add as much blank space as you like without affecting the way things look, and it will make it easier to keep everything up to date. The only time you'll need to be careful with spaces is in pre-formatted text and around links, where a new line or extra space before the end of an anchor might make some browsers leave an underlined space on the screen.

Imagination

Once you've looked at other pages on the World Wide Web, you'll notice that lots of people use buttons or other images for their links, and choosing the right images can

Walkthrough: Creating a map file with MapThis

Fig 1 *MapThis runs under Win32. To create a new imagemap, just start the program and select File New. When you see this screen, press the button marked "Let's go find one" and open your GIF file*

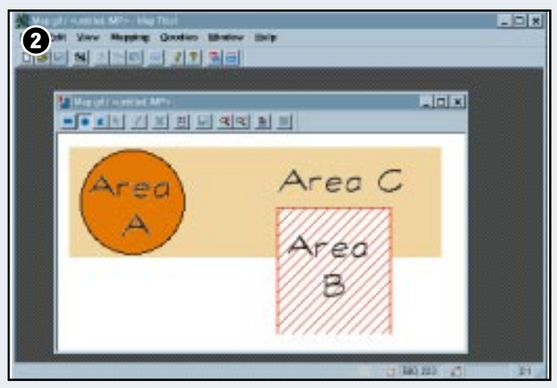
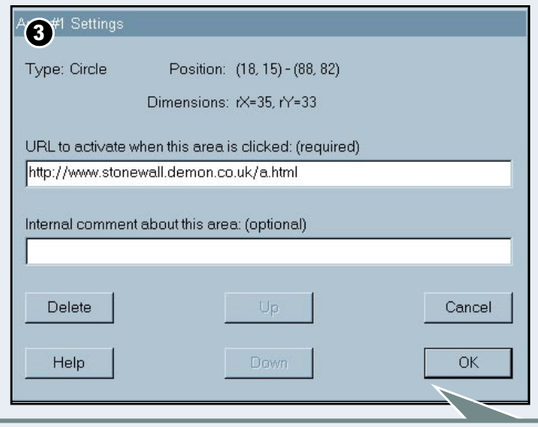


Fig 2 *This is our test image, opened in MapThis. You can zoom in by clicking on the appropriate button, or put a grid over the top of the image to make it easier to line up your hotspots*

Fig 3 *To add a hotspot, just select the type from the button bar, click and drag to create it. When this screen appears, you can fill in the details of what's supposed to happen when people click. To adjust the co-ordinates, drag the edges of the shapes later*



CUTTING EDGE

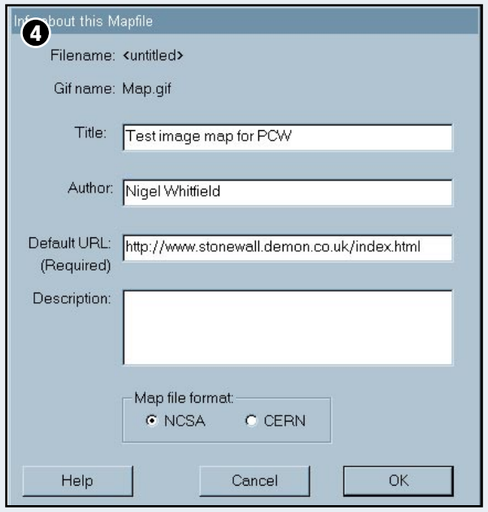


Fig 4 *Select the Map Info button and you'll see this dialogue box, which allows you to specify the default action if none of the hotspots are clicked and to say whether you want an imagemap in NCSA or CERN format*

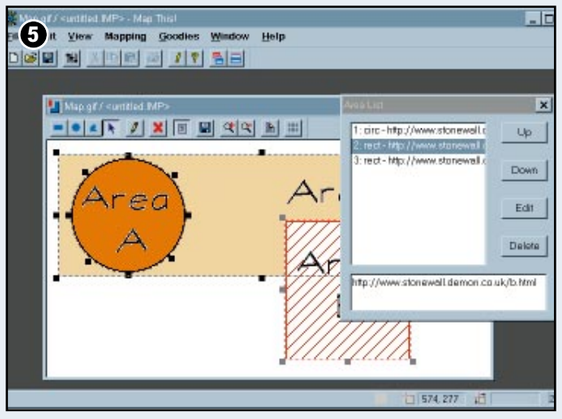


Fig 5 *The area list allows you to see which areas you've defined and to move them up and down the list. In our example, area A must come first, otherwise it will be "lost" in area C and readers won't be able to select it*

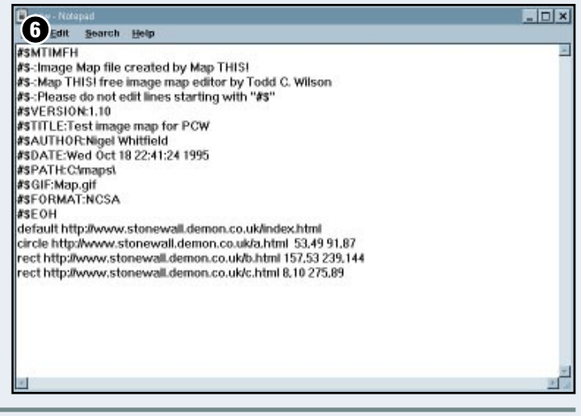


Fig 6 *This is the resulting map file, opened with Notepad. All you have to do now is copy it to your Web server*

make it much easier for people to find their way around.

As well as individual buttons, another popular way of adding links to a page is by using imagemaps. An imagemap is a picture that appears on the page which can be clicked on. The co-ordinates where you clicked are sent to the Web server, and the appropriate page appears. So, if you want to have a completely graphical Web page, giving you control over how everything looks, you could create a large image with built-in buttons.

Remember that if anyone isn't looking at images, they won't be able to find out anything useful from your page, so it's vitally important that you have ordinary text links underneath the picture — or a clear link to a text-only version of the page.

Also, if you want to pack a lot of information onto the screen, you'll end up creating huge pictures. Another problem is that there's no single way to create an image map — it depends on the sort of Web server you're using.

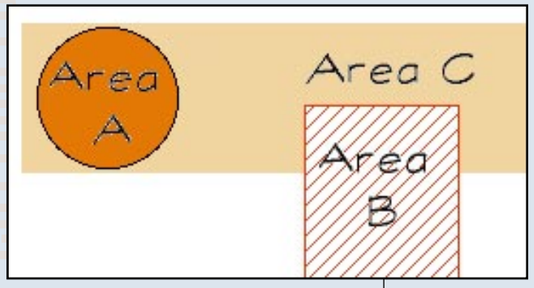
Image maps can be a good option, but you should think carefully before you decide to use them. For instance, lots of people use image maps to put button bars on their page. If you're tempted by the idea, consider using a series of graphical buttons next to each other instead. You'll have lots of images, but you'll also have a page that can display different text for each button, and will work whether people are using a graphical Web browser or a text-based one.

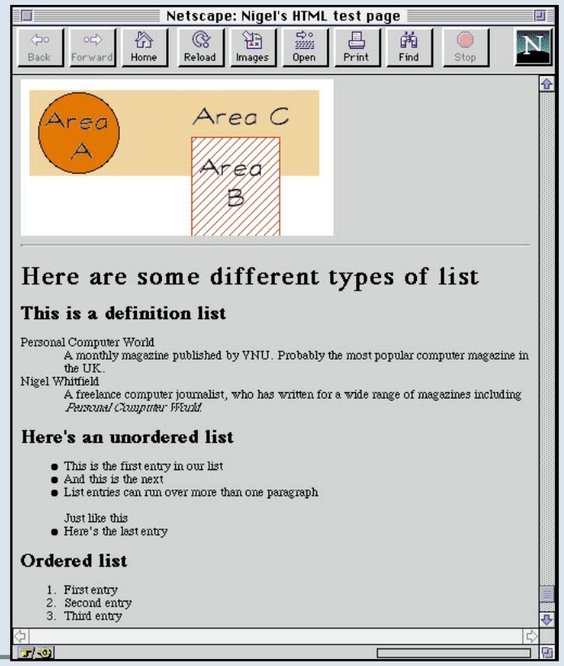
Script secrets

Sometimes, using a clickable image really is the best way to make your page look smart and simple to use. It's not hard to set up an image map, but it does need a little bit of planning.

First, you need to understand how the Web server handles maps, and different servers work in different ways. Most commercial Web space providers use one of two servers, called the NCSA or CERN http daemons, after the places where they were written. We'll show how to make an imagemap work with both. Even so, things will differ from one server to another, and if you're renting Web space you should check with your provider to find out which type of server you'll be using and exactly how to set things up.

To make a picture into a map, there are





Above *Fig 7 (see "Mapping it out", page 257)*

Right *Fig 8 (see "A little list", page 251)*

two things you must do. The first is to state that it's a map when you add it to your Web page with an img tag, and the second is to make it a link to a script on the Web server. Scripts are one way a Web server can process information and return the results to your browser. They could be used, for example, to search through a database, or to see how much disk space is free on the server.

The imagemap program is a special script that looks at the co-ordinates where you clicked and works out which Web page you should see next. It does this by reading a map file, which is a description of the shapes in the image, and which URL should appear for each shape. If your provider is using the NCSA Web server, the image mapping program is called /cgi-bin/imagemap, and if they're using the CERN server, it's called /htbin/htimage.

In next month's article we'll look at how to use scripts in more detail, but for now we'll just look at how to call the image mapping program, and how to tell it what parts of your image lead to which type of link.

All about imagemaps

Although you can use a program such as MapThis for Windows to create your imagemaps, as with the rest of your HTML pages it helps to understand what's happening when you create a map file, and just how it works.

● There are a couple of important things to remember when you're creating a map. The first is to try and make sure that clickable areas are clearly defined, so that people who look at your pages won't be confused about where to click; and the second is to remember that the order in which your hotspots is defined is important.

When the imagemapping program tries to work out what should happen next, it stops at the first hotspot it finds. That's not a problem if none of them overlap, but on the example page we've shown, there's a circle within a rectangle, and it won't work unless you define the circle first. The rectangle will automatically fit round it.

● It's also worth remembering that, though there are differences between the formats of the map files used by the CERN and NCSA Web servers, you can make it easier to convert between them. The most important thing to remember is that when you define a rectangle, you should always use the top left and bottom right corners as your points. Strictly speaking, you don't have to do that for the CERN Web server, but if you do, you won't have as much work to do should you ever use the NCSA one instead.

● Another point to remember when you work out the co-ordinates is that, unlike an ordinary graph, co-ordinates in an image start with 0,0 in the top left corner, rather than the bottom left. Each co-ordinate is a single pixel, so if you use a graphics package to create the picture, the pixel address will be the same as the co-ordinate.

To make it a little clearer, let's look at a sample image, which is 288 pixels wide and 144 high. We'll assume that there are four options when you click on the image, one for each of the named areas, and a file called "index.html" that will appear if you click on any of the white space around the edge. Here's what the image map file would look like for a Web server using the NCSA daemon:

```
default http://www.stonewall.demon.co.uk/index.html
circle http://www.stonewall.demon.co.uk/a.html     55,50    55,88
rect http://www.stonewall.demon.co.uk/b.html       159,55 239,144
rect http://www.stonewall.demon.co.uk/c.html       9,11 276,90
```

You can use either tab or space characters to separate the different parts of each line. This is what the same definition would look like if you were using a CERN Web server:

```
default http://www.stonewall.demon.co.uk/index.html
circle (55,50) 38 http://www.stonewall.demon.co.uk/a.html
rectangle (159,55) (239.144) http://www.stonewall.demon.co.uk/b.html
rectangle (9.11) (276,90) http://www.stonewall.demon.co.uk/c.html
```


More HTML tags

Here's a summary of the HTML tags and image map commands we've looked at this month:

Tags

<pre> ... </pre>	Text between these tags will not be formatted. Line breaks will appear as you type them, and a fixed font such as Courier will usually be used to display the content.
...	Put these around an unordered list (one without numbers).
...	Put these around an ordered list. Each item will be numbered automatically.
	Each item in an ordered or unordered list should begin with this tag.
<img src="picname" ismap>	The ismap keyword denotes that the picture "picname" is a clickable image.

Special characters

These tags must appear in lower case:

&#xxx;	Insert character number xxx from the ISO Latin 1 character set.
£	£
<	<
>	>
&	&
"	"
©	© (not supported by all browsers).
®	® (not supported by all browsers).

Image mapping

All co-ordinates are pixels, relative to the top left corner of your image. URL may be either a complete URL or a relative reference to a document on your server.

Image mapping commands (NCSA)

default URL	Access URL if no other area is clicked.
circle URL x1,y1 x2,y2	Define a circular hotspot, with the centre point at x1,y1 and a point on the circumference at x2,y2. URL will be accessed when the circle is clicked.
rect URL x1,y1 x2,y2	Define a rectangular hotstop, with the top left point at x1,y2 and the top right at x2,y2. URL will be accessed when the circle is clicked.
poly URL x1,y1 x2,y2 ... xn,yn	Define a polygon with corners at positions x1,y1 to xn,yn.
point URL x,y	URL will be accessed if the click is nearest to the point x,y.

Image mapping commands (CERN)

default URL	Access URL if no other area is clicked.
circle (x,y) r URL	Define a circular hotspot with its centre at the point x,y and a radius r.
rectangle (x1,y1) (x2,y2) URL	Define a rectangular hotstop with diagonally opposite corners at points x1,y1 and x2,y2.
polygon (x1,y1) (x2,y2) ... (xn,yn) URL	Define a polygon with corners at positions x1,y1 to xn,yn.

Scripts are called as a special type of URL, giving the name of the script, followed by a slash and the rest of the parameters. In the case of an imagemap, you have to tell the server the name of the file that contains a description of your picture, and your Web browser will add the co-ordinates on the end. Here's an example, for the NCSA Web server:

```
<a href="/
  cgi-bin/imagemap/test.map">
<img src="map.gif" ismap></a>
```

In other words, the graphics are in a file called map.gif, and the file test.map describes which areas are clickable. For the CERN server, all you have to do is change the name of the mapping program.

Mapping it out

All well and good, but what's in the map? It's not as complicated as it seems — there are just a few lines that describe the different shapes in the picture and what happens when you click on them (Fig 7). You can describe circles, rectangles and polygons, and create a default response for when people don't click on one of the hot spots.

The panel opposite, "All about imagemaps", explains how imagemaps work in more detail, but if you want to save time you should download one of the many programs designed to create imagemaps for you, such as WebMap for the Macintosh, or MapThis for Windows. Both programs let you highlight areas in your picture and automatically create an imagemap file for you, without having to worry about how everything works. If you're trying to create a complex map, it's almost certainly worth using one of these programs rather than trying to build the map yourself by hand.

With a few image maps and lists, it should be possible to produce a very professional-looking Web site.

Next month we'll look at how to create tables, and how to add forms and scripts to your Web pages to make them interactive.

PCW Contacts

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Innovations

One piece suite

As the Internet develops its appeal to Mr & Mrs Average in the home, the PC mass market is evolving different approaches, in parallel. Tim Frost does his homework.

As the Internet soars in popularity, so do attempts to develop its interface on the desktop PC. Companies leapfrog one another in an attempt to come up with the perfect web browser or integrated suite of Internet applications; this year's growth area. All this is to make the Internet more usable for general computer users, many of whom use the Net at work, to explore at someone else's expense.

Adding better user interfaces, pictures, sound and movies to the computer is seen as the holy grail of the online world with a huge number of companies jumping on the home page bandwagon, trying to out-do each other in the fancy appearance of their pages.

Different

But there is a parallel development that takes a fundamentally different view of the way in which the mass market will approach these services. The large set of boxes we know as a computer is perhaps on the way out — at least, in the home.

We've seen the advent of all-in-one PC boxes such as the Compaq Presario, and more recently the Olivetti Envision approach where the computer looks more like a VCR than a PC and plugs into the TV. But even this is hardly revolutionary. The view of some telecoms and service provider companies is that using computers to access the online world may be a bit of a cul-de-sac; eventually limited

> *'the mass market lays with a much less technical-looking box than a computer'*

to office work and PC enthusiasts. They believe that the mass market (potentially every household with a telephone and a TV) lays with a much less technical-looking box than a computer.

Diametrically opposed

Infogrammes, better known over here as a games developer, is working on an online system which is diametrically opposed to the world of PCs, ATIPs and HTML. It sees the future for online as products that sit comfortably in Mr & Mrs Average's front room.

Its proposals are for a set-top box, along the lines of a satellite decoder, that connects to the TV to provide games, shopping and information services. The box has a processor with a fast 28Kb modem inside. It simply connects to the phone and the TV to deliver an interactive function that looks like a cross between a Playstation and super teletext-type service.

The company has already gained experience delivering online services in which the householder is interested, with Minitel in France. Minitel is a mini keyboard and display that connects to the phone socket to send messages and access services.

Ten years ago, France Telecom (FT) supplied the boxes free to thousands of its domestic customers: the increased use of the phone lines quickly paid for the hardware. FT and other companies providing Minitel services have been onto a good little earner ever since.

As a major player in Minitel, and having experimented with interactive games on national TV programs, Infogrammes believes online services are going to merge day-to-day access information services like weather and traffic reports, with entertainment and interactive gaming. Its system is fast enough to deliver sound, simple animation and slow, frame-rate video and react quickly enough for smooth game-playing against a central computer or online users. All this and (as far as the family is concerned) with not one computer in sight.

Halfway between

Philips is playing with an idea that is halfway between current online ideas and Infogrammes' approach. CD-Online, a Philips-backed organisation, is tapping what it hopes will be a growing market for CD-i owners with an add-on box to access the Internet from your TV and the CD-i's remote control.

The system comes as a combination of modem and CD-i disc. The 14.4Kb modem plugs into the back of the CD-i unit and into the phone socket and links directly into the machine's processor and video output.

The disc contains the Internet interface, which is graphics-orientated and has an animated tutor, called Dave, which guides the user through the different facilities and services available on the Net. The system accesses the Internet through CD-Online's gateway (via Pipex).

The company operates just like any other service-provider. But in CD-Online's case the service is pure Internet, the hardware is pure games/VCR. You might argue against the wisdom of hitching up with CD-i (which has yet to grip the nation) but the real question is; which direction will online take? The huge increase in the number of home PC's will help to promote interest in working online over the next two years.

But after that, will your online hardware move into the telephone and the TV, where it will merge with video and audio on demand, satellite, teletext, cable and home shopping? It could become just another way of accessing the electronic world outside the house.

Horizons

The future's 3D

The PC needs low-cost graphics acceleration in order to compete with the home consoles market. Ben Tisdall brings news of a chip which should allow every PC to support 3D graphics within a year.

The home market is now the driver for developments in graphics and multimedia. Nearly 30 percent of all PCs sold now end up in the home, and the number is growing by 15 percent a year.

Home PC users are big games players, and for games developers the PC offers several advantages over consoles. Distribution is free, there are no royalties to pay to the console manufacturers and the content of games is not vetted by them. PCs currently account for between 10 and 15 percent of the games markets and the proportion is predicted to grow.

High-quality games require fast 3D graphics. The success of Flight Simulator and, more recently, Doom is largely down to three-dimensionality. 3D in this context doesn't generally mean the stereoscopic effect you get when you wear 3D glasses, but a detailed, rendered 3D world that you can move through.

For the PC to keep up with the new generation of consoles (Sony's Playstation and the Sega Saturn both have 3D graphics acceleration), low-cost 3D acceleration for the PC is needed. That way you get the graphics speed of Doom with the detail of games like Myst. The aim is to close the gap between the dazzling pictures on the packaging or in the adverts and what you see on your computer screen.

There are three key bits of technology required for 3D acceleration. The first is operating system support. Windows 95 provides the kind of stable, standard, reliable software interface that games developers and hardware designers have been looking for. Before Windows 95, 3D APIs were mainly DOS-based, like the games applications, and produced by third party companies like Argonaut Brender and Rendermorphics RealityLab. Microsoft's acquisition of Rendermorphics has allowed the RealityLab 3D API to be built into Windows 95. This API includes complete scene management and a software geometry engine. But developers who already have their own API can still write straight to the lower level Direct 3D API; this is particularly useful for companies porting existing DOS games to Windows 95.

The second requirement is a geometry engine to do the heavy number-crunching and deliver the framework for a scene. The job of the engine is to process environment descriptions and translate them into 3D polygons. Pentium processors provide geometry engines with the necessary horsepower to rotate and translate objects in a scene to the user's viewpoint, to decide on the light and shading characteristics of the polygons, and to clip (or remove) polygons that are out of sight from that viewpoint.

The final requirement is a rendering engine, and this is where 3D processors come in. They need to be scalable as new, faster CPUs are introduced.

> *"High quality games require fast 3D graphics"*

They need to be widely accepted by developers and hardware manufacturers, and, above all, cheap enough to compete with console prices.

The job of the rendering engine is to intelligently construct a 2D representation of the 3D geometry — 30 times every second. The process has four main elements: polygon rendering, texture mapping, atmospheric effects and hidden surface removal.

Polygons, usually though not always triangles, can be rendered as flat shading, Gouraud shading or texture mapped. Flat shading is low quality and looks boxy but many games still resort to it to increase performance. Gouraud shading improves on the boxy look by "interpolating colour from each vertice of each polygon"; in practice, smoothing out the rendering to give a metallic or plastic appearance.

S3's ViRGe 3D accelerator chip, announced at Comdex Fall in Las Vegas, provides the necessary oomph at the right price to bring 3D graphics into the mainstream on the PC. Seventeen hardware manufacturers and 14 games developers have agreed to use the chip, and S3 is already confidently predicting that 3D graphics chips will be the next billion-dollar chip market.

The chip supports some pretty advanced 3D features including texture mapping, true per pixel perspective correction, support for using live video as a texture map, and transparency which allows realistic rendering of water and glass. And it's engineered to keep costs down. It uses a 208-pin package that's compatible with S3's other video chips and will cost under $40 apiece in volume. S3 expect this to translate into cards costing under $200. By next Christmas every home PC will probably support 3D graphics and inside quite a lot of them will be an S3 ViRGe 3D processor.

Bluesky

Breaking the **Big Barrier**

Using the human brain to send electric information to computers shows that true artificial intelligence may be closer than we think. Toby Howard explains.

In just 50 years, the computer has revolutionised our lives, and our futures. But one problem remains: the interface between computer and mind. The Big Barrier is almost as impenetrable today as it was in those early days when we punched paper tape.

Researchers are seeking more expressive ways to communicate with machines. Virtual Reality has gone some way towards allowing machines and humans to share the same conceptual space. But there are drawbacks: the head-mounted displays and datagloves are expensive, often cumbersome and inappropriate for many interaction tasks. Other approaches include natural speech recognition, gaze tracking and gesture recognition, where neural networks interpret hand, body and face gestures. Recently, researchers writing in the prestigious journal *Presence* suggested a "Nose Gesture Interface Device". Such is the climate of today's research that not everyone spotted the joke.

All of these methods, however, are based on the user's muscular movement. The breakthrough will come when we can communicate by *thinking*. And it's begining to happen.

Controlling machines with our brains isn't a new idea. In 1967, Edmond Dewan described experiments using subjects wired to an electroencephalograph (EEG), which records and graphs the electrical activity of the brain. With practice, the subjects were able to reduce the amplitude of their brain's alpha rhythms, to transmit Morse code to a teleprinter.

Research into the Brain-Computer Interface, or BCI, began in earnest in the early seventies, when the United States Department of Defense saw the promise of fighter pilots using their minds to directly control their planes. The project was unsuccessful, but the groundwork was laid for a field of research now growing rapidly, and over the last decade, great advances have been made.

A successful BCI must be bi-directional. Getting information into the brain is relatively easy through normal sensory channels. But reducing the brain's information to electrical signals is harder. Although leading researcher Jonathan Wolpaw has commented that "in theory, the brain's intentions should be discernible in the spontaneous EEG", the sheer complexity of the brain's measurable activity produces EEG traces which present a huge problem of interpretation. However, by focusing on very specific areas of brain activity such as motor function, it is possible to analyse EEG data using filters, fourier transforms and neural networks, to extract useful signals from the noise.

Using this technique, workers at the New York State Department of Health have been conducting experiments with "mu rhythm", an 8-12Hz brain rhythm centred on the sensorimotor cortex. With biofeedback training, subjects learned to move a cursor around a screen by modulating their mu waves. At the University of Illinois, researchers have trained subjects to control a "thought typewriter", which displays their chosen letters and words on a screen.

There are even a number of cheap EEG monitoring systems available aimed at the hobbyist, with PC or Mac interfaces. IBVA Technologies' Interactive Brain Wave Analyser, for example, comprises a headband with adhesive electrodes which send data by radio to a Mac interface box. This processes the raw EEG to give data which can be viewed as 3D graphics or converted to MIDI to control a soundcard or synthesiser. One user is Sylvia Pengilly, Professor of Music Theory at Loyola University in New Orleans. "I always wanted to 'think' my music into the computer," says Pengilly. "It's still in the early stages, but I can control the form of the music according to the moods I set."

Although the principles of EEG-based control sound simple, the extraction of meaningful data from an EEG trace remains at an extremely simplistic level. Motor functions are readily recognisable; "thinking" signals, such as "I'm thinking about blue skies", remain a challenge to decipher.

An alternative to EEG analysis is to implant electrodes into the brain matter itself, and stimulate/monitor groups of brain-cells directly. Electrodes contain toxic metal leads, but researchers at the Max Planck Institute for Biochemistry in Munich have overcome this by creating a "silicon to neuron junction", which can directly stimulate a nerve cell without damaging it. Used in conjunction with existing "neuron transistors" which sense the ionic potential of a nerve cell, this technology paves the way for two-way communication. The dangers of inserting electrodes into brains, of course, still remain.

Although still at an exploratory stage, the implications of recent research results are phenomenally exciting. Perhaps one day, the Big Barrier will disappear altogether. And instead of typing this article on my PC, I will merely have to think it in.

PCW Contacts

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A collection of links to information about BCI may be found at **http://www.cs.man.ac.uk/aig/bci**

Retro

Hit and miss

Sony intended the MSX to become the forerunner of a standard for home PCs. Big names backed it, high street electrical retailers stocked it, and stocked it, but...
Simon Rockman fills in the background on why it flopped.

Sony once produced a machine called the HitBit. It was not a hit. In fact, it was part of the miserable failure that was the Sony MSX. Before the PC established itself as a *de-facto* standard, the Japanese conglomerates had a go at it. The idea was that if enough manufacturers produced compatible machines, they could produce a standard which would allow the same software to be used and banish forever the horror of little Johnny not being able to play his Spectrum tapes on his mate's Oric Atmos.

The result was MSX, a machine with a Z80 CPU running at 3.58MHz, a version of Microsoft Basic in ROM, varying amounts of RAM (typically 32 or 64Kb) and the TI9918 video chip. Like some predecessors which used the same video chip, the graphics helped kill it.

As a home computer it was designed to be plugged into the family TV and use a cassette recorder for storage. Files were saved at 1200 or 2400 baud.

The sprites are all right

Like the rival Commodore 64, the MSX machines offered Sprite graphics; a technology which PC graphics cards, in the main, still haven't caught up with ten years later. These were separate characters which could move around independently of other graphics on the screen. Driven by the hardware, sprites are ideal for games applications as bullets and aliens. But the sprites on the TI9918 were limited: they were small, about the size of a normal character, and if more than seven appeared on a line they began to disappear.

The graphics speed was limited by the need to write to the screen serially. It was not memory mapped and this meant the MSX was much harder to program than its contemporaries. With hindsight, the machine seemed doomed, but at a time when the likes of JVC, Toshiba, Sony and every other big-name manufacturer was backing the technology, there were people who felt it couldn't fail. Some of those were the high street electrical retailers who bought a lot of stock. As this stock continued to gather dust on the shelves years later, the same retailers were loath to stock computers again and a bad taste lingers still in the mouths of some people.

The ill-fated HitBit, an MSX machine beset by grim graphics and an irritating tune on its only game

Against this background, the *PCW* review of the Sony HB-75 MSX machine seems horribly optimistic. This, in part, may have been due to the usual high build quality of the Sony machine.

Big-name backing

With the emphasis on games it had two joystick ports and took games cartridges. Thanks to CMOS-RAM with a five-year battery back-up, it was possible to save games. With all the big manufacturers backing the format, it seemed likely that there would be a lot of good software for the machine. In practice, there was Antarctic Adventure (a game with a penguin and an irritating tune) and, er, that was it. Some Spectrum games were converted, but nothing of note.

That irritating tune was produced by the AY 3-8910 sound chip (which was very good for its day and found its way into a number of other systems). The sound provided was three channels over eight octaves.

Resisting temptation

The Sony MSX cost between £250 and £320 at a time when most home computers were less than £200, but still the conclusion was: "The Sony HB-75 will be a very tempting purchase for a first-time buyer, particularly if they already own a Sony product. As an MSX machine it carries the benefits of an easy to use and powerful Basic along with a promised glut of software.

"It also expands on the MSX core with the inclusion of RGB and three useful firmware packages which illustrate the potential of the data cartridge. The 3.5in disk drive will be only one of the many peripherals available as hardware manufacturers no doubt jump on the MSX bandwagon."

Despite having only three wheels, no-one noticed that this particular wagon would be somewhat difficult to roll. The computer industry was very much better off as a result.

BOOKS

When the hitchiker's guide to the superhighway meets the rough guide to the Net, you know it's time to drag yourself kicking and screaming out of the dark ages and online. Dylan Armbrust and Joanna Scott tell us why. Meanwhile, Janice Murray and Ben Tisdall sort out the distinction between geeks, nerds and propeller-heads once and for all.

Living at Light Speed — Your Survival Guide to Life on the Information Superhighway
Author **Danny Goodman**
Publisher **Arrow Books**
ISBN **0-09-964931-4**
Price **£8.99**
Rating ✒✒✒✒✒

Warning. If you are tired of reading about the information superhighway, stop reading *right now*. If, however, you are one of the many people out there still trying to understand what the devil the information superhighway is, and what to do about it, read on.

Goodman's *Living at Light Speed* is one of those rare computer-type books that actually explains in plain English what computer technology is, how it affects us, and where it's going. And the real bonus is that it's not a boring read. He takes the reader on a gentle journey into the world of the superhighway, beginning with the origins of communications technology and ending with tips on how to prepare for the future.

Most people today are still afraid of the superhighway and view it as a technocentric endeavour for the select few. Goodman debunks this viewpoint by showing that most people are already connected to the highway but don't realise it. Voicemail, cable TV and even the lowly answering machine are only a few of the devices he links to the development of the superhighway.

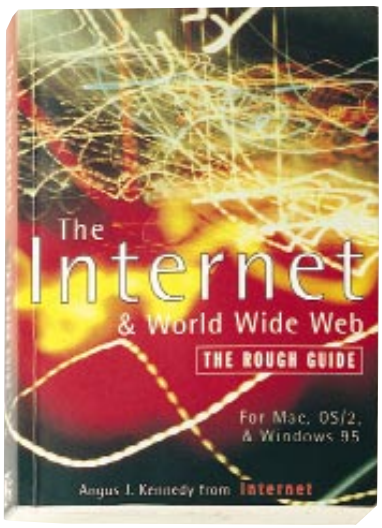
Most newcomers don't want to know where the superhighway came from, but where it is going and what it means to them. This is where Living at Light Speed shows its strength. Goodman lists his Ten Myths of the Superhighway (myth 3 — Only the "haves" will have access to the Internet) and refutes these with well reasoned and backed-up arguments which demystify the Internet and make it accessible.

But Goodman doesn't go overboard in lauding the virtues of the superhighway. He clearly states that, contrary to popular belief, the superhighway has a long way to go before giving us that interactive Utopia we've all been expecting. Old telephone technology, PC-based systems and Big Brother are just some of the pitfalls he discusses. The mention of these pitfalls only reinforces the value of Living at Light Speed. For those thinking about hopping on to the Internet, this book provides a thoughtful and balanced view of what the road conditions will be like.

The Internet & World Wide Web — The Rough Guide
Author **Angus J Kennedy**
Publisher **Rough Guides**
Pages **320**
Price **£5**
ISBN **1-85828-198-9**
Rating ✒✒✒✒✒

How many of us truly believe the old "the bigger the better" myth? That's not to say where there's quantity there is no quality, but when a pocket-sized guide turns up for review amid all the "paving stones" it certainly stands out from the crowd.

The Rough Guide travel books are known for their off-the-beaten-track approach, but this time they have ventured right off it and into cyberspace. As the latest market research proclaims that British households will be joining the Internet at a rate of about 4,000 a week in 1996, Rough Guides have wasted no time in providing us with an authoritative guide on how to get there and what we can do at the world's latest number one destination.



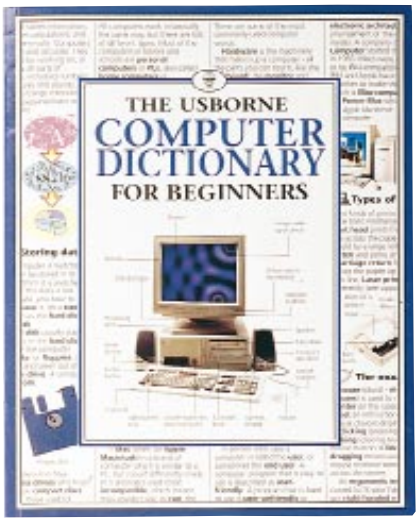
Written by Angus Kennedy of Internet magazine, The Internet & World Wide Web - The Rough Guide is informative, straight talking, succinct and thankfully not totally void of humour. Your first startling observation, apart from the electrifying front cover, will be that it stands at less than six inches, but brace yourself for the stunningly cheap £5 price tag — another rare attribute among Internet paper-based publishing.

Although there is an American slant to the book, this is not too intrusive, but do be prepared for the small font size. Limitations on size and budget also mean that colour and graphics are the first to go but, hey, you're a byte-sized backpacker now, so forget the first class treatment. Nevertheless, you will gain first class knowledge of the Internet from basics such as getting connected to useful chapters on email, how to use ftp (File Transfer Protocol), and for the adventurous among you, there are step-by-step instructions for your first IRC (Internet Relay Chat) session. Part II of the book is devoted to the World Wide Web with site-by-site coverage to help you locate the winners and avoid the over-rated time wasters.

The book also takes a glimpse at cutting-edge Internet software, particularly that allowing you to hear realtime sound, download video and of course make those free international phone calls. However, as the author is honest enough to admit that "to go through all these programs in depth is well

beyond the scope of this guide, these pages should prove a jumping-off point for the curious or committed", you'll quickly realise that the Internet itself can provide all the guidance for future exploration.

The Usborne Computer Dictionary For Beginners
Author **Anna Claybourne**
Publisher **Usborne**
ISBN **07460 19866**
Price **£5.99**
Rating ✎✎✎✎✎



The Usborne Computer Dictionary For Beginners is a slim volume packed with all the jargon, the how's, why's and when's to get you started in the computer age.

On first inspection a 14-page index seems a little extensive for a 50-page paperback, but once you begin to read you'll realise why. Just about every nerdy cyberspeak term is included; from essential basics such as desktop and hard disk to Internet terms such as Gopherspace, Veronica and Jughead (and the cartoon series those last two came from). You can even look up chip numbers and therefore learn the difference between a 386SX and a 68030.

Although it calls itself a dictionary, this isn't set out in the usual dictionary manner. It gives double pages to particular topics, making it more of a textbook or quick-reference guide. Such topics include The History of Computers, Peripherals, How Computers Work, Sound and Music Software and Programming. So much is packed into such a tiny space that you cannot expect an in-depth look into any particular topic. Instead, you get a brief explanation on each subject before the next is tackled. It will, however, give a brief grounding into all the basics.

Cross-referencing is used well, with key words italicised and starred to a page number reference at the bottom of each page so you can flick from one term to another. The book is jammed full of illustrations and well organised, although the mix of drawings, diagrams and photographs do jar in style a little. At the back (before the mammoth index) there are useful glossaries of terms not used in the book, and computer slang so you can find out after being engrossed by the book that you've actually turned into a geek, a dweeb, an anorak or (God forbid) a propeller-head.

I would expect most children who use computers at home or at school to be familiar with a lot of the contents of this book. It is, however, an up-to-date and coherently presented textbook for all those who are still longing to know the difference between a Net Judge and a Net Evangelist.

Microserfs
Author **Douglas Coupland**
Publisher **Flamingo**
Price **£9.99**
ISBN **0 00 225311 9**
Rating ✎✎✎✎✎

Microserfs began as a short story. We printed it in the May 94 issue of *PCW* and it recounted seven days in the lives of the young programmers who drink soda, eat pizza and worship Bill (Gates), and whose "universe consists of home, Microsoft and Costco". Coupland, best known for Generation X, has now expanded the book into a novel.

It begins in Microsoft as the main characters write and check code and frantically watch the price of Microsoft stock. Later the action moves south to Silicon Valley as the narrator, Daniel Underwood, joins his roommates in a new startup to write a game called OOP!. The gags come thick and fast, particularly in the first 100 pages. But it's a relentless pace to sustain, and after a while the effect is reminiscent of being stuck in a lift with a wise-cracking American for hours on end.

There's a subtle distinction between a nerd and a geek. Daniel defines it like this: "I think geek implies hireability, whereas nerd doesn't necessarily mean your skills are 100 percent sellable. Geek implies wealth." Well, the geeks who populate this book get harder to like as the book progresses, as they discover their sexuality (never pleasant where geeks are involved), weather crises, and finally take the product to CES (Consumer Electronics Show) in Las Vegas; all the while speaking in an almost alien language full of face time (time spent communicating without using email), Jeopardy categories, Nerf darts and Star Trek references.

Parts of *Microserfs* are immensely quotable, and this does keep you turning the pages. Nevertheless, by the end of the book, I couldn't care less what happened to any of the characters. Ultimately, Coupland has failed to turn his brilliant short story into a great novel. ■

Top Ten Books: February 1996

1	Delphi How-To	Waite Group	£36.50
2	OLE Controls Inside Out	Microsoft	£37.49
3	Teach Yourself Database Programming with Delphi	Sams	£37.50
4	Microsoft Windows 95 Resource Kit	Microsoft	£46.99
5	Visual Basic 4 Database How-To	Waite Group	£36.50
6	Director Demystified	Peachpit	£32.95
7	Windows 95 Secrets	IDG Books	£38.99
8	PhotoShop 3 Wow! Book	Peachpit	£32.95
9	Java!	New Riders	£32.99
10	Using HTML Special Edition	Que	£37.49

List supplied by the PC BookShop, 11 & 12 Sicilian Avenue, London WC1A 2HQ. Tel: 0171 831 0022 Fax: 0171 831 0443

Kids' STUFF

There's a bit of time travel on the agenda this month for Paul Begg and daughter Siobàn. One minute they're kings of the castle, the next they're staying cool in the face of bloodthirsty Vikings, before long they wind up in the court of the Prince of Persia. And without so much as a teabreak.

Exploring Castles: *the illustrations just don't hack it, but the information is good*

Castle capers

Exploring Castles is designed for and aimed at older school children and ties in with the National Curriculum Key Stage 2/3. The disc0 explores an exciting subject and is packed with information, but unfortunately the overall look and feel is lacklustre and uninspiring. The illustrations in Braveheart are sharp and crisp, the colours bright and vibrant, but those in Exploring Castles look like amateur snaps taken on a dull day and come from rather dusty and well-used transparencies. Whoever photographed Tintagel, one of the castles upon which the Camelot legend was based, has captured none of the drama of the castle's cliff-side location. The picture of Cardiff castle fails to convey the way it still dominates the city centre. What little you can see of Corfe Castle is ridiculous. Also, much of the text is dull white on black. I mention this at length because I feel that an educational package should be visually exciting, spark off your imagination and make you want to discover more about the subject.

When it comes to content, however, Exploring Castles doesn't disappoint. From the opening screen you have five choices: About Castles, Building a Castle, Living in a Castle, Castle Guides and Castle Data. Each section leads to other choices. For example, About Castles offers Types of Castle, Attacking a Castle, Features of a Castle, and Defending a Castle. Types of Castle takes you into 11 pages on text and illustrations about different ways of building castles, from medieval Motte and Bailey through to Edwardian. Some pages are accompanied by a movie and an expert-guided tour, such as historian Tony Gregory's tour of Orford Castle.

Living in a Castle and Building a Castle are self-explanatory. Castle Guides takes you to Chirk Castle in the March of Wales to just before Christmas 1322. Everybody is busily preparing for the arrival of Lord Fitzalan, Justicar of Wales, and you can discover what life was like by clicking on one of several guides, such as John the Baker. Unhappily, this was a disappointing multimedia experience, because the guides were brief and text-based. A character narration and costume photographs instead of the cheap-looking line drawings would have been a vast improvement.

Castle Data offers a Guide to the 159 Castles of the British Isles (I noted a couple of anomalies such as the inclusion of the remains of the Roman town of

Vikings!: *The reconstructions of the Jorvik museum can't replace the real thing, but they're not a bad taster*

Read, Listen and Learn: *Muppets feature heavily but don't speak. The games are simple and will appeal to young children*

Wroxeter in Shropshire, yet the much-visited Leeds Castle in Kent is missing. There's a dictionary of terms, student's resources, which offers easy access to pictures and other material for inclusion in project documents, and teachers' resources, comprising worksheets, classroom ideas, and a database of books, videos and useful addresses (a disappointing eight). This disc contains a lot of information but the presentation lets it down.

Vikings!

Vikings!, which ties in with National Curriculum Key Stage Two, is a generally superior CD-ROM, though not easy to navigate. Using material from the Jorvik Viking museum in York, the disc reconstructs an impression of life in Viking times. However, it's disappointingly superficial. For example, quotes are taken from the Anglo-Saxon Chronicle. The CD could easily have incorporated the whole of the Chronicle so that the extract could be seen in the context of surrounding extracts. Instead, the overall impression is that valuable source material has largely been disregarded. Likewise, a short account of Alfred the Great could have been supported by Asser's Life of Alfred. A little more depth in it's treatment of historical sources would have given this CD longer appeal and turned it into a lasting reference.

The deficiencies aside, Vikings! was an enjoyable CD-ROM and a good introduction to the period for young children.

Interactive series of software titles being launched in Britain by Iona Software. Although the suggested age group ranges from 3 to 7, it's really best suited for pre-readers. It is designed to equip children with early reading skills and does it through three activities. In Same and Different you have to click on words that sound the same. Letters helps children identify a lett
er by seeing the shape, hearing its sound and identifying the correct letter shape. Beginning Sounds: Phonics asks children to click on the pictures which start with the same sound.

There are over 60 activities, the accents are English — well, Irish actually — and the overall appearance is good. My only real complaint is that the disc features the Muppets and there's a big picture of Kermit on the box along with the "Jim Henson Interactive" logo. On the disc itself, there seems not a trace of Miss Piggy's dulcet tones, or of Fonzie, Gonzo or Kermit. I think a lot of Muppet fans will feel cheated by this. I know I did. This aside, it's a good program for the little ones and there's enough to do here to keep them occupied for hours.

Siobàn's judgement was "cool!", which is high praise indeed.

Wot No Muppets?

Read, Listen and Learn is the first in the Brighter Child

Maths Workshop

Broderbund is probably best known for its Living Books

series, but I recommend you try and take a look at a new title called Maths Workshop. It's as slick as the Talking Books, but instead of telling a story, you play a series of games that help develop maths skills. For example, Bowling For Numbers is a game in which you are asked to perform simple tasks such as addition, subtraction and multiplication. Below the sum are four boxes, each displaying a number. Click on the right number, then do another sum until enough bowling pins have been set up at the end of the bowling lane, at which point a gorilla bowls a mean strike. The games introduce different real-life applications for basic maths, from Bowling For Numbers to the Rhythm Shop, which uses fractions to play beats and rhythms. Other games introduce spatial visulisation, pattern recognition, logic, shape recognition, and much more.

Maths Workshop is as good as any Living Books title, though sometimes even with help it's a little difficult to understand exactly what the game does — an adult may have to give help here. A particular bonus to those jaded by transatlantic voiceovers is the fact that the accent is English throughout.

Top marks for maths, but Broderbund fall down big time on the spelling. The box describes the owner of the Maths workshop as Polly, but the software and manual spell the name Poly. Maybe it's high time Broderbund brought out Words Workshop.

Above *Polly or Poly may not be much of a speller, but she's a great guide to the maths-learning games*

Right and below *Prince of Persia: a simple scrolling arcade game, but great fun and with superb graphics*

Prince of Persia

Finally, we were taken back in time this past month when I glanced at the specifications of a newly reissued game: it runs under DOS, requires no more than a 10MHz 286, wants 640Kb of RAM. Those were the days.

Prince of Persia, a simple scrolling arcade game that won considerable praise a few years ago because the human animations behaved like real people. They jumped, knelt down, fenced... did everything just like a real person would. Prince became so popular that there was a sequel, Prince of Persia 2: The Shadow and the Flame. Siobán and I spent hours playing both games and were pleased to see both reissued by Broderbund on a single CD-ROM.

Frankly, they pale in comparison to Doom, but if you haven't got either incarnation of Prince it's worth taking a look, especially if this Christmas you got a family PC and are trying to wean the kids away from their Sega or Nintendo.

Exploring Castles
Price £39.99
Contact Anglia Multimedia
Tel 01603 615151
Fax 01603 631031
Rating ★★★☆☆

Vikings!
Price £39.99
Contact Anglia Multimedia
Tel 01603 615151
Fax 01603 631031
Rating ★★★☆☆

Read Listen and Learn
Contact Iona Software
Tel 0181 296 9454
Fax 0181 296 9455
Price £19.95
Rating ★★☆☆☆

Maths Workshop
Contact Broderbund
Tel 01753 620909
Fax 01753 621404
Price £39.99
Rating ★★★★☆

Prince of Persia Collection
Price £19.99
Contact Broderbund
Tel 01753 620909
Fax 01753 621404
Rating ★★★★☆

CD-ROMs

From Bill Gates's business bible to a guide to getting online, CD-ROM titles are focusing more and more on technology, as Adele Dyer and Eleanor Turton-Hill discover. For those disillusioned with the age of machines, there's also something warm and furry to curl up with.

The fun "Explore" section lets you find new subjects to look up

Compton's Interactive Encyclopedia 1996

Coming hard on the heels of Encarta and the new Grolier encyclopedias, comes the Compton 1996 edition.

The tag line "for families" that emblazons the box gives you an idea of the ethos. Compton's is more fun that most encyclopedias. If you are looking for a learning tool rather than just a reference work, especially for a child, this is probably your best bet.

The emphasis on discovery is backed up by an "explore" section. This has such things as "Grandma's Attic", "Compton's Newsroom" and "Wild and Free". You are presented with a room with several objects inside it. You can click on these to see a picture and to go to a related article. There are numerous options hidden behind each object, so each time you click you will see something new.

One nice feature is the module which lets you build your own multimedia presentations from the contents of the encyclopedia. So if you are interested in, say, space travel, you can piece together articles, pictures, movies and tables. The learning tool becomes a teaching tool, but this is also a nice introduction to multimedia segmenting for those new to the idea.

Like the other new encyclopedias, Compton's has opted to include direct access to an online service with updated information to add to your encyclopedia. However, despite the multimedia, the actual entries are not as substantive as on the Encarta or Grolier versions. This is not to say the entries are skimpy and uninformative; simply that they are not as in-depth as those of their rivals.

The only real disappointment is the photographs. Many of them are low-resolution scans which look broken up when viewed full-screen. This may simply be the pay-off for having more photographs on the CD.

Another slight annoyance is the size of the buttons. You need these to navigate and control the encyclopedia, but they are so tiny you will have difficulty actually seeing the commands on them.

Included in the package is a "real picture world atlas", Small Blue Planet, which consists of a number of views of Earth taken from space by satellite. The most interesting are the global relief and history and language globes, the former having close-up satellite photos of such areas of interest as the Mississippi Delta, Naples and Mount Vesuvius.

Compton's Interactive Encyclopedia 1996
Contact Bastion Compton NewMedia UK 01491 412652
Price £49.99
Rating ●●●●❍

Eyewitness Virtual Reality Cat

Eyewitness Virtual Reality Cat is one of a series of CD-ROMs from DK Multimedia. It's an educational package, with video

The viewing tools built into Virtual Reality Cat allow you to explore the "virtual" museum, focusing on different objects as you go

snippets created by Dorling Kindersley, and information from the Eyewitness book series as well as a massive supply of pictures, artwork and sound.

Like many "edutainment"-style CD-ROMs, the Virtual Reality Cat can be explored in several ways. Once installed, you find yourself in a museum building packed with all kinds of exhibits. Using arrows which appear in your path, you can stroll down corridors and move from room to room clicking on objects which take your fancy. If you get lost, there's a navigator tool in the top right-hand corner which helps you find out where you are with the aid of a schematic map.

All kinds of cats are included in this CD-ROM, from cute domestic pets to larger creatures like lions, cheetahs and leopards. The subject matter is diverse, covering every aspect of the feline world: habitat, physiology, anatomy, lifestyle, and conservation. There's a large section devoted to cats and mythology, explaining such subjects as the history of the Egyptian sphinx and the association between cats, witchcraft and black magic.

Strolling around a building can be a great way of exploring a specialist encyclopedia, but can be slightly random, especially if you want to find something specific. It's difficult, for example, to locate a picture or object that you were looking at five minutes ago, unless you retrace your steps meticulously. An index utility, located at the entrance of the museum, provides help in the form of a main index, a video index, and a visual catalogue when clicked on.

There's also a selection of short pre-prepared tours, which guide you around the museum, displaying video-clips and images based on certain themes. If you get bored of these, you can use a record function which allows you to create your own tours.

In general, this CD-ROM is intelligently put together, with enough depth and diversity to hold your interest. It will run on Windows 3.x as well as Windows 95 with a minimum spec of 486SX/25 and 4Mb of RAM. This, combined with a reasonable street price, should attract a wide market.

Eyewitness Virtual Reality Cat
Contact Dorling Kindersley Multimedia 0171 753 3488
Price £29
Rating ●●●●○

• Easy Tutor — Get Connected 96
• Instant Access To... the Internet

The basic premise behind these two products is the same. Most people have heard about the Internet — who can avoid it, as the British media goes into hype overdrive on the subject? — but the logistics of getting connected are still a mystery for many people.

Easy Tutor Get Connected works as a walk-through of the various methods of getting connected and what you can expect to find out there. It talks you through everything, from what is the Internet, to pulling in your modem, to how to run NetScape.

Everything is explained through diagrams and a voiceover commentary, but as nothing is written down, you have to listen to everything. This inevitably entails a passive learning method and a lot of sitting around. Also, it does not allow quick reference if there is one specific thing you want to look up.

The step-through demonstrations of how to connect and use the Internet are simplistic, to say the least. Anyone who has even the skimpiest knowledge of how their computer works will find these sections pointless. The basics are covered, but the problems you may encounter are not. Following your instruction booklets will be of more help to you than this CD.

It does, however, have a major bonus: a library of useful home page addresses. These cover a wide variety of subjects, from the useful to the fun to the downright weird.

Instant Access to … Internet takes a slightly different

Bill Gates's vision of the future is explored in short films, as well as in an interview with the man himself

The Road Ahead

Bill Gates has (predictably) committed his vision thing to print in *The Road Ahead*, and true to the form of a techno-guru he's backed it up with a CD-ROM.

The CD includes the entire text of the book, annotated with hypertext links, a short video section on Bill's view of the future and an "Ask Bill" segment. There are hyperlink sections to explain references in the book; these are well written and feature audio and video tracks to liven them up. In general, these take the form of the great man uttering words of wisdom, but what else can you expect on a BG CD.

The segments where Bill gives his view of the future are, if anything, a disappointment. The future according to Microsoft covers home, education and business in a networked world. There are somewhat twee videos of how the future technology will be put into practice in the real world, complete with brief explanations of each concept.

Bill Gates has made himself a fortune out of Microsoft in the last decade, and just to push home this fact there is a virtual reality guided tour of his new home and the gadgets that will control it. However, his assertion that he is at the forefront of innovation is not borne out by what we see of him here. He comes across as a man who uses other people's ideas and simply has the good business sense to make them available to the general public.

If you are expecting great things from this CD, don't hold your breath. Bill Gates will have to do much better than this if he is to continue to leave his stamp on the technology of the future.

The Road Ahead
Contact **Penguin 0171 416 9000**
Price **£14.99**
Rating ●●○○○

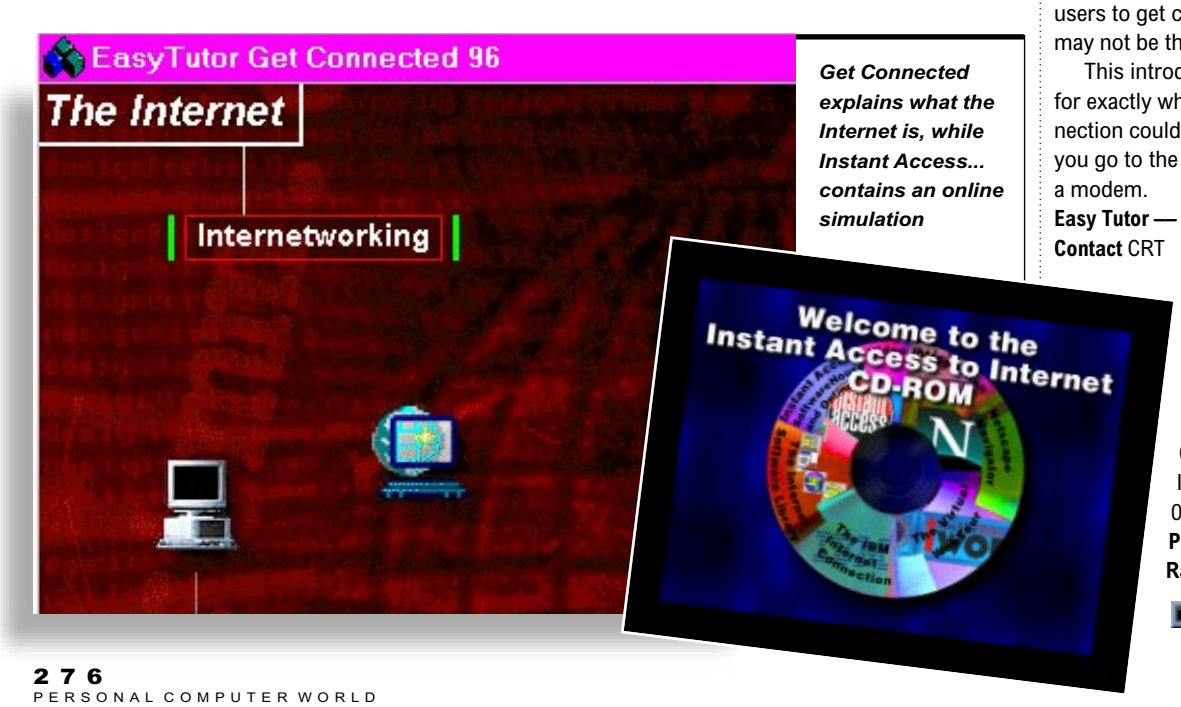
approach. Rather than a tutorial, it is more of an introductory scratch and sniff. There are three main parts. Firstly, there is a tour, introducing the basic concepts of the Internet and how the CD operates. The two main parts of the CD are less tangible. There is a large software library of relevant packages and, most important of all, a simulated tour via NetScape.

The multimedia sections of the CD are limited to the initial tour. Here there is copious use of video and sound, as most of the text of the tour is spoken with only bullet points on the screen. This section is much shorter than the initial screen suggests, especially considering much of the information is repeated either in the enclosed video or the sleeve handbook.

You do not need a modem or an account to lose your Net virginity. There are several Web sites on the CD, many of which link to others in the collection. Otherwise, if you have the necessaries, you can go online within the confines of the CD. If you ever get out there and get lost, you can come straight back to the CD.

There are a few offers included in the CD. Not only do you get a free video and copy of NetScape, you also get an introductory offer to join up to the IBM Internet Connection. This offer is of rather dubious value — it does make it easy for new users to get connected, but it may not be the best deal for you.

This introduction gives a feel for exactly what an Internet connection could bring you before you go to the expense of buying a modem.



Get Connected explains what the Internet is, while Instant Access... contains an online simulation

Easy Tutor — Get Connected 96
Contact CRT Multimedia
0181 743 9900
Price £29.99
Rating ●●●○○

Instant Access To… the Internet
Contact Instant Access
0181 205 2596
Price £24.99
Rating: ●●●●○

Screenplay

NEWS

Up, up and away

Better known for video recorders than video games, JVC is set to release a number of new titles for the PC. Already established as a major force on the Japanese games consoles market, the company currently has five projects on the go.

By far the most interesting is Deadly Skies, described as a "strap yourself in and feel the heat of the afterburners" flight simulator. Casting you in the role of top gun, the game has you battling it out with eight opponents to prove that you're the best. What's more, you get to fly a number of famous aircraft including the classic F-14 Tomcat (as seen in Top Gun), the MiG 29, F16 Fighting Falcon and the F15 Eagle. The game's scenarios have you duelling in the desert, operating over the ocean and hanging about in Hell. Deadly Skies is due for release in January 1996 and will retail at £34.95 on PC CD-ROM only.

JVC 0171 240 3121

It's a kind of magic

Followers of the fantasy role-playing series Wizardry can look forward to the release of the eighth game in this award-winning series. Entitled Wizardry Gold, it's billed as an exciting re-engineering of the classic game, Crusaders of the Dark Savant.

Among the features on offer are SuperVGA graphics, CD-quality music, sound effects and digitised speech, together with a new style of interface. What's more, it's a multi-platform affair with versions for Windows 3.1, Windows NT, Windows 95 and, for the first time, Macintosh on the same CD.

Wizardry Gold will be available from Mindscape in January 1996. Pricing unknown at press time.

Mindscape 01444 246333

Luke out

Origin's Wing Commander III was the game that launched a thousand Pentiums but only ran on a few of them. Now Power Macintosh users can take to the stars, if their hardware is up to scratch. Requiring an 8Mb PowerMac with a Level 2 cache card, Wing Commander III continues the story of the bitter war between the human Confederation and the furry, cat-like aliens known as the Kilrathi. Key features include dogfights and fast-moving 3D texture-mapped graphics.

Wing III was the first interactive movie to feature actors you might have heard of. Chief among them is your character, Christopher Blair, played by Mark Hamill, otherwise known as Luke Skywalker from the Star Wars trilogy. Joining him is John Rhys-Jones, from the Indiana Jones movies, and eighties porn queen Ginger Lynn Allen.

Destined for success, Wing Commander III: The Heart of the Tiger comes on four CDs and is available from Electronic Arts, price £54.99.

Electronic Arts 01753 549442

Charts

HMV Games LEVELONE

1	Destruction Derby (CD)	Sony Int
2	Hexen (CD)	GTI
3	FIFA 96 (CD)	EA
4	Worms (CD)	Ocean
5	Command & Conquer (CD)	Virgin
6	Championship Manager 2 (CD)	Domark
7	Encarta (CD)	Microsoft
8	Rebel Assault — White Label (CD)	Virgin
9	Actua Soccer (CD)	Gremlin
10	DOT Tentacle — White Label (CD	Virgin
11	Need For Speed (CD)	EA
12	Mortal Kombat 3 (CD)	GTI
13	SU27 Flanker (CD)	Mindscape
14	WipeOut (CD)	Sony Int
15	Indycar — White Label (CD)	Kixx
16	Essential Sports (CD)	EA
17	Crusader: No Remorse (CD)	EA
18	TFX (CD)	Hit Squad
19	Cinemania 96 (CD)	Microsoft
20	Essential Business (CD)	EA

CUTTING EDGE

Mortal Kombat 3

The long-awaited return of Shao Kahn and his evil minions is as graphically gruesome as Chris "Lui Kang" Cain dared to hope. The future of humanity depends on you.

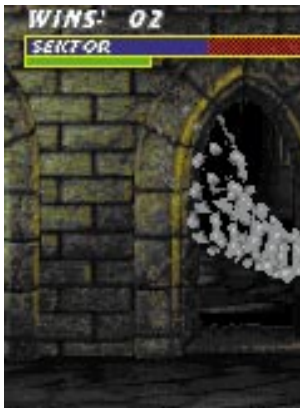
Even if you've been living on the dark side of Milton Keynes, chances are you've heard of Mortal Kombat. To crown all the recent hype, the third game in the series has arrived for the PC.

For the uninitiated, Mortal Kombat is all about the evil demon Shao Kahn and his plan to take over the Earth. Shao lives in another realm, known as Outworld, with henchman Shang Tsung and a variety of strange and sinister creatures. To gain entry to the human realm, Shao and his army must first defeat its champions in ten tournaments of Mortal Kombat. They've managed to knock seven shades out of us nine times, and now only one contest stands between us and eternal darkness.

In Mortal Kombat III Shao has entered the human realm thanks to the resurrection of his dead Queen, Sindel. Between them they've stolen every soul except those of the fiercest warriors and a few of the original cast. You are humanity's last hope.

You can choose from 14 warriors, including Chinese hero Lui Kang, ninja Sub Zero, a New York cop called Stryker, and sorcerer Shang Tsung.

Each character can punch and kick in a standard way, and has his own range of special attacks. Lui Kang, for example, has a great line in fireballs and high kicks, Sindel screams at her victims, and Shang Tsung has the ability to morph into every character — handy or what?



Mortal Kombat III is simple to pick up, but learning the best combinations of attacks against each opponent takes some time. All the characters have been carefully designed to keep them equal. Bouts are fought on a best-out-of-three basis, and on winning your second round you're urged to finish your opponent. You can do this with a simple punch, or, once you learn how, with a spectacular Fatality move. Fatality moves range from setting people on fire to ripping them apart and pulling their heads off. The gruesome results warrant the game's 15 certificate.

Mortal Kombat III's graphics are close to the original, with fast-moving sprites, fine detail and good colour. Overall presentation is good, and the PC version has the same number of scrolling layers and speed as the arcade version. Sound is also up to scratch with plenty of digitised screams and slaps. In fact, the game's programmer has declared that this is the best version. There's just one problem. While there's no denying the game plays well, the lack of a standard controller on the PC is likely to cause a few headaches. The arcade version of Mortal Kombat III requires six buttons as well as a joystick to control movement. The nearest controller on the PC is a six-button joypad, but when I tried the popular Phase 9 from Euromax it failed to work properly. The positioning of the buttons in the arcade also makes the game harder to play than the original.

This aside, Mortal Kombat III is an excellent conversion of a great arcade game, and a must for beat-em-up fans everywhere. Just make sure you've got the right controller, and a friend to tackle in two-player mode.

System Requirements
486/33 or higher, VGA graphics, double-speed CD-ROM, DOS 5.0 or higher, 8Mb RAM, 29Mb hard disk space, SoundBlaster
Price £44.99
Contact GT Interactive
0171 258 3791

Fatal Racing

It's fast, it's furious, it's probably the best racing game in the world. Gordon Laing lowers the chequered flag

Every year, the world's top eight car manufacturers hold a race to prove who has the fastest and strongest car. The winning company can look forward to huge sales over the following year, and the winning driver will enjoy fame and fortune. This annual competition has grown into a violent racing frenzy, with drivers encouraged to knock their opponents off the road in order to take the lead, and fatalities almost commonplace.

The eight international companies herald from six countries. Each company has two circuits near to their main manufacturing plants, including jumps, loops and corkscrews, along with an unusually terrifying array of hairpins and banked corners.

You have the unique privilege of choosing from eight cars, each with its own strengths and weaknesses. One may grip the road like glue but have the speed of a sloth. Now select a track, from a choice of eight. Once you've won at a medium or higher level, another eight circuits become available. Both tracks and cars are shown as rotating 3D models, while the CD-ROM version accompanies each with a brief vocal description.

Fatal Racing can be played by one, two on a split screen, or by up to 16 over a network; in this scenario a 20Mb install must be made on each PC, but only one CD is required. One of five views may be selected while racing, complete with smoke and flames as the damage grows. In fact, you'd better keep an eye on the damage indicator and make emergency pit stops before you explode altogether.

The graphics menu offers a huge list of detail options. I went for maximum quality at SVGA and reduced the screen size until I got fluid motion on a P90 under Windows 95. Running under DOS is faster, and the normal VGA mode is quick enough for a good 486.

Gameplay is fantastic — the entire *PCW* office is addicted. Sound effects and music are gripping, while the graphics, particularly in SVGA mode, are excellent, closely matching the best Saturn and PlayStation offerings, so long as — and here's the crux — you have a super-fast PC. If your Pentium 133 has been waiting for a power application to really stretch it, buy Fatal Racing and invite your console-owning pals round who'll say it's acceptable — but at least you can run MS Office, too.

System Requirements
486DX2/66 or faster, 4Mb RAM, MSDOS 5.0 or higher, CD-ROM drive running MSCDEX 2.1 or higher, requires VESA compatibility for SVGA mode
Price £44.99
Contact Gremlin Interactive
0114 275 3423

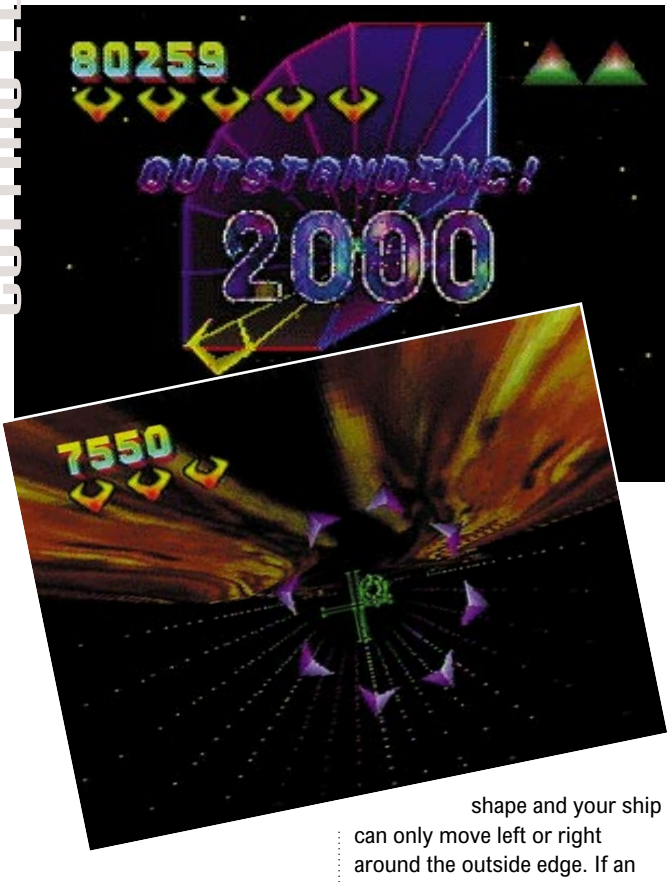
Tempest 2000

A classic console shoot-em-up, with a nineties makeover for the pc, Tempest 2000 gets Chris Cain's vote hands down

Originally designed for Atari's Jaguar console by veteran games programmer Jeff Minter, Tempest 2000 is an update of the classic arcade hit, Tempest. This shoot-em-up, with its simple 3D graphics and fast-moving action, took more ten pences than most of today's top titles will ever see.

Tempest 2000 brings the arcade classic into the nineties with better graphics and improved sound, but the gameplay stays exactly the same. The main part of the screen is a web-like playfield with you at one end and a positive horde of aliens bent on your destruction at the other. The idea is to destroy them before they shoot or collide with you, then move on to the next level and do it all over again.

CUTTING EDGE



To make things more interesting, each level is a different shape and your ship can only move left or right around the outside edge. If an alien manages to cross over to your side it'll do its best to crash into your ship and send you hurtling through space. One on its own shouldn't prove too much of a problem, but two or three aliens up your end can be a wee bit painful.

As with most shoot-em-ups, things get progressively harder as you move up through the levels. To even the odds, a bonus object will appear on the web from time to time, and shooting it will give you something useful like a more powerful laser for your ship. By far the best bonus is a drone ship, which doubles your fire power and gives you time to breathe.

Graphically, Tempest 2000 is much better than its predecessor. Although the ships are small but perfectly formed U shapes and the lasers are represented by a couple of flashing pixels, the use of colour and scrolling is outstanding. It would have been nice to see some improvement on the 3D side, considering the current growth in this area, but I can't complain too much.

One major headache about Tempest 2000 is the the game's memory requirements under DOS. Most users will find themselves having to delve into their Config.sys file to configure things properly. Even under Windows 95, you need to fiddle about to get things going.

As a bonus, Atari has included a conversion of the original version of the game on the CD-ROM. There's also Tempest Plus, a slightly revised blast, and Tempest Dual which gives you and a friend a chance to battle it out together.

Tempest 2000 may not look quite as good as the other games in this month's *Screenplay*, but it's great for PC gamers who want to shoot down memory lane.

System Requirements
386DX40 or higher, 4Mb RAM, DOS 5.0 or higher, VGA, 2Mb hard disk space, SoundBlaster or compatible, CD-ROM
Price £39.99
Contact Atari 01753 533344

Leisure Lines

Brainteasers courtesy of JJ Clessa.

Quickie
No prizes, no answers. Arrange four 50p pieces, four 20p pieces, four 10p pieces, and four pennies, into a 4 x 4 grid, so that no row, column, or main diagonal, contains more than one coin of the same denomination. Easy, eh?

This Month's Prize Puzzle
I think this month's problem is fairly tough — but who knows? Someone's bound to come up with an easier solution than I did by mere number-crunching.

It's about consecutive whole numbers — positive integers, to be precise. There are three ways in which a total of 15 can be obtained by summing two or more consecutive numbers — viz,

15 = 1 + 2 + 3 + 4 + 5
15 = 4 + 5 + 6
15 + 7 + 8

A total of 45 can be obtained in five different ways:

45 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9
45 = 5 + 6 + 7 + 8 + 9 + 10
45 = 7 + 8 + 9 + 10 + 11
45 = 14 + 15 + 16
45 = 22 + 23

and so on.

Using the positive numbers from 1 to 999, can you find the two values which can be obtained in the greatest number of ways?

Then write down on a postcard, or the back of a sealed envelope, the two numbers, together with the number of ways in which they can be obtained, and send them to: *PCW* Prize Puzzle, P.O. Box 99, Harrogate, N. Yorks HG2 0XJ, to arrive not later than 20th February 1996. Good Luck!

Winner of November 1995 Prize Puzzle
The November puzzle was tough. It must have been, since apart from there only being 26 entries (all correct, by the way) there were no signs of the usual "Easy, easy!" cards. The problem was to find your way through the grid and obtain the hidden message, which was:
You need to compute the sum of all the primes which contain exactly two digits
and so, the answer to the problem was 1043.

The odds were shorter than usual and since all the regulars were present, we fully expected a two-time winner to emerge. But, t'was not to be: our ERNIE drew out the card from Mr PH Tanner, of Glasgow — who, so far as our records go (and that's right back to the start in 1981), has not won before. Congratulations, Mr Tanner — your prize will be with you shortly.

This month's Prize Puzzle is just as difficult, so to all the also-rans — the odds could be shorter.

Hands On Contents

Hands On is the place where readers can contribute to *PCW*, and as always we'll pay for anything we use. Macros, sections of code and hints and tips will be rewarded with a £20 book or record token (please say which you'd prefer) and we'll pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format.

All submissions should be emailed to the author of the appropriate section, or snailmailed to Hands On, *Personal Computer World* Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.

We're constantly working to improve the contents of *Hands On*. If you have any suggestions, send them to the Editor at the address above, or email them to: editor@pcw.ccmail.compuserve.com

A fish called **Brenda**

View options, folder settings, save settings, and more, available to you only via the registry editor. Tim Nott tells you how to get at 'em, at the same time introduces you to his new friend, Brenda. He adds on some top tips, too.

How does it do that? Since last month, when we looked at some of the tricks you can use when opening and closing folders, I've been trying to make sense of how Windows keeps track of folder settings — if at all.

You've probably found it an equally frustrating experience; how on earth do you get it, say, to turn the toolbar on by default, or show items in a particular view and order? Why does Windows insist on re-opening any folders you had open when you close and restart? And given that you can close a folder and all its ancestors with Shift+close, why can't you do the converse; close a folder and all its descendants? And while we're at it, how can you close all open folders on the desktop?

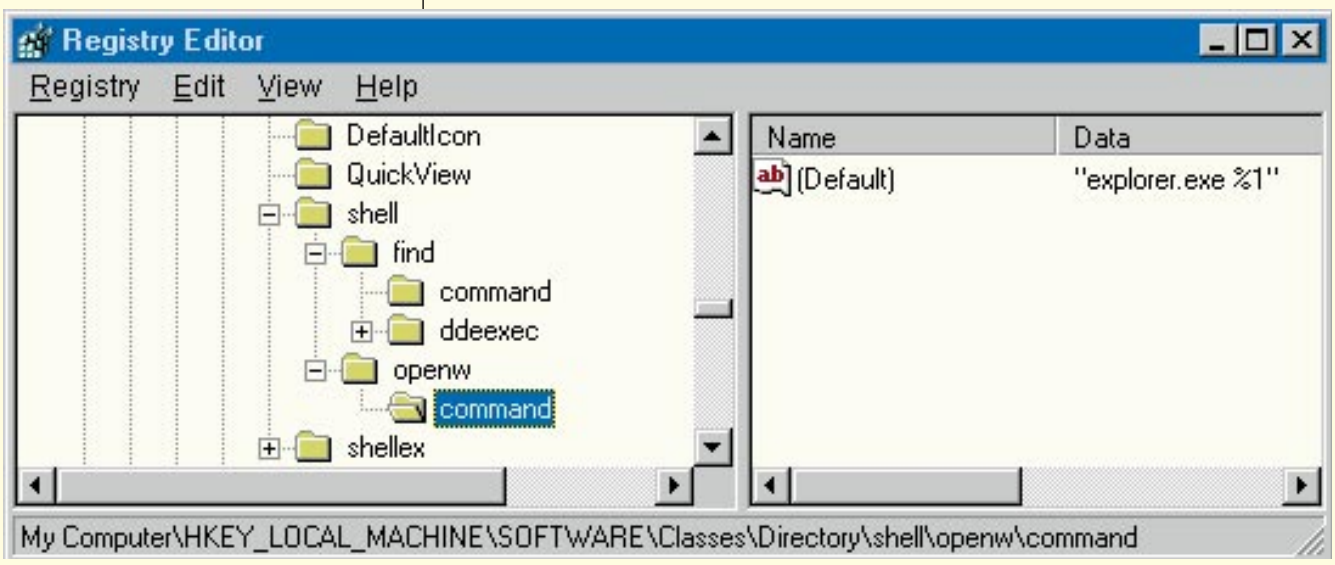
Well, I must confess I haven't a clue about the last two, although if it's any consolation you can minimise everything on the desktop from a right click on the Taskbar. I have made some progress on the rest, though, even if at times it didn't seem like it.

It's considerate of Microsoft to offer us various views of a folder, with large or small icons, list, or details. However, the differences between small icon and list view are subtle to the point of making you wonder why they bothered; the only notable difference I've found is that you can rearrange small icons, but not list items. Similarly you can have a toolbar, status bar, or not.

Once you've experimented with these options, it becomes evident that one size does not fit all. For folders that only contain other folders, I prefer to view large icons, and there's little point in having the toolbar and status bar. For folders that contain data files, I want to see the size and modification date of each one, and have the toolbar and status bar to hand. And for the "My Computer" folder I want big icons and no toolbar, but I *do* want the status bar as it tells me how much space is left on a drive. You may have other preferences, but the important thing is getting it to work in the way you want.

If you are viewing folders using a single window, then each new folder will inherit the settings of the preceding one. This works upwards and downwards, so if you double-click on a nested folder, resize the window or change the view, then backspace up, the parent will have changed. If you go to the "View/Options" menu, choose the "Folders" tab, and select "Browse folders using a separate window…" you'll find that any changes you make to a folder's appearance will be

Putting a new command on a folder's right-click menu



saved. Thereafter, as long as you open that folder in a separate window, the view, tool and status bars, and sort order, should be the same. Even if you have "Browse in a single window…" as the default, remember last month's tip that holding down Control as you open a folder forces a new window (as does opening a folder or shortcut from the desktop) and this new window will have its "private" settings if they exist. (For another way of spawning a new window, see the *Top Tips* panel.)

The first thing, therefore, is to decide on a global preference, and having set the view option to single-window, open the "My Computer" folder and tweak it until it is the way you want your default view. Then change to multiple-view, and tweak all the folders you want to keep as exceptions to the rule, including "My Computer", if you want.

That at least is the theory. But it doesn't always seem to work that way and in the gloom of the practically non-existent documentation, it can still be hard to get things the way you want. In particular, the width of a folder window appears to depend on the quantity of the contents, which might make sense in icon view but is plain daft in details view when you want it to be constant. Column width in detail view also seems to be a law unto itself.

So they all rolled over...

According to an unofficial Microsoft source, Windows can retain 50 folder settings. But I can only seem to manage 29. It will continue to save new arrangements, but will discard the settings for the folder least recently accessed. And this brings us to a further problem: open a folder, resize or change the view, and Windows will obligingly save the settings whether or not you want it to, thereby bumping something else at the end of the list of which you might have been quite fond.

To stop your saved settings dropping into oblivion you need to edit the registry. You may like to read the rest of this month's column before you do this, but the section to make for is:

```
HKEY_CURRENT_USER\Software\
Microsoft\Windows\CurrentVersion\
Policies\Explorer
```

You'll see an entry in the right-hand pane entitled "NoSaveSettings" with a value of "00 00 00 00". Double-click on the entry, and change it to "01 00 00 00". Close Regedit.

You've now frozen the saved settings. And, you'll find you've stopped the behaviour mentioned in the first paragraph — Windows will no longer insist on re-opening the folders that were open when you last shut down.

Editing Reg

Despite, in many respects, having far more user control from the Control Panel — changing menu and icon fonts, for example — there are still many options that can only be accessed by editing the Registry, or by getting a utility to do it for you. We've already dealt with "Save settings" and I've mentioned a few others in past columns.

Last month I mentioned the trick of showing icons for .BMP files as miniatures of the file, and in last September's issue covered the trick to creating your own "Tip of the Day". So perhaps it's about time we took a look at the Registry and its editor in more detail.

The Registry, while in theory replacing all the old .INI files, is not a text file. It consists of two large binary files, USER.DAT and SYSTEM.DAT, which can only be accessed via the Registry Editor. Depending on your setup, you may not have this installed on the start menu but it should be in the main Windows 95 folder as REGEDIT.EXE

Safe hex

The important thing to remember is that if you thought editing the Windows 3.1 .INI files was a perilous business, then you ain't seen nothin' yet — you can really, truly, madly, deeply screw up your entire system by editing the Registry.

Fortunately, there are a few safeguards. Every time Windows 95 loads successfully, it makes backups of USER and SYSTEM.DAT with the .DA0 extension (that's a zero, not a letter "O"). Should Windows refuse to load, or report a corrupt registry, then restart the machine in DOS mode by holding down F8 at boot time or booting from the emergency

Top Tips

Okay, you've backed it up in a variety of different ways, so lets HIT that Registry!

Zoom — If you find the "animation" annoying when you minimise or restore a window, you can remove it. Go to HKEY_CURRENT_USER\ Control Panel\ Desktop\ WindowMetrics, double-click on "MinAnimate" and set the value to zero.

Menu speed — Going up a level to HKEY_CURRENT_USER\ ControlPanel\ Desktop, create a new string value called MenuShowDelay. Double click on it and give it a value in milliseconds. This controls the speed at which the start menu sub-menus open; the default is around 400. It's worth experimenting; too fast can be distracting as unwanted menus flash up. Set it to a very high value, and the menus won't cascade until you press the mouse button. You need to restart Windows for this to take effect, so...

Restarting your computer — If you select the "Restart…" option in the shut down dialogue, then hold down shift as you press "Yes", you will restart Windows rather than reboot from scratch.

Desktop icons (1) — There's a lot you can do here, but let's start with the Recycle Bin. Find it at HKEY_CLASSES_ROOT\ CLSID\ {645FF040-5081-101B-9F08-00AA002F954E}. More simply, do a search for "Recycle". Open the "DefaultIcon" key and you'll see three entries — double-click to change the icon for each. You need to specify the path and filename of the new icon, and add a number, as some files contain several icons. For a standalone .ICO file the number should be zero; e.g. "C:\myicons\fish.ico,0"

Desktop icons (2) — While you're in the vicinity, click up a level to the '"645FF…" key and double-click the "default" entry in the right-hand pane. You can then rename the Recycle Bin to something less silly. Mine is now a fish named Brenda, but I'm not sure why.

Opening folders — Another way to open a new window when "Browse single…" is the default. Go to HKEY_LOCAL_MACHINE\ SOFTWARE\ Classes\ Directory\ Shell. Create a new key with the name "openw". Double-click on its "default" in the right-hand pane and type in "Open New". Create another new key under "openw" called "command". Give this a default value of "explorer.exe %1". Don't include any of the quotes; regedit supplies its own when needed. Close the Registry, and you'll now find that right-clicking on a folder icon offers an "Open New" option.

startup disk you made when you installed Windows 95. (You didn't? Well put this magazine down immediately and proceed to Control Panel/Add-Remove Programs/Startup Disk.)

The following sequence of DOS commands will restore the registry from the backups:

```
attrib -h -r -s system.dat
attrib -h -r -s system.da0
copy system.da0 system.dat
attrib -h -r -s user.dat
attrib -h -r -s user.da0
copy user.da0 user.dat
```

A rather more organised way to safeguard the Registry is to use the Configuration Backup utility, located on the CD-ROM only at Other\Misc\Cfgback. With this you can keep up to nine Registry backups in compressed form. These are saved by default in the Windows folder but you can move or copy them elsewhere for safekeeping. You can only restore them from the Windows folder, however, and you have to be running Windows to do so. Furthermore, it won't back up multiple user configurations.

If you want to save all or part of the Registry in text-readable form, then choose "Export Registry File…" from the "Registry" menu. Give a file name, and choose whether you want to export the entire Registry or just the current branch. If you don't specify an extension, then it will be saved with the .REG extension. The advantage of this is that you can restore the registry from a .REG file from DOS, using the version of Regedit on the Start-up disk.

There are additional reasons not to do this. Double-click on a .REG file, and it will attempt to re-import into the registry, which could be a disaster if you've been tampering with it. It's better to save it as a .TXT file, then a double-click (or right-click/open) will load it into Notepad (if smaller than 64Kb) or WordPad if larger. You can then examine the file without risk of damaging the "real thing".

A useful aid to keen Registry detectives who want to know where certain settings are kept is to export the Registry to "BEFORE.TXT", close Regedit, make a change with Control Panel or an application's "Options", then re-open the Registry and export it to "AFTER.TXT". You can then use the file compare from a DOS box. Make sure you're "in" the folder where you exported the Registry files, then type

```
"FC BEFORE.TXT AFTER.TXT >
CHANGES.TXT"
```

without the quotes. CHANGES.TXT will list all the differences between the two files.

Finally, there is nothing to stop you backing up the registry files in the traditional way by copying SYSTEM.DAT and USER.DAT. As you can give them long file names, such as "I am just going to tinker with HKEY_CurrentUser… I may be some time" this may well be more helpful than using the Configuration Backup utility, which only gives you 31 letters of description.

Play with Powertoys

If the above scares the living daylights out of you anyway, I don't blame you. Even with copious backups and clean underwear, editing the Registry is somewhat challenging. This is where getting someone or something else to do it for you comes in handy.

Enter Powertoys, which you should find on this month's CD-ROM cover disc. Failing that, it's available from the Microsoft Network, the Microsoft Web site at http://www.microsoft.com/windows/software/PowerToy.htm, the Windows 95 conference on CIX, and various other sources.

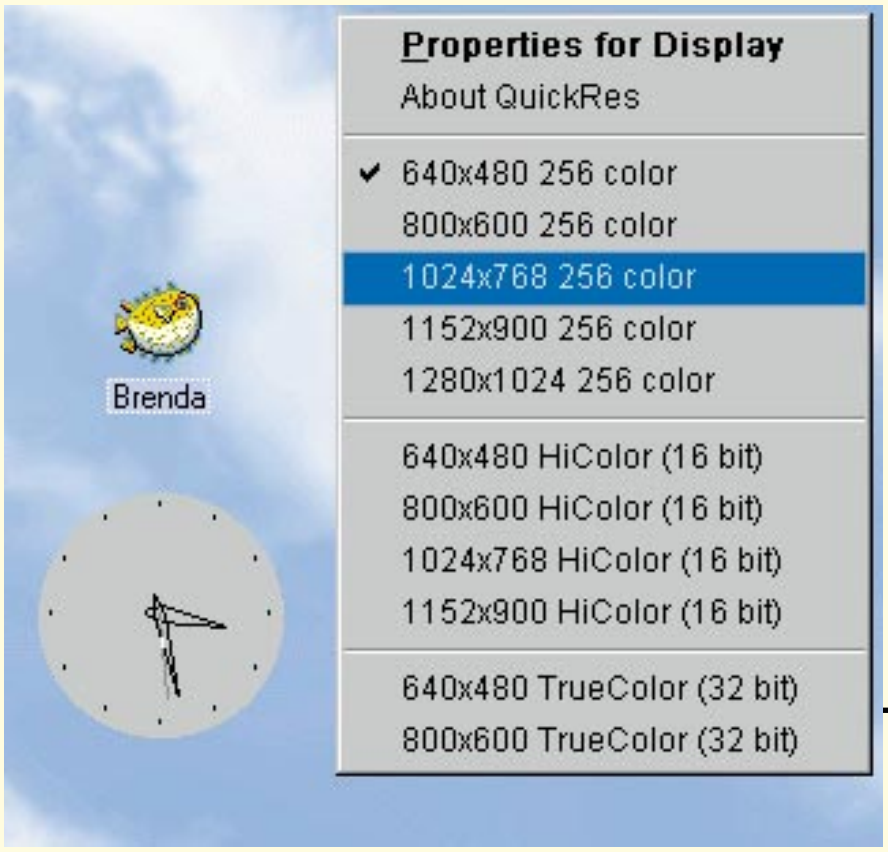
Powertoys is a collection of goodies produced by the Windows 95 Shell team, and released without charge or official support. Some are just showing off — the tired old Windows 3 clock makes a comeback but this time it's round. No borders, no title bar, just a circular window. Others might drive you mad; my particular loathing was Xmouse, which makes the focus follow the mouse pointer without clicking, in the X Windows style. Most, however, are absolutely brilliant and provoke the righteous shout of "Why isn't this a standard part of Windows?"

Switch on to Quickres

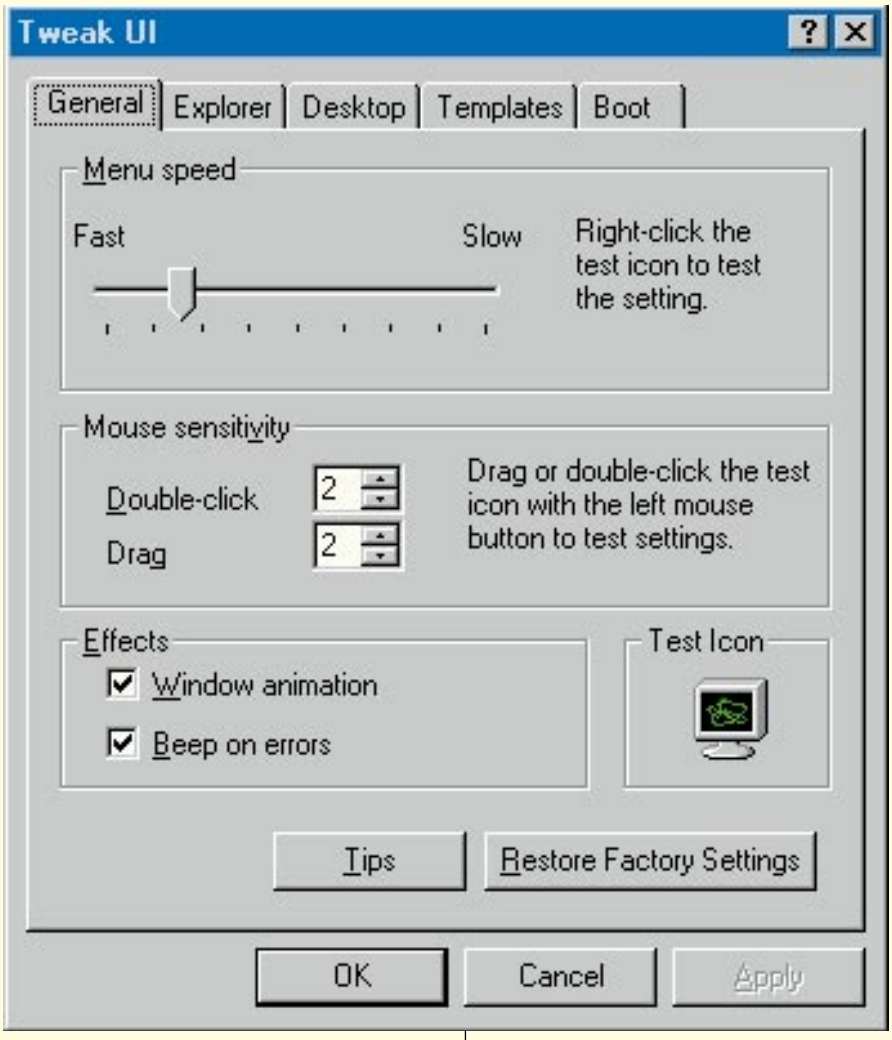
Quickres will, if your display card and drivers permit, let you switch resolution and colour depth without having to restart Windows.

This is something that's been so high on my wish list, and for so long, that I can only melt with gratitude. Stick it in your Startup folder and it puts a little icon in the taskbar "notification area" by the clock. Click on this, and a list of possibilities appears. Click on one, and everything goes black and staggers around for a few seconds then, hey presto! you're in the new resolution.

Cabview lets you peer into Microsoft



A round clock, instant resolution or colour depth changing, and a fish called Brenda



Reach beyond Control Panel without editing the Registry

CAB files (the compressed wads of installation files) and extract individual items. There's an enhanced CD player, a "Send to…" add-on to despatch files to any destination, and more.

Oh my, it's TweakUI

Star of the show is TweakUI. This is a Control Panel add-on to reach parts of the Registry only previously accessible with Regedit.

You can disable the "Save settings" that I wittered on about, just by checking a box. You can remove the little arrows from shortcuts if that is your desire. You can remove the seemingly unshiftable items from your desktop and you can change the speed of menu pop-ups. All in all, these people are trying to do honest Windows 95 detectives, such as your humble correspondent, out of a job.

As these are unofficial, they are not supported by Microsoft and the readme files are full of disclaimers: *"The entire risk arising out of the use or performance of such products and documentation remains with you. In no event shall Microsoft or its suppliers be liable for any damages whatsoever"*.

In particular, check out the TweakUI help file which is refreshingly candid about the bugs. Interestingly though, there's a disclaimer to the disclaimers, which states: *"Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you."*

So if this does stuff your PC and you do succeed in taking Microsoft to the cleaners, please let me know.

PCW Contacts

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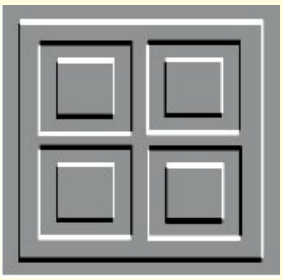


It's a fair **clip**

You can really put the clipboard through its paces; even frequent users may not appreciate its versatility. Tim Nott waxes lyrical on ways to use it in Windows and in DOS.

What a wonderful thing is the clipboard,
Though not made of plywood or chipboard,
It can keep anything,
From a textual string
To a pic of Madonna's top lip stored.

More prosaically, the clipboard is one of the most useful features of Windows, and is astonishingly versatile. You probably know the keyboard shortcuts for clipboard operations — Control + C copies the selection leaving the original, Control + X copies and deletes the selection, and Control + V pastes in the contents of the clipboard.

What you may not know is that there is another set of keystrokes that does the same thing. Control + Insert (copy), Shift + Delete (cut) and Shift + Insert (paste) are a legacy from Windows 3.0 and earlier, but are particularly convenient for left-handers. Note that when you paste, it doesn't empty the clipboard; you can carry on pasting the same data into the same, or different, applications. However, the clipboard can only hold one piece of data at a time, so if you Copy or Cut a new selection, the old clipboard content is lost.

The clipboard isn't really a single item; rather, it's a collection of related functions, and the way it behaves depends on the nature of the data being copied. Which brings us to the clipboard viewer. Windows for Workgroups comes with a deluxe version called the Clipbook, with multiple pages, a toolbar, and the facility to share pages with other users on the network, but we'll keep it simple with the standalone version.

Try opening notepad and the clipboard viewer. Type some text into the former, select and copy it; you should see it appear in the viewer. Now go to the viewer Display menu, and you should find three entries: Auto is the default, which means the viewer has chosen the most likely format; plain ANSI text, as seen in notepad or cardfile and shown as Text on the menu; and there's an option to display as OEM text. This latter uses a fixed-pitch font and supports the box-drawing characters used under DOS. While we're on the subject, you can copy and paste in DOS sessions too, but the procedure is slightly different.

Open a DOS box and you should see the usual boxed instructions starting Type EXIT and press ENTER... Click on the system menu button, top left, or press Alt + Enter, and select Edit from the menu, then Mark. Drag the mouse over the area you want to copy (in this case, the box) and the colours will invert. Press ENTER to copy; you'll see the text appear in the clipboard viewer. If you have the display set to auto or text, the box characters and spacing will be garbled. Switch to OEM and you should see the original DOS characters.

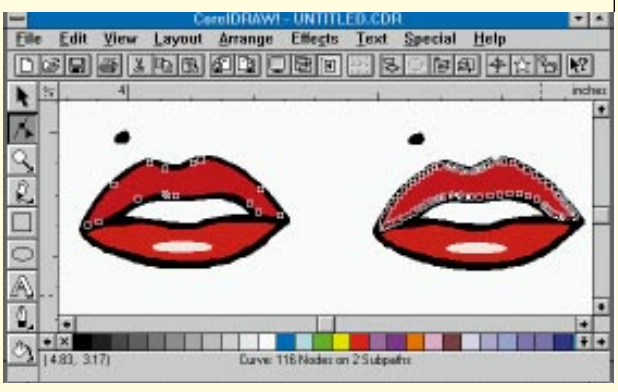
You can also paste to a DOS box, but once again the keyboard shortcuts aren't the same; type Control + V on the screen and you'll just see ^V. Try typing Dir followed by ENTER into Notepad and copy it. Then switch to the DOS box and select Edit/Paste from the system menu. You should get the same result as typing Dir then ENTER at the prompt.

Copying text from Write you'll see a third format in the viewer's Display menu, Owner Display, which will show the font and size. Unlike most clipboard data, which survives closing the originating application, this option reverts to the plain-text pumpkin when the Write document is closed. This happens because Write, rather than the clipboard viewer, is doing the real work here, and the formatting can only be pasted back into the same, or a simultaneous, instance of Write.

In the picture

Things get more complicated with pictures. Try copying part of a Paintbrush image to the clipboard and you'll see the display menu now includes Bitmap, Picture, Palette and three other greyed-out options. So what is actually on the clipboard? All of these things, and possibly more. If you save the contents of the clipboard as a .CLP file, you'll see that it is many times the size of the original data. The clipboard supports a substantial range of its own formats. In the case of paintbrush files, a Windows Picture, a device-independent bitmap, the colour palette used in 16 and 256-colour pictures and a

Left *The clipboard can hold data in a number of formats simultaneously*
Below *The lips are Corel objects. Copying and pasting in Windows native WMF format changes 15 Bézier curves to over 100 straight lines*



Paintbrush "object" are all available.

The native clipboard formats have their limitations however, particularly with vector drawing objects. If you have a copy of CorelDraw (or most other drawing applications), try copying part of a drawing, then Paste Special... into Write. You'll get a choice of pasting a CorelDraw object, or a Picture. Paste the picture, then copy it and paste back into Draw. The two shapes might look much the same but the Picture will have been changed to the Clipboard's own WMF format.

Luckily, the technology of OLE (Object Linking and Embedding) means that you're not limited to the Clipboard native formats. Applications can "register" themselves with Windows as OLE servers, and preserve their native formats as OLE "objects". Hence, in the previous example, if you paste the CorelDraw Object instead of the picture, you can close CorelDraw, copy the object elsewhere, restart CorelDraw and paste it back; it will retain its integrity as a Corel Object.

Every picture tells a story: Word text pasted straight into Paint as a picture

Guessing game

So what about the client, the application into which you're pasting the data? How does it know what to help itself to from all this richness? Like the Clipboard Viewer's Auto format, the client takes a look at what's on the clipboard and guesses at the most appropriate format. Word for Windows, for example, will default to choosing RTF if it's on offer. Failing that, it will go for plain text if, say, the clipboard contents originate in Write or Notepad.

With applications that are OLE clients (that is, they can accept embedded objects from OLE servers) you get a choice. The Edit menu will contain a Paste Special... option. The choice of formats available at any one time on the clipboard depends on the host application. If you use Microsoft Word, you can see a rather bizarre implementation of this. Select and copy some text from a Word document, then look at the Clipboard Viewer display options. As well as plain and OEM text, plus a load of greyed-out options, you'll see Picture.

Normally, with text from Write or Notepad on the clipboard, Paintbrush will prompt you to select the text tool and position the cursor — you'll then paste in the raw text using Paintbrush's current font settings. Text from Word, however, pastes straight into Paintbrush as a bitmap, just as if you'd captured the screen with Alt+Print Screen. You can also Paste Special... back into Word as a scalable picture. This may sound sublimely useless, but it does have its good points; you can scale a whole page by copying, then paste a picture of it into a frame.

A clipboard Picture can thus perform as both a bitmap and a vector image. Generally, when faced with a Paste Special... choice between Picture, Bitmap and Object, the first will be the most economical in terms of file size. Pasting as an Object retains the original format, as illustrated in the CorelDraw example. Another advantage is that double-clicking on the object will load it into the originating application for editing. With OLE 2, this can happen "in place": instead of the application starting up in its own window, the toolbars and menus of the container's application will change to suit.

Objects embedded in this way substantially increase file size, but you can opt to link, rather than embed, the object; thus, the linked data remains in a separate file and only the details of the link are retained in the container. It makes life more awkward as the container file is no longer self-sufficient, but it's particularly useful for including multiple copies of a graphic in the same, or different, documents.

As we've seen, the memory occupied by the contents of the clipboard (particularly with pictures or OLE objects) can be very large, but there's no universal way of clearing the clipboard to free that memory. The Viewer is the only Windows component with a built-in Delete command, and few third-party applications (PaintShop Pro being an exception) have a "clear clipboard" command. A quick-and-dirty way around this is to copy something small, say a letter or two of text, which will displace the previous contents.

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A new batch of OS/2 games, how to pick up the pieces after a dodgy installation, and why you should use Warp for Internet access. Terence Green brings you the rundown.

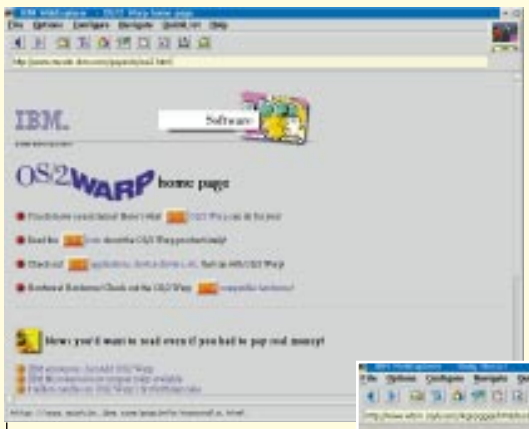
In last month's column I promised news of betas of Warp Server, SystemView and Lotus OS/2 products. I should have known better. SystemView for OS/2 was announced on 7th November for an end-1995 release, Warp Server will have gone to manufacturing by the time you read this and will become generally available in early 1996, and the Lotus SmartSuite Betas haven't turned up yet.

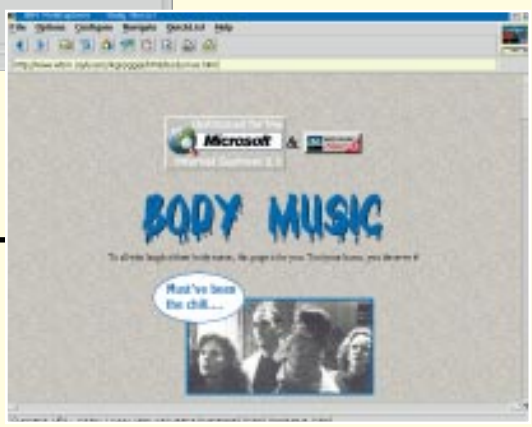
In the meantime, OS/2 has been repositioned again. Or rather, it hasn't. During the summer it might have appeared to some that OS/2 was going downmarket and becoming a Windows 95 competitor in the home market. Not so. Despite press releases trumpeting Warp's take-up among home users, OS/2 Warp is still the same safe client/server operating system for large companies that it was before IBM marketeers felt a sudden rush of blood to the head.

Meanwhile, IBM has sent out review copies of Classic Games for OS/2 Warp, SimCity Classic for OS/2, a bunch of card games, some puzzles and block games and a few role-playing shoot-em-ups.

Classic Games for OS/2 is essentially the UK version of the USA's FunPak for OS/2 with many of the really interesting bits removed. What remains is installed into the X:\FUNPAK directory, taking up 17Mb. The US-only FunPak includes gems such as a Windows Paint program for kids, a dictionary and a child development guide. And it runs in any Warp version.

Having installed Classic Games for OS/2 on Warp Connect and not being big on computer games, I pointed a 13-year-old I keep handy for just such occasions at it. She liked the puzzles and word games but trying to run SimCity crashed the system. Perusing the SimCity readme had led me to update a sound driver following installation. I went back and replaced it with the original, which helped, but the system was still unstable so I backed out of the whole Classic Games installation using the Archive function.





Above *The OS/2 Home Page: source of OS/2 information and support*
Right *Body Music: WebExplorer 1.03 supports HTML 2.0*

The single life

While mucking about with Classic Games, I noticed that it seemed to work better when I wasn't running any Windows applications. In fact, if you don't need to run any DOS or Windows applications you can make OS/2 more reliable by removing DOS and Windows support using Selective Uninstall. Also, check the CONFIG.SYS to see that PROTECTONLY=YES and IOPL=NO. These changes will make OS/2 more reliable by reducing the amount of direct interaction with the hardware.

Then you only need to worry about buggy OS/2 applications, the quality of the OS/2 video and peripheral drivers you're using and the dreaded "single message queue". The biggest problem with OS/2 once you have the underlying hardware sorted out, is when a program hangs on input. Because OS/2 has a synchronous message queue, no other process can accept input via the WorkPlace shell (WPS) until the program that has hung while holding the input queue gets going again or terminates.

It is possible to recover gracefully from the lock-up, but it requires a little patience. The message queue handler is much improved with Warp but the problem isn't going to go away until Warp for the PowerPC is ported to Intel, and this is not likely to happen until late in 1996 at the earliest. Warp for the PowerPC has to ship first, around mid-1996. There will, however, be a further partial fix when Warp II on Intel ships in spring 1996.

In the meantime, the best thing to do once you're sure that OS/2 has frozen is to press CtrlL-Esc and wait. If you're extraordinarily lucky the Windows List will pop up and you can close down the offending program from there. More usually, nothing will happen and then it's best to wait a while. A dialogue box should pop up naming the program that has stopped accepting input and offering to terminate it. Due to my problems with Classic Games, I found it useful to close down and restart the Windows session as one of the symptoms was a failure to paint the screen properly over any open Windows windows.

If Ctrl-Esc doesn't work you'll have to reboot Warp, but before you do this, try to

Recovering from a flaky installation

To do this you need to store an archive of your Warp installation before you make any upgrade to the system. Bear in mind that the archive system is no substitute for a full backup of any data you couldn't bear to lose. Archive saves OS/2 initialisation and configuration files, which it backs up in a .KEY file. The files saved include the OS/2 INI files, CONFIG.SYS and AUTOEXEC.BAT and the desktop configuration. Restoring from an archive sets your OS/2 system back to what it was when the archive was saved.

Archives can be restored at boot time. To bring up the System Recovery menu which allows you to select an archived configuration, hit ALT-F1 when OS/2 is booting and the block cursor is shown in the left-hand top corner of the screen with "OS/2" next to it.

Archive isn't enabled by default, and it only saves three configuration changes, dropping the oldest in turn. For this reason it needs to be used carefully. Enable it from the Desktop Settings Notebook (right-click on desktop, choose settings) once you have your system running smoothly. Each time you reboot, a fresh archive will be saved. Each archive shouldn't need more than a megabyte; you can set the save location if you like.

Once you have saved three archives with the system running smoothly, go back into desktop settings and switch off archiving. You need three good archives because some OS/2 installs, the networking ones especially, reboot the system twice. In future, each time you make a sizeable change to the system, wait until you're sure it works fine and set the archive on again to update the three saved configurations.

reboot via the keyboard with a Ctrl-Alt-Delete which will cause OS/2 to flush its cache buffers to disk before shutting down.

How they are related

It's possible that the problem with the Classic Games Pack was somehow related to my running the Ameol Offline Reader for Windows because of the screen painting symptoms. I use Ameol to access the CIX conferencing system and for email, but unfortunately there's no OS/2 version. The upside is that Ameol occasionally misbehaves under Windows for Workgroups too, and it's far easier with Warp to just close down the Windows session and restart it, leaving all other applications unaffected, than it is to reboot DOS and restart Windows.

I'm still using Ameol to access the CIX conferencing system, but now that CIX has started offering an Internet access service which is fast, inexpensive and reliable, I've mostly moved over to running OS/2 Internet applications. The IBM Web Explorer 1.03 (it only runs on Warp, not on OS/2 2.xx) is still a bit clunky, but it supports most of the new HTML 2.0 features including forms, tables and inline graphics.

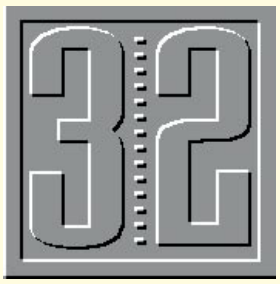
A good reason to be on the Internet with Warp is for access to the latest fixes, patches, and technical information. IBM's OS/2 Home Page is the starting point for most of these explorations and it's where you can find answers to support questions after your 60 days free support runs out — handy if you don't want to pay £45 annually to extend it. Be careful, though: I recently spent an hour downloading about 10Mb of an OS/2 FixPack which was still an unsupported pre-release version. Costwise, it's not a killer. An hour-long cheap rate local call costs under a pound and CIX Internet access costs me £15 per month for 25 hours of use. The problem was that I downloaded FixPack v12 which was still in beta when I found it on the Hobbes ftp site. *Don't* do this.

Officially-sanctioned FixPacks are placed on ftp://service.boulder.ibm.com and ftp://ftp.pcco.ibm.com sites. FixPacks which appear elsewhere with higher version numbers are pre-release versions, uploaded by benevolent souls who have been sent the fix by IBM for a specific problem. You can soon tell, when you see the IBM warning in the README.1ST file on the first FixPack disk, that this is a "not for redistribution" issue. Check the two sites mentioned to ascertain the latest FixPack release number.

The most recent official FixPack, v10, is generally available, and is recommended if you're having problems. If you're not, leave well alone. Despite the number, it's the second cumulative public release of Warp fixes and it came out at the end of September 1995. It's a 7.5Mb download and you will need another one-time 1.5Mb download of "kicker" disks (WKICKR.ZIP) in order to install any FixPack. A subset of FixPack v10 files, WFWIN10.ZIP, contains driver fixes and updates for installation.

PCW Contacts

Terence Green can be contacted either by post c/o *PCW,* or by email to **tgreen@cix.compulink.co.uk**
Updates and fixes other than FixPacks are also to be found on CompuServe (OS2SUPPO), **ftp://ftp.software.ibm.com and http://www.ibm.com**



A Most Excellent pest control

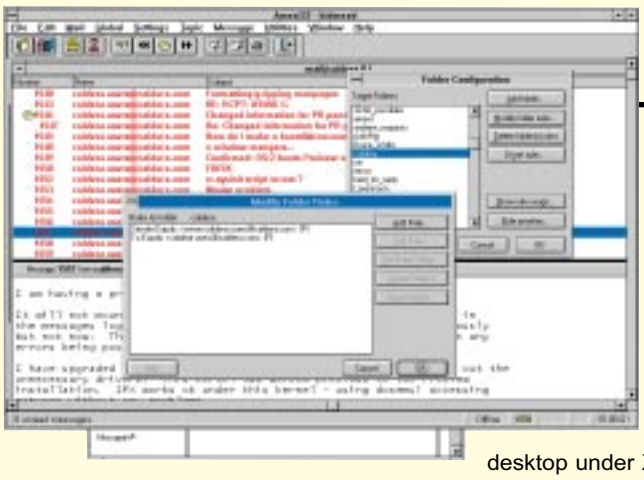
Chris Bidmead looks at ways of bug-bashing via a mailing list on Caldera Preview, stands his ground on Emacs evangelism, and defies the old adage: "Time waits for no man".

As you might expect from the name, the Caldera Preview releases have had their share of minor bugs. Pest control is being carried out through a mailing list which is a kind of electronic conference that works through your regular email box. The mail server at the far end ensures that whenever you address a message to a particular recipient, in this case caldera-users@caldera.com, your missive is automatically re-sent to all the subscribers to the mail group.

This is a simple, elegant and downright Unixy way of running a private conference, but it does have one snag. If your mail-reading app is too simple-minded, it won't offer any way of separating the mail list messages from the rest of your mail traffic. The mail reader I use, Ameol (A Most Excellent Offline reader) doesn't know how to sort mail, so on signing up to the hyperactive Caldera list, my regular daily correspondence quickly disappeared into a blizzard of chat about Caldera.

I'm currently running the 32-bit version of Ameol under Windows NT. Ameol is primarily designed as a front-end to the CIX conferencing system, but CIX also handles my mail and uploads it to me automatically whenever I go on line. Yes, I suppose I ought to be exploring purer Unix-based mail systems, and sendmail is definitely on my agenda. But Ameol and CIX have been my faithful postmen for several years now, and I'm loath to fix 'em when they ain't broke.

The mailing list problem, however, was on the point of driving me to settle down with the O'Reilly "Sendmail" book, when I came across an Ameol add-on, written by Martyn Lovell. Called Mailsort, it's an electronic filtering system that checks incoming mail and categorises it according to rules that you program into it. The particularly nice thing about Mailsort for me is that like Ameol itself, it comes in 16-bit and 32-bit flavours, so I can run it on my OS/2 system as well as under NT.



The 32-bit version of Ameol, running on Windows NT

A hitch for Portage

I've recently written in this column about the Consensys product, Portage, which bolts on to Windows NT and gives it most of the functionality of Unix System V right down to kernel level. Unfortunately, Windows NT 3.51 breaks Portage, throwing up a segmentation fault error when it loads the Portage kernel at boot time. I'd come to depend on Portage as a bridge between Windows NT and my other Unix systems. But the new version of Windows NT now fits much more comfortably onto my 16Mb DX2 machine, so it's Portage that gets the elbow, and I've promised myself to seek out interesting non-Unixy things to do with the operating system.

What finally set the seal on Portage for me was the discovery that despite the promises of the Consensys brochures, the company will not after all be coming out with an X Windows System to accompany the product. One of my hopes for Portage was that it would eventually fulfil my ambition to unify Windows NT and Linux on a single desktop under X, but I'm now going to have to come to that via a different route. Pity, because judging from the email that flooded in when I first wrote about Portage, it's clearly a product that fills a gap. And as a core Unix-on-NT product it continues to work fine if you don't mind sticking with the older version of Windows NT.

I expect I'll be coming back to Portage when the compatibility problem is fixed, but I think Consensys would probably be wise to skip this present version and wait for Windows NT to settle down first. I gather that version 3.51 was originally intended to be distributed with the Windows 95-like interface, but the final build of that didn't arrive in time for shipment. Hopefully, by the time you read this Windows NT will be in sync with Windows 95 and the updated version of Portage will be winging its way to me.

Beating the clock

In common with many laptops, my faithful Tonto has a suspend mode that shuts down the system when you close the lid, then restores everything next time you open up the machine again. This seems to

I stand by Emacs evangelism!

A few people have wagged fingers at me over the evangelism for the good ol' char-based interface I was parading last month. I retract nothing, but perhaps I should put this into context. Last month I was rediscovering Emacs. It was a joy to be able to get on with the job of writing without the burden of function and screen furniture that a modern word processor like Microsoft Word for Windows heaps on you. More about Emacs in a moment. My hearty endorsement of the character-based screen was, in retrospect, perhaps one of those "necessity is the mother of invention" things. As I think I said, I'd taken Linux (and Emacs) away on holiday and was stuck with a portable on which I couldn't get X to run.

Since then, a good deal of twiddling and the indispensable help of a new version of Caldera (Preview II, which includes the latest XFree86 version 3.1.2) has changed the picture. XFree86 3.1.2 now properly supports the Western Digital WD90C24 video chip used in a lot of portables, and at last I've been able to equip Tonto with a very handsome 640 x 480 x 256 X-based screen. In Caldera, the Motif-like GNU fvwm (feeble virtual window manager) goes on top of X, and on top of that the distribution runs a proprietory desktop manager called Looking Glass (note: unlike the rest of Linux, *not* for free distribution). It's in this environment that I'm currently running Emacs, writing this column in a salmon-coloured, blue-bordered window; one of several I can have up at the same time.

For and against

Okay, arguments against using X and Emacs; really only one. Emacs is already pretty huge, if you include all the macros, extensive documentation and tutorials that come with it (well, I suppose 9Mb is pretty modest by current word processor standards). X adds a whole clump more code to your hard disk and puts paid to the idea of running anything serious in less than 8Mb of RAM.

Arguments for; lots. Most importantly, you don't dispense with any of the simple goodness I was raving about last month. Entering and navigating text remains as fast as you could wish. Admittedly, the screen starts to look a little more complicated — when Emacs detects X, it puts on its party clothes in the shape of a menu bar at the top of the window. You can pull down sub-menus with the mouse in the usual way, and pop up menus directly from within the windows with commands like the Control key and Left mouse button combo (which gives you a choice of different screen fonts). I prefer the versatile keystroke combinations for the basic stuff. I find the X Windows presentation easier on the eye than a raw char screen, considering that you can set your choice of background colour and font.

Finger-flickin' good

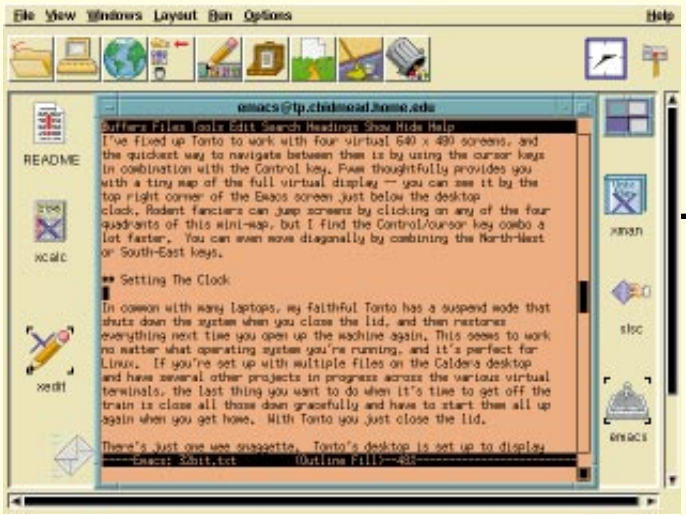
Flicking between Emacs windows ("frames") is handy too in the X version. The char-based Emacs supports this as well, although you don't get to slip and slide the frames with a mouse, just switch over between virtual screens. I've found it best not to use the mouse for this, anyway. The fvwm display can be arranged to have a virtual size that's bigger than the physical screen can show — the actual ratio depends on how much video RAM you have. I've fixed up Tonto to work with four virtual 640 x 480 screens, and the quickest way to navigate between them is by using the cursor keys with the Control key. Fvwm provides you with a tiny map of the full virtual display — you can see it by the top right corner of the Emacs screen just below the desktop clock. Rodent fanciers can jump screens by clicking on any of the four quadrants of this mini-map, but I find the Control/cursor key combo a lot faster. You can even move diagonally by combining the North-West or South-East keys.

work no matter which operating system you're running, and it's perfect for Linux. If you're set up with multiple files on the Caldera desktop and have several other projects in progress across the various virtual terminals, the last thing you want to do when it's time to get off the train is close all those down gracefully and have to start them up again when you get home. With Tonto you just close the lid. There's just one wee snaggette. Tonto's desktop is set up to display a clock, so I can keep an eye on the time as I write. This is updated by Linux's own system clock, but when you go into suspend mode, the clock does too. So when you next open the lid, on Friday morning, Linux still thinks it's Thursday evening. I decided to live with this, and apart from the clock falling drastically behind, everything worked fine and I let a week go by without rebooting the system.

When I finally rebooted, I happened to notice a system startup message which claimed to be "setting the clock", and once up and running I noticed that I was indeed back on time.

Get a grep on it

The machine's hardware clock, which stores its data in CMOS, was obviously



Tonto and Emacs, sitting on the Caldera desktop with Xclock at last showing the right time

unaffected by suspend mode. Only the Linux system clock was losing time, and on bootup something was synchronising them back again. The lesson I've learnt from Unix in general and Linux in particular is that you can usually find out how things work by snooping around, and the place to start when you're looking at initialisations is the etc/rc.d directory. This contains the shell scripts that are run every time the system powers up, and you can track down which does what by grepping through them, looking for the relevant string you saw on screen during the initialisation process.

In one of the main files, rc.sysint, I discovered the string I was looking for and found it was associated with a command called "clock". Running "man clock" returned a definition of the programming function clock() which wasn't what I wanted. If you're looking for a user command that happens to have the same name as a programming function, you have to explicitly mention the manual volume you're looking for, or use man with the -a parameter, which will show you entries in all the sections.

I happened to know that user commands are in the eighth volume of the manual, so I re-entered the request as "man 8 clock" and got the following description:

```
Clock manipulates the CMOS clock in
variaous (sic) ways, allowing it to be
read or written, and allowing
synchronization between the CMOS
clock and the kernel's version of the
system time.
```

It turns out that the -s option updates the Linux system clock from the CMOS clock, so all I had to do was just run this manually every time I returned from Suspend mode. But in fact there's a better way. Why not just run "clock -s" regularly to make sure the two stay in sync?

You can do this by taking advantage of a long-standing Unix institution, the cron daemon, one of several "hidden helpers" which chug away in the background getting things done for you. Cron keeps an eye on the clock, and runs tasks at a particular time of day, or on a particular day of the month, or whatever. You set these tasks up in a somewhat cryptic text file that lives in the directory /var/spool/cron/crontabs/ and is named after your particular account.

The system also keeps another crontab file in the directory/etc which is the responsibility of root. This system crontab takes care of things like cleaning out temporary files regularly and running scheduled updates on various files. For example, the root cron is typically set up to update the "what is" database on a regular basis (see later).

I decided that the clock update dodge I was about to install wasn't really a core system responsibility, so didn't belong in the main /etc/crontab file. (A decision somewhat influenced by the fact that this file has a slightly different format from the user crontabs, and I didn't want to risk screwing up anything critical.) But on the other hand, the clock update shouldn't just be associated with the Emacs user on my system, called "elbid". Tonto only gets used by me, but in various capacities.

Who should I be today?

After working with a Unix system for a while you get used to dividing yourself up into a gang of different users, depending on what you happen to want to do with the machine. Root takes care of system admin, el bid writes this column, bidmead issues invoices, and so on. This kind of applied schizophrenia turns out to be very useful. I solved the dilemma by logging in as root and editing root's personal crontab file, stored with the others in the /var/spool/cron/crontabs/ directory.

You are not encouraged to edit the cron file directly; instead there's a combined editor/viewer utility called crontab that evokes vi and makes sure the revised file is presented back to cron for processing. The line I added to my crontab was:

```
*/3 * * * *     /sbin/clock -s
```

The man pages for crontab will fill you in on the fine detail; essentially the line is divided into two fields. The first, comprised here mostly of stars, defines when and how often the action has to take place, and the second field defines the action.

So now when I open the lid, the clock on the screen is still wildly out, just for the first minute or so. Then the cron command kicks in, momentarily blanks the screen (for some reason I'm calling this "a feature") and updates the clock.

Hello, handsome

The AIX box has finally arrived, just as I was putting this column together. It's a very handsome PowerPC 604 machine, and I'll tell you all about it next month.

Unixes are getting more and more similar, but AIX has its little peculiarities. The standard way of getting up to speed on a new system is to use the man pages, and more particularly the apropos command. Type something like "apropos disk" on the shell command line and you'll get a short summary of every command in the man pages relevant to the word "disk".

Apropos works through an index database file called "whatis", which on Linux systems is assembled from the man pages by running "makewhatis". (Other Unixes work similarly, but may use different commands.) On the new AIX box, apropos kept returning "Cannot find matching entry", a firm indication that the whatis database hadn't been compiled.

Only when I got stuck into finding out how to do that, did I discover there weren't any man pages on the system to index. I went to install CD and fished about in there for about half an hour and turned up nothing. Eventually I contacted IBM, and we had the following exchange:

Bidmead: "So where are the man pages, then?"

IBM: "They're part of our general system information package, InfoExplorer."

Bidmead: "Ah. So where's InfoExplorer?"

IBM: "InfoExplorer is a cost option, available for £310."

Bidmead: Collapses open-mouthed in astonishment.

PCW Contacts

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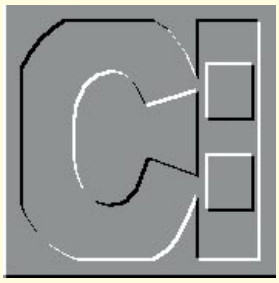


The magnificent **seven**

There are some neat tricks you can work with DOS. Simon Collin knows the wrinkles and has selected seven of the craftiest.

The advance of Windows has taken its toll. Since DOS is now merely a part of Windows rather than an operating system in its own right, it makes sense to merge any DOS questions into the *Hands On Windows* column and this will take effect from the next issue.

So to give you a final dose of DOS advice, I have selected some of the neatest tips and tricks from the past couple of years and condensed them into this single page.

This is no mean feat, since we have covered just about every aspect of DOS: from Novell DOS to networking, batch files to hidden commands; it's all covered somewhere in your back issues.

Here then, are my top tips and neat tricks for DOS.

1. Multiple commands

One of the most annoying aspects of batch files is their inability to run multiple commands using wildcards.

For example, if you want to view the contents of all the files with a TXT extension, you'll have to use the TYPE command umpteen times.

Here are three ways of getting around this. The standard method would be to use the FOR command:

```
FOR %F IN (*.TXT) DO TYPE %F
```

This is rather rigid, so you could replace the TXT and TYPE words with user-definable parameters:

```
FOR %%F IN (%2) DO %1 %%F
```

However, it's even better to use the COMMAND/C command to run any DOS command for you:

```
FOR %%F IN (%2) DO COMMAND/C %1 %%F
```

Save this in a batch file called MULTI.BAT and you can type in MULTI TYPE *.TXT to view all your text files.

2. Key press utility

Trying to get a batch file to respond to a key press is pretty hard work. Here's a neat little utility that will return the value of any key that's been pressed as an error level. It returns the character's ASCII value less 48, so that: 1 is 1 rather than its ASCII value of 49; 2 is 2 rather than its ASCII value of 50 and so on.

```
N KEYIN.COM
E 0100 31 C0 CD 16 2C 30 B4 4C
E 0108 CD 21

RCX
A
W
Q
```

3. Undocumented DOS features

Microsoft has left a few undocumented features within DOS — some are worthless, but a couple are useful. This one lets you view all the files in a directory, including all hidden files.

Just type in 'DIR ,'. The comma will also work with the ATTRIB command and will reset all the attributes of all the files in the current directory.

The comma is great with the DIR command, but be careful when using it with the ATTRIB command, since it can mess up your backup strategy and will remove any share or read-only attributes.

4. Basic debugging

When testing a batch file, life would be so much easier if you could run it through a debugger to catch all the typos and errors.

DOS doesn't provide quite this level of service, but it does let you step through the batch file one line at a time to check that the program is working correctly. To create your own basic debugging tool, use the COMMAND command. If you want to step through a batch file called TEST.BAT, enter the following command:

```
COMMAND /Y /C TEST.BAT
```

DOS will load a second copy of the command interpreter and will step through each line in the batch file asking you, with a '[Y/N]' message, if you want to execute this particular line. Once all the lines of the batch file have been executed, this new, second, command interpreter is unloaded.

5. Environment variable

Tailor your version of DOS and speed up searches using some of the internal DOS variables: to see which are currently being used, just type in the command 'SET'.

However, there's one nice little environment variable that's not often mentioned: DIRCMD. Whenever you issue a DIR command, DOS first checks to see whether the DIRCMD variable has been set. If so, DOS will use this as its default and list the contents of the directory. For example, if you often want to check the contents of the \FILES\LETTERS\COPIES\SENT subdirectory, set this into the DIRCMD variable and you'll get a listing of this directory if you enter just DIR with no parameters.

To set an environment variable, use the SET command again:

```
C:\>SET DIRCMD \FILES\LETTERS\COPIES
\SENT
```

6. Making the most of batch files

You can really make the most of a batch file by using the environment variables that your PC stores. If you have Novell DOS, you can access environment variables to display user name, network details and so on. For MS-DOS users, there's a particularly useful tip to let you append a new directory to the PATH variable:

```
PATH=%PATH%;C:\NEW_DIR
```

7. Keeping track of time

Want to keep track of the time within DOS? Here's a DOS Prompt command that uses ANSI sequence codes to display the current time at the top of the screen.

You'll need to load ANSI.SYS in your CONFIG.SYS file for this to work:

```
PROMPT $E[s$E[H$E[K$Dat$T$E[u$P$G
```

● I hope you have found this column useful and that it has helped you to make the most of DOS.

PCW Contacts

Write care of *PCW* or via email to **scollin@cix.compulink.co.uk** or **CompuServe 72241,601**

Let's get **personal**

Tim Phillips **looks at the latest crop of notebooks, brings dispatches from the frontline at Dr Solomon's, and some more mighty macros.**

I've taken a break from the nasty headaches of big, bruising word processors this month to enjoy the more understated charms of this year's new crop of PDAs. My predecessor in the Hands On WP hotseat got his biggest postbag ever when he investigated some of the functions of the Psion 3a's word processing. I've been looking at the Psion's competitors: the excellent new HP OmniGo 100, Sharp's ZR-5000, and the Trekkie's favourite, the Newton MessagePad. The first two look and feel like the Psion; the last, as you are probably aware, is quite different.

The OmniGo concentrates on financial applications, and it's an excellent scientific calculator, but that's not why we are here. It also has excellent pen input, something that the Psion lacks. HP uses Graffiti, a pen input system that relies on the user to write letters in a certain way. So the letter "A" is written as a '^', like a teepee. This speeds up handwriting recognition, is quick to learn and very accurate.

The main problem is a 63mm-square screen that taxes your pen input capability, and a lack of transfer functions.

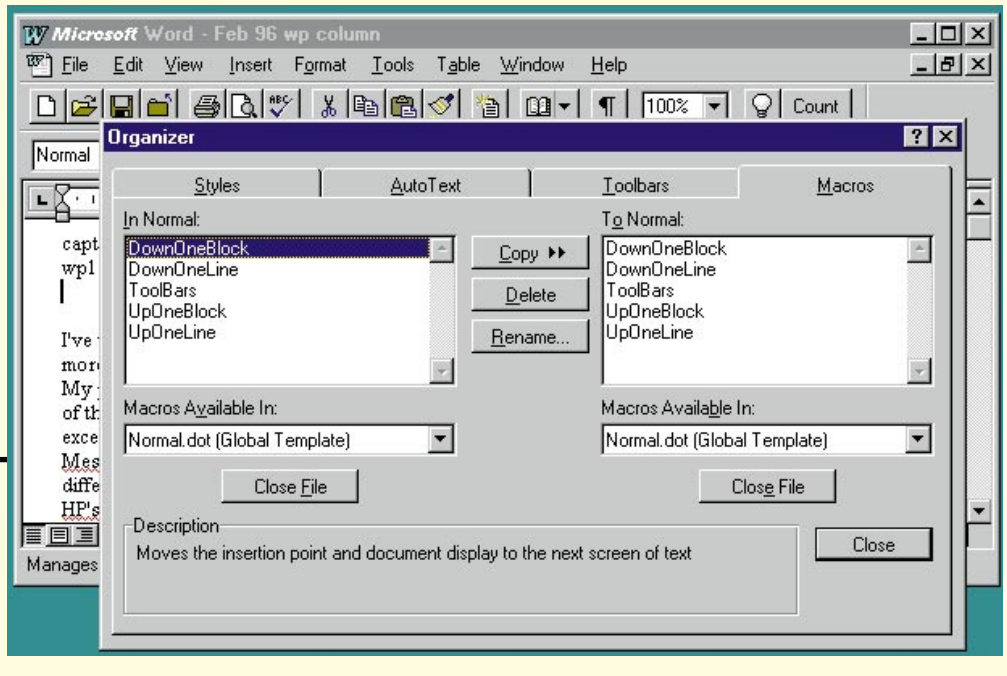
Sharp's ZR-5000 is excellent if you want to write short memos. It has a screen the size of the Psion 3a and decent handwriting recognition, but more importantly, it has the best little keyboard around. Pen input is best as a way of dragging text around to edit your notes. Recommended, but at £400 compared to £250 for the Psion and the HP, it's not cheap. There's also a capacity to exchange documents with a desktop.

Finally the Newton, which has just been launched with version 2.0 of its operating system. At about £700, this is both too big and too expensive to be an organiser for casual use. It does have several interesting improvements for word processor fans though.

First, it has a keyboard option which plugs into the serial port so you can type, rather than just write with a stylus. Second, it is now much easier to use a serial cable to swap information with your PC or Mac — a basic requirement which surprisingly has taken Apple two years to accept. Finally, the handwriting recognition is now excellent, although slow. It looks as if the days when you can write your document instead of typing it are still some way off. The Newton has some great features now, and you can also get Graffiti on a PC Card for it — but its note taker is still not a word processor.

Virus vengeance

Viruses are back in the news, with Dr Solomon's accusing its competitors of not being aware of the dangers of Word for Windows viruses. If you recall, we wrote about the Concept virus (Microsoft called it



If you are flummoxed by the "Colors" stealth virus, you can go looking for the rogue macros using File, Templates, Organizer to get this dialogue box

Finding the right words

Firstly, three problems on Ami Pro 3.1. You know how it is, you wait all month for one then three come along at once.

● James Ball from Swindon has two of them. He wants to know whether he can start up Ami Pro without the "untitled" document opening as well.

The answer is no — but you can record a macro which closes that document, and set the macro to autorun when you start Ami Pro. If the idea is to save time on Ami's exhaustive startup routine, then this makes the problem worse, not better.

If the problem is just that you don't want a spare document hanging around, then this isn't so bad — as the untitled document vapourises as soon as you open an existing file.

His other question also involves opening documents. "How do I display more than one document format at once? I use text and Ami Pro documents and switching between them wastes hours."

Again, there's no straightforward solution, as Lotus informs me that the one-type open box is hard coded and unchangeable. Instead it recommends recording a macro to open a certain file format, and putting it on the icon bar. You could have one for text and one for Ami Pro — which also short-circuits the tedium when Ami Pro resets its target directory each time you change the file format you look for.

● Our virgin WordPro question from Eric LaPlace of Liverpool, who asks whether he will need to do bulk conversion of files when he switches to WordPro from Ami Pro.

The answer is yes if you want WordPro format, but no if you are happy to leave the files as Ami Pro files, which Word Pro will open transparently. If you do want to convert, WordPro has an Import function on its file menu which allows you to select multiple files, and saves the converted file in the same location alongside the old version.

● A man called Jeff mailed me from South Africa, where I hear Archbishop Desmond Tutu and Springbok captain Francois Pienaar are both confirmed readers of the column and macro club contributors, to ask why you have to wait until your Word 6 document was finished to add numbered or bulleted indents.

The lucky answer is that you don't. If you're a user, try it now. Type a list, but before each item type an asterisk followed by a space. After the first item, the list reformats and you have automatically indented bullet points. Now do the same thing, but type a dash (minus sign) at the beginning of each line instead. You get a different sort of bullet. Now do this using the numbers 1, 2, 3. Again the formatting changes to make a

CONTINUED ON NEXT PAGE

a "Prank Macro") a couple of months ago, and as predicted, a few copycat viruses have made their way into circulation.

The virus anoraks at Dr Solomon's have been telling me about the two most significant, Nuclear and Colors.

Nuclear adds the message: "And finally I would like to say: STOP ALL FRENCH NUCLEAR TESTING IN THE PACIFIC!" to the end of your document when you print it, if the system clock is between 55 and 59 seconds. This thoroughly admirable sentiment is one of several payloads in the macro; the other two, which were meant to produce a normal virus and also to delete system files on 5 April, are thankfully bugged and don't work.

You'll find Nuclear by looking under Tools, Macro and checking to see if nine extra macros have been added to normal.dot. One is called "Payload".

Colors is more significant. Although its payload simply changes the Windows colour settings regularly, it is a stealth virus: look for its macros under Tools, Macro and the macros hide themselves. Instead, look under File, Templates, Organizer, Macros to see if illicit macros have been added.

There are several more new viruses detected like this; I recommend you buy an anti-virus product that will spot them. Currently Dr Solomon's will, and McAfee and Norton don't. This may have changed by the time you read this column.

What's certain is that document viruses are getting more sophisticated. More people share documents than the executable files that traditionally carry viruses, so take precautions if you're on the Internet or a large network.

Yet more exciting news for WP users — Novell is selling WordPerfect. This means problems for WordPerfect users: no matter who buys it, there will certainly be a delay in the next release, if indeed the commitment is there to continue development. If WordPerfect were not a major headache for Novell, with development costs outstripping revenues in the midst

Finding the right words (continued)

numbered list as you type, and if you change the order of the items, the numbering changes to fit.

The tricky bit is ending the list — type enter, followed by backspace to go back to normal paragraph formatting.

● Gary Martin writes from Reading. He's another WordStar user who wants a bit more flexibility. The answer to these WordStar for DOS problems is usually buried in WSCHANGE — which is the utility for controlling default settings — but it's such an involved process to find the right information, I don't blame him for giving up. I can help him because I found someone else with a similar problem who had contacted WordStar tech support online.

Like a lot of the *Hands On* readers who mail me, Gary writes a lot of academic papers and needs to enter simple formulas. The trouble is that Wordstar will wrap his formulas when he enters the hyphen at the end of a line, so a simple line like 3-2=1 might get broken after the minus sign.

There are three solutions to the problem. Either enter a hard return immediately before the formula so it begins a line, which may look funny if the document is justified or if you subsequently reformat. The second is to turn off the word wrap, using the commands ".aw off" before the line and ".aw on" immediately after the line. This doesn't solve the justification problem. The final option is to make the hyphen one of the characters which don't induce a word wrap. In WSCHANGE, find the section which controls word wrapping, and enter the hyphen as a new character to avoid. This will mean that you can't automatically wrap a word where you want it, but it does have the advantage that your justified text will stay justified.

● Finally, to show all you Mac users that we care, WordPerfect for Macintosh 3.0 (not my favourite program) has given Janet Erid, of Norwich, a problem. She is trying to convert her documents to PC format, and the smart quotes refuse to translate into quotes — either smart or stupid — in a WordPerfect 6.0 equivalent. Instead, she gets blobs. However, when she opens the document in WP 5.1, the quotes are still there.

Luckily, this one was known to Novell. In WordPerfect 6.0, the smart quotes are not recognised and converted to TrueType characters unless you install the Typographic fonts which include smart quotes. Install that font and the problem is solved.

Smart quotes are a constant source of trouble for users, which is a shame as they do look professional in a document. Mac users started the trend, and you can follow their email across the internet, as it's littered with funny characters instead of quotation marks. My general advice is that if you are going to be making documents for either Internet consumption or printing, then leave them turned on. If you are going to convert a document, or are going to use the word processor to type email, or if you are printing on anything except a laser printer, turn them off or check very carefully that they will convert sensibly. I keep my smart quotes turned off, and nobody has complained — yet.

of Microsoft's onslaught, it wouldn't be up for sale. As my postbag has become almost 100 percent Microsoft-based, I can believe WordPerfect's buyer will have lots of ground to make up, at least among *PCW* readers.

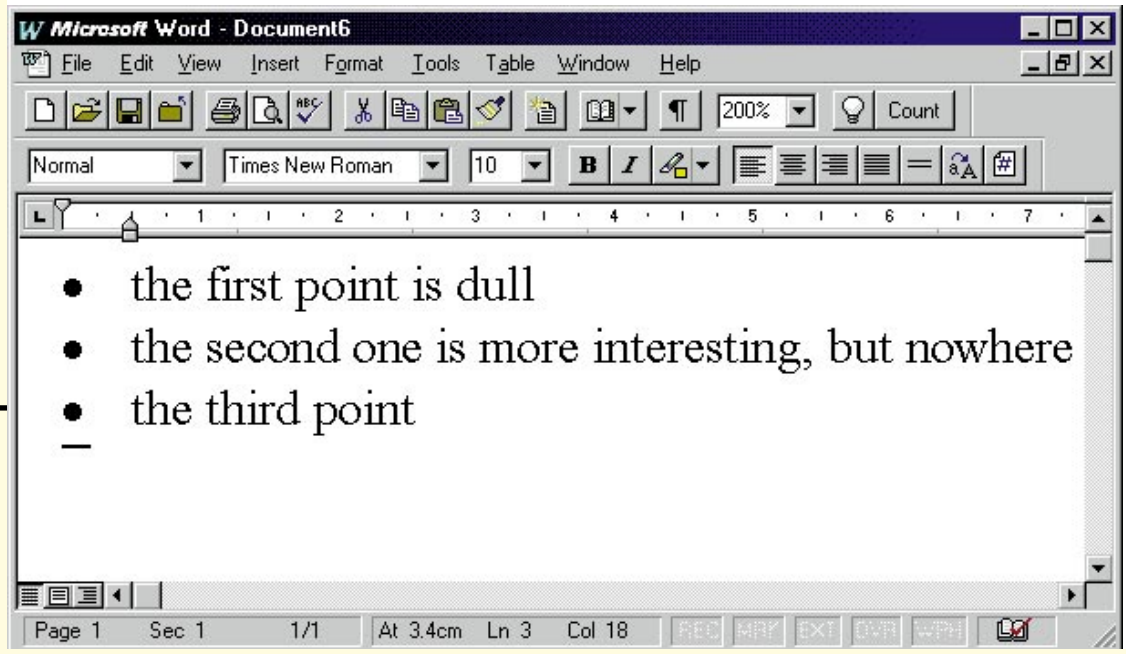
Win'95 freebie

Now for some good news if you are one of the dwindling band of Windows 95 users who haven't invested in Microsoft Office yet. The Word for Windows viewer is now available for Windows 95.

Hold on to your hats there, because it really is jolly useful. It automatically configures itself as a helper app for Web browsers — even Netscape, which shows a commendable sense of fairness for Microsoft. It will view files — although it will not allow you to edit them — created in Word version 1.0 and later, or 4.0 and later if it's Word for the Mac. You get all the page layout, including headers and footers, and you can print too.

This might seem underwhelming, but there are two important applications. The first is for business users on a network, where some workstations need access to documentation but don't need a full Word Processor. The second is for Internet browsing. Using the Word Viewer, you can enclose hyperlinks in a document, and a browser like Netscape can follow them.

You get your free copy of the viewer either by visiting "Free stuff" at www.microsoft.com, or from the MSWORD forum on the Microsoft Net-



Enter a list of bullet points in Word using the asterisk, and it automatically reformats them in a list

work, or by ordering it from Microsoft on 0345 0020000, where you get charged postage.

Tim's macro club

My macro club members have been keeping their heads down recently with Christmas shopping and so on, but I am indebted to a couple of postal correspondents for the following:

Andrew Rowland of Barnsley adds to our body of knowledge on transposing characters. He points out — rightly — that the macros we have used so far all clear the clipboard, which can be irritating if you want to cut and paste large amounts of text. He suggests an alternative form, "Which just goes to show that the best answer is not always the one a recorded macro may suggest, and a foray into macro programming can be well worth the edit."

```
Sub MAIN
CharLeft 1
a$ = Selection$()
EditClear
CharRight 1
Insert a$
End Sub
```

Anyone got any other macros which are an improvement on anything you could get by recording keystrokes? Prizes for the best.

Roger Musson of Kirkham has an excellent macro for label printing in Word. I happen to know from experience that this is a continuing source of disappointment and frustration for users, and I'm glad I don't have to do it very often.

Use the Tools/Envelopes and labels menu option to define then insert a page of blank labels. The document now contains an empty table with the number of rows and columns, height and width appropriate to the sheet of labels being used. Go to the first cell in the table and design one label...when the design is complete use the following macro to replicate the contents through the table.'

A simple idea that works very well. It means that you can also add images, artwork or fancy fonts using WordArt to your label, and the macro handles them as well.

```
Sub MAIN
       EditGoTo .Destination = "\Cell"
       CharLeft 1,1
       EditCopy
       While NextCell() <> 0
             EditPaste
       Wend
End Sub
```

An easy macro but very useful. Two points to make: first, make sure you set up your page of labels properly. Word offers all the standard size and make sure you pick the right one — a couple of millimetres error in setting your label size will be disastrous by the bottom of the page. Second, make sure your printer can handle label printing. As Mr Musson points out, if you can print on card, this is a cheap way to make your own business cards.

Another neat trick for Word users, this time from Peter McGarvey at dial.pipex.com. "I find that the two toolbars at the top, plus my toolbar at the bottom can sometimes make the document window a tad small: this helps.

It's a simple macro to toggle the formatting toolbar (the bottom one). Make it into a button on the top toolbar, and it will turn the formatting bar on and off. If you replace the word "Formatting" with any of the other toolbar names that you find in View, Toolbars, then it will toggle that particular toolbar too." (See above.)

```
Sub MAIN
  If ToolbarState("Formatting") = 0 Then
     ViewToolbars .Toolbar = "Formatting", .Show
  Else
     ViewToolbars .Toolbar = "Formatting", .Hide
  End If
End Sub
```

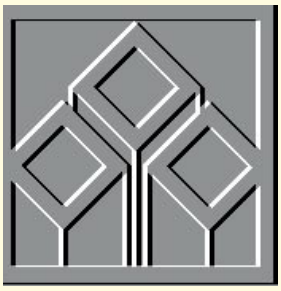
Apologies: please, oh please stop emailing me to say that there's an easier way to skip from cell to cell in a table than the macro provided by Lee Curtis of Idle. As I should have noticed at the time, you use Ctrl-Tab for that. It's what Ctrl-Tab is designed for. There's no excuse. I am most terribly sorry. Now leave my mailbox alone.

Finally, yet another challenge to tax the brightest minds of our generation from Phil Stanton, who asks: "Is there a way of incorporating some kind of counter in a Word 6 macro? I use Word to produce my invoices, and currently I have to look at the most recent invoice to find out what the next invoice number should be. I would like to have some kind of permanently stored counter, so that when I open a new document based on my invoice template, and the AutoNew macro runs (which currently just inserts the date), it puts in the correct invoice number."

Prizes for elegant solutions, as ever.

PCW Contacts

And that's that for this month. Surface or airmail to *PCW*, otherwise I'm on email at **wong@cix.compulink.co.uk** and **CompuServe 100436,3616**



Ten **green** bottles

Stephen Wells **picks up tips for using Excel to improve industrial processes, and tries to decipher the growing jargon of spreadsheet publishers.**

Melvyn Perry, from North Yorkshire, is a process improvement specialist who takes advantage of the flexible graphing features of Excel.

He tells me that process improvement work frequently uses statistical data analysis. It might be for measuring things like the volume of liquid in bottles. A specification for a bottled liquid product will obviously demand that the volume remains consistent.

When the bottles are filled by machines with multiple filling heads, you have to see that each filling pump provides the same output as all the others.

The average pump output is calculated, as is the standard deviation of the error in the sampling method. This error is deployed to calculate what is known as the least significant interval (LSI) and is used to compare the average pump outputs.

The LSI is the uncertainty in the value of the average output. If two averages are further apart than the maximum and minimum least significant values for the respective averages, then those averages are considered to be statistically different.

Melvyn says that the quickest way of identifying any filling pumps that differ from the rest, is to graph the pump averages with the LSI bars shown. Then, any pumps with overlapping LSI bars are operating at the same average. The LSI bars are essentially the same as error bars.

He has collected data for each of ten pumps for his example. The averages, and the lower and upper least significant values, are shown in *Table 1*.

He selects this data and makes a line graph, then reformats the chart with high/low lines. By selecting Patterns and deleting the joining lines (where appropriate), and changing the data markers to a dash for the end of the "error bars", he arrives at an attractive chart that shows which pumps need adjusting. *Fig 1* shows that pumps seven and eight on the multiple-head bottle-filling machine are underfilling.

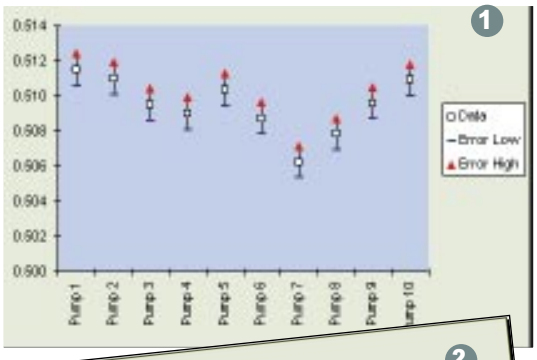
Melvyn sent me a disk of the tables, with example charts which I first duplicated with Excel 4, then tried it in Excel 7. The results are the same but the charting procedure and formatting is so much easier, partly because of the multi-tabbed dialogue boxes which first appeared in version 5, and partly because of the context-sensitive mini-menus offered with right clicks on the mouse in the Windows 95 version.

To create a graphical summary of data sets, Melvyn uses the Box and Whisker plot. This reflects the median, minimum, maximum and inter-quartile values. The inter-quartile range is a measure of the dispersion of the data — its spread. The lower and upper quartiles are the values at the 25 percent and 75 percent rankings of the data. The median is the 50 percent point.

To demonstrate the value of the Box and Whisker plot, he used the data from the filling head example and worked with pumps 1, 7 and 8.

The data is shown in *Table 2*. Using Excel 4, he made the chart (shown adja-

Figs 1 & 2 Performance of the multiple-head bottle-filling machine



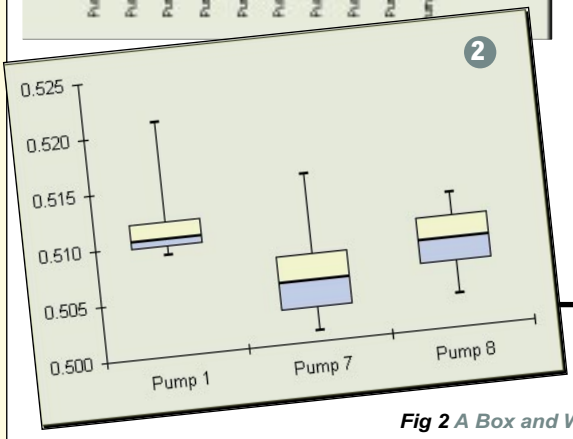


Table 1: Error Bars

Item	Data	Error Low	Error High
Pump 1	0.512	0.511	0.512
Pump 2	0.511	0.510	0.512
Pump 3	0.510	0.509	0.510
Pump 4	0.509	0.508	0.510
Pump 5	0.510	0.509	0.511
Pump 6	0.509	0.508	0.510
Pump 7	0.506	0.505	0.507
Pump 8	0.508	0.507	0.509
Pump 9	0.510	0.509	0.510
Pump 10	0.511	0.510	0.512

Table 2: Box and Whisker plot

	Pump 1	Pump 7	Pump 8
Lower quartile	0.510	0.503	0.506
Minimum	0.509	0.501	0.503
Median	0.511	0.506	0.508
Upper quartile	0.512	0.508	0.510
Maximum	0.521	0.515	0.512
Median	0.511	0.506	0.508

***Fig 1** A hi-lo chart made from Table 1. It shows that pumps seven and eight are under-filling*

***Fig 2** A Box and Whisker plot from Table 2, showing the median, minimum, maximum and the inter-quartile values of pumps one, seven and eight*

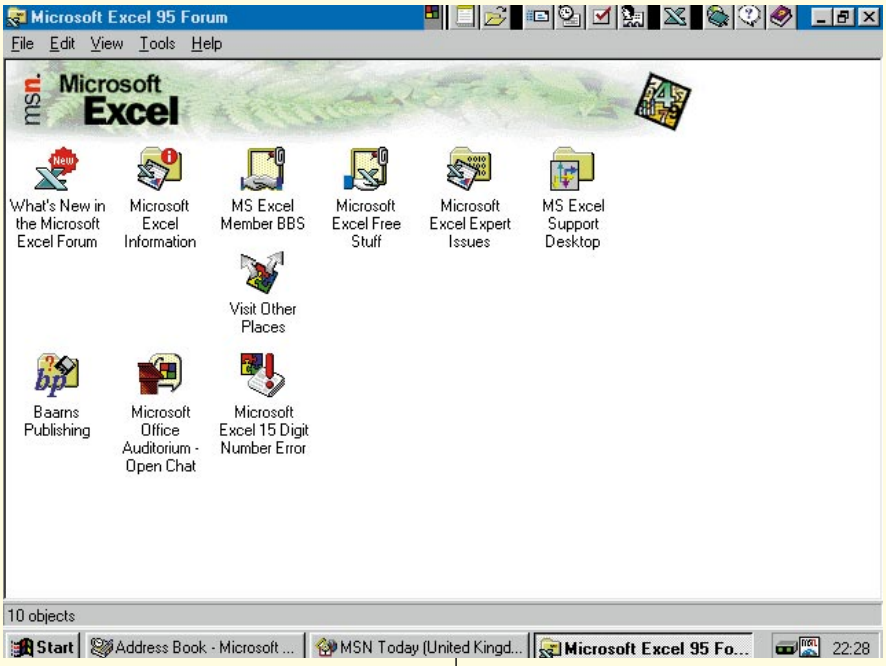


Fig 3 *If you sign up for the Microsoft Network, you can click on a Help option in Excel 7 to instantly connect to all these resources*

cent to *Table 2*) like this:

Select the complete data block (e.g. I4:L10), choose the Chart Wizard and extend the square to chart size. At Step 1, choose Next. At Step 2, choose Line, Next. With Step 3, take Line chart Type 7. At Step 4, change Data series to Rows; and accept 1st Row for Labels and 1st Column for Legend. At Step 5, choose your option for having a data legend or not.

Now double-click the chart so that the menu bar changes and choose Chart, Add Overlay. Choose Format, Main Chart, Hi-Lo lines and Up/Down bars. Set Gap Width at 100%: this formats the main chart. Format the overlay in the same way. Excel 7 doesn't use the term "overlay"; instead you Format Groups 1 and 2.

Double-click on a horizontal line in the graph. In the resulting Patterns dialogue box choose: Line, None; Marker, Custom; Style a dash; Foreground black; Background, white. Then check the Apply to All box. Double-click on a marker and choose those same options again, and that's it.

The box and whisker plot illuminates three points. Firstly, the data may not be symmetrical — particularly for pump one. Secondly, pumps seven and eight are similar in that the median of pump eight falls inside the median to upper quartile value of pump seven. Thirdly, pump one has a higher output than pumps seven and eight, as seen with the LSI comparison.

The box and whisker plot is very powerful and is often used in statistics. Melvyn says: "It is a shame that this plot cannot be made more quickly in Excel." Ironically, Excel 4 did have a spare square in the choice of chart types box, but Excel 5 filled it with a doughnut-type chart.

Why do I pass on such an obscure use for a spreadsheet? It's my experience that applications, or chart variations which are new to me, frequently strike a chord with readers. I've had quite a bit of response to my recent column dealing with golf handicapping, as well as my article about calculating nurses' shift hours.

Going through the changes

I remember when a shop was a shop. Then it became a retailer, expanded to a retail outlet and finally, a traditional retail distribution channel.

The hyperbole used by spreadsheet publishers has grown in the same way. Particularly Microsoft with Excel. We used to have macros, templates and add-ins. Then it was Wizards. Then Auto this and Auto that. And now it's enhanced IntelliSense technology.

Interchangeably called "Excel 7" and "Microsoft Excel for Windows 95", the latest incarnation is like one of those massive cinema organs with every conceivable feature and accessory known to man.

Microsoft's admirable intent was to move to a task-orientated approach. So instead of thinking about functions and formats on worksheets, you'd think about budget reviews, contact lists, and financial analysis. Pete Higgins, Group VP Applications and Content, says: "You've told us that your primary focus is on getting your work done, not learning our products."

The inference is that all these ease-of-

use accessories will cut the time taken to learn the software. A laudable objective. But computer software is only a tool and the user always has to familiarise himself with it. The more complex the tool, the longer it takes, initially.

To take a simple example, the information you would obtain by running the macro, CHECKUP.XLM in the Excel 4\Library\Checkup directory, you can now find in the Excel 7 menu bar. But would you find it under (a) File, Properties, Statistics? Or (b) Tools, Options, General? Or (c) Help, About, System Info?*

One way or another, the new Excel in combination with Windows 95 offers more kinds of help than has ever been seen on a spreadsheet.

Cleverly, to save memory the Help file only adds subjects as they're needed. The VBA (Visual Basic for Applications) library, for instance, doesn't load until you run or edit a VBA macro.

The menu bar Help offers you a choice between a Contents, an Index, Find, or the Answer Wizard.

The Contents offers drop-down chapter heads and the Index offers a complete alphabetical listing. Both of these are like an on-screen manual. Find is like a database search: type in a word, choose from numerous options for searching, then pick a topic.

The Answer Wizard lets you type a question like "How do I change colours in a block?" then offers a choice of subjects.

You can also reach this main Help file by clicking on the desktop and pressing F1. Often, the resulting Help screens will contain buttons to take you to a branch, show you an example, or even start a macro. These are called Shortcut buttons.

Another form of Help is the question mark in the title bar of every dialogue box. Click the What's This? button, then an item, and a clarification statement appears.

The constantly running Tip Wizard makes helpful suggestions as you go along. If it's suggesting that you use an icon for something like creating a note, it displays a working icon whether regularly visible on a toolbar or not.

There is the context-sensitive mouse right-click menu, too: you might be looking at a list of files to open and you can choose a Quick View of the file, or examine its properties.

You can find out what any button does just by pointing at it. You can view any helpful note which you've attached to any cell (or play any warning sound) just by pausing the mouse cursor on the cell. These are now called Cell Tips.

Top Tips for Lotus 1-2-3 Release 4 for Windows

● You can put text in a cell outside your printed page area and have it appear in the header or footer. If you were to enter it in cell Z1, for example, you just put \Z1 in the left, centre or right box of the header or footer section in Page Set-up.

● Here's an easy way to multiply or divide by a constant. Let's say you have a series of currency amounts in the range A1 to A12. You want column B to carry the same amount plus VAT at 17.5 percent. Just enter 1.175 in, say, cell F1. Then choose Range, Analyse, Multiply Matrix. In the dialogue box put A1:A12 in the First matrix slot, F1 for the Second matrix and B1 for the Resulting matrix.

● A simple formula for calculating the first day of each month is:

```
+D1+32-@DAY(D1+31)
```

This assumes column D is in a date format. You enter any date in cell D1. Enter the formula in D2. Mark the block D2 down as far as you like. Choose Edit, Copy Down.

● To access a comprehensive list of all @Functions with descriptions, choose Help, the Search option, and then the Search button. Type @Functions. Pick @Function Categories and click the Display button and the Go To button (marked >>). To go to each succeeding group of @Functions, repeat clicks of the Go To Button.

● To add notes to formulas, just separate them with a semi-colon. To add one to a label, enter it like this:

```
+"Jan 8 '96";Marsha's birthday
```

The date will appear in the cell. Both the date and the note will appear on the Edit line.

● If you're getting an ERROR message in, say, cell A12 caused by a division by zero in cell B5, then you can suppress it like this. If the current formula is

```
@SUM(A3..A11)/B5
```

change it to:

```
@IF(B5,@SUM(A3..A11)/B5,"")
```

If you'd rather be advised about the problem with a more specific message, enter instead:

```
@IF(B5,@SUM(A3..A11)/B5,"B5 has a zero")
```

I also think it's helpful to be able to view an instant total for any block of cells you mark. The answer appears in the status bar. This feature is called AutoCalculate. And more than just a SUM, you can right-click on the figure and instantly change it to an average, a cell count, or the maximum of a range and so on.

Finally, there is always the latest Help from the horse's mouth. Assuming you've joined the MSN Network, you can go straight to the screen shown in *Fig 3 (page 309)* , from Excel. Just choose Help, The Microsoft Network, Microsoft Excel 95 Forum, Connect.

If you choose an item to download, it goes into the C:\Program Files\The Microsoft Network\Transferred Files folder. Then you can view it or print it at your leisure.

Loose ends

I'm grateful to Shane Devenshire, of Walnut Creek, California, for the panel of tips for Lotus 1-2-3 (page 308).

Speaking of post from overseas, among the hundreds of requests I've received for the financial analysis templates (described in this column over the past year) have been a number from regular readers of *PCW* in places as far away as Colorado and South Australia. Most know the drill for foreign correspondence; others enquire how to pay for the return postage.

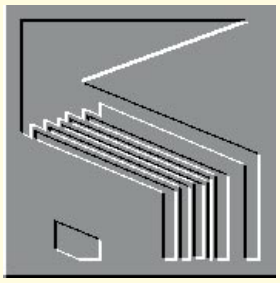
Wherever you are in the world you can buy Coupon-Réponse International coupons at your local post office. You just send these with a formatted 3.5in disk and a return address envelope to the usual address. And I'm going to spell that out because I receive so many creative interpretations of that phrase: Stephen Wells, Personal Computer World, Editorial Dept, VNU House, 32-34 Broadwick Street, London W1A 2HG.

** The answer to the question about how to run the info macro is (c).*

PCW Contacts

Stephen Wells welcomes comments on spreadsheets and solutions to be shared. Send them to PCW Editorial at the usual address or at **Stephen_Wells@msn.com.**

For the financial analysis Excel templates for service companies and those which carry stock, send a formatted 3.5in disk and a stamped, self-addressed envelope.



Speed is of the essence

If database users need indices to keep speed up, Mark Whitehorn asks why 70 percent of databases don't maintain an index? Plus Query optimisation, and using the Count function

WordArt

Microsoft WordArt is a nice little add-in that lets you embed nifty font attributes into your programs. If you own any Microsoft products, you probably have this program on your computer.

To insert a WordArt object:

1. Choose Edit, Insert Object in Access (or click the Object Frame Tool on the Toolbox toolbar).

2. Depending on your version, choose Create New and select Microsoft WordArt2 (or if you only have 1.0, choose that, and click OK).

3. Type your text. Note the toolbar and menu is Word Art's.

4. Click the first dropdown list, "Plain Text", and choose the flow you would like your text to have. (You probably can see the effect of this in the background as you work.)

5. Choose Format, Stretch To Frame (or use the 7th tool from the right) so that the text will fit in its frame if you resize it back in your program.

6. Choose Format, Shadow and pick a shadow style and colour if you want one (or click the second button from the right).

7. Choose Format, Border or click the first button on the right to choose a border colour and thickness for the text.

8. To rotate or stretch the text, choose Format, Rotation And Effect or click the fourth button on the right. With this option you can increase or decrease the amount of stretch, as well as rotate your text.

9. If you want to colour your text or add a pattern to it, choose Format, Shading or click the third button from the right.

10. To return to your program, simply click out of WordArt.

11. To edit the WordArt object, just double click it and you will be back in Word Art.

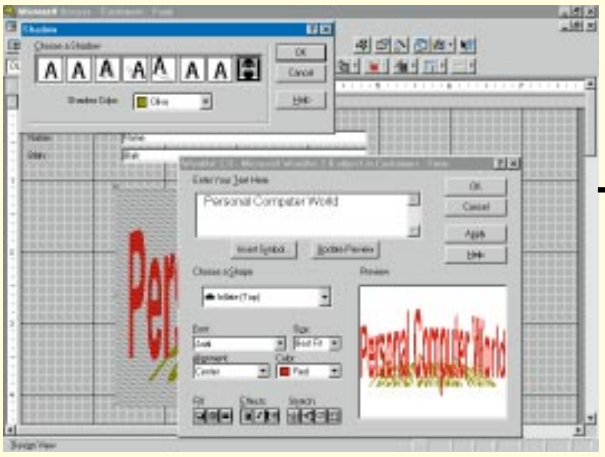
Paradox pause

The fastest way to get out of an operation in Paradox is to press Ctrl+Break (Ctrl+Pause). Fast it may be, but it's also very dangerous. In most cases in Paradox, pressing Ctrl+Break will end a task and return you to the main menu, but nothing you were doing will be saved. Here are some of the places you can use this command: to exit the edit mode without saving changes; to exit the sort screen without executing a sort; to exit the Modify Restructure screen without saving changes; and to exit the Create mode without saving your work.

Ctrl+Break is particularly dangerous in the Report Writer. When you are in the Output to screen mode, the result of pressing Ctrl+Break depends upon where you are. If you are not at the end of the report, it brings you to the end of the current page; the second time you press it, you go to the end of the report; the third time, you return to the report writer. If you mistakenly think you're not at the end of the report and press Ctrl+Break twice, you will exit the output screen and then the report writer without saving any changes. Take heed.

The need for speed

Microsoft recently looked at a whole collection of databases "from the wild" — databases that real users were running in a cross-section of real companies, not just from the



Left *Using WordArt to create a text object for use in Access*

Below *The WordArt object embedded in the form. Restrained and dignified, I hope you'll agree*

Fortune 500. One surprising fact that emerged was that about 70 percent of those databases had no indexing whatsoever (presumably apart from the Primary keys). Since indices are a vital component in keeping a database running rapidly, this may well account for users' frequent complaints about the tardiness of their databases.

Access 95 now boasts the ability to create indices for you automatically (as do some other RDBMSs), and this is to be applauded. However, it is still worth knowing why an index should make such a difference to data retrieval speed. Back in the December issue I promised to cover the general topic of speed, so here we go.

Speed is one of a range of factors (including usability, data integrity and scalability) which are all-important when choosing an RDBMS. Speed isn't the be-all-and-end-all, but it *is* pretty important. Speed is influenced by a very large number of factors which include (not in order of priority):

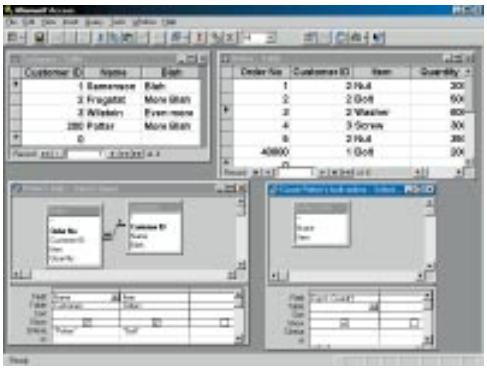
- hardware (speed of processor, amount of memory, etc.);
- disposition of data across the hardware;
- query optimisation;
- size of tables;
- number of tables;
- disposition of data within tables; and
- indexing

I don't intend to digress into a hardware discussion here, but the most common advice I hear is: "Buy more memory". The disposition of data across hardware platforms is all bound up with the machines themselves.

Query optimisation

Query optimisation is more germane, since it is under software control. It is important in consideration of speed, because not all requests for the same information are identical. It is possible to express several requests for exactly the same data in a variety of different ways. Despite the fact that the

Count me in



Using nested queries to ensure that Access can count right down to zero. The two tables are shown at the top of the screen. The query on the left counts the number of times Potter has bought bolts (zero). The query on the right counts the number of records produced by the first query (zero as well). The result of this second query will display properly on a form

Well, I asked for tips and tricks, and here is one in the form of a question from Stuart Elliot, which he rapidly followed with the solution.

"I am trying to use the Count() function to return the number of records that match the selection Criteria in a selection Query. The function normally returns the correct number, when at least one record matches the Query's selection Criteria. However, when no records match this Criteria, the function returns an #Error code. The Count function is being used in a "text box" on a sub-report, based on the aforementioned Query. Is there any way I can get the Count function to return a zero (i.e. "0") when no records match the Query's selection Criteria?" Before I could answer this, the following arrived:

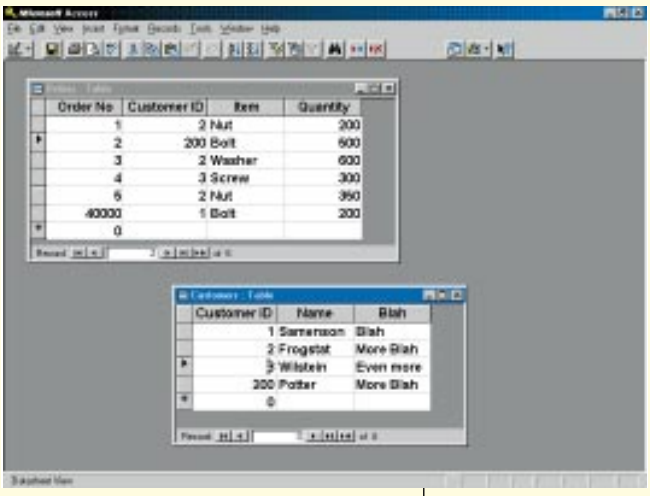
"I now have an admission to make. I found the answer to my problem, and in the MS Access User Guide at that [he says, embarrassed. No shame in that: how many of us actually read all the manuals? — MW] The information is on page 130 of the User Guide for Access v1.1.

The answer is to create a second query that contains the first query. Here are the steps:

1. Create a new selection query.
2. "Add" the first query to the second (instead of a table).
3. In the second query's first "Field" cell, enter "Count(*)" without the quotes.
4. Select "Save As" for the second query and give it a meaningful name.

How it works: The first query selects a record set according to its selection criteria. The second query generates a total of the number of records returned/selected by the first query. The * in the Count function means count ALL records in the record set (returned by the first query, in this instance), even those with Null fields."

I love problems that solve themselves.



The two tables used in the discussion on optimisation

Fig 1 Nuts and bolts

Customer ID	Name	Blah
1	Samenson	Blah
2	Frogstat	More Blah
3	Wilstein	Even More
200	Potter	More Blah

and their orders which number 40,000:

Order No	Customer ID	Item	Quantity
1	2	Nut	200
2	200	Bolt	500
3	2	Washer	600
4	3	Screw	300
5	2	Nut	350
40000	1	Bolt	200

answer table will be the same in all cases, the queries can take wildly different times to run.

If this sounds impossible, consider the example in *Fig 1* (page 314). Suppose you have a table of 200 customers (you'll have to imagine the missing 196 and 39994 records respectively).

Assume that we only sell four items — nuts, bolts, washers and screws — and that they all sell equally well.

Suppose you were performing the search manually and wanted to find all of the orders which have been placed by Potter for Bolts. There are several strategies you could adopt:

You might look through the 40,000 records in the ORDER table and extract every record which shows a sale of bolts — approximately 40,000 / 4 = 10,000 records. Then you could search through the CUSTOMER table, and find out that Potter has [Customer ID] 7. Finally, you could extract from your table of 10,000 records all those which have [Customer ID] = 7; perhaps 500 records.

But, of course, you wouldn't really do this. You would search through the CUSTOMER table, and find out that Potter has [Customer ID] 7, and then you would look through the 40,000 records in the ORDER table and extract every record which had [Item] = "Bolt" and [Customer ID] = 7.

Why would you do it that way? Because the first strategy searches through a total of 50,200 records, the second only 40,200; so the second should be (simplistically) about 20 percent faster.

This is a simple example of optimisation, and most RDBMSs would handle it without any trouble. Many queries of multi-table databases are much more complex than this, in particular those which involve queries which are nested to several levels. For example: "Of the employees who have dealt with client X within the last six months and sold her item Y, how many have sold product Z in the last three months to clients in countries with a GNP greater than that of country A, and who have a bad credit rating with more than two of our credit sources?"

An optimiser should be able to arrange for this request to be processed efficiently. However, the optimiser has to do more than simply decide the order in which the tables are processed. For example, in a multi-user system, an optimiser might receive several queries at about the same time, which require a specific table to be queried in the same way. Clearly it is more efficient to simply query this table once and "share" the resulting answer between the incoming queries.

Query optimisers are complex entities, and you are unlikely to want to write your own, so you might wonder why I have included them in a list of factors which you can look at to improve performance. The crucial point is that not all optimisers are equally efficient; so the choice of optimiser can have a significant effect on speed.

What it is to be normal

The size and number of tables and the way the data is spread among them, can clearly have a marked effect upon performance. However, the interaction of these effects can be complex.

Consider a badly designed database where little or no attempt is made to normalise the data. It contains a small number of tables, each stuffed full of duplicated data; result — a glue-like response. Now consider a properly normalised database. Lots of small, neat tables, no duplicated data; result — a glue-like response.

What? They can't both be bad, can they?. Let's consider why each of these (admittedly extreme) examples might be slow.

In the first, non-normalised example, the tables are "artificially" large because of all the repeated data, so the RDBMS has to look at huge numbers of records in order to find the ones you seek.

In the second example, the tables don't suffer from duplicated data, but there are so many tables that the RDBMS spends an inordinate amount of time opening and closing them, checking the data dictionary for join information, maintaining referential and data integrity, that it has little time left for the users and their queries.

This is not to say normalisation is a waste of time. In general it's wonderful, and should certainly be regarded as the default choice. Like all tools though, it doesn't have to be used blindly.

Two's company

In a database which is used by several users, some entering data and some querying the database, those who are querying it are generally managers, trying to see the historical trends within the data. The problem is that the "management" queries are large and complex, and interact badly with the inputting work. Essentially there are two databases needed here — one which accepts data input, and the other which is a data pool or "data warehouse". Once we make that momentous decision, we should also be able to see that the need for normalisation differs between the two.

More on this, and indexing, next issue.

PCW Contacts

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column. He's on **m.whitehorn@dundee.ac.uk**

Crossing the great divide

Gordon Laing, *PCW*'s very own good-times guru, has long wanted his PC and Mac to make beautiful music together, or failing that, at least open each other's graphics documents. Not quite plain sailing, but cool.

It's the new year; a time when our thoughts turn to everybody sharing our world in peace and harmony. With this in mind, I thought it was about time my Mac and PC got on well enough to seamlessly open documents created on each other. Well, it might work.

This is not a time for lack of optimism however, and it certainly seems I'm not alone in the attempts to share across the platforms, judging by the amount of requests we hear on the subject at *PCW*, so here goes. It's worth bearing in mind, as we attempt to exchange complex graphic documents, that half the Internet-equipped world continually struggles to exchange what is basically plain text. You may or may not be surprised to learn that simply opening the text files sent by the various contributors to *PCW* is a huge translation job in itself; but back to the plot.

The best intentions

I'm not attempting anything too clever, like opening PageMaker layouts in Quark XPress or Illustrator files in FreeHand. My intention is to take three of the most common Macintosh graphics applications which coexist on the PC, and see how easy it is to exchange documents.

Despite the fact that many earlier versions of one application could open, perhaps by chance, its cross-platform counterpart, I'm only going to be looking at the same version numbers which actually claim compatibility. The three apps are, not entirely surprisingly: Quark XPress 3.31, Adobe Photoshop 3.04, and Macromedia FreeHand 5.0.

XPress proved tricky at first thanks to Quark preferring to work with version 3.31 for cross-compatibility, but Windows 95 refused to co-operate until I updated to revision 5. I downloaded this update from the official Quark website, and everything was fine.

The first major problem to overcome on every type conversion — PC to Macintosh or vice versa — is the filename. Macintosh filenames are limited to 31 characters, but can use upper and lower case, spaces, or in fact any symbol you'd like. DOS and Windows 3.x are limited to the 8.3 file system — that is, an eight-character description followed by a three-character file type. Sadly there is a limited choice of characters, with no case differentiation or spaces.

What's in a long filename?

Windows 95 is a huge improvement over Windows 3.x, offering long filenames of up to 256 characters complete with case and spaces. There are some peculiarities with the banning of several characters, and the option to display or hide the old DOS three-letter file extension. Under DOS, Windows 3.x and Novell NetWare (without the OS/2 long filename support) the first descriptive portion of a long Windows 95 filename is truncated to eight characters, followed by the three-letter file extension, which was there all along.

The file extension is Microsoft's way of identifying the file type. Word knows to look out for DOCs. A paint package knows that TIF, GIF, BMP and PCXs are all bitmaps with known properties. By retaining, but hiding the extension in Windows 95, Microsoft has ensured a certain degree of backward compatibility with DOS and Windows 3.x.

When confronted with a DOS/Windows filename, the Macintosh just sees it as a bunch of characters. The fact that they are arranged as eight, followed by three with a dot in the middle, is of no consequence. However, many Macintosh applications look out for header information, or have been warned in advance of the PC file extensions and recognise them correctly. All three of the apps discussed here recognise and understand the file format from the PC extension.

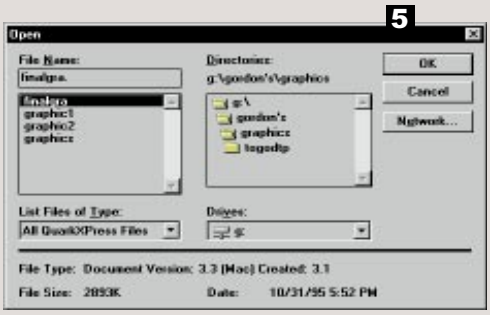
Dot's the way to do it

When the PC platform is faced with a Macintosh filename, it is unable to identify the file type without an extension. A quick and easy solution is for Macintosh users to bung in a dot, followed by the appropriate file extension for their unfortunate PC friends; but it's a tough habit to get into — and why should they?

One reason is that a Windows application immediately looks for its native file format in the open dialogue box. Quark XPress for Windows, by default, looks for anything with a QXD extension. Photoshop seeks TIFs, GIFs, BMPs and the like. The only way a Windows open dialogue box will see unmarked files is to go for a totally wildcard search by typing *.*.

Consequently, opening a Macintosh file under Windows is a multi-problematic affair. Firstly, unless the Mac user has ended the filename with a dot and the correct file extension, Windows will not see it; and even when you force it to, you'll have to know what kind of file it is. Secondly, once you've searched for *.*, you'll only see the first eight characters which may not sufficiently identify the desired file.

Opening PC documents on the Macintosh



Okay okay, I'll use any excuse to get my picture in PCW, even twice on a single page!

(1) *Adobe Photoshop 3.04 for Windows, having opened the layered document I created for last month's column. Eagle-eyed readers may have spotted that the type layer has been removed*

(2) *MacroMedia FreeHand 5 for Windows, opening a FreeHand for Macintosh document. (Illustration by Jon Mason.)*

(3) *Notice the missing fonts alert box. This could be solved by installing the correct fonts on the PC, or by converting all type to curves. However, once converted to curves, type loses any character attributes and can only be edited as a shape*

(4) *Quark XPress 3.31 for Windows, after opening the layout for last month's column with, er, me on it again*

(5) *There were a few problems however. The open dialogue box had to search for *.* before seeing the documents, although XPress did identify their Mac origins*

(6) *The ubiquitous missing fonts alert box, and there's a fair few of them...*

Opening PC documents on the Macintosh

Infuriatingly, Windows 95 cannot interpret and display Macintosh long filenames.

Once each platform has seen and identified the desired file, one final hurdle remains: it may just not be able to translate that particular format. Show a Macintosh pict file to many PC painting applications and they'll freak; even some of those claiming support for the suitable PCT extension. Similarly, the Windows Metafile, WMF, and even occasionally PCXs or BMPs, leave the Macintosh none the wiser.

Adobe Photoshop is a good all-rounder at opening a variety of different bitmapped files, and indeed just about the only PC application to deal with Macintosh picts. This won't be an issue here, however, since we're dealing with three applications which should certainly be able to open documents created on their respective cross-platform counterparts.

Starting with the easiest first: Adobe

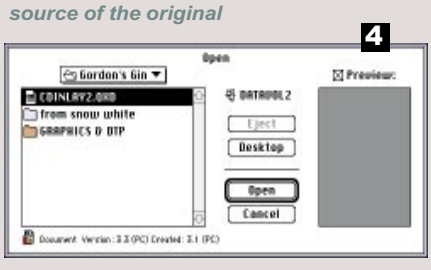
Opening Windows files on a Macintosh is considerably easier than opening Mac files under Windows.

(1) *Adobe Photoshop 3.04 for the Macintosh, having opened a Windows PSD file, complete with layer information. To be fair, Photoshop for Windows has no difficulty opening layered Mac documents (see previous page)*

(2) *Macromedia FreeHand 5 for Macintosh having opened a FreeHand for Windows file. To make life a little more interesting, I got FreeHand for Windows to open a CorelDraw file (the famous eye) and convert it into a FreeHand FH5 file. Once on the Macintosh the image was totally editable, even after two conversions*

(3) *Quark XPress 3.31 for Macintosh, after opening an XPress for Windows document. The type on the original Windows document was exclusively Helvetica. Since Helvetica was installed on the Macintosh (indeed, on almost every Macintosh in the world) the file opened without reflow or complaints of missing fonts*

(4) *The Macintosh XPress open dialogue box, having recognised the Windows source of the original*



Font of the Month

Photoshop 3.04. Although Photoshop has long been able to open vector EPS files by rasterising them, it is undoubtedly first and foremost a manipulator of bitmaps.

Photoshop handles bitmap files just about transparently across platforms. Sometimes you may have to give it a hand by "opening as" when it's not certain of the file format, but otherwise you'll experience few problems. Photoshop's native format (PSD extension on the PC) opens transparently across platforms, complete with any layer or channel information. "Opening as" may crash under Win95 unless you are running v3.04.

XPress and FreeHand, along with any other application which may deal with text, have one big problem in common: fonts. When you open a document on a machine, even on the same platform which does not have the same fonts installed, you're in trouble. The machine lacking the correct fonts has to substitute something else, causing reflow and no end of worries. In the old days, applications would commonly substitute Courier, partly due to it being a common font on all systems, and also rarely used and hence spotted straight away as a substitution. Not much help though.

Newer applications will list the fonts missing and allow you to make you own closest match substitutions. The process can even be automated using the Panose font matching system, which finds its own closest matches. Unfortunately Panose is not used on any of the three apps discussed here, and despite being a good idea, does not work that well.

The best bet, if you want it to work perfectly, is to buy the same fonts from the same source. The only format I have found for this to work with any degree of success is PostScript Type-1, but be aware that every foundry has its own slightly different versions of popular fonts. These may not look that different until you have a page of text, at which point the different kerning tables and letter spacing becomes apparent.

This aside, XPress and FreeHand documents appear to cross the platforms without any other difficulties. Even when you do have the same set of fonts on each platform however, you should check all text elements for reflow or incorrect substitution. The situation is better than it was a few years back, but not totally without grief.

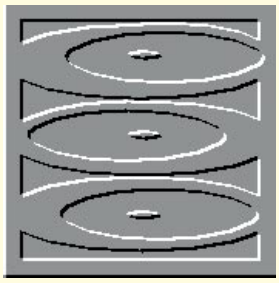
Font of the month

Yet another gem from FontWork's *FUSE* (issue number 13, Spring 1995, entitled Superstition), is Santa Domingo by Pablo Rovalo Flores, born 1969 in Mexico City. Along with much TV design work, Pablo designed the Mexican Yellow Pages in 1995. Santa Domingo's lower case characters have different baselines, giving a jumbled effect, while the upper case stay on the same straight. There are four variations of the font, the fourth being a neat set of skull symbols. Those of a superstitious nature should call FontShop for a copy.

PCW *Contacts*

Anyone got any happy cross-platform kiss-and-make-up stories? Write to me at the *PCW* address on Broadwick Street or email me as **gordon_laing@pcw.ccmail.compuserve.com**

Faces 01276 38888
FontWorks 0171 490 5390
FUSE 95 page
http://www.contrib.net/fuse95/



Caught in a **shower**

Panicos Georghiades and Gabriel Jacobs make their selection from the glut of new multimedia products flooding the market. Plus they ask, what will Intel's Indeo Video Interactive do for developers?

Multimedia moves so rapidly that it's a job to keep up with the shower of new products which regularly drench the market. They're nearly all interesting, though most are hardly earth-shattering. However, apart from Intel's new release of Indeo (about which lots more to come), three other new products of some significance have caught our eye this month.

The first is a piece of software which allows multimedia applications to be published easily on the World Wide Web. It comes from Asymetrix, producer of Multimedia Toolbook and 3D/FX. Asymetrix has just announced that it will support the recently announced NeScape (Web browser) inline plug-in API in all future Internet versions of its products.

We don't know how many NetScape users there are out there, but it must run into millions throughout the world. Not surprising, then, that a major multimedia company has decided to make itself NetScape compatible. Even the most short-sighted industry watcher knows that the future of the Internet must lie in full multimedia capability, and NetScape seems to be establishing itself as the standard.

The second product is for the Mac, which many believe is (as ever) struggling for its existence, despite the fact that until very recently it was so obviously a superior machine to the PC, especially for multimedia, and still is the machine of choice for developers. It's perhaps for this reason that the next version (4.2) of Adobe Premiere, the digital video editing program, has first been released for the Mac.

This new version includes Adobe's new CD-ROM Movie Maker plug-in, and adds QuickTime 2.1 and Adobe Type Manager version 3.8.3. Adobe also claims that it improves performance on a PowerMac with its native Sound Manager 3.1.

Cool storage? Sony's new CD-ROM jukebox for mass storage applications

The CD-ROM comes with Specular LogoMotion, a program for creating animated 3D logos using QuickTime and still-image files.

The final new product is what we would guess to be the biggest CD-ROM drive in the world — Sony's first CD-ROM jukebox, the CDZ-R360 (pictured above), aimed mostly at library applications in the educational, scientific, medical, service and engineering markets.

It consists of two CD-ROM drives and offers a storage capacity of up to 234Gb. That's more than we can imagine — you too, probably. Anyway, to put this in a way which most of us *can* imagine, it holds up to 360 CD-ROMs. The two drives can read all standard CD-ROM formats: CD-DA, CD-ROM, CD-ROM XA, CD-i and Photo-CD (including multisession). The robotics design is said to be very reliable (it's based on Sony's pretty-well proven audio CD jukeboxes) and is maintenance free.

The system comes with a SCSI-2 interface for data transfer and robotic control, and, for compatibility with older software, an RS232 interface for robotic control only. Included are drivers for Windows, Mac, and Novell NetWare.

The price? A cool £7,500. Not everyone's first priority, therefore, but as demand for CD-ROM jukeboxes inevitably increases, so prices will fall.

Do you need 200-odd gigabytes of storage? Well, we're old enough to remember a time when a 600Kb floppy disk on a Sirius 1 was considered far more storage space than anyone could ever imagine needing in the foreseeable future. Times, they are still a-changin'.

Intel Indeo Video Interactive: IVI — what will it do for developers?

One of the most important and exciting recent developments in the world of multimedia has to be Intel's release of a new Indeo digital video standard. Just when

you thought the dust was beginning to settle, and that MPEG-1 would be the digital video standard of the future (on computer equipment as well as domestic video), Intel makes available its new digital video format: Indeo Video Interactive (IVI). It includes features which put it technologically ahead, and therefore make it very attractive. Its key features are simply not available in other formats, and so it has to be counted as an exciting new development in the world of multimedia.

Now, care... we're not saying that IVI is about to replace MPEG, and certainly not in the domestic market. But anyone developing multimedia applications (PC or Mac) would do well to consider IVI. It's based on a compression method called Wavelet (see Ben Tisdall's article on page 251 of the December 1995 issue of *PCW*). And, as its name indicates, one of its most important features is interactivity.

Talk of interactivity in video usually brings to mind the impression of having the freedom to navigate from one point in a storyline to another, or even to make up a story by choosing one of a number of outcomes. The idea is based on that of branching: as you work your way down a tree structure, you can choose to take one road instead of another.

IVI certainly has this. However, there can be more than that to video interactivity, and IVI has that much more, such as allowing you to alter in real time image characteristics like brightness, contrast and saturation. Such functions give programmers far greater flexibility than ever before. For instance, it will now be easier to fade out a video segment at any point in real time, without having to incorporate the fade in the video clip.

There's interactive support for transparency effects, too. With this, video or graphics objects of arbitrary shape can be overlaid onto either a video or graphics, and interactively controlled during run-time via a joystick, keystroke or mouse. This means you can create video where the user can select, say, the background for a talking head.

And that's far from all. With IVI you get something called local window decode, which means you can create an independent playback window within a larger video display. Of what use is that? Well, developers can give users a view of just those portions of a video to which they decide to pan.

You also get random keyframe access. A similar facility was only last year implemented in some top-end MPEG encoders,

Question & Answers

We get fairly inundated every month with queries, mostly via the Internet rather than snail mail. We're glad to receive email messages, but if we were to reply to each one of them personally, we'd be running a full-time BBS; so we have to stick (mostly) to answering queries in the magazine. And for that we pick out those we think will interest other readers.

Image problem

How can I import a JPEG image file in Multimedia Toolbook? Although JPEG is one of the options available in the Import Graphics option in the File menu, when I try to import a JPEG file I get an error of an invalid file format. I know that my JPEG files are OK. I can import them into other applications such as PhotoShop and PaintShop Pro. I have examined the "asym.ini" file and the JPEG driver is listed in there.

John Bushby, London

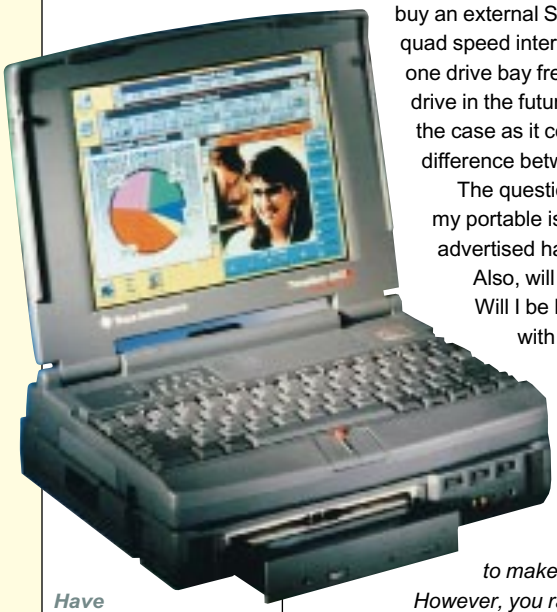
The JPEG file format is extremely useful if your multimedia application has a great deal of images. Unfortunately, Multimedia Toolbook doesn't come with a JPEG import driver, so the driver you have has been put there by some other Asymetrix product — probably 3D/FX. You can get an updated JPEG driver by dialling the Asymetrix bulletin board on 00 33 1 476 29667 (France). However, you can still import JPEG files by using the Clips option and selecting a Video File. You'll have to create a stage object to display this. (At the moment, this solution works only under Windows 3.x.)

TravelMate upgrade

I would greatly appreciate your advice concerning upgrading my TI TravelMate 4000M portable. I would like to add CD-ROM capabilities as well as allowing further expansion. I know you (*PCW*) really like the portable docking station available for my computer, but frankly £399 + VAT for a two-speed CD-ROM drive, some speakers and a battery doesn't sound like good value, no matter how nice it looks. At present the best plan seems to be to

Continued page 325

Questions & Answers (continued)



Have CD, will travel… but at what cost to upgrade the TI TravelMate 4000M?

buy an external SCSI case to hold two 5.25in drives, a quad speed internal drive to put in it, and then leave one drive bay free for maybe another hard disk or zip drive in the future. I would actually save money buying the case as it costs £60, much less than the difference between an internal and external drive.

The question is: will this work? The adaptor on my portable is SCSI-2, but the cases I've seen advertised have just been described as "SCSI". Also, will the 60W power supply be enough? Will I be limited to expensive types of hard disk with this idea? Basically, do you think it's sound?

James Purbrick, Nottingham

We didn't write the article you refer to (Docking Notebooks — October 1995 issue), and we don't know your particular portable well enough to make any definite pronouncements about it. However, you raise the important issue of adding CD-ROM (and therefore multimedia) capabilities to portables, and that of associated cost.

There's no reason why a DIY job shouldn't work provided you sort out the connections and make sure that all the electrical characteristics of the individual components you're planning to install agree with each other. When most people refer to SCSI they usually mean SCSI-2, so there shouldn't be any problem there (but check with the suppliers and get the specs in print).

A power supply of 60W may or may not be enough. Most hard disks and CD-ROM drives consume about 13 to 17W, so you should have no problem with fitting three devices. But we're sceptical about whether you can fit all four?

Finally, if price is the main problem — and it seems to be — consider that the £399 price is an RRP. The street price can be nearer £300.

And while we're at it, we should also add that the docking station includes more than you say. What about the 16-bit sound card and the microphone? What about the speakers which have a wide/narrow stereo field capability? If you shop around, the docking station may actually be better value.

but it looks as if it's set to become the norm, and IVI already offers it as standard.

What is it? First you have to be aware of one of the solutions to the problems of compressed digital video. This is that a great deal of space is saved by not compressing every individual frame of a video segment, but only the differences between one frame and the subsequent frames.

But the problem with video compression which works in this way (as MPEG does) is that when there's a sea-change between two consecutive frames (in the worst cases, cuts from one scene to another), the first frame of the new sequence is radically different from its predecessor, and the video quality plummets.

The only solution is to make the frame which starts a new sequence, into a so-called keyframe — in other words, the full frame is stored rather than the differences between it and the previous frame, thus refreshing image quality. This has not been possible so far with standard codecs (COmpressor/DECompressors) which store keyframes at constant predetermined intervals. IVI lets you place keyframes anywhere in a video stream, so image quality can be rapidly bumped up during playback.

Further enhancements to quality include a scaleable quality feature. Earlier versions of Indeo video allowed the frame rate (frames per second — about 25 are required for a really seamless motion effect) and image size to be varied, within limits, in order to take into account differing computer performance.

IVI goes a stage further than its predecessors. It's now possible for video quality to scale automatically between different quality "bands". What this means in practice is that you can offer video in a window on lower-level machines, while also allowing full-screen smooth-motion video to play back on higher-level machines like Pentiums. The idea isn't new — in fact, it's the way certain things are done on the Internet — but here it is built into a video compression system. Furthermore, the quality achievable with this system when you use higher-level machines is quite exceptional. IVI will play back at full screen — in software alone, of course — with near-VHS quality when run on a 90MHz Pentium PC or above.

Something special

Special techniques have also been applied to that other problem endemic to digital video: that of data transfer rate from CD-ROM drives which typically don't squirt the data fast enough for full-screen seamless motion video. IVI can manage such video on a Pentium PC, with excellent picture quality, equipped with a standard double-speed CD-ROM drive.

You get other goodies with IVI, too. One notable feature is password protection: developers, for instance, can assign passwords to keyframes to protect individual video clips from being altered.

A Software Developers' Kit which includes the IVI PC drivers, programming tools, and documentation is available free, says Intel, to developers. Apple QuickTime 2.01 and 2.1 drivers should be available by the time you read this.

Many firms will be offering a variety of third-party software add-ons, development tools, compression services and realtime capture cards designed to work with IVI: Adobe (for Adobe Premiere), Asymetrix (for Digital Video Producer), and Digital Video Arts (for its WakeBoard high-performance PCI Bus IVI capture and compression card). And Intel claims that many others have plans to do so, too; something we can well believe.

For more information on IVI, go to Intel's World Wide Web site at http://www.intel.com (multimedia and game developer information area), or to the Intel Forum on CompuServe (IntelA, then the multimedia library).

PCW Contacts

Panicos Georghiades and **Gabriel Jacobs** will be glad to answer your questions. Either write to *PCW*, or email **g.c.jacobs@swan.ac.uk**

Adobe 0131 4532211
Asymetrix 0800 716957
Sony Computer Peripherals 01932 816619
Intel 01793 403000

Loop the loop

Steven Helstrip looks at Steinberg's new audio editing package designed to run under Windows 95 and NT, shows you how to create a Mixer Map, and recommends the best loop collection yet.

Last month we looked at ways to add delay, or echo, to synth parts using MIDI information instead of a dedicated delay unit. Not only does this save you from buying an effects unit in the short term, it provides greater flexibility — assuming, of course, that your synth has enough polyphony. Delays, and particularly stereo delays, can help to "bring out" parts within a mix. Over the next few months we'll be looking at other ways to enhance your tracks, without necessarily having to buy expensive studio equipment. First, though, some interesting developments for Windows 95 and NT users.

Mixer maps made easy

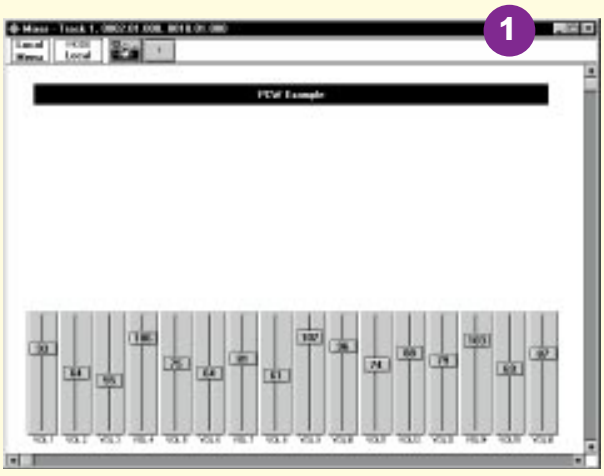


Fig 1 *Faders to control main volume for each of the 16 MIDI channels*

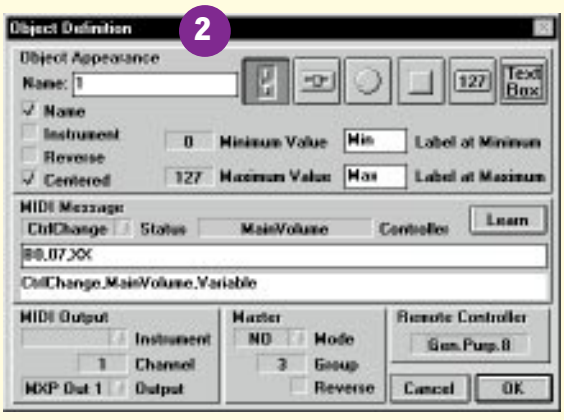


Fig 2 *The object editor looks pretty scary, but it doesn't take long to get to grips with it*

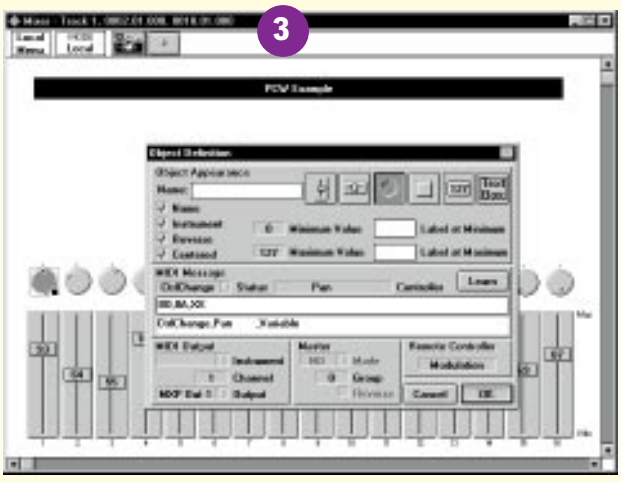
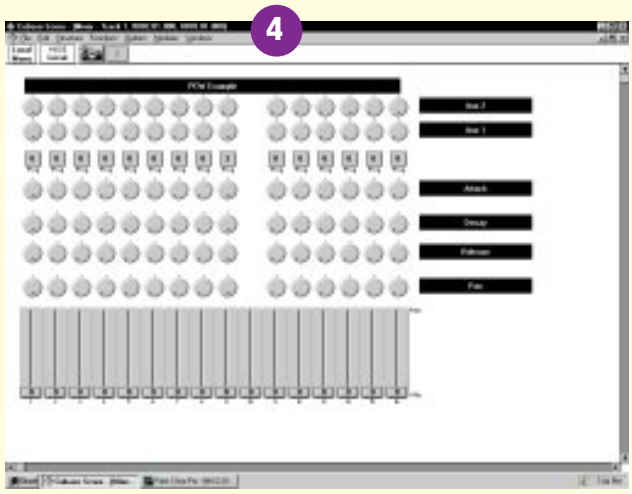


Fig 3 *Adding objects to control pan position*

Fig 4 *The finished mixer map. Looks good, doesn't it?*



WaveLabs

Just before Christmas, Steinberg released details of its new 32-bit wave editor, WaveLabs. This is the first pro-audio application to run under Windows 95 and NT and is, according to Steinberg, the fastest editor to be available to date.

WaveLabs has been developed for pro-studio use and integrates features such as time stretching, pitch correction, harmoniser, parametric EQ and sample conversion. The package supports .WAV and .AIFF formats, and has unlimited zoom and undo. WaveLabs is expected to be available by February, although no prices are available as I write.

Tapeless tape, high-speed applications and automated mixing are welcomed with open arms by today's musicians, but for the recording studios it's not such good news. Not because it's expensive to keep up to date, but because the time needed to mix a track gets shorter and shorter as new technologies appear.

Take for example the introduction of hard-disk recording, which, among other benefits, provides instant random access to any part of a track. Time taken up with fiddly things like rewinding tape on a traditional 24-track is cut right down. Over a five-day session, it amounts to a saving of around half a day.

An album can now be edited on one PC, cutting in half the time it took two years ago. The studios are losing out.

Using Continuous Controllers

Most synthesisers, including sound cards, allow you to control many settings, or parameters, of its instruments via MIDI. Such parameters include the attack, decay and release times; cut-off frequency, resonance and modulation settings. By adjusting these settings, new sounds can be created. More to the point, it is easier to simulate "live" instruments more accurately, making for a better final product.

In most cases these parameters can be controlled using Continuous Controllers (CCs). A common example is a CC to set the volume of an instrument at the beginning of a song. To do this you would insert a CC event (Continuous Controller 7) with a parameter between 0 and 127 where 0 equals off and 127 is maximum.

It is possible to control these parameters in real time with most sequencers. Cubase lets you do this in several ways. Firstly, you can map Modulation to any CC from the MIDI setup dialogue box. This will allow you, for example, to control the reverb level for a single instrument by moving the modulation wheel on your master keyboard. The most flexible way to manage controllers, though, is to create a Mixer Map. Mixer Maps allow you to assign sliders, dials and buttons to Controllers, providing an intuitive and graphical environment to play around with and record CCs in real time.

Important Controller Numbers

00	Bank Select
01	Modulation Wheel
05	Portamento Time
07	Main Volume
10	Pan Position
65	Portamento On/Off (**0**=off **127**=on)
91	Reverb Level
93	Chorus Level

Creating Mixer Maps in Cubase

Although setting up a mixer map requires some knowledge of the workings of MIDI, don't let this put you off — we'll cover all the main elements in this column. To create a mixer map you need first to set up a mix track. To turn a track into a mix track, pull down the Track Class menu (the C column) and select Mix Track. Next, create a part by double-clicking between the left and right locators.

The track info column will display "Untitled" in the instrument column and the default mixer map will be loaded. This is a generic mixer that allows you to control program change, volume and pan for each of the 16 channels. To create a new mixer map, however, double click the "Untitled" box and select empty.

When you double-click on the new part which was created earlier, the "empty" mixer will be opened. In this first example we will create faders to control the main volume of each one of the 16 channels.

When the right mouse button is clicked, a toolbox is displayed. Select the "new" tool and click with the right mouse button. This creates a new object and opens the object editor. You can choose from six objects — horizontal and vertical faders, dial, on/off switch, numerical display, and text boxes. Select the vertical fader and choose control change in the MIDI message box. Next, select main volume from the controller box (CC7). Once you have selected your MIDI output and MIDI channel one, you're ready to try it out.

Press OK, then select the play tool (the pointing finger icon) and move the slider up and down. All being well, this should control the volume on MIDI channel one. The quickest way to create the remaining 15 faders is to duplicate the first. This is

done by holding down the Alt key while dragging the fader to a new position. When you let go of the mouse button, the object dialogue is reopened. Select channel two for the output and click OK. Do this for all 16 channels. If you want to give names to each object, or fader, enter this in the name field of the object editor. Double-clicking on any object will reopen the editor.

No mixer is complete without panpots, so the next job is to create pan dials for each channel. This is done in exactly the same way, only you need to select continuous controller ten. You can also add program change buttons to your mixer.

Creating objects to control instrument parameters

This can be done in exactly the same way as before, but first you need to do a little research. Because there are few standards in the MIDI specification, there isn't a standard CC to control, for example, the release time of an instrument. Some synths enable you to set a CC number manually, but when it comes to sound cards, you need to check its MIDI implementation chart. This can be found towards the end of the card's manual.

In *Fig 4 (page 326)* I have added three sets of dials to control attack, decay and release times for each of the 16 channels. The synth they were set up to control was a Roland U220. From its setup pages you can map any parameter to a Continuous Controller; therefore, I assigned attack to CC 60, decay to 61 and release to 62. When I created the dials for the mixer map I followed the same steps as before, only entering different CC numbers.

Fig 3 shows two rows of dials which have been set to control auxiliary send levels — in this case, reverb and chorus. Thankfully, there are standard controller numbers for these, which are shown in the table *(page 327)*.

These examples have been set up to control very simple parameters, but almost any parameter can be accessed. If they cannot be accessed using CC messages, they can be controlled using system exclusive messages. We'll look at system exclusive events next month, and at more creative ways to use the mixer maps.

Here we go round again: Loopisms 6

This is Dzone's latest, and by far its best collection of loops yet. There are 24 loops altogether, each repeated 20-odd times, and one-shot samples taken from the Vintage Keys sound module for added value. There's a CD-ROM partition on this disc, with each sample stored as .WAV files, and fully-working demos of Cubasis and Software Audio Workshop. Oh, there's also the shareware version of Doom, should you not already have a copy.

The majority of loops fit into the house/garage genre, with rhythms reminiscent of Joe T Vanelli, Frankie Knuckles and David Morales. You'll also find three jungle-esque loops in this collection. They don't quite fit in here, but they're there for good measure.

The quality of these loops is consistently high, with tempos ranging from 64bpm right up to 165 — obviously one of the jungle loops. For just £12, this is yet another bargain from Dzone. Don't bother with the Vintage Keys samples, though. As they've only been sampled at middle C, they're just about useless.

PCW Contacts

Readers' contributions to the Sound column are music to our ears. If you have any hints or tips, any MIDI-related items or general comments, send them in to the usual *PCW* address, or to **steven_helstrip@pcw.ccmail.compuserve.com**

Dzone 0181 651 2222
Harman Audio (Steinberg) 0181 207 5050

The **common** touch

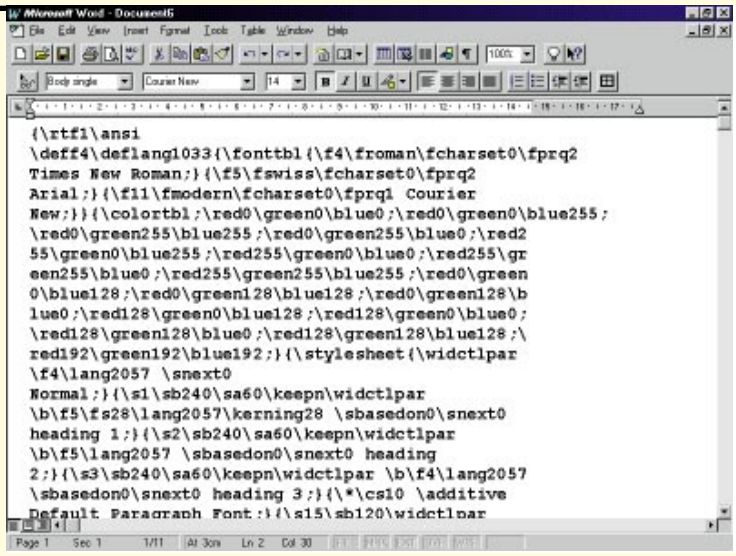
Got a nice little Windows 95 or NT application under development? Including a few common controls can make all the difference, you know, and at very little cost. Plus, launching DOS programs from Delphi. With Tim Anderson.

It's always nice to get something for nothing. If you are developing for Windows 95 or Windows NT, there are a host of new features you can include in your applications for very little cost, since they are integrated into the operating system. These are the Windows 95 common controls, and you can expect to find them in most 32-bit Windows development languages including Visual Basic 4.0, Visual C++ 4.0 and the forthcoming 32-bit Delphi.

Most of the new common controls are similar to items previously available as third-party VBXs, which is bad news for VBX vendors who now have to think up new gizmos. It also presents developers with a choice: either stick with the old solutions, or adapt applications to work with the new, common equivalent.

Right *Rich Text Format in its raw form — not a pretty sight*

Below *The RichTextBox supports a reasonable range of formatting options, but cannot display justified text*



A good example is the rich text control. Once you needed HighEdit, AllText or Visual Writer to include rich text support, but now it comes as standard with VB. The add-on vendors will argue that their controls offer more features, making it possible to migrate smoothly from 16 to 32 bits by plugging in a code-compatible OCX. True; but common controls slim down your application, and as a shared resource make more efficient use of Windows. They also give your program the same look as other mainstream applications, usually considered a benefit. All this assumes that you no longer need to support 16-bit Windows.

Access to the common controls from Visual Basic 4.0 is via two OCXs. Most of the controls are in COMCTL32.OCX, while the rich text box is in RICHTX32.OCX. To show some of the possibilities, here's a look at using two of the most significant: the TreeView and RichText controls.

Windows 95 Common Controls

The following controls are supported by Windows 95 and NT 3.51 or higher, but are not available in 16-bit Windows:

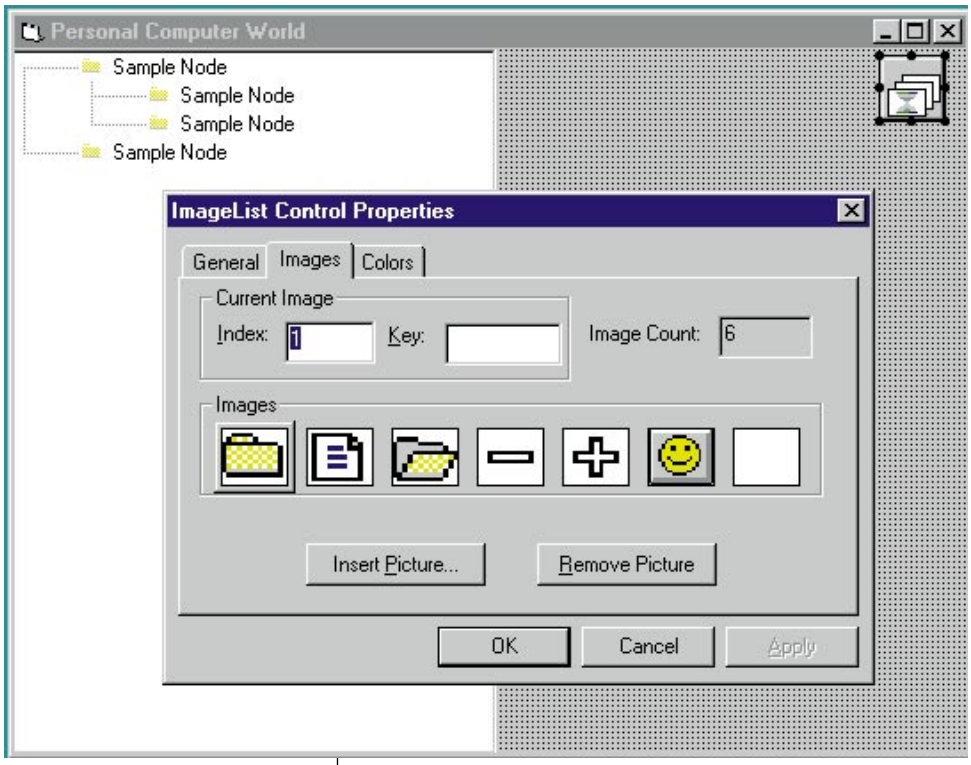
ImageList
Like the earlier PicClip control, ImageList is a way of storing images (bitmaps or icons) so that they can be used by an application without loading them individually from disk at runtime. ImageList is much easier to use than PicClip.

ListView
If you've used Explorer, you know what to expect in ListView. Like Explorer's right-hand panel, ListView enables a list of items to be displayed as large or small icons, or as a detailed list. A fourth mode, Report, allows additional text to be displayed for each item.

ProgressBar
A chunky gauge control to keep the user amused during those long operations.

Slider
As its name implies, Slider lets the user set a value with the mouse by dragging a sliding bar.

StatusBar
Your application can have a pre-built status bar divided into panels. You can write text to the panels in code, or automatically set them to display standard information such as date, time or insert/overwrite status.



The ImageList control lets you store bitmaps or icons in an application for use by other controls. In this example, the ImageList supplies bitmaps for a TreeView control

TabStrip
You can create tabbed dialogues using the TabStrip control. Because tabbed dialogues have become such an important part of many Windows interfaces, an alternative is supplied in both 16-bit and 32-bit form; the SSTab control.

BOX CONTINUES ON NEXT PAGE

Branching into TreeView
You should think of the TreeView control as a collection of nodes. Each node is a branch of the tree. To set up a TreeView, you use the Add method of the Nodes collection, the syntax for which is:

```
Nodesobject.Add(relative,
relationship, key, text, image,
selectedimage)
```

This intimidating parameter list is not really so bad: it tells the TreeView control where the new node fits in the hierarchy, provides an unique identifying key and, optionally, an image to display by the mode. For instance, you might use TreeView to construct a multimedia viewer: the book title is the root of the tree; chapters are the next branches down; sections are below each chapter.

Fig 1 shows a parameter list in which the image parameters are unused. When included, they refer to the index of an ImageList control with the selected image parameter, making it possible to change the image when the node is selected.

Once the tree is set up, the chances are you will want something to happen as the user navigates through the tree. The most useful event is NodeClick, which provides the current Node object. For example, the following will place the text of the current node into a RichTextBox:

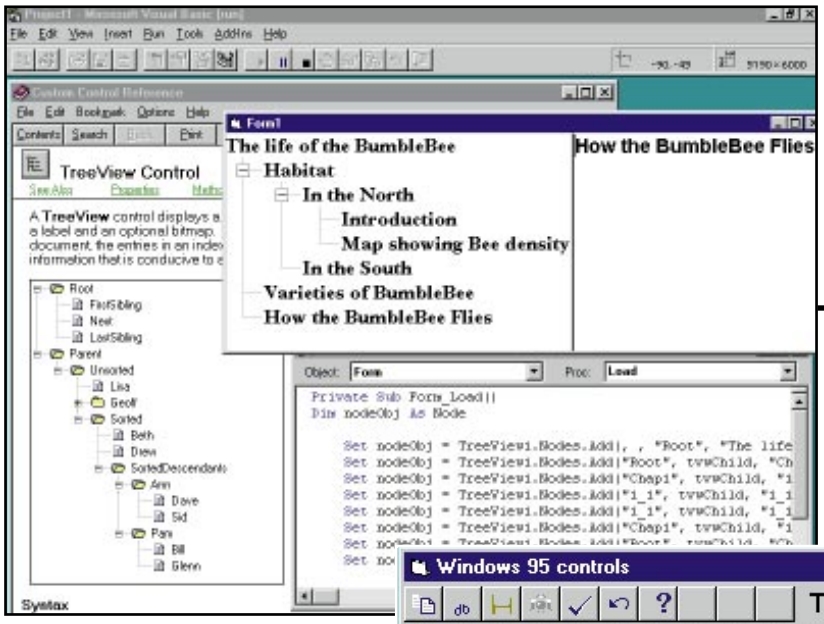
```
Private Sub TreeView1_NodeClick
(ByVal Node As Node)
RichTextBox1.Text = Node.Text
End Sub
```

To develop the idea further, one approach would be to store rich text documents in an Access database. The Key for each node could identify a record in the database, and in the NodeClick event you could write code to display the text, and hey presto! a multimedia document and viewer for the price of very little code.

Fig 1 Parameter list

```
Dim nodeObj As Node
Set nodeObj = TreeView1.Nodes.Add(, , "Root", "The life of the BumbleBee")
Set nodeObj = TreeView1.Nodes.Add("Root", tvwChild, "Chap1", "Habitat")
Set nodeObj = TreeView1.Nodes.Add("Chap1", tvwChild, "1_1", "In the North")
Set nodeObj = TreeView1.Nodes.Add("Root", tvwChild, "Chap2", "Varieties of BumbleBee")
Set nodeObj = TreeView1.Nodes.Add("Root", tvwChild, "Chap3", "How the BumbleBee Flies")
```

More Windows 95 Common Controls

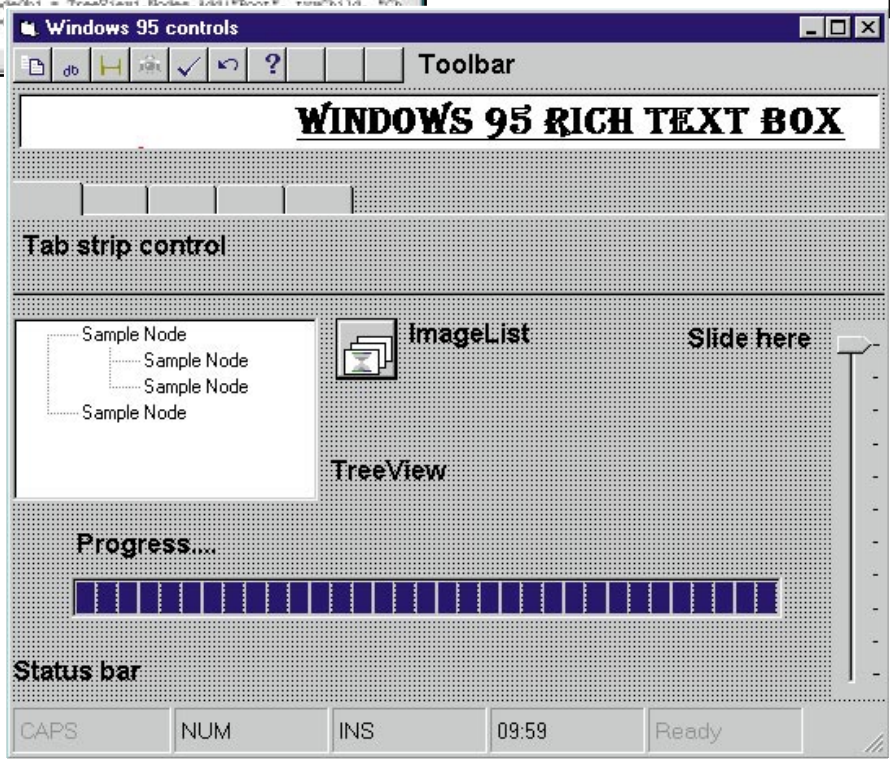


RichTextBox

This is the heavyweight among Windows 95 controls and is the basis of the WordPad accessory applet. Basic word processor functionality is built in, including the handling of multiple fonts and styles. For applications that require the display of formatted text it is indispensable, particularly if you want the user to be able to edit, cut and paste.

Left *TreeView: just the thing for family trees, multimedia books or boring old directory viewing*

Below *Windows 95 Common Controls are the most efficient way to jazz up a VB 4.0 application*



Toolbar

Microsoft's off-the-peg toolbar control is a panel object with a buttons collection, and can be linked to an ImageList control to obtain appropriate icons. You can define tooltips and align the bar top, bottom, left or right. Sadly, it cannot be made to float, or re-aligned via drag-and-drop. The toolbar control in Visual FoxPro is much better: why can't those people at Microsoft work together?

TreeView

One of the most powerful controls is the TreeView, a hierarchical list. If ListView is demonstrated in the right-hand pane of Explorer, TreeView is the left-hand pane. Microsoft must like tree views, since the Microsoft Network online service uses them to the point of frustration. But in the right context, a tree view is ideal.

Get RichText quick

The RichTextBox is a superset of the standard edit control. You should never use a Rich Text control where the standard item will do, since it consumes more resources. With a standard text box, properties like FontName and FontSize affect all the text in the control. The RichTextBox has SelFontName and SelFontSize properties instead and these alter either any selected text, or the next characters typed if no text is selected. That makes it easy to format text in code, or from a toolbar or menu.

You can load and save files with the RichTextBox either in plain text or RTF format. Clipboard support is automatic. There's also a Find method which searches for a given character string. Printing is carried out using the SelPrint method. SelPrint will output selected text, or the whole contents of the control if no text is selected. It does not print directly but needs a handle to a device context. The simplest approach is to use the VB Printer object which has an hDC property. Note that this is not valid until something has been printed, so you need to print an empty string before calling SelPrint, with code like this:

```
Printer.Print ""
RichTextBox1.SelPrint (Printer.hDC)
```

The RichTextBox is data-aware. Simply binding it to a memo field gives you the basics of a book viewer or document management system as it automatically reads and writes RTF documents to the database. Overall, this is an excellent control, although as it lacks the ability to justify text, display pictures or include OLE objects, there is still space for third-party rivals.

Zipping into Delphi

One of the most enduring DOS programs must be PKZIP. Adam H writes:

"I'm brand new to Delphi but getting along (I think). I have one question that is

really bugging me. Can you launch other applications from an app created with Delphi, and if so, how?

I wish to create a simple application with two buttons on — BACKUP and RESTORE. When a button is pressed, it will run the PKZIP program and compress a directory onto a floppy, or vice versa.

Also, can you trap the messages issued by the PKZIP program and place them into the Delphi app?"

You can launch applications from Delphi using the API functions WinExec or LoadModule. For example, the following runs the Windows calculator:

```
WinExec('CALC.EXE', SW_SHOW);
```

In Visual Basic you can do the same thing with the Shell command, but this does not achieve what Alan requires. PKZIP is a DOS program, so to run it in Windows will open a DOS window, execute the program, and leave the window on the screen. You can improve on that, for example by creating a .PIF file for PKZIP, specifying that the DOS window closes on termination, and using the SW_HIDE parameter:

```
winExec('PKZIP.PIF      A:\BACKUP.ZIP
C:\DOCS\*.DOC', SW_HIDE);
```

That works well if there are no problems, but what about error handling? What if PKZIP produces one of its "y/n" prompts and waits forever in a hidden window for an answer? At this point, things get nasty. Alan wants to trap PKZIP's messages, but even if he uses DOS functions to redirect PKZIP's output to a file for parsing later, there will still be difficulties with prompts that need a user response. We are back to the untidy DOS window solution. Another problem is that WinExec is asynchronous: the Delphi or VB application will continue to execute at the same time PKZIP is running. The program would need to enter a loop, calling the API function GetModuleUsage with the instanceID returned by WinExec, until it returns zero to indicate that the program has terminated.

You can do a better job of running DOS programs from Windows by writing a Virtual Device Driver (VxD) to intercept DOS stdout and stderr — not exactly visual programming. The easier solution in this case is to use a compression library designed to be integrated into applications. There are several to choose from, including Microhelp's Compression Plus and PkWare's Data Compression Library.

What is Rich Text Format?

Rich Text Format (RTF) is Microsoft's format for transferring formatted text between programs. It includes codes to identify fonts and styles. RTF uses the backslash to begin control words, and brace characters to identify groups of text. For example, the code "\b" means "bold", and "\b0" means "turn bold off". Therefore, you can embolden a word in an RTF document like this:

```
Here is a \b bold \b0 word in RTF
```

Because an RTF file generally uses only plain text, it is easy to transfer between different applications, or across different platforms like PC to Apple Macintosh. Usually it is more reliable than using conversion routines that work on word processor formats like those used by Word, WordPerfect or Ami Pro. RTF is particularly important in Windows, since it is the standard clipboard format for transferring formatted text.

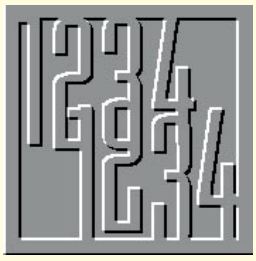
The RTF standard has caught on well and every self-respecting word processor or DTP application supports it. The snag is that Microsoft controls the format and tends to add zillions of new control words with every new version of Word. This has caused problems for the industry. An example of this is the Windows help compiler which is meant to work with RTF documents from any source, but has a mysterious preference for those produced by Word. For most other purposes, though, older subsets of the full RTF standard are quite adequate. RTF is documented by Microsoft, and its description, together with code for a simple RTF reader, can be found on the Developer Network CD.

Next month

Just arrived is Crystal Reports Professional 4.5, and new OCX versions of First Impression and Visual Speller. Look for a report in the next issue.

PCW Contacts

Tim Anderson welcomes your Visual Programming comments and tips. He can be contacted via *PCW* at the usual address, or on **freer@cix.compulink.co.uk**



Boxing clever

Should Blind Barpersons wear Boxing Gloves?

Mike Mudge does some ducking and diving.

The major investigation this week has been suggested by Nigel Hodges of Cheltenham, following upon the work of Richard Ehrenborg and Chris Skinner, *Journal of Combinatorial Theory*, May 1995, pp249-266, and the earlier treatment by Martin Gardner, *Scientific American*, Feb/March 1979.

Statement of Basic Problem. Four glasses are arranged symmetrically on a circular tray. The barperson selects two positions, the tray is then rotated by his opponent. The barperson can then touch the glasses which have just occupied the chosen positions and is permitted to invert zero, one or both of them. The process is repeated and the object is to end up with all the glasses pointing the same way.

Now this can always be achieved in five moves, as shown in *Fig 1*.

Fig 1 Five moves for the Barperson Problem

1) Select either diagonal and turn both glasses up.	u	•
	•	u
2) Select any side and turn both glasses up.	u	u
	•	u
Given no win, the configuration is given by:	u	u
	d	u
3) Select a diagonal. If it displays u-d invert d to win, otherwise invert one of the u to yield:	u	u
	d	d
4) Select a side. If it is u-u or d-d invert both to win, otherwise invert both to yield:	d	u
	u	d
5) Invert either diagonal to win.		

Extension to the Basic Problem

Generalise the number of glasses from four to n and ask:

(i) What is the minimum number of "hands" needed by the barperson?

(ii) What is the maximum number of moves needed to guarantee a win?

Now to the boxing gloves... In this extension, the barperson is not only blind but unable to tell which way up the glasses are! It is claimed that the four-glass problem can still be solved in seven moves; while the problem of 2^n glasses can be solved in (2^{2n-1})-1 moves with the requirement that the barperson has at least 2^{n-1} hands and further that this solution is optimal.

Problem NH. Simulate the BLIND BARPERSON PROBLEM, with/without boxing gloves; either in an interactive mode or with built-in (random) choice, and collect data for various numbers of glasses and various configurations of barperson (i.e. number of hands variable). Using the result of such simulation or otherwise, solve the n glass problem.

Note: The theoretical results appear to depend upon sophisticated algebra of finite groups.

A Quest from Teck-Sing Tie in Sarawak:

Problem TST (I). Is the general factorisation problem an NP-complete problem? i.e. Has factorisation of an arbitrarily large composite number been proven to be equivalent to an NP-complete problem?

Problem YSY (II). Can we prove that the difference between a prime, p_n, and the next prime, p_{n+1}, can never exceed $((1n(p_n))1n(1n(p_n)))^2$?

Further, can we prove that there is at least one prime between p_n and p_n plus the above logarithmic expression, and that this is the smallest possible gap? Some empirical investigation *may* disprove this!

Problem MH. José Castillo has conjectured that the (Smarandache Expression) $x^y + y^x$ where x,y are co-prime integers greater than or equal to 2 generates only a finite number of prime values.

Mario Hernandez at Univxiq (whatever that is?) would like an analysis of prime occurrences. *viz*

$3^2 + 2^3 = 17$

$4^5 + 5^4 = 1649 = 17.97$

News Flash. At October 9th 1995 Harvey Dubner used his Dubner Cruncher (details from Harvey Dubner <951017164327 70372.1170 JHD102-1@CompuServe.COM>) to find after a ONE DAY search a record twin prime pair:

$P = 190116*3003*10^{5120}$

and

$Q = P + 2$

each has 5129 digits.

Any investigations of the above problems may be sent to Mike Mudge, 22 Gors Fach, Pwll-Trap, St. Clears, Carmarthen, Dyfed SA33 4AQ, tel 01994 231121, to arrive by 1st May 1996. All material received will be judged using suitable subjective criteria and a prize in the form of a £25 book token or equivalent overseas voucher will be awarded, by Mike Mudge, to the "best" solution arriving by the closing date. Such contributions should contain a brief description of the hardware used, details of coding, run times and a summary of results obtained. Additionally, any comments upon the specific problem areas covered this month, together with any references to any published, or unpublished, work in these areas, would be greatly appreciated.

Please note that material can only be returned if a suitable stamped addressed envelope is provided.

Prizewinner, Numbers Count -147- July 1995

This month's prize goes to George Sassoon, of Ben Buie Lodge, Lochbuie, Isle of Mull, Argyll PA62 6AA, for his efforts in the factorisation of large numbers and in inspiring co-operation between computer users to attack (in an effective manner) a major task.

PCW *Contributions welcome*

Mike Mudge welcomes readers' correspondence on any subject within the areas of number theory and computational mathematics, together with suggested subject areas and/or specific problems for future **Numbers Count** articles.

Up, **up** and away

Stephen Rodda **was well pleased with his new SCSI adaptor; under NT it made his machine fly... Under Windows '95 it barely cleared the runway. Plus, why you shouldn't let the good times roll.**

I'm a fan of SCSI peripherals, as opposed to IDE and EIDE. I recently installed an Adaptec 2940 PCI SCSI adaptor, which allows the direct addressing of the drives through the PCI bus: I expected a speed increase, but at first sight, the results were rather peculiar.

Having installed the drivers under NT before removing the drives from the old card, I turned the machine off and installed the card in my machine. I replaced the SCSI drive cable from the Adaptec 1542 onto the PCI card and switched the machine back on. I thought I'd see how the card behaved under Windows 95, so I selected that on the initial boot screen.

Windows 95 took a moment or two to recognise the card but then, bingo; the card was installed and running. I had expected a significant speed increase; but I noticed nothing.

"Well, let's see what happens under NT," I thought. So I rebooted the machine into NT and even on the blue startup screen I noticed that things were going to be different; my computer positively flew.

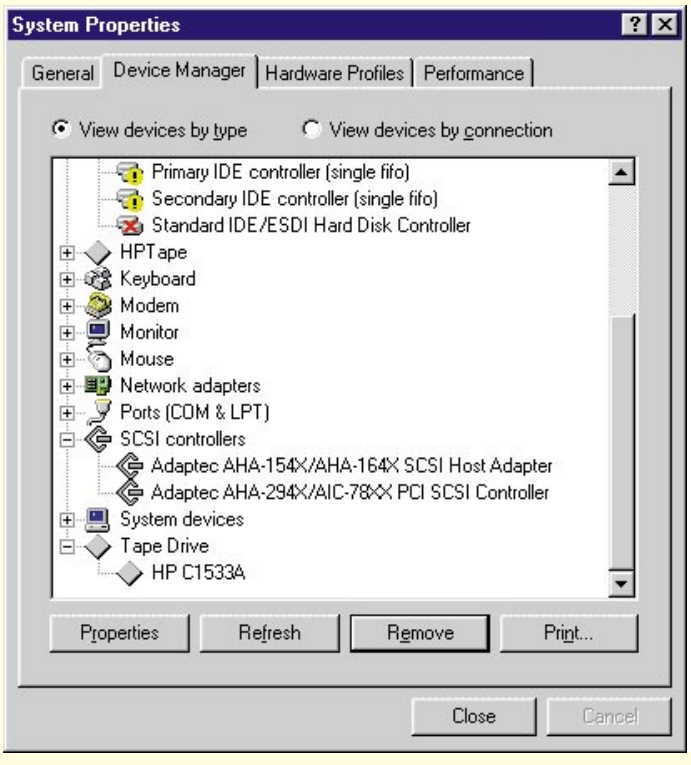
Apart from upgrading processors and RAM in large quantities, I have seen nothing which breathed life into an installation in quite the way this card did. A couple of months ago I mentioned that NT was definitely faster than Windows 95 and now it's come up trumps.

Why should this happen; that Windows 95 scarcely shows a difference whereas the acceleration under NT is so noticeable? I put it down to the fact that although Windows 95 is certainly better-protected than Windows 3.x, its drivers aren't quite as intelligently-multitasking as the NT's.

Installation of the card, by the way, wasn't quite as straightforward as it might have been, although I ascribe this to the fact that my machine has a few other adaptors cluttering it up. I ended up by assigning an interrupt (14 seemed as good as any other, since I don't use the built-in IDE controller) to the PCI board myself, whereas it should have done that all by itself.

Having worked out that this was the problem, I found everything else working just as it should be. Note that in the screenshot below, the IDE adaptor is shown as conflicting and therefore unavailable, and this is because I used IRQ 14.

Remember, unless you're going to be running your machine under DOS or Unix, the chances are you won't need to buy the Adaptec EZ-SCSI any longer, since most operating systems (OS/2, Windows 95, NetWare and NT included) come with drivers for almost every SCSI adaptor card available.



Windows 95, showing the Adaptec adaptor installed

Good times, bad times

For those of you with an Email network connected to the outside, it seems that the pseudo-virus called "Good Times" is doing the rounds again. This is probably because educational establishments have gained a new intake of students who have become just about literate enough on the Internet to propagate messages which they think are real, honest-to-goodness warnings for their fellow man.

Most of us have been there before. The most famous is the Christmas Tree virus which propagated over the Internet automatically, taking advantage of a small security hole in the SENDMAIL command,

where it read the address books of the addressees and forwarded itself to the next set of unwitting recipients. Now that hole has been plugged, these sort of scams rely on public-spirited people to reproduce. Hence their reproduction is all up to the addressees.

The big bad three

There are three basic species. One is the "Send postcards to this boy in hospital suffering from terminal cancer" (if you're reading this, Craig, I'm glad you've been better for quite some time now).

Then there is the "I was ripped off by a cookie shop which charged me $250 for a copy of its cookie recipe, please give all your friends copies of the recipe for free." Now I was born, bred and dragged up in a hotel and I know a bit about cooking; it's a simple shortbread recipe and not worth bandying about on the Internet.

The other variety, "Look out for this mail message entitled 'Good Times' because it'll format your hard disk", keeps rearing its ugly head.

It is probably worthwhile putting these three in an introductory mail message to new subscribers, telling them that they are all hoaxes which only slow down the Internet (or your local LAN).

The "Good Times" pseudo-virus seems to have taken many people unawares. This is simply because it's written in good, easily-understood, non-technical language which those in ultimate authority (who may know little about computers) can disseminate throughout a corporate structure.

Unfortunately (or fortunately, really) it is just so much totally inaccurate drivel — it's virtually impossible for a mail message to format your hard disk. And it certainly isn't in a non-existent mail message with the heading of "Good Times".

A trojan task

The best defence against this would be to remove ANSI.SYS from the CONFIG.SYS file. Such hard-disk trojans work simply by issuing the correct ANSI commands to program (perhaps) a function key and then to issue the ANSI command which equates to this keystroke. Without ANSI.SYS, the command cannot work.

If you do need ANSI.SYS, then the other method of defence is to make sure that all versions of DOS which you run are 3.3 or above, and to give each hard disk a label. With a label on the hard disk, when the FORMAT C: command is issued, you have to specify the correct label for the hard disk before the formatting operation can commence.

Messages received and understood

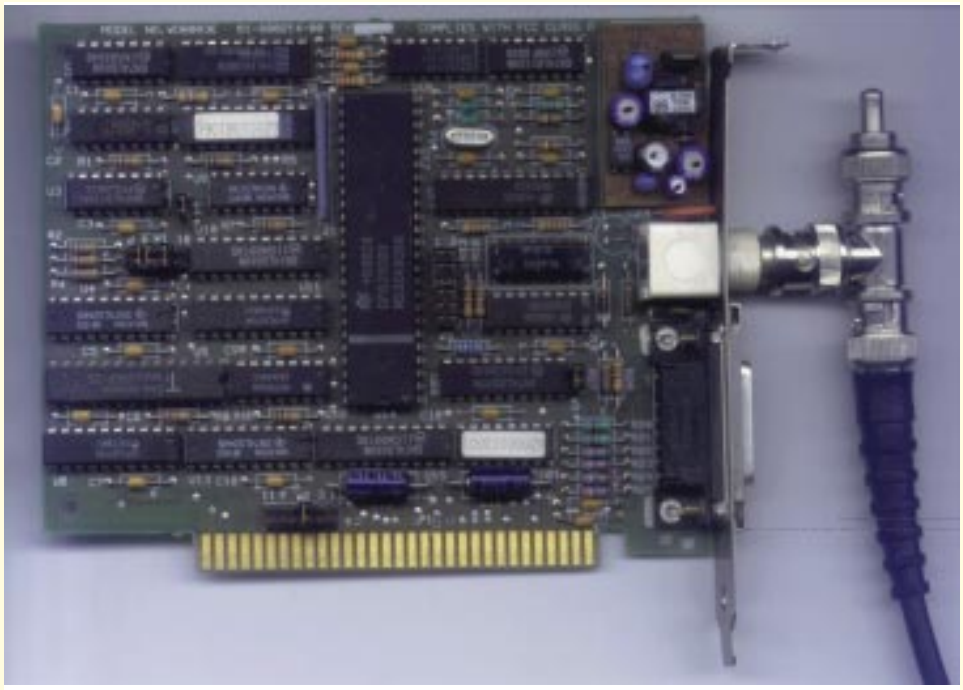
PC link-up

I need some advice on linking two PCs together. At home we have two Mitac 486DX/2 50MHz PCs with 8Mb RAM and 250Mb hard drives; one machine (which I use) has a double-speed CD-ROM and the other (which my father uses) has a modem.

We are considering linking the two machines together because I would like to use the modem while my father does his work, and he would like to access the CD-ROM drive (as some of the data and software for his work comes in on CD-ROM). My father will be getting a 1Gb hard drive, and I would like access to that, too.

We have access to Windows for Workgroups and a cable to link the computers up, but I am unsure as to whether this would work, or even if it would be worthwhile. Could you advise me?

Elliot, Kuwait



Network card with terminator, cable and "T" piece

You don't specify, Elliot, whether your cable for linking the machines together is a network cable or a null-modem cable. Let's assume it's a null-modem cable. Don't worry about what I'm going to say about the cable, though.

Windows for Workgroups doesn't support null-modem links as a means of networking, although Windows 95 does. The disadvantage in any case would be that the speed of the network link would, in all probability, be unacceptably slow.

I suggest you get hold of a couple of NE2000 clone boards with a length of Ethernet cable, a couple of "T" pieces (sometimes included with the adaptors) and two terminators.

The photograph above is of an 8-bit card with "T" piece, cable and terminator, but since I get many queries about this arrangement I have included the picture for you and for others to see how the end card of a network is connected. Of course, if you were to add a machine between the two machines, then instead of a terminator you would have another cable attached.

A network is not expensive to set up. You should be able to get hold of a pair of network cards, cable, "T" pieces and terminators for around £50. At these prices, since you already have Windows for Workgroups, the price of a $25 network which would allow you to network using the serial ports (£25 in the UK) is not really worth considering.

Now all you have to do is to install Windows for Workgroups to take account of the new hardware and of the network. Start Windows Setup (in Windows, not in DOS) and you can install and configure your network adaptor card driver.

"A network is not expensive to set up ... you can get [the components] for around £50"

As far as sharing the modem is concerned, you make no mention of whether the modem is internal or external. If it's an external modem, you can, of course, change the wiring of the null-modem cable to an ordinary modem cable and use a switch box. If it's an internal modem, you'll have to use a modem-sharing package.

You don't say exactly what you want to use the modem for. If it is intended for use as a fax modem, then Windows for Workgroups allows fax sharing through Microsoft Mail. If it's merely to be a general-purpose modem (perhaps for surfing the Net) then it's probably cheaper to buy another (perhaps faster) modem for yourself than to buy a modem-sharing package which, at around £100, is pretty near the price of a new, fast, modem.

New name

Is it possible to rename our Novell Server (3.12)? If so, how can I do it and what are the implications?

mn@cix

Look in Autoexec.ncf and you'll find the old server name there. The possible implications are that if some machine or other has a shell setting for the preferred server it may not find it. But if there's only the one server then it's likely there's no problem lurking around the corner.

Another point worth considering is that Windows-type clients remember their connections by using the //servername/directory notation in the WIN.INI file, so the connection paths on any such machines will have to be changed and re-remembered.

Something you might find it useful to look for is a full path reference to the machine name in the login script. It's a good plan to refer to the server name in the mapping procedure of a login script so that if, and when, a new server is added to the network, your users will still have the same mappings defined. They can then have other machines expressly added to the script, too.

Of course, in a multi-server setup there may well be problems (other than those detailed above) in changing the server's name, which you could well do without. These will include the login script problem

This year, I'm going to...

Now that the seemingly endless round of Yuletide and New Year parties is over and one's liver is at least part way back up the steep hill from cirrhosis, we should look at some New Year computer resolutions.

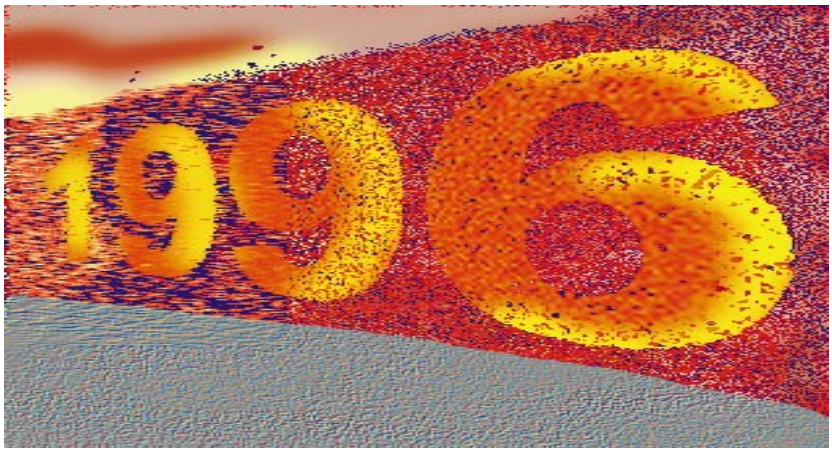
How about slimming? No, I don't mean going to a gymnasium to get rid of the excess Yule goose; I mean hard-disk purging. During the course of normal use a network can accumulate a good deal of "shrapnel". This is the term I use for those temporary files we all create on the spur of the moment when we save what we think is a nifty macro, for our own use as a separate file. Once it's been merged with our current templates we no longer need it, yet somehow it's remained, just sitting there on the hard disk eating up space.

Backup files, too, are terrible culprits, as are intermediate files produced, say, when scanning a page ready for an OCR or DTP package (the resultant file may be long gone, but the intermediate files still take up their megabyte of space each). I know I keep on about backup, but it can't be repeated too often. Perhaps it's time to look at your backup tapes. Do some of them need to be retired?

Have you been good recently and cleaned your tape heads? With some drives, by the time they warn that they need cleaning, it may already be too late!

If you haven't backed up at all (*and you know who you are!*) please back up now. If you haven't got a backup system, whatever you do, don't turn your machine on again until you've installed one.

Next month I'll be looking at Arcada Backup Exec for NetWare 3 and 4, which has just landed on my desk.



mentioned above and the possibility of wrong ATTACH commands appearing in the login script. Personally, I would not change a server's name unless the old name was rude.

The glorious 12

I've got a 12Mb machine and I want to run NT Workstation on it. Will this work? I don't really want to spend money on lots of memory at the moment.
Mb@cix

Yes, it will. It won't break any records for speed, and I'd suggest you really should consider putting in another 4Mb as a minimum (or better still, 8Mb).

The machine will run NT Workstation — in fact, I've run Server on 12Mb, but wouldn't want to again — and, I suppose, at a reasonable rate; it just won't fly.

At your service

I've just bought NT Workstation 3.51, and I've read about the service packs available for it. Surely I don't have to add these to a new product?
AS@cix

Yes, you do. Microsoft supplies the NT CD in precisely the same state as when it was first released. You should use Service Pack 2 (which includes Service Pack 1) right away. This is available from all the usual places: Microsoft Network, ftp.microsoft.com, CompuServe and CIX.

PCW Contacts

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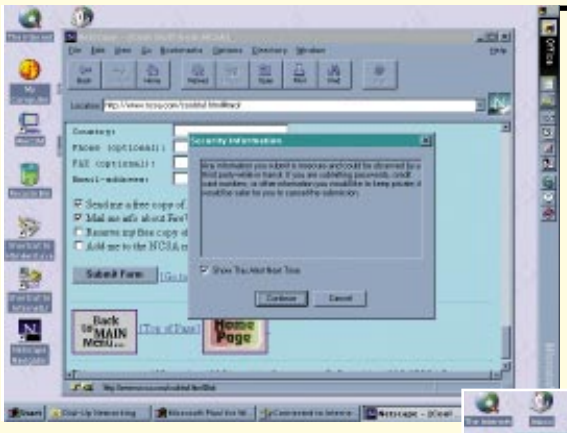
A **winner** or a wince?

WinCIM 2.0 is here at last. There are some new features, but some niggles too. "Was WinCIM 2.0 worth the wait?" asks Stephen Cobb. Plus, the latest buzz on security from Internet World '95.

Users of Windows and CompuServe may be pleased to know that Version 2.0 should now be available. I say *should* because although you can ask for a copy to be delivered through the post (using GO ORDER), and a copy may be distributed on a forthcoming CompuServe CD, there is no word yet on a version for downloading. In fact, the new version appeared in the US some time before the UK release was ready, but I had a chance to install and use the new version just before the deadline for this column.



Left *Netscape lets you know when data travels "in the clear", but the risk of lost connections is much greater*

Below *WinCIM 2.0 works under Windows 95 and offers hyperlinks between CIS and the Web, although configuring Internet connections and browsers can be tricky*

I can report that it does exist and that it does perform the basic email and forum browsing just like the previous version (1.4). Unfortunately, some of the newer features are more problematic. By next month, I should be able to report in depth on performance since I have taken a chance and installed it on my "real" computer.

As far as appearances are concerned, WinCIM 2.0 looks pretty much the same as the previous version. A few of the buttons look different but the menu structure is practically identical to version 1.4. The real changes are deeper within the code, the biggest technical innovation being the integration of CompuServe Information Service (CIS) and the World Wide Web. This means that buttons and menu items within CompuServe can now take you directly to the Web. You can even enter a Uniform Resource Locator (URL) such as http://www.compuserve.com, directly into the GO field in WinCIM to get to an Internet site. For example, to reach the Compaq forum on CompuServe you enter GO COMPAQ. To reach Compaq's Web site, you enter www.compaq.com. Furthermore, if Compaq's Web master decides to implement the right code you will be able to link from the Web back into CompuServe. Unfortunately, I couldn't get this to work, despite several hours of playing with different settings and reading numerous message threads in the WinCIM support forum.

In order to accomplish this wizardry, WinCIM 2.0 comes with the CompuServe Mosaic Internet browser which, I can report, is a significantly improved version of the Spry Air Mosaic browser that CompuServe has previously distributed. Once you have established a Winsock-enabled CompuServe connection you can access CompuServe and the Web simultaneously. You could do this before 2.0, but now you can launch into the Web from within WinCIM and you don't have to use the CompuServe Mosaic browser if you already have a browser preference.

By default, WinCIM 2.0 automatically installs and configures the new CompuServe Mosaic browser, which has been upgraded to include features such as backgrounds and centering of text and images. But even if you decide to use NetScape or another non-CompuServe browser with WinCIM, you will still be able to follow the links back

The view from Internet World '95

The big picture

Last month I went to the Internet World '95 show, in Boston. The place buzzed with excitement. You could sense the unstoppable logic of using one enormous network for everything from banking, to shopping and paying taxes. Back in 1983 a lot of people felt the same way about everyone getting their own PC. Of course, at that stage in the game it was unclear what those computers would look like, or even what operating system or application software they would run (CP/M was still a strong contender for business systems and Apple had not yet sued Franklin Computer for making clones of the Apple II). You just felt that everyone getting their own computer was just around the corner.

The same is true of the Internet. Everyone knows it's the right idea, we just don't know exactly how it will take shape. Before we get there we will see any number of false starts, dead ends and surprising comebacks. One thing we can do to ease the transition to a truly networked world is to learn from past mistakes. Remember that like all great advances in technology, ubiquitous personal computing only became a reality many years after the leading edge was first discerned. The same proved to be true of networked computing. And by the time these technologies became commonplace they exhibited another classic techno-trait; fallibility. Every technology has its down side and the sooner we accept that fact and work to minimise it, rather than pretend we have found the first truly riskless technology, the better will be our chances of success.

Are we there yet?

A lot of the people I talked to at Internet World wanted to know when the Internet would be secure enough for commerce? When would the World Wide Web be safe enough for banking or filing tax returns? These were not vague speculations; recent figures suggest that the number of commercial Web sites is growing at a rate of 27,000 per month. The question about taxes came from a senior revenue service official.

My response to such questions is to point to my notebook computer. I explain that I have had it for about a year so it is not quite state of the art, but that I am intimately familiar with its operation. Then I say, in all honesty: "I never know when it is going to crash next. I do not back it up as often as I should. I have to run a virus scanner over every disk I put in it. Many of the applications I use have annoying bugs, but I dare not upgrade them in case that makes things worse.

(*Continued on page 345*)

At last! You can search the contents of your WinCIM filing cabinet in the new 2.0 release. But does it have to take so long?

into CompuServe. Unfortunately, the process for customising WinCIM to do this is not a menu item. You actually have to edit the CIS.INI file as well as edit the "helper application" section of your browser (I can understand the folks at CompuServe wanting everyone to use their browser, but automating the CIS.INI part of this configuration process would have been more considerate).

Next month I will report on how this all works; if I can make it work. At first glance it looks like some fiddling with winsock.dll files may be necessary since CompuServe installs its own version — this can conflict with previous versions if you have already been browsing the Web through a non-CompuServe connection. For people who can make a local PPP Internet call cheaper than dialling into the nearest high-speed CompuServe number, configuration of WinCIM 2.0 can get decidedly complicated.

One new feature that should make the diagnostics a little easier is a Help option in the failed connection dialogue box. But some of the advice is indicative of how far we have to go before software is as easy to use as it should be. Consider this for instance: "Increase the HMI Time-Out value in WinCIM. Choose Session

Internet World '95 (contd)

I live in fear that someone will steal it. And you expect me to use it for banking?"

Of course, some people think the answer to this hangup is just to buy a newer, better computer, or to be a better user but this leaves much to be desired. Consider what happened to a friend of mine who was on a business trip to Argentina. In front of two hundred people, who had paid for him to be there, his brand new Toshiba Pentium notebook running Windows 95 froze up just two slides in to a Microsoft PowerPoint presentation: not just Ctrl+Alt+Del crashed; not just turn it off and start over crashed; but because Windows 95 was in control of the power management system when the crash occurred, he had to take out the battery pack and then wait for the backup battery to drain before he could even reboot. And this is no neophyte but a surgeon, pilot, programmer, and former head of a software company (who wrote a lot of the program code himself).

What has this got to do with telecommunications? Consider what happens if we start banking on the Web any time soon. Mr Smith wants to transfer some money from one account to another: he clicks on the home banking icon, the modem dials and a connection is made. He types the details of the transaction, clicks the send button, and… crash. The general protection fault dialogue box appears with that ridiculous choice between Close and Ignore (we all know they mean the same thing). At this point, Mr Smith may think that his biggest problem is figuring out whether or not the transaction was completed. But the really big problem is who to blame. Here are some choices: the PC maker, the operating system publisher, the shop that sold the system, the modem maker, the Web browser vendor, the phone company, the local Internet service provider, the regional backbone supplier, the bank's Internet service provider, the company that makes the system that runs the bank's Web server.

In other words, the lack of universal secure transaction protocols is not the main obstacle to commerce on the Internet. Before we worry about people stealing credit card numbers off the Internet we have to deal with basic hardware and software reliability. According to Simba Information (a market-research firm based in Connecticut), about $20m traded hands on the Internet in 1994, although numbers for 1995 were not yet available — they are bound to be higher than 1994 but I doubt whether they will be spectacular. While there may be 24 million people with Internet access in the US alone, very few of them are ready to rely on the current technology for serious commercial activity.

Settings from the Special menu, select the More button in the Setup Session Settings dialogue and then increase the value in the box beside HMI Time-Out. A reasonable value is 120." I'm sorry, but if 120 is a reasonable value why is the default setting 30?

Looking for your mail?

Last Friday, I left the office a little early and didn't check my email until Monday; there were over 20 messages in my WinCIM in-basket. So as far as I am concerned the most hoped-for improvement in version 2.0 is the Search option in the WinCIM Filing Cabinet. You access this through the Filing Cabinet command (Ctrl+F is the shortcut). As you may know, a variety of objects such as mail messages, forum messages, articles, and news stories can be stored in the filing cabinet. The problem has been getting back to the items filed long ago (several of my folders contain several megabytes of information and I had taken to using a generic Windows search tool to find things).

Now you can find any object by date or date range, subject, sender or contributor. You can even perform a text search based on any text string in the body of the message. You can search folders, In-Basket, Out-Basket, or a combination of all three. But you'd better not be in a hurry.

Apparently, WinCIM does no internal database-style indexing of your filing cabinet contents, so the search process itself is no faster than using an external search program such as Outside/In (which allows you to start reading target files before the search is completed — something you cannot do with the WinCIM search command).

All of this suggests that CompuServe still hasn't grasped just how much mail serious users receive, or how much they come to rely on their mail program to organise it for them. More immediately helpful for email buffs is the simplified addressing of non-CompuServe mail users such as Internet and cc:Mail. This is handled via a list box for address types in the address book dialogue box (no more typing INTERNET: in front of Internet addresses).

There are some nice additions in other areas, too. For example, a preference has been added for both Forum Conferencing and CB Simulator to automatically update the "Who's Here" list every so many seconds (you can select the setting). You will find this very handy if you use these areas of CompuServe.

Was it worth it?

Unfortunately I couldn't find one of the new features that had been announced; the ability to view a wider range of documents. The README file says that a new View button works like this: "If the file to be viewed has a Windows file association defined, the appropriate application will be used to view the file." But I couldn't find a button that worked like that, which is a pity because this feature is tied to another area of enhancement; the ability to send binary files to enhance conferences. These can be still motion video clips from a video feed; that is, graphic images sent at regular intervals, closed captioned text, charts, sound, or pictures. The moderator can send any combination of files and file types to conference participants.

Network users of WinCIM will be pleased to know that secure logins are built-in to version 2.0, so that your password is not transmitted across the network in a readable format. A General Preference has been added to control window handling with Keep Windows Maximised as the default setting (when a window is maximised, subsequent windows will also be maximised until you restore the size). International icons have been added throughout the product to accommodate the global CompuServe Membership. Lastly, for the iconically-defective such as myself, the mouse now displays hints as to the purpose of any icon at which you point — if you are one of those people who instinctively recognises the meaning of any icon you can turn this feature off.

So was WinCIM 2.0 worth the wait? I am inclined to think not, but I am unsure as to what the alternative is. I suspect that I will eventually figure out how to get it working properly, but I seriously resent the effort involved. The search feature sounds good, but unless I am missing something really obvious it is not a big improvement on my existing methods of coping with email. I have been told that the problem of filing cabinet breakdowns has been fixed, but there should be more to cheer about in a 2.0 upgrade than "it doesn't break any more".

PCW Contacts

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Mac to Basics

If you're sitting looking at that shiny new Mac you got for Christmas, wondering what's behind the smooth exterior, Chris Cain unearths its revealing features. Plus, the alliance that could be Wintel's undoing, and news of Apple's QuickDraw 3D accelerator card.

Happy New Year! I know this is the February issue, but through the power of magazine logic this is the first *Hands On* Macintosh column of 1996. This month, along with the news and views, I'll be taking a closer look at Apple's innovative QuickDraw 3D, a piece of software that could have as much impact in the graphics world as QuickTime has had on the multimedia market.

As it's the new year, I'll also be going back to basics briefly for all those people who received a lovely new Mac for Christmas. Despite it's easy-to-use interface MacOS can be a little confusing to newcomers, so I've knocked up a quick guide to the System Folder to point out what's what.

But first the news, and the top story at the moment is that Apple, IBM and Motorola have finally published the specifications for a new, open, unified personal computer architecture. Originally known as the Common Hardware Reference Platform (CHRP), the specs are now formally entitled the PowerPC Microprocessor Common Hardware Reference Platform. What a mouthful.

In lay terms, what this will hopefully give us is a new PowerPC-based platform that will run MacOS, Windows NT, OS/2 and just about anything else you might want to throw at it. In theory, you'll be able to take all your existing software applications over to the new machines and run them as if they were on a PowerMac. It may even mean the beginning of the end of the dreaded WinTel alliance. For more detailed information and a full report on new CHRP developments, see this month's *Newsprint*.

Apple was making a few noises at the 1995 Apple Expo just before Christmas. The show itself was jam-packed with distributors, dealers and software houses, but it was Apple itself drawing large crowds with some great demonstrations of its new technologies. Among the more impressive were QuickDraw 3D, Copland, and a brilliant introduction to

With QuickDraw 3D installed, you can cut and paste 3D data as easily as 2D pictures and store them in the Scrapbook. The small boxes at the bottom of the screen are standard tools for rotating, zooming and moving the image

Beating the System

If you've just got a Mac for Christmas, chances are you're having great fun but don't know exactly what's going on inside. Just for you, here's a quick guide to the all-important System Folder and its contents under System 7.5.

System Folder

The System Folder contains all the software your Mac needs to start up. When you switch on your machine, it looks for this on its internal hard disk, but you can also boot from floppy, CD or an external drive. Once it's found a working System Folder, up pops the picture of the smiling Mac. The average size of this folder can range from a single megabyte to 50Mb or more — it depends on what you have installed.

Extensions

Data inside the System Folder is split into a number of sub-folders, and one of the most important is called Extensions. Extensions are software plug-ins that add functionality to your Mac and, in most cases, are loaded into memory on startup. To add a new extension to your system, you drop it into this folder, and to remove one you take it out. This approach makes it easy to keep track of exactly what software there is on your Mac. Apple provides a horde of useful extensions with the system software, including AppleScript, AppleGuide and QuickTime. Popular third-party extensions include RAM Doubler and Speed Doubler from Connectix. The more Extensions you have, the more memory your system software will use, and the less you'll have to run applications. You can boot the Mac without loading any Extensions by holding down the Shift key on startup.

Control Panels

Control Panels are a bit like Extensions in that they add functionality to your Mac, but they also offer a level of user interactivity. Double-clicking a Control Panel will normally bring up a small window allowing you to change some system setting or other. Typical windows include Desktop Patterns, which lets you change the look of your desktop; Mouse, for setting the speed of the mouse cursor; and Extensions Manager, used to turn Extensions on and off without the need to remove them from their folder. While most Control Panels are useful, many of them can be turned off as they are either not needed for day-to-day computing, or they are completely useless — a bug in Apple's System Software Installer can put things on your system you don't actually need. If you have a desktop machine, you can remove any Control Panels related to PowerBooks, such as PowerBook, AutoRemounter, PowerBook Display, PowerBook Setup and Trackpad.

Fonts

The Fonts folder is easy to understand — this is where all the fonts your system uses for its screen display and printing are stored.

Apple Menu Items

Extremely handy, this one. Anything placed in this folder appears as an item on the Apple Menu in the top left-hand corner of the screen, making it easy to access whatever application you're using. It's just the place to put aliases of your favourite applications, utilities or Control Panels.

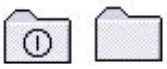
Preferences

This is where Control Panels and applications store data about their current user preference settings. It's good practice to examine the contents occasionally, removing any preferences files for applications you no longer use.

Launcher Items

Items in here are aliases that appear as large icon buttons when you run Launcher. To custom your own setup, just add or remove them.

Startup Items and Shutdown Items



Again, nice and easy to understand. Any program placed in these folders will run automatically as soon as the System has finished loading, or on Shutdown.

System file, Enablers, Finder, Clipboard

These files are essential for your Mac to operate, so don't mess with them unless you know what you're doing. As you can see, the System Folder and its contents aren't that mysterious after all. Other things you may find inside include the contents of Note Pad and Mac Scrapbook.

QuickTime VR courtesy of Apple UK's Technical and Services Consultant, Peter Lunn.

The QuickDraw 3D acceleration card (as mentioned in last month's *Newsprint*) is a 7in PCI adapter that plugs into any PowerSurge Mac, and can improve its 3D performance by up to a factor of twelve. And at a price of £299, it fits nicely into both the business and mass consumer markets. I'll be looking at this card as soon as Apple can get me one.

Quick on the draw

QuickDraw 3D is Apple's attempt to implement a standard for the storage and manipulation of 3D data on the Macintosh. It's software-based and consists of four main parts: a common file format known as 3DM, a common user interface, a geometry engine and a rendering architecture.

The file format for QuickDraw 3D is 3DMF, a cross-platform system that supports both traditional 3D data such as geometric shapes, and all the information that represents a particular view of a scene, including textures. Its aim is to allow 3D information to be shared easily between applications in much the same way as .PICT files are today. With this installed, users will be able to cut, copy and paste objects between programs as easily as 2D images.

Another step towards making 3D easier to use is to provide a common user interface for dealing with the data. Currently, being proficient in one 3D application doesn't necessarily mean you'll be able to pick another up quickly, because the tools used are often completely different. QuickDraw 3D provides a standard set of tools that allow you to rotate, move, resize and generally manipulate objects which will be available in any application that implements it. Users will be able to move from one package to another without the need to learn a whole new interface. In many ways, it's like the QuickTime control strip which appears at the bottom of the window whenever you work with movies.

The other two main ingredients in QuickDraw 3D are the geometry engine

and the rendering architecture. The former handles the generation of basic geometric shapes such as squares, triangles, circles and polygons, while the rendering architecture deals with rendering the images on screen complete with shading and texture maps. It supports the popular OpenGL standard, and accepts plug-in third-party shading engines. This is another area where acceleration cards really get put through their paces.

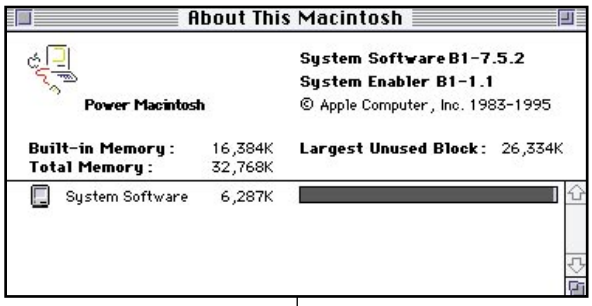
QuickDraw 3D is currently only available for PowerMacs, can be downloaded from Apple's Internet support sites, and comes with some of the new PCI Macs. It's also smarter than the average system extension as it only loads into memory when required. When it does load, however, it adds around 3Mb to the memory your system software takes up.

A version for Intel Pentium machines running Windows is currently being planned, which will help drive this forward as a standard.

If QuickDraw 3D takes off, as I expect it will, we will see a whole new approach to graphics on the Mac. Be prepared for a new version of MacOS with a 3D front-end, new applications, and games that are out of this world. For more on 3D, see this month's *Horizons,* page 261

Utility of the Month

The February Utility of the Month award goes to Mac OS Purge, a Freeware program I recently downloaded from eWorld. It's simple, effective, runs in seconds and could save you from a nasty system crash.



Mac OS Purge helps clear the unused code out of your system file

Mac OS Purge works by literally purging any data left behind in your system memory when you quit an application. It's especially useful on machines with tight memory conditions, such as those running with 4Mb, where stale data can build up and eventually cause all sorts of problems. For example, if you load and then quit an application that uses QuickTime, the extension will load but may not clear itself after the application is shut down. The next program you run then has less memory to use, and if you load a few "leaky" programs, a system crash can occur.

By rights, this kind of thing is something the OS should sort out by itself. Until it does, Mac OS Purge will come in handy. It's currently on version 1.0.1, and the author, Kenji Takeuchi, can be contacted at atttak@midway.uchicago.edu.

Descent brings fast blasting action with the smoothest graphics ever

Picking up Descent

Mac gamers on the Internet will be interested to hear that a demo of Interplay's top action game, Descent, is available for downloading. Located in the demo area of the MacPlay website, it's a 7Mb introduction to the PowerMac version of one of the bestselling PC games of last year.

Descent is a 3D shooting affair set in a similar style to Doom, but this time you play the pilot of a small space-mining vessel. The idea is to rescue humans left stranded in space mines that have been overrun by hostile forces. Your average everyday space cadet sort of thing.

What makes Descent stand out from other games of this type, apart from the addictive gameplay and a network option, is the quality and smoothness of its graphical engine. Not only is it fast and fluid, but for the first time in a 3D Mac game, the texture mapping doesn't tear at the seams when the detail gets complex. The game will run full screen at 320 x 200 with pixel doubling, for a PC style display, or a sharper 640 x 480 on high-end machines. And I do mean high-end — while it runs well on a 9500, my 7500 doesn't cut it in high res. I have heard that a new version may be appearing, complete with QuickDraw 3D support, but I don't have any information at time of writing.

PCW Contacts

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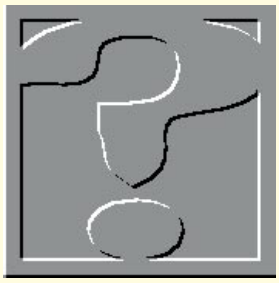
Apple Computers **0181 569 1199**
Quark **http//www.quark.com**
QuickDraw 3D can be downloaded from **http://www.info.apple.com/qd3d/QD3D.HTML**
The MacPlay Demos website is at **http://www.macplay.com/website/demos/demos.html**



Any **questions?**

If you've got a PC problem, or think you could help out other readers, contact Frank Leonhardt who this month manages to upset IBM, Intel, Microsoft, most computer dealers and the entire academic establishment, in just two pages.

Q My computer takes about two minutes to start up Windows 95. I don't think this is correct. I have a 486 DX250 VLB 128Kb cache with 8Mb RAM. I would be grateful for any advice. I enclose copies of my AUTOEXEC and CONFIG files.
Julie Musk

Windows 95 does take ages to start up on what Microsoft thinks of as a low-end machine. There is nothing wrong with your CONFIG.SYS or AUTOEXEC.BAT files, but you might be able to tune your BIOS setting to make the machine run faster. My solution to the slow startup was to put Windows 3.11 back onto my 486 with 8Mb RAM.

Spot the difference

With the release of Win95, I have decided to upgrade my PC. What are the differences between the Intel range of motherboards, e.g. Triton, Zappa, Endeavour? Also, it seems that to use Win95 efficiently you should use 16Mb of RAM. Should I go for Windows NT instead, as it's a true 32-bit OS?
Mark Antony Smith

Triton is the codename for Intel's current Pentium support chipset. Older boards would have used sets like Neptune, which are not as efficient. The Endeavour is Intel's latest motherboard and it's rather good. It has built-in SoundBlaster-compatible hardware, and a version with integrated Diamond Stealth-like graphics is promised for spring '96. Endeavours can also be fitted with a 256Kb or 512Kb pipe-burst cache option which will allow the Pentium to run significantly faster than a standard cache. It has four ISA and PCI slots, although only seven cards in total can be fitted.

The Intel Zappa also has a Triton chipset with a standard cache option, one less PCI, one extra ISA slot and no integrated sound hardware. It is cheaper than the Endeavour.

Intel isn't the only company to make Pentium motherboards, however. The Triton chipset is available to third-party manufacturers whose products are noticeably cheaper than Intel's. For example, you can buy a non-Intel Triton board for 20 percent less than a Zappa or a board with pipe-burst cache for 13 percent less than an Endeavour. Not having a Triton chipset saves only about £15. The word on the street is that the non-Intel boards are just as fast, other things being equal.

As to the Windows 95 vs *Windows NT question, I'm afraid you don't have the choice you were expecting. Windows 95 will run in 8Mb but prefers 16Mb, while Windows NT runs in 16Mb but prefers 32Mb. Windows NT doesn't have the compromised functionality from which Windows 95 suffers, but you have to pay the price in RAM. Personally, I'd go for Windows NT if I weren't stuck with an 8Mb 486SX/25.*

Real programmers do it themselves

As a student, I have been using computers to write essays for a few years now. I would really like to go a step further and learn to program properly (not in BBC Basic, as I did for Computer Studies GCSE). However, I can only find full-time degree or HND courses, or those aimed at the professional market costing upwards of £500.

Could you suggest somewhere that might do a course suited to learning programming at the hobby level? I did try a correspondence course once, but due to disorganisation and staff rudeness I didn't get very far. Any ideas?
Chris Liddel, York

There is no simple answer to this question — it depends a lot on what you have in mind by programming "properly". BBC Basic is actually a very capable programming language supporting block structuring, local data and indirection, and there is no reason why you can't apply proper programming techniques while using it. But for backward compatibility with earlier Basics, it does accept monolithic and unstructured code if that is what you choose to give it. I fear that a typical GCSE course does not have the time to explore the differences between the two coding styles to any useful level, as good style only comes into its own in larger projects.

If, by "proper programming", you have

SIMMs and the art of PC purchasing

The best way to wind up your friendly local PC dealer is to wander into his shop and try to order a machine to an exact specification. The chances are you will specify at least one item which has been discontinued or is incompatible with something else on your list. Back up your demands with an insistence that you read good reviews for all the bits you're after, and you'll have them ranting down the phone to me about how journalists in general cause them untold grief.

They do have a point. Just because a particular video board is the fastest in a group test, it does not mean that it is compatible with all motherboards past, present and future. An obscure sound board might sound great, but if there are no Windows 95 drives for it and the manufacturer has gone out of business, then that's that.

In the circumstances, you have two choices: you can either be guided by the experts, and if they are building several machines a week they probably have some idea about what works and what doesn't; or you can proceed by trial and error yourself. A dealer isn't going to be interested in building you a Frankenstein's monster because he suspects, quite rightly, that you'll be back a day later complaining that it doesn't work and probably blaming it all on him.

If the dealer is friendly, he may supply you with the bits on the basis that he'll exchange what doesn't work.

However, from time to time a few things crop up which you should be asking about. This month it's SIMMs. A Pentium processor board normally has four SIMM slots for memory. These slots have to be filled in pairs. SIMMs come in 2Mb, 4Mb, 8Mb, 16Mb and 32Mb sizes at present, but 2Mb SIMMs cost rather a lot per megabyte. The 8Mb SIMMs have always been a bit cheaper per megabyte than the 4Mb ones.

If you ordered a machine with 8Mb in it you would probably receive two 4Mb SIMMs, leaving two slots free. A 16Mb machine would have two 8Mb SIMMs and two free slots for expansion. However, 8Mb SIMMs have just gone up in price (not a lot) but it is now cheaper for dealers to fit four 4Mb SIMMs to get the 16Mb, which leaves you with no free slots for expansion. This is one question you really should raise with your dealer.

something in mind which would be commercially useful, then BBC Basic does not impress when entered on a CV unless accompanied by something mainstream. Real programmers use Assembler, or these days Cand C++. However, an awful lot of application programming is carried out in Visual Basic or Delphi, and database application languages like Oracle and dBase. Although such packages are used for large projects, they are not, in my opinion, particularly well suited for the purpose as they don't encourage, or even allow for, a maintainable programming style. Such languages are popular because you do not need highly skilled programmers to get results. They do, however, yield rapid results so they are a good choice for trivial applications and quick hacks.

In the mainframe world, languages like Cobol, PL1 and RPG still rule the roost and show little sign of being displaced.

There is a tendency for degree-type courses to concentrate on the academically pure languages like Pascal, Modula, Simula and a truckload of experimental application-specific systems of which no-one else has even heard. There are probably good reasons for doing this, but the fact remains that degree students generally require a year or three after graduation to learn C properly before they can earn their keep in the real world.

So what should you learn? Visual Basic is nice and easy and does have a commercial application. C is the obvious choice if you want to get at the inner workings of the system, though not for seekers of instant algorithmic gratification.

*There are plenty of books, videos and courses available for teaching yourself either of these languages. Books about C, in particular, tend to go into the art of program design as well as teaching the language. I can personally recommend "*The C++ Programming Language*" by Bjarne Stroustrup, as it has plenty of examples on how to use the language rather than just explaining how it works. It isn't intended for complete beginners, however. "*The Design of the Unix Operating System*" by Maurice J Bach should be considered required reading as well. It isn't a programming tutorial but explains how Unix was designed and written, with just the right level of detail necessary to understand the techniques used. Even if you never program Unix, the algorithms described can be applied to many types of programming problem.*

By reading and practising, there is no reason why you can't learn to program to any level you choose — many microcomputer programmers are entirely self-taught. Doing a course wouldn't hurt either because of the group support available while trying to get your mind around a tricky concept. Many local councils run evening classes in computer programming and these are probably worth a look. The course content might only be to GCSE level, but the access to like-minded individuals and knowledgeable tutors could be much more important to you.

There are local computer clubs and societies too, which you might consider joining. Some are obviously better than others, so it's worth looking in on more than one.

Give us a C

I have just bought a copy of Borland Turbo Assembler for the PC. Are there any good books to help me learn? I have been programming in C for a number of years now and need to write some fast routines

Paul Taggart

*Osborne/McGraw-Hill publish a good selection of reference books for microprocessors and "*The 8086 Book*" by Rector and Alexy starts from the ground up. "*Mastering Turbo Assembler*" by Tom Swan (published by Hayden) covers the 80x86 series up to the 386, and also has chapters on working with C and Pascal alongside Assembler.*

The extra 486/Pentium/P6 instructions aren't necessary for a tutorial and once you've cracked programming the 386, all you will need is the latest Intel data book for the relatively minor additions.

PCW Contacts

Frank Leonhardt is an independent computer boffin who can sometimes be contacted on **0181 429 3047** or via email as **frank@dircon.co.uk** or **leo2@cix.clink.co.uk**. Letters may be sent to *PCW* at VNU House, 32-34 Broadwick Street, London W1A 2HG, but individual replies are not normally possible. Please do not ask about cover disks or CD-ROMs.

The C++ Programming Language:
Bjarne Stroustrup,
ISBN 0-201-12078-X
Addison-Wesley 01734 794000

The Design of the Unix Operating System. Maurice J Bach,
ISBN 0-13-201757-1
Prentice-Hall 01442 881900

Intel 01793 403000

Simply Computers 0181 523 4020

LAN of action

Networks often seem baffling to the uninitiated, but Local Area Networks are simply a common way for computers to share resources. Eleanor Turton-Hill takes the ghost out of the machines.

Most areas of computing are shrouded in some form of technical jargon which they've developed over the years, and networks are no exception. They seem to have accumulated an air of mystique which makes them intimidating even to the most knowledgeable in the computer industry.

But as we all know, there's no such thing as "black art" in computers — just a list of nasty acronyms, a few underlying concepts and a vast amount of trivial information you acquire over time. The type of network you're most likely to have used is a LAN (Local Area Network), as this is the most popular network model. Here I'll give a brief overview of the LAN, as well as explaining some of the terms used in network technology.

A cunning LAN

Computers are connected together into networks so that resources can be shared between groups of users in the most efficient way. They enable users to access and exchange information within a single office, as well as sharing programs and expensive devices such as laser printers. Without a network, each PC in an office is an island and the only way to pass files from one machine to another is by floppy disk.

The typical LAN setup has one central fileserver which holds all shared applications and data. The fileserver is usually a powerful PC with plenty of hard disk space to service client machines with limited storage capacity. Each PC attached to the network acts as a client, requesting services from the server. All the PCs on the network can see the server, but none of them can see each other. Most LANs only have a few clients, but some are able to handle hundreds.

The fileserver holds the network operating system which controls all network operations. It manages users' access to the network's shared resources. For example, if two users request use of the printer at the same time, the network operating system will control the order in which the print jobs are processed. It also contains facilities which enable the network administrator to maintain security, and utilities such as electronic mail. Some LANs have more than one server, each dedicated to a certain function such as handling a database, controlling print functions or managing communications.

On the buses or in the ring

Networks can be arranged in three different configurations or topologies. The simplest type of network is a "bus" network, where all network nodes are strung together in a line. This structure has some fairly fundamental drawbacks, the most obvious one being that if the cable is broken in the middle, the network is split into two.

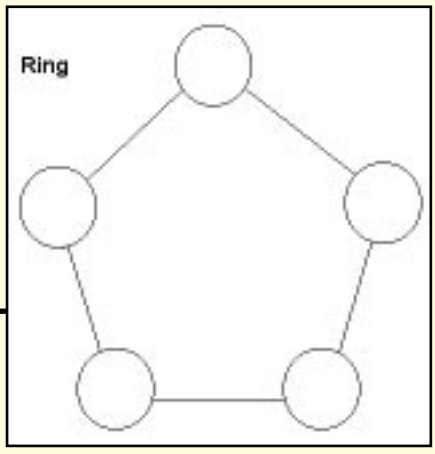
Another type of configuration, known as the "Star" network, is arranged with all nodes connected to a central hub or switching box forming a star shape. In effect, each node has an independent connection to the network, so that if one cable breaks, none of the other nodes has to be affected.

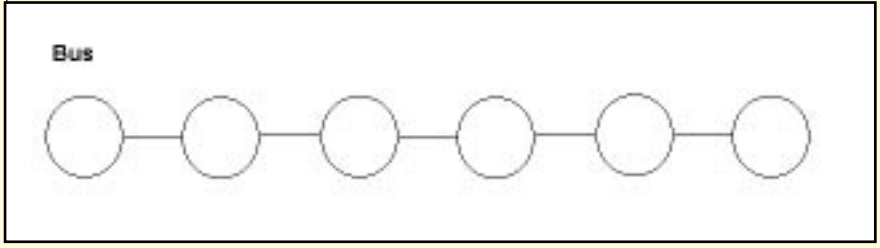
The third type of configuration is the "Ring" network. Here, the nodes are connected to each other along a single, circular path. This structure is very much like a bus, only there's no end to the line. The last node on the line is connected to the first node, forming an endless loop.

All members of a local area network must normally be positioned within 800 to 1,000 feet of each other, because the strength of the transmission signal decreases as it travels. Short distances therefore enable the signal to be received more clearly. Multiple LANs can be joined together in various ways, and LANs using different protocols can be connected by "bridges". "Gateways" connect different types of networks to each other, for example a PC LAN to a mainframe network, and "routers" are used to link together LANs with compatible protocols.

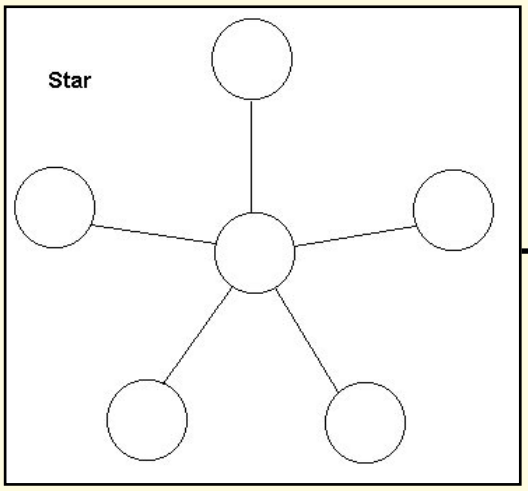
Making contact

In order to connect a PC to the network, you must first install a network adapter or interface card. This goes inside the PC and controls the physical transmission of data over the LAN. The network cable is





Right and Below: *Ring and Bus Networks are both decentralised network topologies. Each workstation can access the network independently*



In a Star topology, all the nodes are operated from a central server. With this type of configuration, a defective workstation won't bring down the entire network

attached to the interface card at the back of each PC. Some network cards provide two or three different types of connector, so that you have the choice of different cabling methods. The most common network adapters are Ethernet, Token Ring and ARCnet. The Ethernet variety can be cabled together directly, using "T" connectors which fit to the jack at the back of the adapter. All computers can then be connected by joining "T" connectors to each other.

Different network adapters access the network in different ways, and their raw data transmission speed varies. Token ring, for example, waits for a special signal known as a "token" before transmitting, whereas Ethernet adapters just wait until the network is clear. With Ethernet adapters, two packets of data will periodically collide, and both adapters will time out for a random period.

An Ether world

The vast majority of LANs use Ethernet. Essentially, Ethernet is just a standardised way of connecting computers together to create a network. It specifies what kind of cables to use, how long the cables can be, how they should be connected together and how computers transmit data to one another using the cables. One of the reasons for its popularity is the fact that Ethernet is remarkably cheap compared to ARCnet.

Ethernet defines the infrastructure upon which the network is built: it does not define the type of network operating system. All commonly-used network operating systems can work on an Ethernet network, and if the network is built using a solid Ethernet base, then the operating system can always be changed later.

Ethernet is often referred to by network administrators as 802.3, because that's the definitive standard set up by the Institute of Electrical and Electronics Engineers (IEEE). The standards are designed to ensure compatibility between different bits of equipment made by different manufacturers. Without using this standard, it would be impossible to mix and match Ethernet components from different sources.

As well as defining the practical building blocks for LANs, Ethernet also specifies the techniques used to control the flow of information over the network cables. The technique Ethernet uses is called CSMA/CD (a memorable little acronym) which stands for "carrier sense multiple access with collision detection". Because several devices may try to communicate at any given time, access methods need to be established. Using CSMA/CD, a device first checks to see if the cable is free from other carriers. It then transmits while continuing to monitor the cable. If a collision is detected, the device stops transmitting and tries again later. On a CSMA network with collision detection, all stations can sense traffic on the network so that individually, they can identify the right moment to transmit. Without collision detection it is possible for two stations to transmit simultaneously.

Client-server, at your service

Client-server is one of those trendy computer terms which means slightly different things to different people. Strictly speaking, client-server is an architecture in which processes running independently of each other, send requests, and provide each other with services. The roles of *client* and *server* are defined by the type of process they perform; a process that sends a request is a client, and a process that fulfils the request with the required service is the server. A single process can be both a client *and* a server — it may be both a service provider and a service requester.

If you don't agree with this definition, it's because the meaning of the term has shifted over the past couple of years to mean something slightly different. The definition provided above is a logical definition in which "client" and "server" are understood in terms of their relative functions. These days, most people understand "client" to mean any machine which sits in front of the user, and "server" as any machine *not* in front of the user. In other words, client-server is understood in hardware terms rather than as a model of related processes.

In general, the hardware conception of client-server makes some sense. The user's client machine provides the appropriate user-interface logic to make server requests, and the server responds accordingly. But in practice, the hardware conception does not fit all cases because there are so many different client-server architectures. It is possible for the server process to sit on the same machine as the client. Client-server software usually shields the user from knowing the physical location of the server by redirecting service calls appropriately, and an individual program can be a client, a server, or both.

The basic idea behind client-server is to distribute the processing power and storage space required to run a given application. This is not a new idea by any means; in fact, Local Area Networks have been used over the past ten years to provide many kinds of software solutions. The most basic form of client-server system is where a client (typically a PC) passes requests to the server for file records over a network. In this scenario, the file server is being used to perform a very simple service and the requested data is generally found using many message exchanges.

A database server is more sophisticated. The client's request for data is made in the form of SQL (Structured Query Language) commands, and the results of these requests are returned over the network. Code residing on the fileserver processes the SQL commands, and the requested data is filtered out and passed to the client. This provides a much more efficient system than the basic fileserver model described above, because the code which processes the SQL command sits in the same place as the data and filters out the appropriate data in response to *ad hoc* queries.

PCW Contacts

Eleanor Turton-Hill welcomes any feedback and suggestions from readers. She is on **ellie@pcw.ccmail.compuserve.com**

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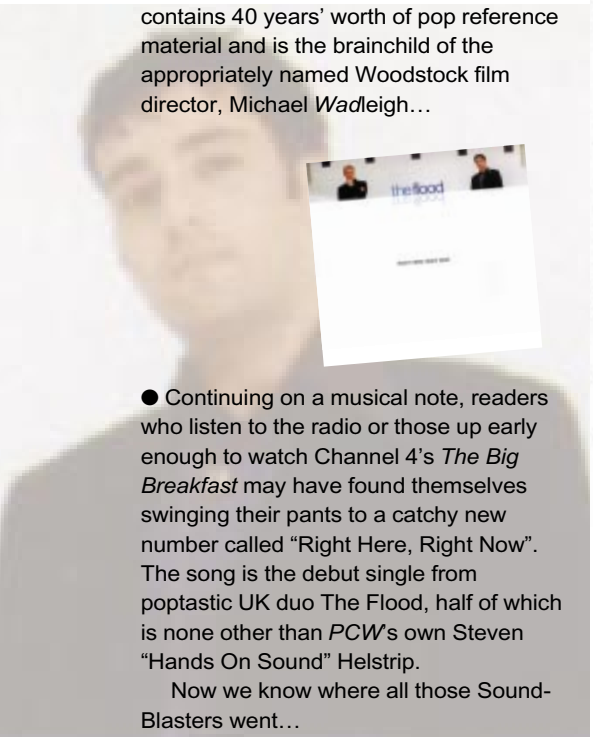
ChipChat

● We hear that high-rolling music bizz research dudes could be forking out for a seriously priced CD-ROM. Okay, so it does include more than 750,000 tracks, 90,000 artists, and 100,000 writers. But priced at £1,173? We're talking most serious wedge here, man.

The imaginatively titled ROCK'n'ROM contains 40 years' worth of pop reference material and is the brainchild of the appropriately named Woodstock film director, Michael *Wad*leigh…



● Continuing on a musical note, readers who listen to the radio or those up early enough to watch Channel 4's *The Big Breakfast* may have found themselves swinging their pants to a catchy new number called "Right Here, Right Now". The song is the debut single from poptastic UK duo The Flood, half of which is none other than *PCW*'s own Steven "Hands On Sound" Helstrip.

Now we know where all those Sound-Blasters went…

● When people register with Demon Internet they get an address with a name and a domain. So, for example, this page could be chipchat@pcw.demon.co.uk. A number of people have gone to great lengths to get themselves a noticeable name, but perhaps the most rewarding is the person who wanted the domain of tombomb.demon.co.uk. This makes more sense when you add in the name of Ivegotta. You can find out more by mailing him, but be careful — you don't want to upset someone that well armed…

● When Digital launched its Alpha RISC processor a few years ago, it came complete with predictions that we'd soon see notebooks with the power of mainframes. Of course, the company forgot to mention that due to the size and heat output of the chip, the machines would probably also need the same kind of cooling systems.

With this in mind, when Tadpole decided to build an Alpha portable, it gave the design a suitable code name. Previous machines had gone by names such as Milton and Wordsworth, so there was only one choice for the new box — Burns.

Sorry, wrong numbers

- In the September issue of *PCW*, page 196, we printed the wrong number for Elonex. The correct one is 0181 452 4444.
- Anyone having trouble getting through to Roderick Manhattan on the number printed on page 19 of the January 1996 issue should try 0181 875 4444 instead.

The news that Carling has put a Web site on the Net dedicated to "the best league in the world" (no, not Serie A) will delight millions of football fans across the country. Except those without computers, of course. Or modems. Or any interest in PCs whatsoever. After all, when was the last time you heard a couple of football fans discussing the Internet? Picture the scene:

"Internet? Nah, can't be bothered with all that technical boll*cks. But blimey, mate, didja see the game last night — blinder, eh? Beautiful dummy. A nutmeg. He shimmied, parried, lobbed it to Incey — ****ing magic. Straight as an arrar, on his left. Fancy a pint?"

Now that's a language we can all understand. Eh? Ref? Hello?

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