

# Personal Computer World 5

May 1996 £2.95

<http://www.vnu.co.uk/hc/pcw>

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 CANS\$12.95

VNU Business Publications

Document Scanners to be Won p251

# 100 MHz PENTIUMS

THE NEW ENTRY LEVEL STANDARD

## Battle Chips

Cyrix 6x86 vs Intel Pentium

## Apricot's PCTV

## Money Matters

Personal Finance software

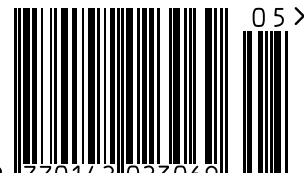
## Lotus Notes 4.0

Leading groupware upgraded

## Olivetti 200MHz Pentium Pro

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

## Group Test: Project Management



9 770142 023069

# DOUBLE DISK PACK

Jumanji screensaver, Linux FT, Duke Nukem 3D, Win95 Shareware

Personal Computer World

100MHz Pentiums ● Battle Chips: Cyrix 6x86 vs Intel Pentium ● Personal Finance software ● Lotus Notes 4.0 ● Group Test: Project Management software ● Apricot PCTV ●

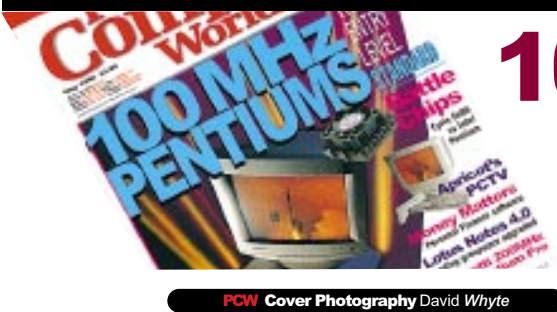
<http://www.vnu.co.uk/hc/pcw>



ALL HARDWARE TESTED BY THE VNU LABS

# Contents

## Cover Story



# 100MHz Pentiums

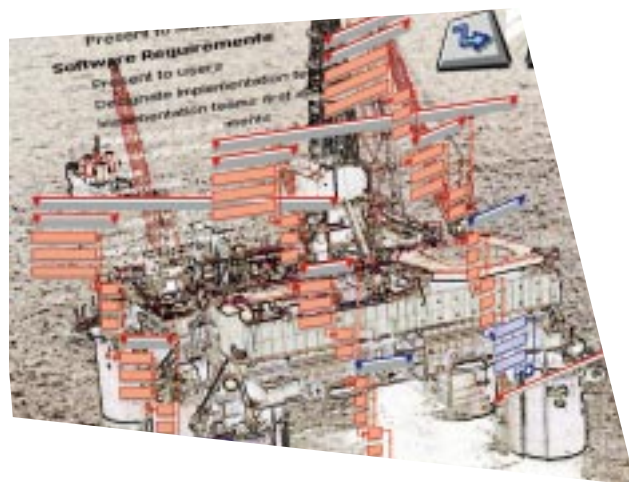
**80** Boasting power without the price, 100MHz Pentiums are set to be the new entry-level PC standard. *Adele Dyer* benchtests 17 of the latest models.

PCW Cover Photography David Whyte

## Features

### Group Test

## 166 Project Management Software



● Making the best use of your resources? Michael Eagleton levels the field.



**120**

## Linux

Linux is a powerful version of Unix that runs on PCs and is collectively owned by its many authors. Martin Houston explains the silent revolution.



**143**

## PCW on the Web

Over the past few months PCW has been putting together a real cracker of a Web site. Paul Fisher explains where it is and what's currently on offer.



**134**

## Interview: William Latham

Pioneering cyberartist William Latham found conventional drawing was just too slow to explore evolution. Clive Akass talked to him about evolutionary art and his innovative Organic Art CD-ROM.



**138**

## Software Localisation

To be really successful, software companies have to offer products in multiple languages. Tim Frost found out how UK-based company, SDL, breaks the language barrier.

## Virtual Working 198

The Internet takes the utopian concept of working from home into a new dimension. Richard Vadon gets hip to the concept of teleworking.



## Reviews

### 54 Gadgets

The weird, the wonderful and the useful.



### 73 Sseyo Koan Pro

A unique music-generating package.

### 74 Signal Box NeuroPredictor

Specialist neural network facilities under Windows.

### 76 TGI Picture Album

### 76 Iiyama Pro Lite 31

High-resolution flat screen monitor.

### 114 Lotus Notes 4.0

Team player *Terence Green* grapples with the latest groupware.

### 56 Apricot MS530 Diamondtron 17

The best home PCTV yet.

### 58 Claris FileMaker Pro 3

The popular database goes relational.

### 62 Olivetti M6 6200 Suprema

A 200MHz Pentium Pro which really flies.

### 62 Digi Datafire ISDN Adaptor

### 65 Cheyenne Inoculan

Virus checking for Windows 95.

### 66 Pioneer DW-S114X CD Writer

### 68 Fractal Designs Painter 4



## 124 Personal Finance Software

*Paul Begg* calls the latest personal finance packages to account.

### 156 Cyrix vs Intel

*Dylan Armbrust* sets the top PC processors head to head.

### 70 Haventree EasyFlow 3

The best all-round flowcharting package.

### 71 GSP HOMEwise

A budget-priced, family organiser.

## Regulars

### 8 COVER DISK NOTES

### 18 Newsprint

Microsoft in new assault on the Web; Fake cache latest; Nokia launches pocket Web terminal; Lotus goes to pieces; Security alert over addressing software; Apple zaps eWorld; Latest from the Windows Show.

### 32 News Analysis

CEBIT report. Microsoft and the Net. Squeeze on Netscape.

### 37 Computations

Rowland Morgan's facts and figures.

### 39 Sounding Off

### 41 Home Front

### 43 Straight Talking

### 45 Business Matters

### 49 Letters

### 78 Long Term Tests

Iomega Zip 100 Drive. Microsoft Encarta 94.

### 330 Buyer's Guide NEW!

## 357 Direct Buyers' World

### 611 ChipChat

## Cutting Edge

### 1 9 7 Introduction

### PCW Online

### 1 9 8 Focus: Virtual companies

### 2 0 5 Net.newbies

### 2 0 6 Net.news

### 2 1 4 Net.answers

### PCW Futures

### 2 2 2 Innovations

### 2 2 3 Horizons

### 2 2 4 Bluesky

### 2 2 6 Retro Computing

### PCW Media

### 2 2 8 Books

### 2 3 8 CD-ROMs

### PCW Fun

### 2 3 3 Kids' Stuff

### 2 4 3 Screenplay (with Leisure Lines, page 246)

### 2 5 1 Competition: WIN Microtek document scanners, hand-painted mice and multimedia bits

Screenplay: Top Gun — Fire At Will

## Hands On



### 2 5 3 Introduction

### 2 5 4 Windows 95

### 2 5 8 Windows 3.1

### 2 6 4 32-Bit

### 2 6 8 Word Processing

### 2 7 2 Spreadsheets

### 2 7 6 Databases

### 2 8 0 OS/2

### 2 8 7 Numbers Count

### 2 8 8 Hardware **NEW!**

### 2 9 5 3D Graphics **NEW!**

### 2 9 8 Graphics & DTP

### 3 0 2 Multimedia

### 3 0 6 Sound

### 3 1 0 Visual Programming

### 3 1 4 Networks

### 3 1 8 Macintosh

### 3 2 3 Computer Answers

### 3 2 5 Beginners

# PCW Cover Disk

This month's floppy cover disk features three superb programs including an animated screensaver, a fast and furious action game, and some Windows 95 animated cursors.

## DOUBLE DISK SUPER PACK

Personal  
Computer  
World

On your CD-ROM and 3.5"  
Disk this month:



### ON THE DISK

- **Jumanji** screen saver based on the movie
- **Animated cursors** for Windows 95
- **Enigma** Breakout-style game

Run A:\PCW.EXE from Windows

Turn to page 8 for full details

### ON THE CD

#### Shareware

- **Cool Wave Editor** - Audio editor with everything
- **TopDraw** - Graphics utility
- **Universal Word** - Latest version of WP package.
- **LINUX FT** - 1.1 Latest version

#### Demos

- **Ulead's Media Studio 2.0** software
- **Descent 2** - 3D action game
- **Ferrari Interactive**
- **Dogz** - Virtual desktop dog
- **OS/2 Warp**

#### GAMES

- **Duke Nukem 3D** - 3D action game that knocks Doom for six

MAY 96

**E**nigma is a game of mental and physical dexterity, written in assembler, with super-slick graphics and sound. It includes a main game and five sub-games, with 150 levels of 60Hz arcade gameplay and perplexing puzzles, based on the game of Break-Out.

The main screen consists of a wall of blocks at the top and a bat at the bottom. The score, level and pickup status are displayed along the bottom of the screen.

Using the mouse, you must control the bat in order to prevent the ball from bouncing off the bottom of the screen. When the ball hits a normal block, the block will be destroyed and there is a chance that either a nasty or a pickup will appear. You will have to learn the best method to deal with each nasty for yourself — touching a nasty is a BAD thing!

Enigma contains five sub-games, each one weirder than the last. When you collect a sub-game pickup, the display will switch to the Betting screen, then to a randomly selected sub-game. You will be shown some simple instructions on how to play the game. It is in your best interests to win the sub-game, as this will give you extra lives, etc.

● If the program will not run from Windows you should run ENIGMA.EXE from the directory it was installed to on your hard disk.



### Jumanji

**H**ere's the screensaver based on the great new Robin Williams film. Just install it from the Program Manager group created by the floppy disk installer, and then use the Control Panel, Desktop utility to configure and test it. Even if you don't normally use screensavers, try this one — it's great.

### Animated Cursors

**W**indows 95 users can add animated cursors to their system, and here are a few more for your collection. They

will be (by default) in the PCWMAY96\CURSORS directory. You can install them using the INSTALL command, then add them to your system in the usual way using the Control Panel.

### PLEASE READ THIS

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 floppy 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



This month there's a superb collection of demos, including games and utilities, graphics, Internet, business and much more. There's also a huge collection of DOS, Windows 3.1 and Windows 95 shareware, screensavers and more.

## MAIN FEATURES Linux FT 1.1

This is the latest version of a fully-working Unix clone that's taking the industry by storm. It is a complete operating system that even has its own graphical user interface. If you know anything about Unix, you'll want to give it a try. For more about Linux, read our introductory feature on p120. For full details on how to install the program please read the file README.FT in the root directory of this month's CD-ROM.

M A Y 1 9 9 6



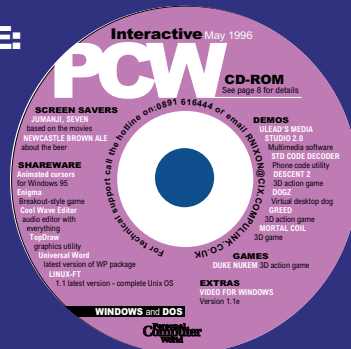
## PCW INTERACTIVE: Entire Contents List

### FEATURES

BitCD — Multimedia demo  
Linux FT — Fully working Unix clone  
OS/2 Warp — Demo of the OS

### DEMOS

Descent 2 — 3D action game  
Dogz — Virtual desktop dog  
Engineering Office — Utility  
Ferrari Interactive — Rolling demo  
Greed — 3D action game  
Indycar Racing — Car racing game  
Mortal Coil — 3D game  
STD Code Decoder — Phone code finder  
Taskey — Information utility  
Topdraw — Graphics utility  
Universal Word — Word utility  
Wetlands — Space shoot-em-up



## Personal Computer World

### INTERNET

Web FX — Web page creator  
Worlds Away — Internet utility  
World Chat — Worldwide chat utility

### MAGAZINE

Hands On — Card file macro files  
Mike Liardet — Two spline files

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

F O L D H E R E

### SCREEN SAVERS

Jumanji — Based on the film  
Newcastle Brown Ale — Based on the drink  
Seven — Based on the film

### SHAREWARE FOR DOS

Duke Nukem 3D — 3D action game

### SHAREWARE FOR WIN 3.1

Cool Editor — Audio Editor  
Exit — Exit Windows quickly  
Tombstone — Strategy game

### SHAREWARE FOR WIN 95

Animated Cursors — Allsoft's animated cursors  
Wipeout — Fully-loaded screensaver

### EXTRAS

CD Test — CD-ROM integrity tester  
Graphic Drivers — Microsoft's SVGA drivers  
Video for Windows — Version 1.1e

● **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.

**Important Note:** We strongly suggest you do not install Linux unless you are technically proficient and know what you are doing. If you do wish to install Linux, you do so entirely at your own risk, and by the action of doing so you agree that neither PCW or VNU are responsible for

any problems you may encounter when using it. If in doubt, don't try to install it.

### BitCD

Multimedia demo. A simply stunning demo with a trial version of a great multimedia authoring package thrown in.

**CONTINUES ON PAGE 153**





A taste of two operating systems — OS/2 Warp and Linux are both featured on the PCW Interactive CD



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 resort 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 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 interactive and select the "Windowed" option and quit again.

**OS/2 Warp**  
Learn more about OS/2, what it can do and what it has to offer you.

**Descent 2**  
Hot on the heels of Descent 1, here's an even more addictive game that pushes the boundaries of 3D game playing even further.

**Dogz**  
Have your own virtual dog on your desktop. Pet him, play catch and much more — without having to take him for walks.

**Ferrari Interactive**  
Drool over the cars most of us can only dream of owning.

**Jumanji**  
A screensaver based on the box office hit film.

**Newcastle Brown Ale**  
Would you believe it, a screensaver about ale?

**Seven**  
Another great film-based screensaver.

**Duke Nukem 3D**  
Wow. If you thought Doom was good, then you're in for a real treat. Duke Nukem 3D is the most innovative and engrossing 3D action game we've yet seen. Even if you're not a game player you *must* check this one out, just to see what your computer can do.

**Cool Editor**  
Probably the best sound-editing package you can get — anywhere.

**Macintosh**  
We're sorry, but Linux FT took up a big chunk of this month's disc, leaving no free room to include any Mac software. We'll try to bring you a larger collection than usual next month.

**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.

**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, 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



The sequel to the hit game, Descent, is nail-biting stuff. Plus, CoolEdit sounds good — check out your Echo and Flange; and be thrilled to bits with the BitCD multimedia demo

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 that it may generate.

**IMPORTANT — READ THIS!**  
**● General Protection Faults**

If you receive General Protection Faults when running PCWI or playing any digital videos, it is probably because your graphic 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 in 95 percent of cases) you may wish to contact the supplier of your graphic 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.



The virtual world of PCW Interactive lets you test drive a Ferrari. Probably the only chance you'll get...



Get down to business with Micro 90, and join Duke Nukem for a new adventure in LA



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 request 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](mailto:rnixon@cix.compulink.co.uk), or on CompuServe 70007,5547.

**● 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.

**● 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 cacheing of your CD-ROM by adding its name to the SMARTDRV

# Personal Computer World



## Editorial

**Editor** Ben Tisdall  
**News Editor** Clive Akass  
**Cutting Edge Editor** PJ Fisher  
**Features Editor** Chris Cain  
**Reviews Editor** Gordon Laing  
**Technical Editor** Eleanor Turton-Hill  
**Associate Editor** Simon Rockman  
**Staff Writers** Adele Dyer / Dylan Armbrust  
**Editorial Assistant** Joanna Scott  
  
**Columnists** Nick Beard / Barry Fox  
Michael Hewitt / Tim Nott / Rowland Morgan  
**International Correspondent** Tim Bajarin

Editorial Phone **0171 316 9000**

Editorial Fax **0171 316 9313**

Editorial Email

first name\_last name@pcw.ccmil.compuserve.com

VNU Web Site <http://www.vnu.co.uk/hc/pcw/>

## Production

**Production Editor** Lauraine Lee  
**Sub-Editors** Patrick Ramus / Jessica Hodgson

## Design

**Art Editor** Darrell Kingsley  
**Designer** Simone Stern

## New Media

**Internet Editor** Angela Collins  
**Interactive Designer** Joolz Pohl  
**Technical Consultant** Frank Leonhardt  
**Interactive Developers** Steve Rogers / Barry Maylott  
**Disk Editor** Robin Nixon  
New Media Phone **0171 316 2058**

## VNU Labs

**Labs Manager** George MacDonald  
**Labs Technical Director** Julian Evans  
**Labs Testing Editor** Jonathan Ricks  
**Operations Manager** Alan Rider

Labs Phone **0171 316 9067**

Labs Fax **0171 316 9059**



Complaints or queries regarding any advertiser in this magazine should, initially, be presented in writing to:

**Anthony George**, 'Customer Relations Department',  
VNU Business Publications, VNU House,  
32-34 Broadwick Street, London W1A 2HG.

Readers are reminded that we are unable to provide technical help/support services, either written or verbal.

## Advertising

**Sales Director** Brin Bucknor  
**Head of Portfolio Sales** Paula Barnes **0171 316 9194**  
**Portfolio Sales Manager** Pranav J Oza **0171 316 9466**  
**Assistant Ad Manager** Kevin Elderfield **0171 316 9303**

### PC Consumer Sales

Jon Miles **0171 316 9302**  
Ben Hedges **0171 316 9308**  
Nick O'Connor **0171 316 9304**  
Matt Rigney **0171 316 9306**  
Beccy Carr **0171 316 9307**  
Fran Taylor **0171 316 9309**  
Stuart Mills **0171 316 9439**

**Micromart Sales Executive** Robert Miskin **0171 316 9305**

### Portfolio Account Handlers

Emma Beagley **0171 316 9502**  
Maggie Bedwell **0171 316 9504**  
Paul Heslop **0171 316 9501**  
Catherine J Russell **0171 316 9461**

**Portfolio Administrator** Janaya Warren **0171 316 9525**

### Advertising Customer Services

Susie Ross **0171 316 9465**  
Sandhya Tanna **0171 316 9372**  
Paul Peters **0171 316 9435**

**Credit Control Manager** Tosh Bruce-Morgan **0171 316 9667**

**US Sales Representative** Global Media Representatives, Inc **0101 415 306 0880**

**Taiwan Sales Representatives** Grace Chu/Kent Lai **010 886 2717 7663**

## Production

**Production Controller** Melanie Thomson **0171 316 9481**  
**Production Manager** Adrian Brown **0171 316 9484**

## Circulation

**Subscriptions Manager** Leisha Bulley **0171 316 9712**  
**Subscriptions Supervisor** Joanne Nicholls **0171 316 9713**

## Publishing

**Founder** Angelo Zgorelec  
**Publisher** Jon Ross **0171 316 9187**  
**Marketing Manager** Juliet Parker **0171 316 9191**  
**Head of Corporate Marketing** Erik Hoekstra  
**Corporate Marketing Manager** Tony Evans  
**Marketing & Sales Co-ordinator** Timothy Mickelborough **0171 316 9820**

Test Results are based wholly or in part on methodologies provided by National Software Testing Laboratories, a division of McGraw-Hill Inc, and licensed to Personal Computer World. Neither NSTL nor the Publisher guarantees the accuracy or adequacy of its testing activities and makes no representations or warranties regarding tested products. Articles or portions of articles translated and reprinted (or adapted) in this issue from PC Digest or Software Digest Copyright (c) 1994, by National Software Testing Laboratories (NSTL), a division of McGraw-Hill, Inc, 625 Ridge Pike, Conshohocken, Pennsylvania 19428, USA. Reproduction of the NSTL material in any manner or language in whole or in part without permission of NSTL is prohibited.



**154,482**  
JAN-JUNE '95



VNU BUSINESS PUBLICATIONS

## REPRINTS

We offer a full reprint service for reproduction of all or part of any current or previous articles. Minimum order 1,000. For details contact Susie Ross or Sandhya Tanna (0171 316 9000).

## USE OF EXTRACTS

We are delighted for people to use quotations and segments of articles for internal or promotional purposes. For clearance, contact Juliet Parker (0171 316 9000).

## SUBSCRIPTIONS

Annual subscription, £24.95. One year Europe only, £95. Rest of World, £125. P&P included. Freephone 0800 526669. Fax 0171 316 9699. Email michael@vnu.co.uk. Credit card orders welcome.

## 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**.

No material may be reproduced in whole or in part without written consent from the copyright holder © VNU Business Publications 1996.

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

The Internet. The most over-hyped, over talked-about topic in computing today. Right? Wrong. The Internet is still underestimated, derided, misunderstood and under-hyped.

Channel 4 recently broadcast an edition of *J'accuse*, by Janet Street Porter, which presented all the old prejudices about the Internet. It's used by sad people who can't relate to others, it's full of trivia that probably isn't true, it's a fad like CB radio. It all came flooding out. Street Porter was presumably given a large wad to trot out this rubbish. If any of it was ever true, it certainly isn't now.

Irresponsible attitudes like hers probably explain why, as usual, Britain is languishing behind the Americans on the Internet. In the UK, every company whose main business is Information Technology, communications, advertising, television or publishing should have its own Web site and email on every desktop. A horrifying number of companies still don't. At VNU (publisher of *Personal Computer World*) email has yet to reach every desk. The same is true at Racal Datacom, makers of modems and ISDN devices. And I'm sure that's just the tip of the iceberg.

Every medium-sized or larger company of any kind should have company-wide email and a Web site to showcase its products, and should be seriously considering using Intranets (internal Web sites) as a way of distributing information internally. Nothing from telephone extension lists to terms and conditions.

For companies of any size, the Web has serious resource implications. The standards of the best Web sites have rocketed in the last year. You don't necessarily need to spend a lot of money on creating a Web site (although it sometimes helps). What you do need to do is think seriously about the kind of Web site you need and who you get to put it together.

**Ben Tisdall**  
Editor



# Next Month

# Personal Computer World

## PCW AWARDS 1996

**We reveal this year's winners of the most prestigious IT Awards**



# Personal Computer World



### Graphics Cards Group Test

**PCW compares the hottest video cards around**



### Pentium 166s

**The first wave of 166MHz Powerhouse PCs go head to head**



### AutoCad '95

**The world's leading CAD package gets a new look**



**June 96 issue**

— On sale Thursday 2nd May

**July 96 issue**

— On sale Thursday 6th June

• Top 50 Utilities; Monitors

\* Next month's contents subject to change.

13  
PERSONAL COMPUTER WORLD  
MAY 1996



# Newsprint

## NEWS Highlights

**Cache confusion** 18  
Dummy-cache motherboard maker not yet marking chips

**Corel gets suite** 19  
Corel targets Lotus and Microsoft

**Lotus in pieces** 21  
Its first software components are unveiled, aimed at Notes 4.0

**Seeing red** 22  
Portables to get 4Mbit/sec infra-red data ports

**Hacker's paradise** 24  
1000 Web sites are wide open to the perils of hacking

**Software bestsellers** 30

## It's Web war as Gates puts the squeeze on Netscape

Microsoft piled pressure on to Web pioneer Netscape last month with a series of announcements apparently designed to corner the Internet software market.

Most curious was a deal with America Online (AOL), on one reckoning the world's biggest online service, which will adopt Microsoft's Internet Explorer as its browser. Just a day before the announcement, AOL told the world that it was adopting Netscape's riva, Navigator.

AOL chairman Steve Chase, in a joint news conference with Microsoft chief Bill Gates, said Netscape would be used by a subsidiary, GNN, "which has a different class of user." AOL's four million mainstream users

will get Microsoft software.

Microsoft will in return put an AOL icon on the Windows 95 desktop, in addition to the icon for Gates's own MSN service.

Gates also announced a new version of his Internet Explorer browser. Version 3.0 will introduce new controls, called Active X, to facilitate the creation and use of multimedia-rich Web pages. "We think this will put us in a leadership position," Gates said.

A beta version is with third-party developers and the final version is expected to ship in late summer. IE3, as Gates calls it, supports Netscape plugins and the fashionable Java

language; but Active X controls can as easily trigger routines written in C++ or Microsoft's own Visual Basic.

IE2 is already a formidable competitor to Netscape, and is better integrated into Windows. Gates said there will be versions for Win 3.1, NT and the Mac, as well as for Windows 95.

Ominously for Netscape, he spelled out again his intention to incorporate browser technology into the operating system, leaving little room for third-party technology. But both he and Chase said they expected Netscape to remain as a competitor.

**Clive Akass**

*MSN charges cut — page 28.  
News Analysis — pages 33/35.*

## No change yet on dummy cache marking

The maker of many of the dummy-cache motherboards sold in the UK had made no decision as we went to press about marking them to avoid confusion or fraud.

Protac International Computer (PIC) admitted last month that it used dummy cache to cut production costs and to reassure buyers by filling chip slots.

PIC said dummies were stamped Writeback to identify the strategy for using cache inside the main processor.

Whatever the motives, the move caused all kinds of fun and games at point of sale (see Newsprint, March and April). Newsprint has been flooded with letters and calls from readers complaining of being misled or ripped off by dealers.

Protac is not the only board maker using dummy cache but it is the biggest.

UK marketing manager Steve Baxter says it could outsell Intel this year to become the world's largest vendor.

He said in February that PIC would consider marking the dummies more clearly. But after meeting company chiefs from the Far East last month, he said: "I cannot say what they will decide."

Meanwhile, Leslie Richards, MD of Eurosoft, warned of reports that fraudsters have restamped Intel processors with a higher clock speed than they are rated for. "It means they burn out before their time."

A "lite" version of Eurosoft's PCCheck program, which can be used to test for dummy cache, is available at PCW's Web site at [www.vnu.co.uk/hv/pcw](http://www.vnu.co.uk/hv/pcw). We will also post there any updates on this and other stories.



It had to happen. We had GSM data phones. We had palmtops. We had cards to let palmtops talk to phones. In the shape of H-P's Omnigo 700 we even had a phone that slotted into a palmtop.

Now, at last, Nokia brings us the personal organiser with a data phone built in. The Nokia 9000 Communicator was one of the star exhibits at last month's Cebit in Hannover. It allows you to send and receive email, short messages and fax, and even access the Web, from anywhere within radioshot of a GSM network. And of course it also packs the usual organiser functions. The price is expected to be about £1350.

Nokia 01480 434343

More Cebit news, page 32.

# Corel draws new Perfect world

Corel previewed WordPerfect 7.0 last month and announced the product rollout with which it will take on the Lotus and Microsoft office suites.

The announcements were marred by confusion over the fate of support staff following Corel's purchase of the WordPerfect family from Novell.

Corel was apparently taken by surprise when Novell made more than a dozen people redundant on the eve of the formal handover on 1st March. Corel has offered jobs to all support staff, five of them with the new freephone support operation in Dublin. The rest were expected to be offered

marketing work. Novell will continue to support WordPerfect until 5th April.

There is a major question over whether Corel can offer the kind of support expected by corporate users.

WordPerfect, once a best-seller, still has millions of users worldwide. Version 7.0, due in June, will be a full 32-bit Win95 application, integrated with the Netscape Web browser and including DTP features such as guidelines and graphics boxes.

Two Windows 3.1 bundles, due to ship this month, include the Corel WordPerfect Suite: WP 6.1, Quattro Pro 6.0,

Envoy, Netscape, Corel Presentations, CorelFlow, and Starfish's Sidekick and Dashboard. It will cost £225 (plus VAT), or £99 as an upgrade.

Corel WordPerfect Professional will add InfoCentral, Borland's Paradox, and Novell's Groupwise. It will cost £499, £149 as an upgrade.

Win95 versions of the software will start to appear next month.

● Novell's new Webaccess allows GroupWise users to access their mail and schedules from a Web browser. A 10-user pack costs £170.

Novell 01344 724000;  
Corel 0800 973 189

## Short Stories



● The boy Gates, future chairman of Microsoft, features in a three-part Channel 4 documentary called "Triumph of the Nerds", which starts on 14th April. It tells the story of how a group of young techies, including Gates, saw the potential for personal computing and became millionaires before reaching their mid-twenties.

# The world's a virtual stage

A black comedy opening this month sounds like a more intelligent look at IT than the tired "computer freaks are nerds" line that currently seems to be de rigueur (see story, right). "Binary Dreamers", by award-winning Robert Shearman, also attempts the difficult feat of putting multimedia on stage. The Nexus Theatre Company production depicts future technicians as having a virtual home and (right, below) children because they lack time for the real thing – largely because they are the only people who understand how to keep the computerised country running. The computer (right, top) is itself a character. The play runs at the Man-in-the-Moon Theatre, Chelsea, London from 2nd April to 11th May, but may transfer to a larger venue later. Details at [www.vidzone.com/nexus](http://www.vidzone.com/nexus), Web site of Nexus Multimedia, which is doing the graphics. Or call the box office on 0171 351 2876.



## Trident 3D chips talk to your TV

● Trident has launched two graphics chips which offer 64-bit graphics acceleration and 3D rendering, and will output to both a monitor and a TV. The ProVidia 9695 is for desktop models and the Cyber 9395 is for notebooks. Both support Microsoft's new 3D direct draw API. (See page 27.)

Kudos Thame 01734 351010

## Toys and us

● Fans of Disney's Toy Story can access its Web site [www.bvi.co.uk/toystory](http://www.bvi.co.uk/toystory) for features, games, film clips and competitions.



## Mega sales

● Omega claims to be QIC cartridge market leader in Europe, having taken 33 percent of sales.

Omega 0800 973194

# For Pod's sake ... Intel pets gissed off over its Ps and Gs

Would you confuse the word "boy" with "toy"? Or "duck" with ...well, we'll leave it at that. Which is more than Intel did when it discovered a UK firm had launched a product called Gentium.

Gentium (Latin for "of nations") is a development environment for executive information systems. Nothing to do with processors, nothing to do with Intel. But developer Planning Sciences has had to change the name to Gentia, after the chip giant's lawyers complained that Gentium was too much like Pentium.

No-one at Planning Sciences would talk about the decision. But someone close to the company said: "Some people are too big to take on in court." US trademark law makes no distinction between hardware and software products.

Intel spokesman Michael Sullivan said: "We have to protect our trademarks."



"He has to speak in English. It seems that Intel has trademarked Latin"

# Lotus goes to pieces over Notes 4.0

Lotus unveiled the first of what it promises will be a string of software components last month — mini-apps that can be used like extra tools within applications.

The first release, due to ship later this year, is targeted at the Notes 4.0 environment, but later ones will be designed for Java, perhaps Netscape, and OpenDoc, which pioneered the use of component software.

Larry Roschfield, senior director of application product management, said research had shown that the "80-20" rule continues to operate: that is, 80 percent of users only ever use

20 percent of an application's functions.

Users were also irritated by having to load, say, a massive word processor to jot down notes while working in another application. Components allowed them to pull up a little text editor, or mini-spreadsheet, without leaving their current environment.

Components also facilitate the embedding of active components. "If you are working in the Notes environment, you can reach for a tool, just like you are at a workbench. They enable you to build richer documents, faster... and they work within

Notes as if they are part of Notes."

Roschfield said Lotus would price components aggressively in a bid to gain market share. A starter pack, costing just £12 in volume or £39 to single users, will include a chart, data query, draw and diagram, file view, comment tool, project scheduler, and spreadsheet. A developer kit will cost £312.

● Notes 4.0 began shipping in February and is selling well, according to Lotus. It claims to have doubled the number of Notes users in six months last year.

Lotus 01784 455445

## Short Stories



### Law reports on CD-ROM

● electronic Law Reports (eLR) will be available this summer on a set of CD-ROMs. The full text of all 753 volumes of the Law Reports published since 1865 will be accessible from the database.

Powerful search tools help lawyers to develop a case history. Single-user price is £5,000, but there is a 20 percent discount on orders before 16th June.

Context 0171 267 8989

### Framemaker gets SGML

● Adobe has launched a new version of its Framemaker specialist desktop publishing package for all major platforms.

Framemaker+SGML 1.0 is said to be the first of its kind to offer Standard Generalised Markup Language editing and publishing within a what-you-see-is-what-you-get environment.

SGML, a superset of the Web language HTML, is a cross-platform formatting language much used for frequently-revised critical documents such as manuals and academic reports — Framemaker's major market.

It is available for Windows, Mac, PowerMac, Solaris, Aix and HP/UX platforms.

Adobe 0181 606 4000

### Kids' deal

● Microsoft's six-month "Kids Promotion" finishes on 30th April. Anyone buying the new Deluxe package of Creative Writer and Fine Artist on one CD-ROM, and one other specified title, is entitled to a free product worth £29.99.

Microsoft 01734 270001

## New software evolves for digital photography market

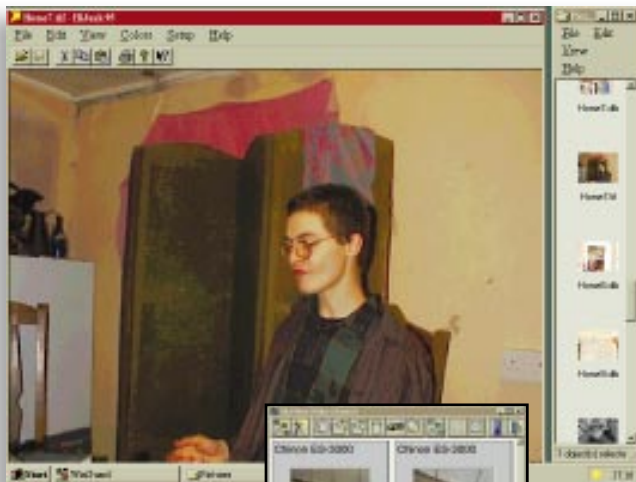
Users of the graphics utility Hijack Pro may have wondered where it could go next, with low-cost paint packages bundling many of its viewing and format-conversion facilities.

Developer Quarterdeck has taken two directions. The old 16-bit Hijack Pro has been given Paint and Draw modules and re-launched as the £100 Hijack Graphics Suite for Windows 3.1.

Launched at the same time at last month's Windows Show was Hijack95 (£50), which looks at first sight like a cut-down version of Pro. But it is quite different: essentially a 32-bit component that acts as an extension to Win95.

It iconises graphics files to help you identify them in file listings viewed from any program. You can get a full view either by right-clicking the mouse or dragging the file to a Hijack icon. Hijack even allows you to make the icons bigger.

The screenshot (above) shows a Win95 directory listing transformed into a scrolling picture gallery (screen right) from which any picture can



be dragged into the Hijack window (screen left) for viewing and manipulation.

This is the start of an evolution of software to cope with the mass market for digital photography, which looks set to emerge soon. Some of the existing stuff is a little flaky, as with the driver for the Chinon EZ 3000 camera (Newsprint, April). NBA, which distributes both the 3000 and the related Kodak DC50, sent me a £199 package called Photo-Wallet (inset) which gets pictures a

little more efficiently from the Chinon — though it can be

used with any Twain device.

It too is more like a component, allowing you to organise and index your pictures, as well as store them fairly compactly — about 100Kb a full-colour shot.

● Quarterdeck also launched a new Internet suite which PJ Fisher will review next month.

Quarterdeck 01245496699;

NBA 01483 301970

## Short Stories

## MO storage costs drop

● Plasmon has doubled the capacity of current magneto-optical storage drives with a new 2.6Gb model. The RF6940 costs £1,770, a big drop in the cost per megabyte.

The drive is also integrated into Plasmon's Jukebox range, where the cost benefit is still more marked. The 52-slot RF52J-694 holds 135.2Gb, double the capacity of the RF52J690 which it replaces, yet costs less at £10,995.

Plasmon 01763 262963

## Adobe pack

● Adobe has launched the Adobe Publishing Collection for Windows 95, combining Photoshop 3.0, Illustrator 4.1, PageMaker 6.0 and Acrobat Pro 2.1. It offers a saving of up to 30 percent on the cost of buying the products individually.

Adobe 0181 606 4000

## Thank you, Fanfare

● SoftKey's Fanfare! Presentations lets you create interactive multimedia presentations easily, works with both Windows 95 and 3.1, and is available at a recommended £39.99.

SoftKey 0181 789 2000

## Hayes suite

● Hayes has launched a new £79 telephony software suite called the Smartcom Message Center. It features support for voicemail, fax on demand, and messaging.

Hayes 01252 775500

## Award deadline

● Nominations for the prestigious British Computer Society Awards for IT close on 31st May. Forms can be accessed at [www.bcs.org.uk/cgibin/awards.htm](http://www.bcs.org.uk/cgibin/awards.htm)

BCS 01793 417417

## 50in inkjet

● ColourGen claims its 50in NovaJet Pro 50 inkjet is the widest available.

ColourGen 0113 277 3689

## Portables to see red with new, fast network links without cables

All portables will ship with infra-red ports capable of passing data at up to 4Mbit/sec by the end of next year, says IR specialist Extended Systems.

That is the ceiling of the IrDA 1.1 specification, though current machines manage only a maximum 1.15Mbit/sec — still ten times faster than IrDA 1 models.

Extended Systems has launched two new IR network links capable of 4Mbit/sec, which it showed linking to IBM Thinkpads at 1.15Mbit/sec. IBM will shortly ship 4Mbit/sec models.

The JetEye Net and the JetEye Net Plus allow portable users to connect directly to a network without the need to hassle with cables. The Plus also has a printer port. They will cost £210 and £180 respectively in Britain; US prices are \$285 and \$242. Mark Willnerd (sic), US-based IR product manager,

could not account for the price disparity. He said: "I have no idea of the distribution arrangements in the UK."

Extended Systems is not alone in pushing its luck on prices: standalone infra-red ports in general cost little less than cheap televisions equipped with an IR port and an IR remote control. The silicon involved costs less than a cable.

Companies have R&D costs to recoup, but they have only themselves to blame for the fact that infra-red links have yet to reach a mass market.

But IR's time does appear to have come. Sharp demonstrat-



ed a video playing across a 4Mbit/sec IR link at Fall Comdex. Hewlett-Packard, which has offered IR for five years, is about to launch in Europe a network adapter called NetBeamIR, which will compete head-on with the JetEye net. It too will offer speeds of up to 4Mbit/sec. The European price has not yet been announced but it costs \$289 in the US.

Extended Systems 010705 875075;

Hewlett-Packard 01344 360000

## Hewlett-Packard keeps dot density down on latest colour LaserJet

Hewlett-Packard has kept the dot density on its latest colour LaserJets down at 300 per inch — but says image resolution enhancing technology (iRET) makes this effectively

1200 dots per inch.

True 1200dpi black-and-white lasers have been available for some time, and dot density has popularly been assumed to be a measure of quality. But HP

is not alone in saying that for colour, in particular, the dot density beyond a certain point is less important than how the colour is placed on the paper.

HP colour programme manager Darren Wall points out that there are implications for speed, too. "The more dots you have, the more data you have to process."

The Colour LaserJet 5 and 5M models are targeted at workgroups requiring multiple copies of colour documents. HP claims the average cost of a colour page is just under 6p, and that the machine has the lowest cost of ownership of any other colour laser.

The Colour LaserJet 5 costs £5,500 complete with 20Mb of RAM; the 5M, for Macs £7,180, with 36Mb of RAM.

Hewlett-Packard 01344 360000

## Turbo upgrade 'faster than Pentium 75'

A new 486 upgrade kit based on the AmD5x86 chip is claimed to outperform rival Intel's overdrive chips, giving the performance of a Pentium 75.

Kingston Technology has added a fan and voltage regulator, and is marketing the result through Datrontech as the Turbo 133.

The Turbochip is clock-quadrupled to run internally at 133MHz on a 33MHz bus, making it suitable for most 4865 SX and DX motherboards, the company says. It includes a floating point unit and 16Kb internal cache.

Datrontech 01252 303534



## Renewed terror campaign highlights peril of instant address systems

A mailshot system which can instantaneously locate virtually anyone in England, including leading politicians, was launched last month at the start of the renewed IRA terror campaign.

GB Mailing Systems said that on police advice it was "revising the script" of its Windows Show promotion of its GB Accelerator system — the first of its kind to be based around a desktop machine.

GB said it could legally allow anyone to browse its data. "But considering the terror alert, GB chose not to use politicians' names and addresses to demonstrate... the directory engine."

This heartwarming demonstration of public spirit was marred by the fact that the company showed to journalists how it could find, within seconds, the home addresses of John Major and other leading politicians.

The system uses 43 million

names and address from the electoral roll, matched against the Post Office address file (see story below). GB says it has retained former deputy data protection registrar John Lamidey to advise "on procedures to manage and maintain best practice in its national register work."

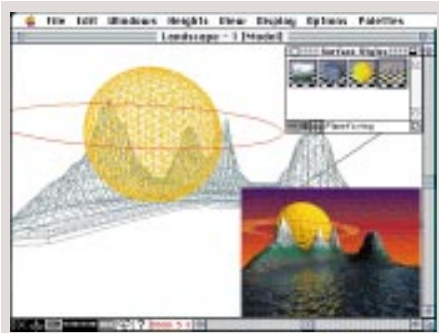
Any would-be terrorist seeking targets would have to pay dearly for Accelerator. It costs more than £30,000.

A spokeswoman for the Data Protection Registrar said local authorities are required by law to provide electoral roll information for a fee on request.

"We are aware that some provide this information in electronic form. But users of this information are required to register with us."

GB Mailing 01244 683333

Clive Akass



Form.Z RenderZone (above), MiniCad 6.0, and Media StudioPro 2.5, previously only available on the Mac, are now available for the PC. MiniCad supports 2D drafting, 3D surface modelling, a powerful database and macros. Form.Z RenderZone from auto.des.sys is a fast 3D modeller with rendering. Media StudioPro provides 32-bit video editing under Windows 95 or NT.

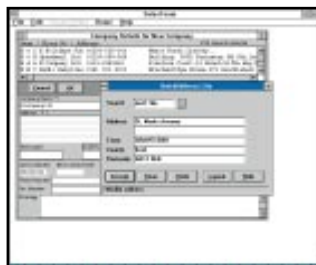
Gomark Design 0171 731 7930

## You too can afford a correct address

The new commercially-oriented Post Office, once a byword for public service values, now urges us on the value of correct addressing while charging a huge amount for addresses.

Addresses and phone numbers in the free-marketing US are public domain information, but software and licenses to access Britain's Post Office Address Files (PAF) have in the past cost hundreds of pounds.

Now Quick Address Systems is offering a £99 package that looks very useful for small businesses. It has crammed all the addresses in Britain, short of house names and numbers, into 5.7Mb with a front-end that



makes them available to any Windows or DOS application.

The idea is that if you are taking an address over the phone, you ask first for the postcode and most of the rest is filled in automatically: you need only ask for a building number and name. Not only does this save typing, you also get a double check on accuracy.

QAS Lite is designed to be integrated easily into standard PC applications such as Word or Excel. More advanced pack-

ages, such as QAS Rapid, provide more details but usually require some expertise to customise.

Postcodes can be linked to several datasets to facilitate marketing, including census-derived information.

AFD was the first to bring prices down with a £154 product called Postcode, which will also provide Mailsort and (where possible) STD phone codes and interfaces for more than 70 Windows applications.

AFD has now announced a £125 add-on called Pinpoint, which provides a grid reference which can be imported into mapping software. Within Windows, it will also display the approximate location on a map and calculate distances.

QAS 0171 498 7777; AFD 01294 823221

### Tim Bajarin: Message from America



Oracle chief Larry Ellison has

unveiled a prototype of his cheap Net-access box, seen as a replacement for the PC. I was shown one by Andy Laursen, who is heading the project.

The NC, as Ellison calls it, is square, with I/O ports in the rear, and is based on the ARM Risc chip. It has a few megabytes of RAM, a Net interface, a keyboard and a mouse. A TV is used as a monitor. It can be used to browse the Internet, send email, or compose documents.

The NC can also receive and send audio and video, subject to available bandwidth (minimum 384Kbps, so they say). Oracle hopes to be the major provider of the underlying database for NCs. It has been developing a universal database with multimedia support with versatile indexing. It also lets companies recast their data into new NC paradigms.

Given the bandwidth needed, the NC is unlikely to hit the consumer market soon. First users will be corporations and schools.

Ellison and Oracle have bet the farm on the Internet. Oracle is counting on the NC to make it bigger than Microsoft. That's quite a gamble. I question whether users will dump PCs in favour of the NC. But it seems to me that the PC and the NC could co-exist as business, education and entertainment go digital.

A user may have a PC in the den and a sub-\$500 NC in the kitchen or bedroom — even in the form of a smart telephone.

So when you hear the rhetoric about the network computer and how it will take over the PC, remember that that debate is too narrow.

The heart of the issue is how each digital access system will work in your office and home in the future, and how they will change the way you work, learn and play in our digital future.



## Short Stories



● This Fujitsu notebook is claimed to be the first pen-driven colour model to run Windows 95. The Stylistic 1000 uses a 486DX4 processor, an infra-red port, and a Lithium-Ion battery pack capable of a claimed six hours of operation.

It is aimed at niche applications based on form-filling and data collection, which can be implemented easily without sophisticated handwriting recognition.

Fujitsu is offering a wide range of stylish peripherals, including a keyboard and stand that can turn it into a desktop machine. Prices start at £2995.

Fujitsu 0181 573 4444

### Intel boosts multimedia

● A new Intel technology is said to enhance multimedia and comms applications. Intel plans to incorporate the MMX architecture extensions on all processors from late 1996 (see page 160). It is preparing to release a new chip, codenamed P55c, to launch the technology.

MMX is intended to enhance rather than replace multimedia components such as sound cards by reducing the load on the CPU. Firms such as Microsoft, Macromedia and Criterion have announced support.

Intel 01793 403000

### Netscape cash

● Netscape reported \$40.6 million revenues for the last three months of 1995, an 80.5 percent increase.

### Print servers

● Microplex showed its \$37510BaseT M205 and 10Base2 M206 miniature multi-protocol Ethernet print servers at Cebit.

Microplex 001 604 444 4232

# 1000 Web sites 'open to hackers'

More than 1000 Web sites use a version of Microsoft Internet Information Server software that is very vulnerable to hackers, according to the latest survey by Web consultant Netcraft.

They use IIS software, downloaded from Microsoft's Web site before 5th March — without a fix Microsoft posted within hours of the discovery of the bug.

The bug is even easier to exploit than a similar one in early Netscape server software — also still in use at thousands of sites. Microsoft posted a fix within hours after news of the bug was posted on the Net.

Many companies are reported to be reluctant to link up to the Net because of the security problem. But Netcraft's Mike Prettjohn says: "They are still careless about it. Security is very hard to achieve. It is not the case that you can stick up a Web site and

assume it will be secure forever."

Netcraft started monitoring Web sites last year and produces monthly reports on the software they are using. "No-one else was doing it and we carried on because a lot of people find it

useful. Even the software companies don't know the figures."

Detailed figures, with links to other relevant information, are at [http://www.netcraft.com/security/http/cgi\\_dos.html](http://www.netcraft.com/security/http/cgi_dos.html)

Netcraft 01225 447500

## Computer security standard ignored

Just two in a hundred companies have implemented a standard introduced last year to improve computer security, according to a new survey. More than half those polled by KPMG had not even heard of the BS 7799 standard, which outlined ten key controls.

Three out of four lack a designated security office and even fewer had a policy for reporting security lapses. A large proportion of companies that had suffered a loss still had no plan to cope with a further incident. Unauthorised Internet connections within companies presented one of the greatest security threats, according to the 1996 National Computer Security Survey.

The survey is priced £235 from Brian Kearvell-White at KPMG on 0116 256 6173.

# BT consumer Internet service is 'too expensive', say analysts

BT finally launched its consumer Internet service at the Windows 96 show, attracting criticism that it has priced the service too high.

BT Internet will cost £15 per month for unlimited access, plus a one-off joining fee of £20. In comparison, CompuServe's new SpryNet service is charged at around £13 per month for unlimited access, while UK based Net-Direct is offering unlimited

access for just £6.99 per month as part of an annual payment plan.

However, BT maintains that it is not "aiming to be the cheapest or the most expensive" but offering a higher level of service and resources. It will offer 0345 access outside London at speeds of up to 28,800Kbps. New users will be given a complete starter pack, including a copy of enhanced Mosaic to



sign up to the service.

Some newsgroups will not be available, but BT says that access decisions are based on illegality rather than censorship. For example, it will not carry newsgroups whose titles suggest illegality, such as alt.rec.cockfighting, an illegal activity in the UK.

BT Internet will be supported by billboard promotions and advertising in national magazines and newspapers. But BT believes that its marketing clout will not give it an advantage over smaller competitors but instead boost the Internet market overall.

CompuServe has announced its first foray into the virtual online world with the UK launch of Worlds Away. By typing GO AWAY members can enter a new chat area which is graphically rich and allows them to generate online personalities from a kit of graphical parts including, strangely, certain vegetables.

Users can create facial expressions and gestures. Virtual cash is available to buy and sell objects from other users as part of an accumulation game. The service has been working in the US since December, and a real marriage has already taken place as a result.

Worlds Away is the first of what CompuServe expects to be many multimedia environments on its service and was developed in conjunction with Fujitsu Cultural Technologies.

CompuServe 01734 525555

PJ Fisher

# Microsoft launches new 3D engine

Microsoft has announced Direct3D, a comprehensive set of API services designed to provide mainstream PC users with realtime 3D graphics. It stems from the highly regarded Reality Lab 3D technology, acquired by Microsoft when it bought RenderMorphics.

Direct3D gives developers advanced 3D functions and a highly optimised software-only rendering engine. It has integral support for mapping

photographic textures and videos to animated 3D objects. It can mix animated 3D and 2D objects within a single scene, and works with hardware accelerators to improve performance.

Ann Mitchard, senior product manager at Microsoft UK, said: "PC users will soon experience a whole new level of 3D-realism in Internet, entertainment, education and business applications."

Microsoft is also set to make Direct3D a cross-platform solution, with versions for Windows 95, NT and Apple PowerMacs.

Likewise, Apple is planning to bring its technology to the Windows platform, fuelling another battle of the standards.

Direct3D is currently shipping to developers in beta form as part of a software development kit (SDK).

Microsoft 0345 002000

Chris Cain

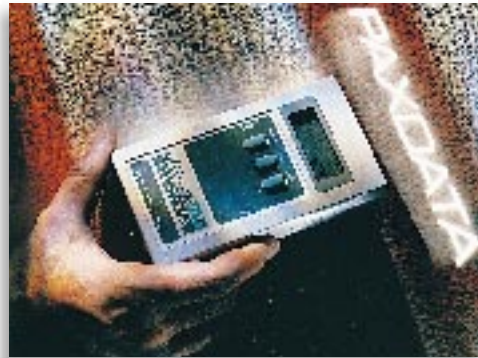
## ISDN 'value' starter kits come online

Two more relatively low-cost ISDN kits were launched last month, amid whispers that BT will cut its controversial £400 sign-on charge later this year.

Motorola demonstrated an ISDN version of its successful Net starter pack, which was built around a V.34 modem. Its £329 ISDN start kit includes a BitSurfer Pro terminal adapter with two analogue ports as well as an ISDN jack.

Cheaper adapters lack an analogue port, which allows you to use existing equipment such as a fax machine or phone handset. However, the Motorola TA, which is styled very like its V.34 modem, is Hayes compatible and so can be used with most standard comms packages.

The pack, which comes complete with an Internet kit and cables, ships this month. Motorola also launches its Vanguard router family, providing ISDN access for LANs and including Frame Relay and X-25 support as standard to allow switched access to private or public carrier networks.



Hayes is offering what it calls an ISDN value pack, which includes a terminal adapter, a fast serial port, and an Internet starter kit. It costs £449.

Paxdata's Ultimate TA (pictured) can aggregate two ISDN channels into one, and can imitate a leased line so that it always appears to be on line.

Motorola 01293 404343; Hayes 01252 775511; Paxdata 01442 2363360

## Wavelet goodbye to noise

High-class squiggles called wavelets are the latest wheeze to hit computing. The maths behind them is devious, but you don't need to get into it to use them, according to Matlab developer The MathWorks.

It has produced a Wavelet Toolbox for Matlab, which can be used for a multitude of tasks, from image compression to noise elimination and (not unrelated) financial analysis.

Simple squiggles have been used for 172 years, since Fourier formulated the theory by which complex waveforms are



represented as a set of sine waves.

But continuous sine waves are poor models for sporadic effects, and clumsy even for some continuous wave forms – for instance, a square wave. Wavelets are discontinuous and sum to zero, like a single cycle

of a sine wave (think of the path traced by the end of a bicycle spoke – the areas above and below the hub cancel out). Wavelets can also have exotic shapes, each suitable for a different class of problems.

Wavelets are related to fractals in that the same shapes repeat at different orders of magnitude, like harmonics in sound. These different orders can be seen in the screenshot, which shows an analysis of noise on a chirp sound.

Image compression is obtained by using such ripples within ripples to represent the subtle changes across a picture.

Clive Akass

## Short Stories

### Textbridge for Web output

● The latest version of Xerox's Textbridge text-recognition product includes features to help companies wishing to translate paper documents into Web pages.

Companies use browsers to distribute information, but need an easy way to post and format it, says Wayne Crandall, managing director of Xerox's desktop document system division in Europe.

TextBridge Pro has sold on its ability to translate formatting as well as text. The new TextBridge Pro 96 includes a light version of SoftQuad's HotMetal editor which can output in HTML.

Xerox Imaging 01734 688421

### Piracy hotline leads to writs

● Microsoft has issued writs against two firms for allegedly supplying illegal software. The firms are Proteck (UK) of Stevenage and Glasgow (also trading as Pro-Technology and Stevenage Computers), and Andrew Fullard, trading as FTS of Plymouth.

The writs follow calls to Microsoft's Sherlock Holmes hotline, which "gives customers the opportunity to validate their software".

● Maidenhead-based Leading Technology, which trades under the name Protek, says it is not connected with the accused company.

Hotline 0345 300125 ext 1001

### Apilink in the UK

● Paris-based Apilink has launched a drive into Britain, coinciding with the launch of Oracle's Universal Server. Apilink claims its product, which acts as a hub between client and server, provides fast, secure integration between mainframe databases and workstations.

Apilink UK managing director Stuart Kenley said: "We are not out to fight with Oracle, Sybase or other systems. We want to partner them."

Apilink UK 01344 382028

Jessica Hodgson

## Short Stories

## Microsoft cuts Net charges

● The Microsoft Network has been transformed into an Internet Service Provider, priced to compete head on with CompuServe and AOL. Prices start at £4.95 per month for three hour's access. Extra access is charged at £1.95 per hour.

Microsoft is promising more UK content, which has been sorely lacking. A forum based around the Euro 96 football championships is one example.

Microsoft is also testing a new IP-based network. Available by the end of April, it will be based on native IP and not IP running over X.25.

The UK will receive 100 percent local call coverage, also by the end of April, and 28.8Kbps and ISDN will be provided at no extra charge.

[www.microsoft.com](http://www.microsoft.com)

Paul Fisher

## SmartPad interface has the common touch

● Database specialist Dataease is offering a utility that provides a common graphical interface for disparate applications running under DOS, Windows 3.1 or Win95.

SmartPad is basically an application launcher, with a bar of icons to summon packages. But it also allows you to insert extra menu items into any application, and to macros, or Visual Basic-type routines to icons.

One use would be to integrate Dataease for DOS into a Windows environment. SmartPad Professional, which is a full development environment, costs £3295; Desktop Lite modules which can run SmartPad modules cost £450 for a pack of ten.

DataEase 0181 554 9582

## Space case

● Pipex Dial is offering Web space for home pages at a rate of £10 a month for 2Mb, or £30 for up to 5Mb. Dial users get a minimal home space free.

Pipex 0500 474739

## New notebooks get battery-friendly Pentium as superfast video zooms in

Intel launched a battery-friendly 133MHz Pentium for notebooks last month, prompting Toshiba and AST to announce models based on it.

The Toshiba models, launched at Cebit, also featured a new PC Card port, supporting superfast video. The Zoomed Video port passes the data stream from a ZV-compliant MPEG video decoder PC Card directly to the graphics and audio subsystems, leaving the processor and system bus completely free to do other work.

The new Pentium is the



fastest yet to run internally at 2.9V on a 3.3V rail, and sits in a thin Tape Carrier Package packet. It runs clock-doubled on a 66MHz bus.

The Tectra 710CDT and 720CDT both have a 6X CD drive and differ only in the

resolution of their 12.1in TFT colour screens: the 720 is capable of 1024 x 768 resolution compared with the 710's 800 x 600. Prices and availability will be announced this month.

AST has also announced a new 133MHz Pentium notebook range. Prices for the Ascentia P model start at £3595, with 16Mb or RAM and a CD drive.

And Viglen has introduced a new Dossier CD range which all feature 16-bit sound and a quad-speed CD drive. Prices range from £2,099 for a 57MHz Pentium with 8Mb of RAM and a 540Mb disk, to £2,949 for a 120MHz Pentium with 16Mb and a 1.2Gb disk.

AST 0181 232 5000 Viglen

0181 758 7000; Toshiba 01932 828828

## Tektronix WinDD proves that new into old does go

A new network package lets you run Windows 95 on old PCs with 4Mb of RAM and a 386, or even a 286, processor, developer Tektronix claims. Upgrading to a Win95 system can cost £1,500 a machine, given the need for 16Mb of RAM and a larger disk.

Tektronix says its WinDD can save up to 60 percent of this cost, by allowing companies to upgrade only the server. It works rather like remote control software: an application runs on the server and the old PC need only handle screen and keyboard data.

A single-Pentium 66MHz server can serve 15 average users or eight power users, says Tektronix. The package can also be used on a portable over an Internet link.

WinDD, which is essentially an extension to Windows NT, has been available on Unix platforms for more than two years. The latest version means multiple platforms can run the same

Windows software on an NT network.

Stephen King, Euro chief of Tektronix's video and networking division, said: "An added advantage is that at one stroke you get

central control. You need only upgrade one set of software on the server."

A 10-user server licence costs £3,513.

Tektronix 01628 403300

## Icons cut through the confusion over PC Cards

These icons have been approved to overcome some of the confusion over the capabilities of different PC Card devices and slots. Three of the icons self-evidently signify 16-bit operation, 3V and 5V cards or slots. The DVB icon will mark a Digital Video Broadcasting slot, which will be used as an interface on set-top boxes (and perhaps PCs) when DVB takes off.

A PC Card logo will signify a manufacturer who is a member of the PCMCIA body which governs the PC Card standards. DMA on a card or slot signifies support for Direct Memory Access, and CardBus shows support for 32-bit bus mastering.

ZV signifies the new Zoomed Video which Toshiba has introduced with its latest notebooks (see above). Full details can be found at the PCMCIA site at [www.pc-card.com](http://www.pc-card.com).





Short Stories

PowerMac prices cut

● Apple UK has cut the prices of its latest range of PowerMacs. An entry-level 7200 is now £850 (plus VAT), or £1,250 with a 17in Multiscan monitor.

Prices on the 7500, 8500 and PCI-based 9500 are also reduced. A basic 9500 now costs £3,460.

Web suite for new servers

● A second-generation Web suite for Mac servers is due to ship this month. Apple Internet Server Solution packs a claimed £2,500 worth of software onto a single CD. It provides all the tools to create a multimedia-rich Web site using one of Apple's new workgroup servers, the 7250/120 or the 8550/132.



● CompuServe, in an overt bid to tempt users of Apple's benighted eWorld service (see story right), is bundling Netscape's browser with its suite of Mac access software.

CompuServe 0800 000200

Stilo SGML

● Stilo has released its HTML and SGML document generator for Macs and PowerMacs. It costs £850. A Windows 95 version is planned for May.

Stilo 01222 483530

Video board

● miro has announced a PCI-based video-editing system for PowerPCs, including a JPEG board and Adobe Premiere software. The miroMotion DC20 costs £999 and supports Hi-8, Video 8, S-VHS and VHS.

miro 01484 510250

Newsprint welcomes feedback from readers. Send your news and views to [clive\\_akass@pcw.cmail.com](mailto:clive_akass@pcw.cmail.com), or call 0171 316 9317

The end of the eWorld is nigh says Apple

Apple finally succumbed to the inevitable this month when it pulled the plug on eWorld, its proprietary online service. The cartoon-like service never fulfilled expectations, peaking at around 120,000 subscribers worldwide, well behind the leading online players. Add in the Cupertino-based company's financial troubles, plus an increasingly competitive online market, and the scene was set for a pull-out.

As a replacement, Apple and America Online have agreed to promote AOL with special incentives for eWorld subscribers to switch to AOL. Apple will put some of its technical support areas on AOL, outstanding email will be forwarded free of charge and eWorld users will get 15 hours free on AOL.

AOL says that it will continue to support the Mac platform with new "refined client software" and full World Wide Web integration. America Online has always been popular with Mac users in the United States, and AOL disks will soon be bundled with most new Macs. Ironically, the Mac client for the UK AOL service will not be ready until mid-summer at the earliest.

PC cloners may switch to Macs

Small PC makers squeezed by big companies such as Gateway and Escom may switch to making low-cost Mac clones following a deal last month to license the Mac OS to Motorola.

The deal was one of the first moves by Gilbert Amelio (below) after taking over as head of Apple.

The most important aspect is that Motorola is the first company to be granted sub-licensing rights, says UK branch manager Phil Spivey.

Mark Hobbs, group marketing manager of Motorola's

distributor Macro, said this meant that motherboards and other components could be sold to systems integrators. "The boards will run the Mac OS, or Windows NT, or IBM's AIX, so they can form the basis of a whole range of machines from cheap Mac clones to servers."

Motorola 01628 763246;

Macro 01628 604383



Dr Gilbert F Amelio

Top 10 Peripherals		
Product	Manufacturer	Last month
1 Quadspeed CD-ROM Drive	Goldstar	6
2 Online Internet Kit	Motorola	2
3 850MB IDE Hard Disk Kit	Western Digital	1
4 Sidewinder Joystick	Microsoft	3
5 3400 Modem	Motorola	5
6 Iomega Zip Drive	Iomega	-
7 Tape Backup 800Mb	Travan	-
8 AWE 32 SoundBlaster	Creative Labs	-
9 Epsom Stylus Colour Printer	Epsom	-
10 SoundBlaster 16 Value	Creative Labs	4
Top 10 DOS		
1 Flight Simulator v5.1	Microsoft	1
2 WordStar v6.0	Softkey	-
3 MSDOS v6.22 U/G	Microsoft	2
4 MSDOS v6.22 MOLP Licence	Microsoft	-
5 Turbo C++	Borland	-
6 Fun School Maths	Europress	7
7 Doom2	Virgin	-
8 Antivirus Quarterly	S&S International	10
9 Accountant v7.01	Sage	-
10 PCDOS Version 7	IBM	6

Top 20 Windows		
Product	Manufacturer	Last month
1 First Aid 95 for Win95	RMG	4
2 Encarta 96	Microsoft	1
3 Windows 95 U/G	Microsoft	2
4 TurboCAD	ISMT	8
5 MS Office 4.2 U/G	Microsoft	6
6 Qemm	Quarterdeck	3
7 MS Office Pro 95 CCP U/G	Microsoft	12
8 Uninstaller v3.5	Microhelp	-
9 Dr Solomons Anti Virus Quarterly	S&S International	-
10 Cleansweep 95	Quarterdeck	7
11 MS Office Pro 95	Microsoft	12
11 AutoRoute Exp UK & IRE	Microsoft	8
13 Corel Printhouse	Corel	10
14 Dr Solomons Anti Virus Quarterly '95	S&S International	-
15 MagnaRAM 95	Quarterdeck	11
16 MS Plus	Microsoft	19
17 MS Office Pro 4.3	Microsoft	-
18 Pass Your GCSE Maths	Mathsoft	-
19 Wincheckit	RMG	-
20 MS Publisher v3.0	Microsoft	-

Figures supplied by Software Warehouse and relate to bestsellers for February 1996.

# It's a seller's market

**Technology trade fairs increasingly cater for the needs of the exhibitor at the expense of the visitor, as the Hannover CeBIT show revealed.**

**B**Y THE CLOSE OF THE Hannover Fair, or CeBIT to give it its proper name, up to 700,000 visitors had clicked through the turnstiles.

For journalists and others with a professional incentive, CeBIT may still be worth the exhausting trapeze through 24 halls of computers, brash, themed stands and blaring

Europop. Maybe. But it is increasingly hard to see why those visitors the organisers most want to attract (IT professionals with a budget) should waste their time, money and shoe-leather to attend.

Like the big British shows, most of which are now defunct, CeBIT has ceased to be a showcase for new technology and has degenerated into a sprawling trade fair catering for a diverse range of interests, most of which are squarely on the supply side of the IT industry.

It offers little excitement, which isn't entirely the fault of the organisers. Perhaps the IT industry has outgrown big, general, shows? Perhaps computer firms are no longer capable of delivering thrills, innovations and surprises every year? Or perhaps we're all better informed and less easily impressed?

There is, too, a mismatch between the needs of the exhibitor and the needs of the visitor. Exhibitors judge a show by the quality of the attendees, measured by and large by the information on their business cards. For visitors, the show will stand or fall on its ability to deliver what is new, interesting or useful. This is true whether the visitors are of the desirable type (IT director, telecomms manager) or the much bigger group of exhibitor-proof undesirables with their combat anoraks and uncertain demographics.

There was nothing at CeBIT this year that couldn't have been seen in a magazine like *PCW*, or learned on a quick tour of IT Web sites. Or if there was,

they'd have been lucky to find it. It is not just the size of CeBIT, but its diversity that makes it so difficult for an innovation to achieve prominence. Size and diversity may sell the show to exhibitors but for the visitor it means seeing less of what you want to see and having to walk further to see it.

Here, the organisers can be held responsible. CeBIT sets out to span the dual worlds of computers and telecommunications, incorporating everything from photocopiers to document collating machines. This is too broad a range even to be classified as "IT".

The exhibits are to be found grouped in halls with labels like "office equipment", and "telecommunications". Not only are these labels dull, they are too general to be useful.

If you were to ask visitors what they had come to see this year, it's a safe bet they would have replied "Internet", or "multimedia". If the organisers had used these labels they might at least have given the impression that they knew a couple of the industry's buzzwords and showgoers would have been able to view the products in context.

CeBIT will no doubt continue to grow — workmen are laying foundations for what looks suspiciously like another exhibition hall. Like the original Hannover Fair, it will eventually fragment into smaller, specialised events like those which have successfully replaced the big computer shows in the UK.

The first signs are already visible. Around the halls were posters advertising a new show for August, CeBIT Home Electronics. If you feel a need to go to Germany to look at computers, go to that instead. It is bound to be more fun.

**Julian Patterson**

## Fujitsu's Eastern promise



*David Mills, CEO, ICL Volume Products:*  
"Consumers demand and trust Japanese brands"

The PC industry is consolidating fast. Smaller suppliers are being pushed to the wall and the world's PCs may soon all be made in Japan, a CeBIT audience was told. This parallel with TV manufacturing came from David Mills, CEO of a new volume division within Fujitsu's global Personal Systems Group. The division has been formed by merging ICL's Volume Products

Division into the PSG, a move that led to speculation that ICL's days as a PC brand are numbered.

The merger is just part of a radical shake-up by the Anglo-Japanese PC giant which aims to become a top three European supplier by the end of 1998, and a top five supplier globally. "We will do that," said a bullish David Mills.

The 80 percent Japanese-owned company stated: "Consumers demand and trust Japanese brands," and Fujitsu's manufacture of its own drives and other components made it unique among PC manufacturers.

To emphasise its intentions, Fujitsu ICL launched 17 new PCs at CeBIT, aimed at business and home users. Highlights of the new range were a new Pentium-based Trend PC/TV and 17in displays, available in the UK by the end of the year.

A new TBird range is aimed at the technically savvy but price-conscious home users who wish to mix and match components and configurations to take advantage of new hardware developments. No prices were released.

<http://www.fujitsu-icl.co.uk>

**PJ Fisher**

EVERY WINTER, Microsoft invites a group of analysts to its headquarters for a strategy briefing. Back in 1989 Bill Gates and Steve Ballmer (then senior vice president of operating software) tried to convince us that OS/2 was going to be the operating system for the next generation of PCs. None of us bought the line and sure enough, six months later, Microsoft dropped OS/2 like a hot potato.

In 1992, Microsoft tried to convince us that it was really serious about client-server technology and creating servers for mission-critical applications. Only now is their server technology robust enough for use in high-level systems.

At last year's session, the Internet was not even mentioned as a strategic issue. So these sessions show that Microsoft is just as human as the next company, even if it does get things right more times than not.

One focus this year was on the direction of the Back Office program, NT and NT Servers. The surprising news is that Windows NT server sales grew 300 percent in 1995, with even higher growth expected this year. Microsoft has won some big contracts in the past six months, with more than 40 major corporations choosing NT as the basis for re-engineered information systems.

But the most important topic was the Internet. Microsoft has gotten Internet religion, and its strategy is to "embrace and extend" the Internet.

It has various ideas in the works to add 3D, video and sound controls to the Internet and make Win95's approach more powerful and distinctive than the competition's. It will have serious NT Internet server technology that will serve as the backbone for many Web sites.

The road map looks something like this: in mid-



1996, Microsoft will release an Internet add-on kit for both Windows NT and Windows 95. (Actually, Windows NT gets the Win95 interface as the major part of its upgrade this year.) This will make it easy for users to connect to the Internet from the operating system.

The major move will come in 1997, when Microsoft will integrate the Internet Explorer right into the heart of Nashville (the code name for what will probably be Win97). This will treat the Internet like just another disk drive.

OLE 2.0 embedded documents from an Internet site will be easily cut and pasted into any desktop application, on the fly (Apple's CyberDog does it with OpenDoc, so it looks like Microsoft went to school on an Apple again).

Some have said that Microsoft was late to the Internet show, but what it really missed was to make hyperlinking a critical part of its OS strategy. It was so caught up with trees and lists that it totally missed the number one element of the Internet and how people really want to navigate through files.

The irony is that even being this late to the Internet party, Microsoft can and will make a major impact on at least the x86 desktop market. Additionally, Windows 95 and Visual Basic programmers will be able to extend the Internet through new Microsoft tools that are tied to Back Office and Internet server solutions.

With such a strong move

# Gates sees the light

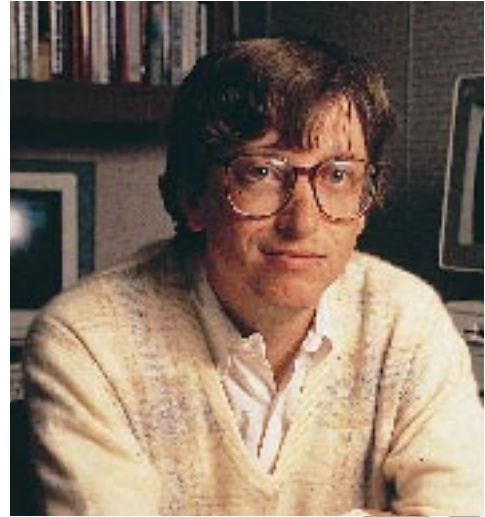
**Having got Internet religion, Microsoft's mission is to embrace and extend the Net.**

towards making x86-based PCs the major way to connect to the Internet, you can imagine how Microsoft chairman, Bill Gates, feels about \$500 Internet appliances.

When I asked Bill about his view of these stripped-down access terminals, he said: "Gee, people are getting excited about X terminals again? They have been out for many years and they have never taken off."

He is being facetious here when he talks about stripped-down terminals, but he points out that these terminals would only have real value if there were large and cheap bandwidth available that would allow them to have a high-speed connection to back-end Internet servers.

He does not believe that we will have real broadband pipes available anytime soon, so he discounts the stripped-down PC model. Instead, he feels that the key will be to get the price of real PCs down under \$1,000, with that PC having a monitor, CD-ROM drive, 28.8 baud modem, 8Mb of RAM and at least a 90MHz Pentium. He believes it is more likely that we reach this configuration and price point well before cheap bandwidth becomes available nationwide.



*From late starter to Internet evangelist: Bill Gates is a man with a mission*

Tim Bajarin



ANALYSIS

**T**HE EARLIEST MOSAIC browser, which transformed the Internet into a global information highway, sent a shiver down my spine the first time I used it. Here was a completely new kind of software; simple in concept yet enormously powerful in effect.

I got a similar frisson loading a beta suite of Microsoft's forthcoming Internet software. It cannot compete with Mosaic for novelty but the power is intoxicating. It includes all you need to set up a Web site and to create pages to post there. It has the feel of the first of a long line; the Caxton press of Internet publishing.

Microsoft can still give us exciting software, Gates be praised, but there are legitimate concerns over whether limits should be set on the company's power. The latest announcements (see *Newsprint*) are both reassuring and alarming.

Reassuring because hidden behind the AOL deal is the fact that the Microsoft Network (MSN) has *not* been a success, despite being bundled with every copy of Windows 95. The service was not even half-way ready by the time of the Win95 launch, and thus lost the benefit of a \$200m hype — so Microsoft cannot always sweep the world its way.

Gates says MSN will continue, and indeed there is no reason why it should not thrive. But now AOL (and perhaps other providers such as CompuServe) will be on the '95 desktop to give users a choice. Microsoft's focus has shifted back to what it does best — software.

Its plan to integrate browser technology into the operating system is eminently sensible. There should be little difference to a user between working off a local hard disk, a local network, or a global network. But it puts the squeeze on third-party

# The Microsoft Net closes in

**Putting browser technology into the Win95 OS is just the latest stage in the tightening of Gates's global grip. The Microsoft/AOL deal may be a big smokescreen.**

## Hard drives are moving on up

**T**he upward trend in hard-drive capacities continues with all major manufacturers announcing 1Gb-plus models for the mass market and predicting that 2Gb will be usual for next year.

Quantum increased its capacity by the simple expedient of reverting to the old 5.25in format, now restricted largely to CD drives. The size of the new Bigfoot models slows access times slightly, but you get 1.2Gb for \$270 (£168) or 2.5Gb for \$380 (£236). Quantum also announced faster high-end drives.

Maxtor, like Quantum, is sticking with older thin-film head technology for its latest drive targeted at the mass market; a three-platter 3.5in model offering 2Gb for £270. Seagate announced a series of high-end drives using the newer M-R technology, which supports higher data densities by using separate read and write heads.

The rapid improvements in capacity have brought about a big increase in upgrade purchases; previously, users tended to change their drives with their PCs. But the new large capacities are likely to encourage storage-hungry applications such as video-editing and digital photography, which will push the demand for capacity still higher.

The new breed of removable drives from Iomega and Syquest offer an alternative. Iomega has said that its £399 1Gb Jaz drive is now available in Europe, but on recent precedent you should call your dealer before making purchase plans, as demand has outstripped supply.

A future development may be a scaled-down version of hierarchical storage management (HSM), used in large systems to shuffle information as needed between fast and cheap slow storage. You could, for example, dump a video from a CD to a hard-disk for playing, or shunt your family photos to and from a cheap backup tape.



*The Quantum Bigfoot 5.25in drive*

browser developers and seems almost certain to extend Microsoft's dominance from the desktop to the Web.

Gates came close to contradicting himself on this score during his AOL press conference. He said he expected Netscape to remain a competitor, but when asked if there was room in the browser business for two players, he replied: "You have to ask if there is room for *one* player. I mean, it's all free software. It is one of the most unusual software categories there has ever been."

He was referring, of course, to the fact that both he and Netscape have made their browsers freely available in a financial war of attrition to gain market share. There can be

only one winner on that score. At another point, Gates said: "It will all come down to people using what is built in." In other words, there will be no point in people buying Netscape to do what the operating system already does.

Browsers are not the only Net software, as Gates himself pointed out: "You have to think... also in terms of server software, or electronic commerce, or media servers."

This shows just how big the stakes are. Perhaps the real reason behind the AOL deal is to get as many different company names as possible up there on the Windows desktop. They might hide the extent of Microsoft's near-monopoly.

**Clive Akass**

ANALYSIS

# Computations

## Taiwanese tie-up

When did Westminster last strategically invest hundreds of millions in a factory? The Taiwanese taxpayer is investing the equivalent of £143m in an advanced computer chip (DRAM) factory in the besieged Republic. The Taiwanese taxpayer also co-owns the main partner in a £435m venture with Philips. It makes you wonder how much Taiwanese giants Acer, Mitac and FIC, and the likes of IBM, Compaq, Apple, NEC and Hewlett-Packard (who buy hugely from Taiwan), owe to public sector subsidy.

● **Source:** Craig T. Chin

(<http://gurukul.ucc.american.edu/MOGIT/cc3461a/taiwan.html>)



BY ROWLAND MORGAN

## Red light on plastic

Ninety-eight to 100 percent of a jumbled heap of plastic consumer waste such as diskettes, CD-ROMs and printer cartridges can now be classified into different polymer types by near infra-red light, using the vibrational characteristics unique to each.

Apparently, the spectra are categorised with a neural network model. This is indeed good vibrations, man, because in packaging alone Western Europe uses 2.2 million tonnes of plastic a year (or 22 Sea Empress supertankers' full), and rising at an annual percentage rate which wipes out the overall rate of recycling.

● **Source:** Sandia Technology Partnerships Program

## Barcoded bins

A barcode-reading zapper in the grimy hand of a British dustman? If it sounds about as likely as a corn circle in your carpet, just consider that clean-living US prairie cities have been doing it for nearly a decade. There's St Louis Park in Minnesota, for example, where the bins outside your office, house, or flat are labelled with stripe-talk so that the husky bin-men can swipe your details into an on-board computer: fill a bin so many times a season and you get a rebate on your council charges. Ever heard of a rebate on council tax or business tax for recycling in Britain? Sounds about as Martian as a barcode reader held by a dustman, doesn't it?... oh, alright, sanitation operative.

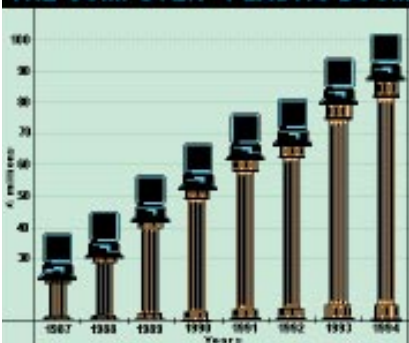
● **Source:** The US National Academy of Public Administration Foundation, 1120 G Street, N.W., Suite 850, Washington, D.C. 20005

## STATELLITE

A seven-hour day on the Web costs an American nothing (after subscription) and a Briton £16.80. A working week's Net access costs an American nothing and a Briton £84. A year's office-work on the Net costs an American nothing and a Briton over £4,000.

● **Source:** BT (8am-6pm local call 4p/min incl. VAT; 1p/min=20 weekends — US local calls are free).

## THE COMPUTER - PLASTIC BOOM



UK demand for moulded thermoplastic components and business machines

● **Source:** NEDO/BPF estimates

## Polymer pile

Plastics amounting to the weight of more than four Titanics are being distributed every year in British electrical and electronic equipment. Euro-laws are looming which impose sanity in the form of take-back schemes. The suits in IT boardrooms are unhappy: watch them join Jimmy Goldsmith on the EU opt-out bandwagon, thinking it's a way to escape responsibility.

● **Source:** British Plastics Federation

## On-line white pages

Thanks to David Fletcher for pointing out (Letters, PCW April) that £199 is a high price for a CD-ROM telephone directory from BT, when wide disk distribution could massively reduce the forests felled by printed books. His proposal for free CD-ROMs, though, has been leap-frogged by the Internet, where a world phone book service is already in place. There's no excuse for BT not to be providing at least its local directories on local servers, right away. Britain's telephone books weigh roughly 61,000 tonnes, consume huge amounts of energy, machinery and toxic ink, and are reprinted at a rate of 20 million every 18 months, yet all 12,000 tonnes of them are out of date on delivery. BT is working on it.

● **Source:** University of Victoria website/British Telecom

## Cable unable

After so many pavements and trees having been ripped up, Britain still has only 1.6 million cable TV connections of the sort that in about two years will deliver wide-band internetting at 100 times the present speed. Germany has over 12 million, Holland over five million and Belgium about 3.5 million. Euromonitor's Book of European Forecasts puts all cable connections at 36.5 million; meaning Britain has only one in 23 of these cable connections (for a population which is one sixth of Europe's), compared with a Euro-average of over 25 percent cabling. The Americans cabling Britain are going to have a job to meet the 35 percent-plus cabling predicted for Europe in 1998. Who is responsible for the clueless decisions made a decade ago? One of them, the former Minister of State for information technology, Geoffrey Pattie MP,

has been knighted by HRH and sits on the board of GEC. Ex-DTI boss, Tebbitt, is shaping public opinion at *The Sun*.

● **Source:** Euromonitor World Marketing Data & Statistics 1995

## The Green-Gauge

### Fujitsu Ergo Pro 152v PC

Energy Saving:	Powermaster
Take-back:	No
Polymer codes:	Yes
Packaging:	Polystyrene

### Canon LBP-460 printer

Energy Saving:	Energy Star
Recycled Paper:	Warrantied
Recycling:	90% cartridge recovery
Take-back:	No
Ozone pollution:	None

# Sounding Off

I see the opinion pollsters have been at it again. Towards the end of last year, clipboard-equipped teams from MORI collared a few

thousand innocents in the high street on behalf of one of the BBC's Horlickstime book programmes. Of the 2,033 collarees who didn't tell them to piss off, 64 percent expressed the opinion that by 2010, we'll all be reading our Jeffrey Archers and Jackie Collines from computer screens. In other words, a representative cross-section of the British public (i.e. the same ones who are prepared to chat to complete strangers about the virtues of new, improved Daz) has concluded that the demise of the printed book is nigh. Could they be right?

As soon the results were published, the BBC brought on some Melvyn Bragg-league literati to say "Cobblers" in response. A bad move. Asking Oxbridge media types to talk about computers is like bringing Oliver Reed on to say something coherent about temperance. Lacking any technological know-how, their only argument against the computer and in favour of the printed book was that you can't read a computer in the bath.

Except you can. It's just that it'll short circuit if you drop it or get shampoo in the keyboard. Then again, it won't do *Lace* or *Scruples* much good, either. No; the bath argument is a rather trite one. What they're trying to say, of course, is that a book is a go-anywhere, portable thing, whereas a computer isn't. But without entering into the debate as to exactly how portable, say, the latest Vikram Seth actually is, what the ignorant literati are forgetting is that in 14 years' time, the computer as we know it will have completely changed anyway. It will be a pocketable thing, albeit with the storage capacity of the Scott Report and more. The real question is therefore: will



**MICHAEL HEWITT**

people be willing to make the cultural change from reading mass-produced hard copy to screen-based text?

The last time humanity had to make such a profound choice was towards the end of the first century of the Christian era. Before then, your regular Book of the Month Club title came in scroll format. To get from page 1 to page 101, you had to wind the text on, page by page, like a photographic film. This system worked well enough for several millennia. The only drawback was that if you accidentally dropped one end, Chapter 1 had unravelled and disappeared halfway down the street.

Hence the development of the bound, paginated book, or "codex", some time between 100 and 150 AD. At last, a book that you *could* put down without risking it rolling away. Although a completely different reading concept from the scroll, it caught on so quickly that by about 400 AD, all the big league authors — Matthew, Mark, Luke, John, God — were demanding to be published in one. The scroll soon went the way of the 486SX.

Likewise, the electronic book will supplant the printed variety because it will be more portable, will carry more information and will be easier to navigate. It won't be a dedicated book *per se*, but an all-in-one device about the size of a cheque book. It will incorporate a computer, a cellphone, a television receiver, and an ID card. (I'd also hazard a guess that they'll put a bottle opener and a little mirror in there, too.) Data will be downloaded overnight through the domestic ISDN link, so you'll wake up in the morning to find your little handheld charged up with an electronic copy of *The Times*, *Personal Computer World*, and *War and Peace*. Or whatever your predilections happen to be.

The really clever bit — the screen — will be constructed from a flexible plastic polymer. It will pull out from the main unit like a piece of clingfilm and, when fully extended and stiffened, will be about A4 size. This screen will be high definition and reflective, able to display graphics, moving pictures, and, of course, the complete text of the latest Joan Collins bonkbuster. To advance forward or back, you'll merely touch either the upper right or upper left of the screen. And, most important of all, the whole unit will be waterproof. So you'll be able to read it not only in the bath, but in the shower, too.

The only fly in the ointment, of course, is that by 2010, the majority of the world's population will be functionally illiterate. So most people won't bother with *reading* electronic books and magazines; they'll just be looking at the pictures.

# Homefront

**W**orking full time as a journalist on PC matters, I have to balance a tight schedule of deadlines. I have to get hold of products for review, seek out information, come up with ideas,

keep track of what's been submitted to whom and whether or not it has been paid for.

Naturally, to keep pace with such a rich and varied life, I use a variety of organisational aids: "To do" lists, the backs of envelopes, Post-it notes, my head, and requests to members of my family for reminders. But every so often I think to myself: "There must be a better way."

So one day I decided to try and get to grips with Microsoft Schedule +, the personal organiser that comes with the Office 95 suite, which had been lying fallow on my hard disk for several months. It is a truly wonderful thing, especially if you spend a lot of time organising and attending meetings, or know people with eight phone numbers — which I don't, but let's not be churlish about this.

Anyway, having tired of organising imaginary summit conferences and scheduling this column as a repeating task with various priorities, alarms and levels of difficulty, my attention was drawn to a menu item entitled: "Seven Habits Quick Start".

The Seven Habits are, apparently, a guide to self-improvement. The sort of thing that you see in bookshops with "This book will change your life" in large print on the cover. What they don't tell you is how. Initially, life is changed by everybody avoiding you in the pub. About a third of the way through the book you give up the hopeless struggle for self-improvement and lapse into profound despair; and this leaves you totally vulnerable to the blandishments of the next life-changing tome.

Anyway, one of the first things you must learn to do is to take time to "Sharpen the Saw". This is illustrated by a folksy little story. You're out



**T I M N O T T**

walking in the woods when you come across a man furiously sawing down a tree. "What are you doing?" you ask.

The man (with admirable restraint, I felt) replies: "Can't you see? I'm sawing down this tree."

"You look exhausted! How long have you been at it?"

"About five hours," he replies.

"Why don't you take a break and sharpen the saw? I'm sure it would go a lot faster?"

"I haven't time. I'm too busy sawing."

And so it is with computers — only a fool would rush in to write a column like this without checking that the cutting edge, so to speak, of one's technology was in tip-top condition.

Firstly, is there adequate disk space for these 800 words? Let's start by emptying the Recycle Bin. Am I sure I want to delete these 87 items? Well, I think so, otherwise I wouldn't have put them there in the first place... but I'd better just check.

Let's clear out a few of these back-up files. And how about archiving some of this old stuff on to disk? And isn't it about time I tidied up Program Manager? (or the Start Menu or whatever it's called this year). And do I really need all these fonts? Let's be honest — when did I last write in Cyrillic or Hebrew?

Right, let's just empty that Recycle Bin again. Now all that dross is out of the way, it would be a shame to pass up the opportunity for a good disk scan. Good heavens, what a lot of lost clusters. I wonder what's in them? Better take a quick peek. Well, they're either terribly important or complete gibberish — let's be ruthless and bin the lot. Oh, and empty the Recycle Bin again.

Stone me — one o'clock already! Never mind, I can give the disk a thorough de-fragging while I have lunch.

Happiness is a full stomach and a tidy hard disk, but wait a minute — this desktop really needs some attention. Either this wallpaper goes (as Oscar Wilde said) or I do. And let's take this opportunity to create a really elegant colour scheme. And perhaps change the fonts in the title bars and menus.

My word, isn't there a lot of customising you can do? Now let's get rid of some of this clutter, organise those shortcuts, and empty the Recycle Bin yet again. And while we're about it let's scrape the crud out of the mouse, find the screenwipes and give the monitor a good clean, shake the breadcrumbs out of the keyboard and er...

Good grief, is that the time? Was I meant to get my copy in today? Sorry... I didn't have time... I was too busy sharpening this saw. Perish this unworthy thought, but perhaps I could have saved myself a lot of time by sharpening my pencil.

# Straight talking

**F**irst, we had manufacturers selling CD-ROM drives that wouldn't play multisession

Photo CDs, long after the standard had been set.

Then we had manufacturers selling drives that wouldn't play MPEG-1 Video CDs, long after the White Book standard was announced. Now we have manufacturers selling ROM drives that won't play CD-Extra or Enhanced CDs (ECD).

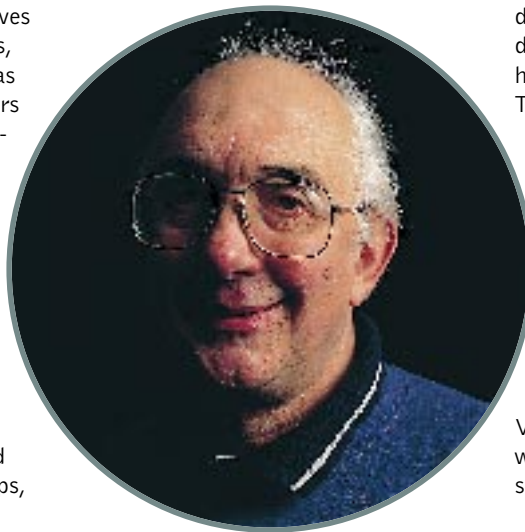
In April 1995, in the run-up to the Windows 95 launch, Microsoft "announced its support for a new audio CD format". This followed a meeting in November 1994, at which Microsoft hosted more than 180 record industry executives, representing more than 65 record labels. For two days they talked about setting a standard for a CD that played audio on a hi-fi and delivered video clips, photos, animation and text from a PC.

The object was to make Enhanced CD a feature of Windows 95. Last June, Apple joined Microsoft and together with the main CD licence controllers, Sony and Philips, released the so-called Blue Book standard for Enhanced CD, now also to be called CD-Extra.

Ordinary (Red Book) audio is put on the first track, or session, of the disc after the table of contents (TOC) which tells an audio player what songs are on the disc. All the computer information is put in later session tracks, and indexed by an extra PC-style directory index which an audio CD player ignores.

A ROM drive can read the Blue Book index only if the PC has been loaded with the correct software driver. The user can pre-load this driver from a second CD. Microsoft's plan was to build Blue Book driving into Windows 95. But even as the standard was set, Philips discovered that some ROM drives (mainly from NEC) refused to read the discs, even with the appropriate driver. Virgin carried out similar research. As 20 to 30 percent of all ROM drives are made by NEC, both companies looked for other options.

Last August, Philips joined with



**BARRY FOX**

Island Records to release the Cranberries ECD, Doors and Windows (one of several ECDs reviewed in our February issue). Doors and Windows does not follow the Blue Book standard. It uses the different Rainbow system, also known as "Don't Play Track One". The computer data goes into the first track on the CD. The audio follows in the subsequent tracks.

ROM drives go direct to the computer data and play it as intended. But a CD audio player goes first to track 1 and tries in vain to play the data. The player should then mute to protect the loudspeakers from buzz-saw sound. Some do, some don't. This is why Doors and Windows carries warning notices and spoken announcements about speaker damage.

The Rolling Stones decided, three weeks before release date, that they wanted Stripped to be an Enhanced CD. Virgin dared not use the Blue Book, and did not like the Rainbow system, so they opted for a third choice; variously called "Track Zero" or "Hidden Track". The

TOC, which normally lasts only a few seconds, is greatly extended to hold all the CD-ROM data. But as Virgin has found, to its cost, many ROM drives refuse to read extra data from the TOC.

Says Rick Carter, head of multimedia development at Virgin: "The only way to discover how many players would play a hidden track CD was to release a disc. That's why we don't charge any more for it than an ordinary CD."

The Stones' Stripped carries a red note on the sleeve which warns that the disc is "incompatible with some NEC drives". So many complaints have rolled in that Virgin has published a 2,000-word message on the Internet, listing all the CD-ROM drives which will not play the disc — NEC tops the list with 11 models. And Virgin has set up a telephone hotline which plays callers a recording of the same information.

NEC states the problem was in the firmware which controls the ROM drive and that it is developing an upgrade. Users cannot change the firmware themselves because it is frozen into an EPROM buried deep inside the drive electronics. NEC has now tested all its drives and come up with a mixed bag of results. Some drives read the data, others read the music, some read both, and yet others read data only after they have been "taught" to do so by scanning an ordinary data disc.

"When new firmware is available ... if the user returns a drive directly to us, we'll upgrade the firmware and ship the drive back free of charge," pledges NEC in the UK.

I tried a recent NEC 273 and it successfully played Stripped. But the same drive won't play a Blue Book CD. This spells big trouble for Sony Music, soon to launch several Blue Book CD-Extra discs, including one by Bob Dylan. These come with an extra CD of Corel drivers — but if the drive is incompatible, it will not load the drivers.

The whole situation is a mess which makes Enhanced CD a nice idea that is still years ahead of its commercial time.



# Business matters

**I**t seems unlikely that Alphonse Karr had the task of supporting PC users in mind when he wrote "plus ça change, plus c'est la même chose."

In 1849 a personal computer was probably a servant who was good at sums. But the quote is very appropriate. Ideas on the best way to keep corporate PC users happy change all the time, yet they often come full circle.

Take a large company I've worked with. Seven or eight years ago they were struggling. Until then, personal computers had been toys which were ordered by enthusiasts who knew more about them than the IT department. Numbers were rising uncontrolled, PCs were being bought for novices, and the small support department, operating from a cupboard, was being overwhelmed.

A visionary manager had the idea of setting up the in-house equivalent of a quality computer shop. Sited in a readily-accessible building with shop fittings and a pleasant ambience, this would be a safe place for new computer users to see what it was all about. I was lucky enough to appear on the scene at this point, running the centre for a couple of years. In a few months of change, a new atmosphere developed. The team took on a commercial approach to customer service which was quite unlike the usual attitude of an in-house support department. It was exciting.

Before long, remarkable changes were happening. Software stocks were held on the premises. We could provide popular software titles straight off the shelf. Most other orders were turned round in a week. And there was a proper system underlying the orders, so none slipped through the cracks. Delivery times for many PCs fell from up to six months to two weeks. We turned the organisation on its head. Instead of being grouped by technical skills, staff were formed into



**B R I A N C L E G G**

small customer teams, focused on the needs of a particular set of users. There was a chance to go out to customers and ask how we could make things better, not just wait for disaster.

If this sounds like the sort of success story familiar to readers of Tom Peters and other management gurus, hold your horses. All was not rosy. PC numbers were growing phenomenally — much faster than we could take on staff to support them. Although a large proportion of PC users were happy, there were problems, particularly with a new hardware supplier: complaints were on the up. We took a long look and put together a plan to reinforce success.

At this point, enter a new IT director. He saw the complaints and took a snap judgement: the PC centre wasn't

working. He would shut it down — after all, he had to make his mark as a new man, and PCs were a vulnerable target. Why? Because everyone had heard of them. Mainframes were big, inscrutable devices which, frankly, were boring. PCs were fun, and found in high street stores at prices everyone could understand. By making a change that affected PCs, the director would have much more publicity than by tinkering with mainframes.

His final masterstroke was to change policy on buying software. The PC centre had provided standard, supported packages, but we would buy other software provided the users were aware that we couldn't be responsible for resultant problems. This approach worked. Almost everyone bought the standard packages because they were so easy to get and we kept the list up-to-date. The few who went elsewhere were happy and looked after themselves. But the new director saw this approach as anarchy. So he banned any software outside a set of infrequently reviewed packages.

The PC business went into decline. Order times fell back to those of the bad old days. Support went out of the window. It took years to return to our standards, and while an excellent central helpline number covered the mess underneath, even now many users don't know how to get software or who to go to for support. Many remember the old PC centre fondly.

Now the IT director has been replaced. While no specific reasons were given for his departure, the continuing unhappiness with PCs must have made a contribution. With his departure, strange new concepts are being heard: Perhaps it would be sensible to give users more choice. Perhaps PC support should be more visible — perhaps it could be given to an outside firm to do in a more commercial fashion. Monsieur Karr had a point.

Send your letters to:

**The Editor  
Personal Computer World  
VNU House  
32-34 Broadwick Street  
London W1A 2HG**

or email

**editor@pcw.ccmil.compuServe.com**

or **CompuServe 71333,2330**

or fax **0171 316 9313**

# Letters

## Porn there for all to see

I was extremely surprised and disappointed to read Michael Hewitt's article on pornography on the Internet ("Sounding Off", March).

Why, oh why, do people not admit that they have accessed areas of the Internet that are variously described as anything from titillation to filth? His phrase "I am told it [porn] takes a hell of a lot of looking" was a classic. Come

on. The fact is that these newsgroups are very easy to access. If he is unaware of where to look, he shouldn't be writing about the Internet in such an esteemed magazine as yours.

I was concerned to read these articles about porn on the Internet because I have teenage children who use my computer to write up their homework, so I thought I'd have a go to see how easy it

would be to gain access. After downloading a listing of 15,000 newsgroups, I went into the listing and couldn't believe what I was reading. This was shortly after reports of the busting of a UK Internet paedophile ring. The very newsgroup that had been plastered all over the news that night was listed. I feel that sweeping this under the carpet and claiming it is innocent is rather like saying that Hitler was a nice man who lost his way in life.

**Michael Dickerson**  
100557,2317@  
compuserve.com

## Retailers are not unblemished

It is to PCW's credit that you print letters and articles expressing dissatisfaction with direct sellers such as Gateway and Time/MJN. To any end-user, such items emphasise the risks of buying direct and will no doubt be greeted with enthusiasm by the retailers, who can at least be confronted with problems

face-to-face. They are not, however, unblemished. The superstore chain, PC World, has just announced excellent financial results but comments made by MD Terry Duddy are somewhat ironic.

Mr Duddy rightly states that manufacturers and software companies need to make computers easier to use, and plug and play is more of a slogan than a reality at the moment. Following the launch of Windows 95, he goes on, his company's support lines were "inundated" with frustrated users. But was it not PC World that opened at midnight on W-Day, with its glossy displays promising plug and play and ease of use? All no doubt contributing greatly to its £90 million-plus turnover.

It would be nice if users had no more problems with a new operating system than a can of beans, but PC World and its like ask for it by selling the product as if it were a can of beans, with no mention of the potential can of worms.

This is not to knock

## Management Mumbo Jumbo

Thank you for an excellent magazine... I think. You see, I am a member of a family and, like any other family, we like to think of ourselves as a fairly efficient multi-aged, multi-sexed, multi-skilled, multi-tasking group of individuals.

Recently, it became apparent within our group that the purchase of some sort of magazine might be appropriate to our corporate needs. We had previously learnt at a seminar that the purchase of magazines by groups such as ours, as well as individuals, was commensurate with proactive informative reading situations and skill enhancement.

There was, however, a conundrum here (let us assume for the moment that it would be applicable for us to buy a magazine) in that we would need to purchase the right magazine, but without reading it (and to do this we would have to buy it) how would we be sure that it was the correct magazine?

As any family would, we started out by taking media measures (largely proactive, of course, although some of them were also anti-active and retro-active), to ensure that the reasons for the consideration of softbacked printware were understood by all members of the group and that any possible future outlay on such a commodity would not be regarded as a waste of resources by one or other of our unit.

Next, we set up a Softbacked Printware Steering Committee to try to establish a mandate to review both the genre and NSPT (News Stand Publication Title) of the SP material required. Without such a mandate we knew we could not proceed. To fulfil its function, the SPSC has to receive regular presentations from its SPSC director (that's me, in case anyone didn't realise how important I was) on SPSC Strategy. A strategy should sell itself by virtue of the benefits it brings, and so, to avoid having to buy up every piece of SP on the

NSPVS (News Stand Proprietors' Vending Site), we set up a Peering Committee to peer into publications while still on the NSPVS to gain FCUK (Future Customers' Unpurchased Knowledge) of their contents. Having read the job descriptions of the rest of my unit and noted their input, I then felt that I had a mandate to go out and buy whatever SP I wanted, and our Steering Committee is now the proud owner of the March '96 edition of PCW (Purchasers who Can't Wait?) magazine (sorry, SP!).

Until all our committees have given their input (and remember, some of this could be proactive) I cannot possibly say whether or not we enjoyed your publication. Speaking completely off the record, I loved it. I especially enjoyed the spoof bit that pretends to be written by a typical middle-management prat who is so insecure about his own position that he tries to protect himself by building a castle of meaningless jargon. I know it's just a joke in your mag, but apparently there really are people like that.

**Ted Chance**  
Norwich

**PCW replies:** Columnist Nick Beard, the offending "middle-management prat" to whom you refer, has now been replaced. Starting this month, *Business Matters* is written by Brian Clegg.



Nick Beard



Windows 95, the obvious choice for anyone new to computers or moving straight from DOS. Upgrading from 3.1x is less clear cut. Do you have the horsepower to run it or are you prepared to pay to upgrade your PC? Your old peripherals will probably not be plug-and-play-ready but will they work properly at all (DeskJet 500s for example)? And unless you upgrade your software to the latest Windows 95-aware versions, the benefits are negligible. All of which means considerable investment in time and money.

Following his comments to the press, perhaps Mr Duddy has sent a memo to all sales staff asking them to warn

unwary customers and put up notices next to the displays? I think not. I suspect memos from on high will say: "Remember every Windows 95 upgrade means lots more upgrades to come, and as for the support calls — never mind, just keep those cash tills ticking over."

**Tony Bayliss**  
100020.1217@  
compuserve.com

### Concorde and the ozone layer

"Computations" is always an entertaining read but sometimes the juxtaposition of facts leads to unsound conclusions. For example, in the March column, one item juxtaposed Concorde, spray cans, the ozone layer, and the word "uncatalysed".

The implications are:

- Concorde would benefit from a catalytic converter. Concorde is a problem to the ozone layer; perhaps a bigger problem than spray cans.
- Concorde may well have burned enough kerosene to fill nine billion spray cans, but how is this relevant? The placement of the text hints that it is equivalent to discharging spray cans into the ozone

layer. There are important differences. I don't recall ever squirting paraffin under my armpits, and aerosol propellants are not suitable fuel for aircraft.

- Catalytic converters in cars reduce emissions of oxides of nitrogen and carbon monoxide at the expense of burning more fuel and increasing the emission of greenhouse gases. Oxides of nitrogen and carbon monoxide are unpleasant chemicals in the environment but they do not, primarily, attack the ozone layer. Putting a catalytic



converter into Concorde would increase the emissions of burnt kerosene just as it increases the emissions of burnt petrol on an ordinary car, by making the engine much less efficient. There is no evidence that catalytic conversion would reduce Concorde's impact on the ozone layer.

**Richard Howells**  
100121,77@  
compuserve.com

### No such thing as free AOL access

I have just loaded your "free" for a month AOL disk, as I am willing to believe your articles which inform us that it is in some ways better than CompuServe, to which I already subscribe. But having successfully installed the free disk and completed the registration doc I was asked for my credit card details. Now I don't know about you, but having been urged to "try before you buy" I was a little perturbed by this as American companies are famous for zapping your card in a nanosecond and then taking a month or two to grudgingly make a refund. Your free offer

## Keep the Mac out of students' hands!

I read with utter disbelief the item "Acorn goes for Apple turnover in UK schools IT" (*Newsprint*, April). I work in education, particularly with the use of computers in chemistry, so I see the IT ability of school leavers at first hand.

The quality of students' mathematical skills has fallen dramatically in recent years as they have become reliant on the use of calculators. To use the Mac OS as the educational standard is to remove yet another skill from the student.

How many Mac users know how to optimise their system, copy files between floppy drives without using the HDD, install new software and hardware, sort out errors (which are usually unintelligible), and so on? I must admit I was a Mac user until last year, but I managed to kick the habit of five years. I became increasingly frustrated with the inflexibility of the Mac OS and the inability of a memory-heavy OS to cope with the simple multitasking (mainly due to out-of-memory errors on a 10Mb 475) of, say, Word 5.1 and Powerpoint. Since scrapping the Mac in favour of a Dan Technology P90 running Win95, I have never looked back.

I would implore those concerned with the provision of IT in schools to seriously consider the future implications of a move to a "point and click" OS. If they still want to go with a Mac-type OS, it might be cheaper for them to invest in the more educationally challenging "Speak and Spell" or V-Tech's "My First Computer".

**Dr Peter Styring**  
School of Chemistry, University of Hull

is not as free as advertised and should not have been worded thus.

I phoned AOL and spoke to a supervisor with a very cavalier attitude, who made it clear: no card, no access — even though I had just given them all my home details including phone number.

This is not the way for AOL to achieve market penetration in the UK. If the company had half a brain cell they would have issued me with a password, enabling me to have ten free hours. Then, a note could be displayed informing me that I had used my ten hours and should hand over my card details if I wish to continue.

If the amateur shareware people can do it, why not AOL? If this is how the Americans now do business, they can go sell it to the marines and I'll advise all my friends not to touch it with a bargepole.

**Nigel**  
100530,1036@  
compuserve.com

### Negative response

Can Microsoft give us a positive statement as to its policy of supporting "old"

software? I am continually disappointed and frustrated at the lack of interest in applications that have been replaced by their Win95 brothers.

As has been pointed out in the informed press over the previous six months, an optimum upgrade to Win95 requires a certain degree of hardware and software replacement. As a SoHo user, I estimate that such an upgrade would cost me in the region of £600-700, with minimal performance improvement in real terms. I have therefore remained faithful to my steadfast WFW3.11/Office Pro 4.3 combination.

I recently tried to obtain a copy of Microsoft's Word 6 Developer's Kit from a high street bookstore. The store couldn't lay hands on it and contacted its wholesaler, which in turn contacted Microsoft only to be told that it was no longer available, having been superseded by the Third Edition (read "Win95 edition"). Yet again, we see an example of Microsoft ramming Win95 down our throats — don't want it; don't need it; wouldn't buy it if I did.

Unfortunately, it would appear that Microsoft has pulled off the marketing ploy of the century and convinced the majority that its new operating system will transform their lives. However, if it's so great, why do we have to buy Microsoft Plus to get the most out of it?

In summary, if you want to develop Word applications you'd better get Win95, Office95, more memory, a bigger hard disk and a copy of the third edition of the Word Developer's Kit. But you'd better hurry; Win96 will be here soon and you'll have to start all over again.

**Colin Barnes**  
100273,504@  
compuserve.com

### Cache concept

Regarding your reporting of the "Fake Cache Scandal", I am an occasional system-builder and I would like to say that I think you are doing a sterling job. The trouble is, very few end-users are aware of the concept of cacheing.

When I discuss the various technical requirements with a prospective client, one of the points I invariably discuss is the cacheing system used on the motherboard. Looking at your figures in the April issue, the most cost-effective combination is standard DRAM with a pipeline-burst mode second-level cache. Judging by the adverts in consumer magazines, most vendors are happy to sell systems on the CPU's spec alone, yet the facts suggest that the faster the CPU becomes, the more important it is that the components supporting it are up to the task.

I recently sold a P90 system with pipeline cache to a client. He has since advised me that an associate has sourced a P120 system that, in use, seems to be *slower* than his. Obviously, the cache isn't the only potential bottleneck in a PC, but when (and if) the CPU is upgraded

to a faster unit, the performance gulf between the combinations available will become increasingly evident.

In view of this, I wonder whether it would be in the public interest if an article were printed detailing the real-world effects that motherboard specification has on a system's overall speed?

**Steve Greenslade**  
100626,120

### Bits and bytes

Pardon me for jumping in, but having read Mike Hicks' letter (*PCW*, April) and Geoff Marshall's reply, I felt obliged to contribute.

I'm not sure there is a problem: Geoff has pointed out a number of factors, but I think both Mike and Geoff have misunderstood the meaning of 28,800bps.

Mike complains in his letter that his Internet connection is only managing 7.8Kb/sec, yet he has a V.34 modem running at 28,800bps which means 28,800 *bits* per second, not *bytes* per second.

If you are running at eight bits per byte, Mike, with no parity and one stop bit, every byte transmitted will comprise a start bit (1.5 bit periods), eight data bits and one stop bit, i.e. 10.5 bits per byte sent.

Simple maths reveals that  $28,800 \div 10.5 = 2,743$  bytes per second, the theoretical maximum speed at which you can send or receive data on a 28,800bps serial data link.

The reason you achieve the higher rate of 7.8Kb/sec is that you have a compression feature in your modem (the V.42bis/MNP5, etc), which is compressing the true data stream to give a higher throughput. The actual figure achieved will be determined by the compressibility of the data in question, and the efficiency of the modem's compression algorithms and hardware. If you try up/downloading some already compressed data (such as a ZIP file) you will probably find that your data throughput falls to 2.7Kb/sec or worse.

The fact that you are able to achieve the higher data rates would seem to indicate that your modem/serial port setup is OK, although I agree with Geoff's comments about checking your UART, etc. The one thing I would add is that your link to the modem should be set to run at a speed considerably higher than 28,800bps, for example 57,600bps or higher if possible (which it probably is since you achieve the higher rates).

Another point to remember is the geography involved. For instance, if I access a UK Web site via my CompuServe account, the data rate is usually very slow compared with accessing a US site: I assume this is because CompuServe goes out onto the Internet from somewhere in the US. If I do the same from my London-based UK Internet provider, then the reverse is true. By the way — the best throughput figure I have ever seen with my V.34 modem is 3.1Kb/sec; so you are doing quite well.

**Chris Tanner**  
chris@k-controls.co.uk

### Supplies and demand

In my job, I am responsible for purchasing supplies and equipment. This includes office supplies and PC-related items. The contrast between these two areas is quite astonishing, and I suggest the PC industry should learn some lessons from their office supplies counterparts.

Consider the following: I can order from any one of a number of office supplier's catalogues, by phone, on a regular basis. I can also take advantage of genuine special offers to further reduce my expenses.

If I order over £30 worth of goods I get free next-day delivery. During the past three years I have never been left with goods "out of stock" or a missed delivery. Free gifts are automatically included in the order.

If I want to order PC

software or peripherals, I can also ring a selection of suppliers. But here is where the fun starts, because the existence of an item in an advert or catalogue is no guarantee that the product is in stock, or that the actual price is the one quoted in an advert or catalogue.

If I can find a supplier with the goods in stock and accept the actual price rather than the advertised one, I am then invited to spend an additional sum, plus VAT, for the privilege of having the goods delivered next day. Often, this is a per-item charge.

In practice, what usually happens is that when I chase the supplier next day to say the goods haven't arrived, I am told they are out of stock and will be dispatched shortly. Yet I still pay for the "next day" delivery. In two recent cases, the next day has been one, two or more weeks from the order date. I am still waiting for a reply to my letter of complaint to one of these suppliers, and am still waiting for the goods from another.

Surely the profit on a £250 item of software or peripheral is considerably greater than on £30 worth of stationery, especially as the latter is already heavily discounted? The couriers used by both types of supplier are the same, and stationery tends to be bulky and heavy, so the carriage charges must be comparable.

**BN Whiteley**  
100656.1512@  
compuserve.com

**PCW replies:** *While we agree that PC dealers could learn a lot from the practice of more mature industries, selling PCs and peripherals is a far more volatile business than selling stationery. The prices and specifications of PCs change on an almost daily basis. Store a ton of photocopying paper for a year and it will still be worth more or less the same. Do the same with a ton of PC equipment and the value will have halved or even quartered.* ■



### Acer Aspire

Good-looking PCs have to be the way forward. Check out the Acer Aspire, "with curves where others use straight lines". Acer also boasts OOBEx, the Out Of Box Experience, which basically means they've pre-installed loads of software and offer instructions on a big colour poster. For £1,275 you'll get a 100MHz Pentium, 16Mb RAM, 1Gb hard disk, quad-speed CD-ROM drive, 16-bit sound card, modem, and 14in monitor with speakers. And don't forget those good looks...

Acer 01628 533422



### Modula-Executive

Fed up with pesky peripherals occupying your desk space? Fancy something a little more stylish, perhaps for your business reception or top executive? Then look no further than the French designed all-in-one Modula-Executive. It's a keyboard, it's a pointing device, it's a screen, it's a pair of speakers, it's a microphone, and yet, it's no more than 15mm thick! A huge cable connects it to your PC, which sits out of view under your desk. The screen is a touch-sensitive 10.4in TFT running at 640 x 480 — simply drag the pointer around with a pen or your fingertip. It may render your monitor, keyboard and mouse redundant, but measuring 725 x 500mm it'll take up as much space. At least you can lean on it, and look over it. Price 15,600 francs (approx £2,000).

Source Développement 00331 64 11 41 01

### IBM ChipCard TC 100

This amazing credit-card sized device is another of IBM's Japanese marvels. It's a PCMCIA card which doubles up as an address and telephone data carrier with its own keyboard, LCD display and CPU. Simply slot it into the card slot on an IBM ThinkPad or desktop and transfer the data. IBM claims enough storage space to keep 500 personal records intact. It's available in six colours but you'll still have to go to Japan to get one, with 19,800 yen (approx £110).

IBM 0345 727272 <http://www.ibm.com>



### Psion Tree Eh?

Defying critics who said it wooden work, Psion has branched out into special edition versions of the 3a. The new wood effect case is the only change but there is a special box, and you can be sure that you'll have a distinctive organiser with which you can log your daily activities. This might be seen as a natural progression of the special version of the Series 3 which Psion makes for Acorn. This special limited edition version is only available as a 2Mb unit and costs £449.95. Psion 0171 262 5580



### GoldStar GPI-1200

For those who want the latest in presentations and interactive training on the move, the impressively named GoldStar GPI-1200 portable CD-i could be just the ticket. With a 5.6in full colour TFT screen it does everything a normal CD-i player can do, and provides both NTSC and PAL video CD playback. Guaranteed to impress the passenger next to you on the train, it's yours for a mere £1,299 + VAT.

GoldStar 01753 500400

### Magellan microCOM-M

The most sophisticated mobile phone systems will at best cover a few European countries, but it's nowhere near worldwide coverage. Enter the ultimate James Bond gadget: the satellite phone, which can make calls from anywhere in the world, completely independent of that country's telephone system. Unfortunately, you have to point the antenna at the desired satellite, preventing use on the move. They're also big, heavy and expensive — until now. Magellan's microCOM-M satellite telephone weighs 2.5kg and measures 173 x 287 x 71mm. Costing £5595 with a charge of £2.83 per minute, it's relatively cheap too.

Next Destination 01722 410800



# First Impressions

It's a family affair as far as Apricot's Diamondtron goes — it's the perfect multimedia machine. The new FileMaker Pro goes relational, and Olivetti's 6200 Suprema really *flies*. Pioneer's new CD Writer takes the strain, and Painter 4 takes the pain out of computer art.



## Contents

- 56 Apricot MS530 Diamondtron 17
- 58 Claris FileMaker Pro 3.0
- 62 Olivetti M6 6200 Suprema  
Digi DataFire ISDN adaptor
- 65 Cheyenne Inoculan for Windows 95
- 66 Pioneer DW-S114X CD Writer
- 68 Fractal Designs Painter 4
- 70 Easyflow Version 3.0
- 71 HOMEwise
- 73 SSeyo Koan Pro
- 74 Signal Box Neuro-Predictor
- 76 PictureAlbum
- 77 Iiyama Pro Lite 31

## 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, our suite of PC benchmarks uses complete versions of industry-standard Windows 95 applications — currently Word, Excel, WordPerfect and FoxPro. We also run a graphics re-draw test using CorelDraw 6, and a Doom 2 frame rate test which is a good indication of games performance.

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, are used to isolate specific components like hard disks, graphics cards and CD-ROM drives. To make them easy to read at a glance, all graphs in PCW are 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

## Apricot MS530 Diamondtron 17

All-in-one PCTV system which shows that Apricot has firmly grasped the concept of multimedia.

If you're going to get your family in front of any PCTV, then get them in front of the Apricot MS530 Diamondtron 17". It's the essence of simplicity and the epitome of plug and play. Turn it on and it will run. We did, and were thoroughly impressed. With the dearth of quality PCTVs on the market it isn't surprising they haven't taken off. Apricot may change all that.

The MS530 is the first multimedia home PC that has everything a family could ask for. It comes Internet ready, has a TV tuner/video card, comes loaded with both games and application software, and, for the *coup de gras*, has plenty of Pentium power and expansion bays giving the user a respectable future-proofing buffer.

The bundled software consists of WordPerfect Home Works,

Lotus Organiser, Auditron (music composition software), Hutchinson Multimedia Encyclopaedia and 3D World Atlas, Windows 95 training CD-ROM, High Octane, Magic Carpet and Wing Commander III, and a free CompuServe trial.

Setting up the MS530 took only ten minutes with the aid of clearly illustrated poster-sized instructions. Be sure to check that you've got all your cables — our review model was initially short a power cable and TV tuner cable loop.

The MS530 is a powerful PC in its own right, boasting a Pentium 133MHz processor, Triton chipset and high-quality 17in Diamondtron screen. Also fitted are a 1.2Gb Quantum hard disk, Sony quad-speed CD-ROM drive, 16Mb of EDO RAM (upgradable to 64Mb) and 256Kb of asynchronous cache. The package is rounded off with a SoundBlaster Vibra

16s sound chip and Cirrus Logic 5434 graphics controller with 1Mb of VRAM (upgradable to 2Mb).

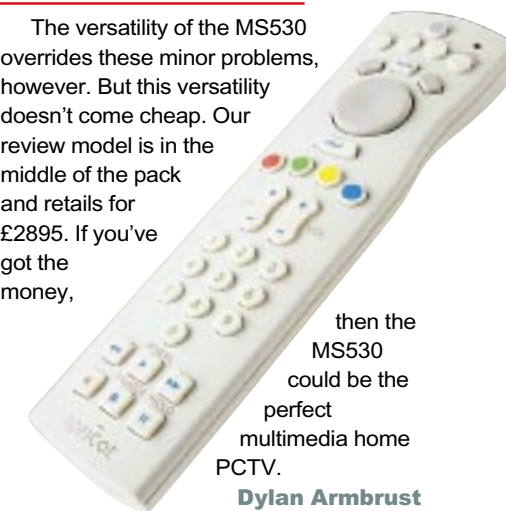
The MS530 comes with all the expected serial, PS/2, joystick and parallel ports so there's no worries about not being able to connect peripherals. There's also room for expansion of the inside, but it's very tight. Already present was a Win TV Prism TV tuner and a Dataflex PC Comms Office 14.4 modem. This left three PCI and one ISA slots available for expansion cards, but the bird's nest of wires and compact space could make the use of three-quarter or full-length cards problematic. This was one of the areas where the MS530 came up short. We were also disappointed to see that one of the system wires had been crimped and stripped of its insulation; obviously caused by a careless assembler jamming the motherboard tray into the unit without clearing the wire.

One area where the Apricot excels is in its fully integrated software and hardware. The whole package is based around EasyManager, a cunning remote

control which features a built-in pointing device. All the software, including the TV tuner, can be operated by the EasyManager remote control. By the simple press of one of four colour-coded buttons, based on the standard TV/Teletext remote controllers, you can turn on the TV, blend it into your desktop, read Teletext, send a fax, listen to a CD, launch a spreadsheet and activate a game. Apricot has firmly grasped that users simply want to sit back and press a button to make things work.

The question most on our minds was whether the TV picture quality was any good. The answer is yes. So long as your reception is good, so is the picture quality. Also included was the ability to block access to any TV channel. This is particularly handy for parents wanting to keep young, curious minds out of potentially corrupting situations, especially as the MS530 allows the user to grab and save images and text from the TV. Glitches did occur when we tried using the automatic tuner. It listed two BBC2s even though one channel was ITV. A bit of fine-tuning sorted it.

The versatility of the MS530 overrides these minor problems, however. But this versatility doesn't come cheap. Our review model is in the middle of the pack and retails for £2895. If you've got the money,



then the MS530 could be the perfect multimedia home PCTV.  
Dylan Armbrust

### PCW Details

**Price** £2895

**Contact** Apricot 0800 212422

**Good Points** Easy pushbutton accessibility for application, communication and games software.

**Bad Points** Bird's nest of wires makes using the expansion slots difficult.

**Conclusion** An excellent all-in-one PCTV system with well thought out software integration.

# Claris FileMaker Pro 3.0

Extra functionality in a relational database, but without support for Windows 3.1.

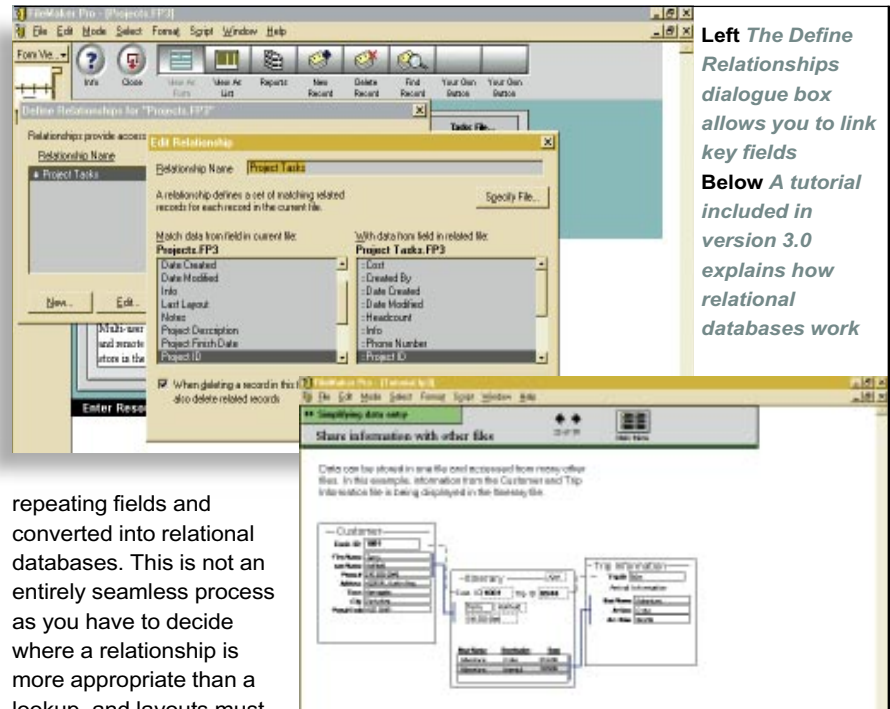
It's over a year ago now since Claris announced that FileMaker Pro would go relational, but it wasn't until January this year that version 3.0 finally appeared. FileMaker Pro has always been a popular database application for the Macintosh but in the past couple of years it has been well received by Windows 3.x users.

FileMaker's strong selling point has always been its ease of use, and it's this which has given it its identity among other database packages on the market. Filemaker Pro has always offered simplicity — the ability to knock together simple data files without having to trample through a quagmire of Wizards and technical manuals.

So, given the attractions of the package, why make it relational? Well, a relational model does provide real benefits. Instead of having lots of isolated flat files, your data can be properly integrated; there are many important functions which simply cannot exist without a relational structure. Secondly, Claris has managed to include the extra functionality without making the product intimidating. There's no underlying programming language for building custom solutions in the dBase or Access sense, and the new interface feels very much the same as the 2.1 version. New users will not feel out of their depth.

The only way of integrating data from multiple files in version 2.1 was by using lookups which, while useful, are also limited. A lookup does nothing more than take a snapshot of a piece of data and copy it from one file to another. Version 3.0 of FileMaker allows you to create live two-way links between files by defining relationships which link key fields, and allowing data from more than one file to be displayed in the same layout.

Setting up relationships is fairly easy once you've got used to the idea of "portals", a new concept injected into this version to refer to an area on a layout used to display records from a related file. To set up a one-to-many relationship, say, between a company name and a group of orders, a portal is used to display a list of data from the order file. Files from version 2.1 can be converted to version 3.0 complete with lookups and



Left The Define Relationships dialog box allows you to link key fields. Below A tutorial included in version 3.0 explains how relational databases work.

repeating fields and converted into relational databases. This is not an entirely seamless process as you have to decide where a relationship is more appropriate than a lookup, and layouts must also be re-defined.

FileMaker has never pretended to be a programmer's package, and the scripting language in version 3.0 is certainly no power tool, but there are several significant improvements included in this version. There's a new IF..THEN..ELSE statement and a LOOP..END LOOP command which makes row by row processing and conditional sorting possible. This gives a much greater degree of control over the behaviour of applications, allowing you to test for the occurrence of particular events and act according to their status.

Other improvements in this version include forty new calculation and field validation functions as well as support for TCP/IP. Being a cross-platform product FileMaker has not gone all out in its integration with Windows 95, but there is a healthy sprinkling of right-click functionality as well as support for long filenames, and OLE 2.0 client.

This version is native on the PowerMac and there are versions for Windows 95 and Windows NT, but support for Windows 3.x has now been dropped which is bound to cause some frustration. Many multi-platform users who currently share databases between Mac and Windows 3.1 will be forced to

move to Windows 95 in order to upgrade, which may prove costly.

If you're an experienced database user you'll find FileMaker Pro limited in lots of ways. Although it enables basic relationship definitions, the relational model contains many holes and if you're used to any degree of control via code, you'll be far happier with a more fully-fledged product like MS Access. If you currently use FileMaker Pro on the Mac, then you'll like the extra functionality in this upgrade.

If, on the other hand, you're a Windows 3.1 user who has not yet started thinking about Windows 95, this upgrade of FileMaker may be more trouble than it's worth.

Eleanor Turton-Hill

## PCW Verdict

**Price** £239.70 full version; £99 (upgrade version)

**Claris** 0800 422322. Fax 01923 208430

**Good Points** Simple relational functionality included without altering the appeal of the package.

**Bad Points** No support for Windows 3.1.

**Conclusion** Worthwhile upgrade for existing users, but let down by lack of Windows 3.1 support.

## HARDWARE

# Olivetti M6 6200 Suprema

A fantastically high spec can only mean one thing — this machine is *fast*.

**W**hen you hear the words Pentium Pro you know there's going to be a lot of processing power under the case. The M6 6200, Olivetti's newest Pentium Pro PC, is aimed specifically at the high-end desktop/server market and the hardware configuration shows it.

The last Olivetti Pentium Pro machine we looked at, the M6 950 Suprema, had a 150MHz processor with on-chip 256Kb Level 2 cache, 32Mb of RAM, EIDE hard drive and CD-ROM drive. The M6 6200 is an even higher-



spec'ed configuration. Our review model was fitted with a Pentium Pro 200MHz processor, 256Kb on-chip Level 2 cache, 64Mb of RAM and a SCSI CD-ROM and hard drive.

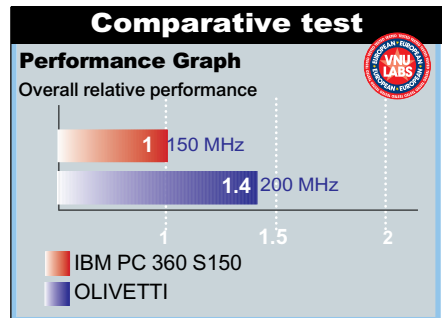
Looking at the M6 6200 externally you wouldn't know it's a speed demon. The metal case is a simple, rather elegant design. Two free forward-facing expansion bays, one 5.25in and 3.5in, plus the CD-ROM, FDD and a single power button are all that occupy the front. To the rear the I/O consists of an enhanced parallel, two serial and PS/2 ports for keyboard and mouse. The DSM-171 17in monitor delivers a good image and is MPR and EPA Energy Star compliant.

The subsystem is made up of a Sony CDU-76S SCSI quad-speed CD-ROM drive, Adaptec AHA-2940 PCI SCSI-2 controller, Matrox MGA Millennium PCI graphics card with 4Mb WRAM and a Seagate ST32430N 2Gb SCSI hard drive. This leaves three ISA, one ISA/PCI, and one PCI slot free for extra

expansion cards. On the software side, the M6 6200 comes loaded with Microsoft NT for workstations 3.51.

With such a fantastically high spec one would expect the Olivetti to perform. And perform it did! Compared to the reference IBM PC 360 S150 machine (150MHz Pentium Pro with 256Kb Level 2 cache), the Olivetti's performance ranged from 32 to 51 percent higher while its overall performance rating was 40 percent greater.

Dylan Armbrust



## PCW Verdict

**Price** £6,110 (or £4,735 for basic configuration of 32Mb RAM and 15in monitor)

**Contact** Olivetti 0181 785 6666

**Good Points** Fast, with easy access to motherboard.

**Bad Points** None to complain about.

**Conclusion** Simple design and obviously fast.

## HARDWARE

# Digi DataFire ISDN adaptor

Fires up remote networking and Net access for Windows.

**T**he Digi DataFire ISDN adaptor enables high-speed remote networking and Internet access for Windows, with Microsoft's Remote Access Service (RAS). It requires an ISA slot and an ISDN-2 Basic Rate connection from BT.

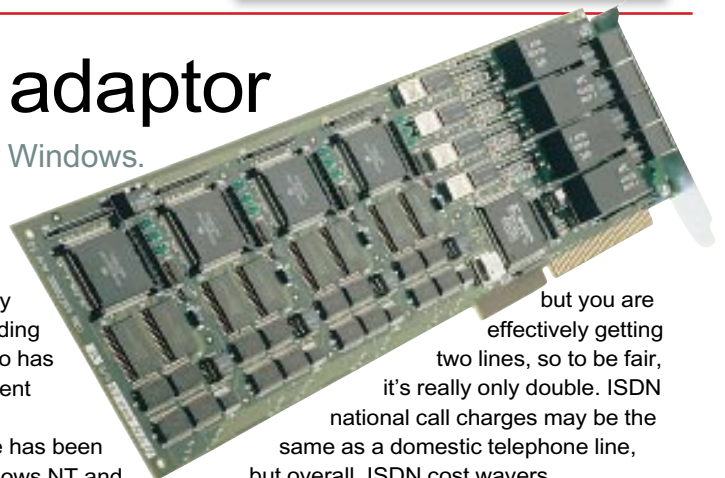
Digi provides Microsoft Windows for Workgroups and Windows NT 3.5x network drivers which enable remote connections via RAS. The DataFire will work with Windows 95 but the Remote Network Access software was still in beta at review time. Microsoft has promised an ISDN update for Windows 95 and as Digi and Microsoft work closely together it's likely that Windows 95 will soon include native Digi DataFire support.

The DataFire is better suited to Windows 95 and Windows NT, both of which come with Internet dial-up software. Windows for Workgroups users will need extra software such as NetManage Chameleon in order to dial-

up the Internet. The Datafire's WinISDN support matches that in many Internet suites, including Chameleon. Digi also has Novell server and client software.

After the software has been installed under Windows NT and Windows 95, the DataFire simply works and delivers either 64Kb/sec throughput (or 128Kb/sec with both ISDN B-Channels in use). With RAS compression a dial-up link to a Windows NT server feels like it's on a LAN. At 64Kb/sec dial-up to an Internet service provider, file transfers run at nearly half a megabyte a minute.

The catch is that although ISDN has more bandwidth than a modem, BT's ISDN installation charges are excessive (around £400). ISDN line rental is four times that of a domestic telephone line



but you are effectively getting two lines, so to be fair, it's really only double. ISDN national call charges may be the same as a domestic telephone line, but overall, ISDN cost wavers somewhere between modems and leased lines depending on the amount of time spent connected. Unlike a leased line, however, ISDN is not a fixed point-to-point connection.

Terence Green

## PCW Verdict

**Price** £395

**Contact** InterQuad Distributors 01753 536464

**Good Points** Fast, reliable and easy to use.

**Bad Points** BT's ISDN pricing stinks.

**Conclusion** Worth it if you do your sums.



## SOFTWARE

# Cheyenne Inoculan for Windows 95

## An easily installed and efficient virus checker.

Although the threat of viruses tends to be a little exaggerated, there is no doubt that PCs, especially if they are connected to the Internet, are at a certain amount of risk. A virus can really screw up your day, so it makes sense to install some form of protection that can detect and eradicate any that may be sitting on your PC. Protection in this case comes in the form of the new Inoculan from the Cheyenne company.

It installs easily enough, immediately backs up critical files and looks for viruses that may exist in memory. If any are discovered it advises you to restart Inoculan via a clean Windows 95 (i.e. original) bootdisk, then purge memory of any viruses, just to make sure.

There are two parts to Inoculan. The main detox unit allows you to examine and clean up files, folders or whole drives connected to the PC, or via a LAN. This utilises a File Manager-style window (complete with drive directory trees) which allows manual checking and cleansing of files. This all works intuitively and even new PC users should have little trouble configuring Inoculan.

The main part won't run immediately; it sits in the program group like any other well-behaved

Win95 application and only runs when you want it to. However, it always checks for viruses in memory when it first fires up. If viruses are found, Inoculan provides several options for dealing with infected files: delete, rename, cure, move, purge, or move and rename. Depending on circumstances, a cure or purge would be the usual choice. Compressed files can also be checked (useful for stuff obtained from the Internet) and extra Windows compression extensions can be added to the default list of compression formats to be checked.

Inoculan's other part, Wimmune, runs in the background and provides a constant check on PC activity. This installs as part of the Start Up and watches every time a file is opened or downloaded from the Net, or a floppy inserted. Unlike other systems, Inoculan's Wimmune scores by not

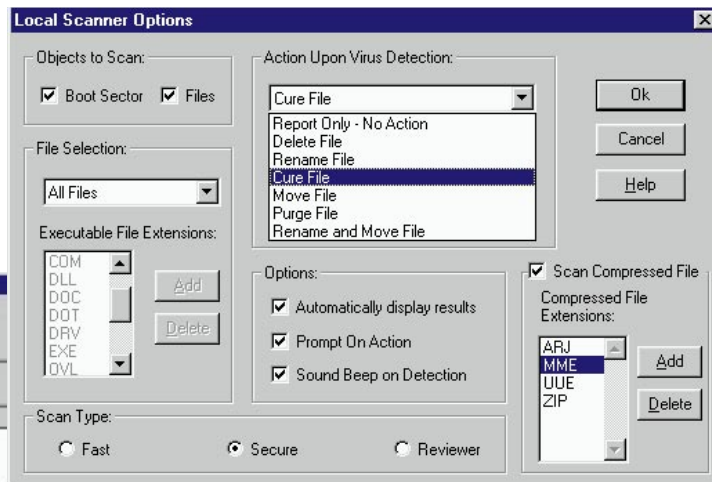
tediously telling you that it is checking and only flashes an alert dialogue if it finds anything suspicious — it's nice to know it's there.

Following installation you will also notice a new shell extension to Windows 95. A right-click on files and folders now displays a new icon in the options list next to "Scan for viruses", where Inoculan has taken over from the default Windows 95 virus scan. And if you have installed the Microsoft Plus! Pack you can configure Inoculan to work with System Agent to scan for viruses at regular intervals. Both these examples demonstrate Cheyenne's care in designing Inoculan to take advantage of Windows 95 functionality, not just to make it look pretty.

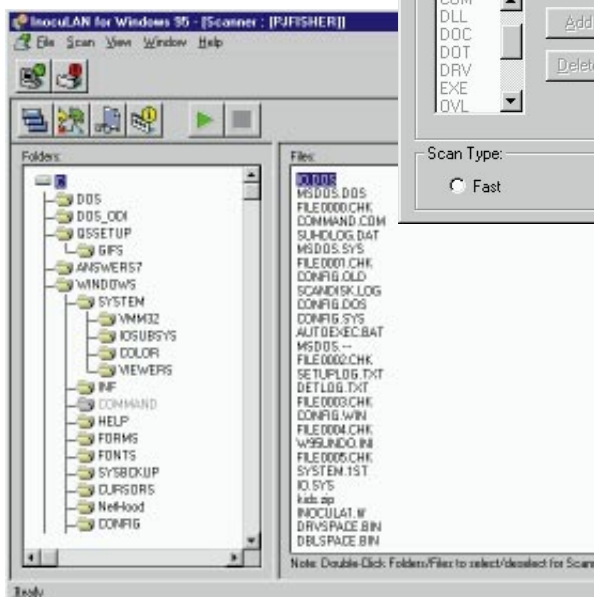
The level of options in such an inexpensive package is comprehensive and Inoculan offers more than enough protection for the known viruses. What it lacks is a way of updating protection so that it can deal with new strains of virus as and when they arrive. A simple download of protection files should be

possible from the Cheyenne or other sites on the Web. It would be useful, too, if individual files could be dealt with from the directory tree and not just from a right click. As a plus, Cheyenne promises unlimited technical support on Inoculan, as is the case with all its products.

**PJ Fisher**



Above *The Options* dialogue allows you to configure Inoculan as you like it  
Left *Inoculan* makes it easy to scan drives on the LAN



### PCW Verdict

**Price** £45

**Contact** Cheyenne 01737 775500

**Good Points** Installs and works without a hitch. Runs in the background and watches everything. Good value.

**Bad Points** Unable to check individual files from directory tree. No virus update facility.

**Conclusion** Efficient virus checker that does everything it claims and produces peace of mind.

## HARDWARE

# Pioneer DW-S114X CD Writer

A solid CD Writer that can take the strain of serious use.

Check it out: Pioneer's new CD Writer may not have the most charming name, but by golly, it's a solid chap. While the current craze is to release cheaper and possibly flimsier internal CD writers, Pioneer has stepped back, rubbed its chin in thoughtful consideration, and chosen to release a relatively expensive, but incredibly sturdy device.

Take a deep breath: the RRP of the bare drive is £2260, or £2760 with the recommended, and rather good, Gear for Windows writing software. Compare that with the RRP of complete bundles seen recently under £800 and Pioneer seems to be ever-so-slightly overpriced.

But these internal cheapies are double-speed writers, often built for home use only, and supplied with mediocre software. The Pioneer writes at quad-speed, is an external device, and is built to withstand anything. Just eject that tray to experience true smoothness and solidity — it exudes physical confidence. Now compare it to Yamaha's considerably lesser-built quad speed, which at street prices of £1499 internal or £1649 external, isn't that much cheaper.

The Pioneer is a SCSI-2 device and features a 1Mb data buffer which should ensure uninterrupted data transfer during the writing process. It also supports multisession reading and writing. The physical process of writing a full 650Mb disc should take around an hour at single-speed, 30 minutes at double, and 15 minutes at quad-speed. Remember that you'll have to add the time for the software to format and ideally verify the information.

You can plug the Pioneer straight into a Mac, or you'll need a SCSI interface for a PC — we recommend an Adaptec PCI 2940 Ultra or UltraWide SCSI card. The Gear software comes on a CD which includes both Mac and Windows versions, the latter with specific 32-bit support for NT and 95. Gear supports verification before and after writing, making it suitable for backup. It also formats the information quickly, considerably speeding up the overall process.

Fast CD writing requires quick hardware and a clean system. At quad-speed you really should be using an AV hard disk over a PCI SCSI bus. Sadly, I could only get the writer to run at double-

speed with my messy Windows 95 installation.

Anyone serious about fast CD writing should clean out their system, or better still, start again with a fresh installation. You should also buy media designed for use at fast speed. By serious I mean those who need to load a disc, write at quad-speed, then load another disc straightaway for another project. I'm talking about the



constant (semi-) professional use that would justify the purchase of a quad-speed writer, built to take the strain.

The Pioneer DW-S114X is just that writer, and it's great to see manufacturers designing for this high-end market, rather than simply churning out cheaper and shoddier products. Of course these shoddier products are fine for the rest of us, who only write CDs every so often. It's only when you start to run a mastering service, with constant hammering, that you may yearn for something faster and sturdier. The Pioneer fits this bill.

A quick note to any budding CD writers. CD-R is great for distribution. The discs are fairly cheap at around £8 a go, have a decent capacity of around 650Mb, are small and light, but best of all, can be read on virtually every CD ROM drive. CD-R can be good for backup, but you can't rewrite over portions already written to, and if the software doesn't offer a verification pass, it's nigh on useless. A medium which cannot be written over would surely be great for archiving, but unfortunately, CD-R discs are

*Probably the most solid CD Writer in the world. The optional "Gear" writing software is as capable as the writer itself*

considerably more delicate than their pre-written silver discs, easily damaged, and have a habit of fading over the years. You should also be aware that some software takes an age to format the data, rendering the single, double or quad-speed issue often irrelevant.

Despite all this, CD writers remain incredibly desirable peripherals. While the Pioneer confidently caters for the high-end pro market, the rest of us can go for one of the cheaper bundles constantly dropping in price.

**Gordon Laing**

## PCW Verdict

**Price** £2260 (RRP), £2760 with Gear software  
**Contact Pioneer** 01753 789789  
**Good Points** Fast, incredibly sturdy.  
**Bad Points** Relatively expensive.  
**Conclusion** Ideal for serious or pro market use.

## SOFTWARE

# Fractal Designs Painter 4

It may make a Cézanne of you, but you're probably better off with cheaper tools.

**A** well-known creator of electronic music was once asked why his synthesisers made such unnatural noises? His response was that he could not see the point of spending a lot of time trying to emulate a saxophone when a better result could be achieved by simply bringing in a saxophonist. The point of this comment was that new technology creates instruments in their own right, and these devices should have their own voice. This analogy can easily be applied to Fractal Design's Painter.

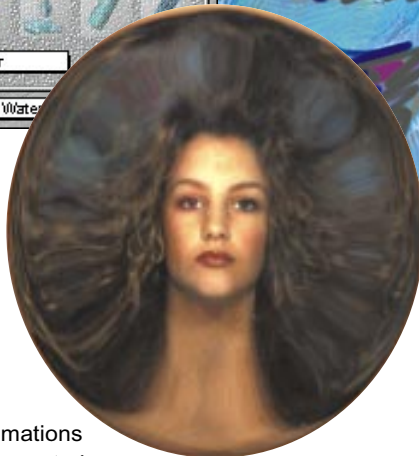
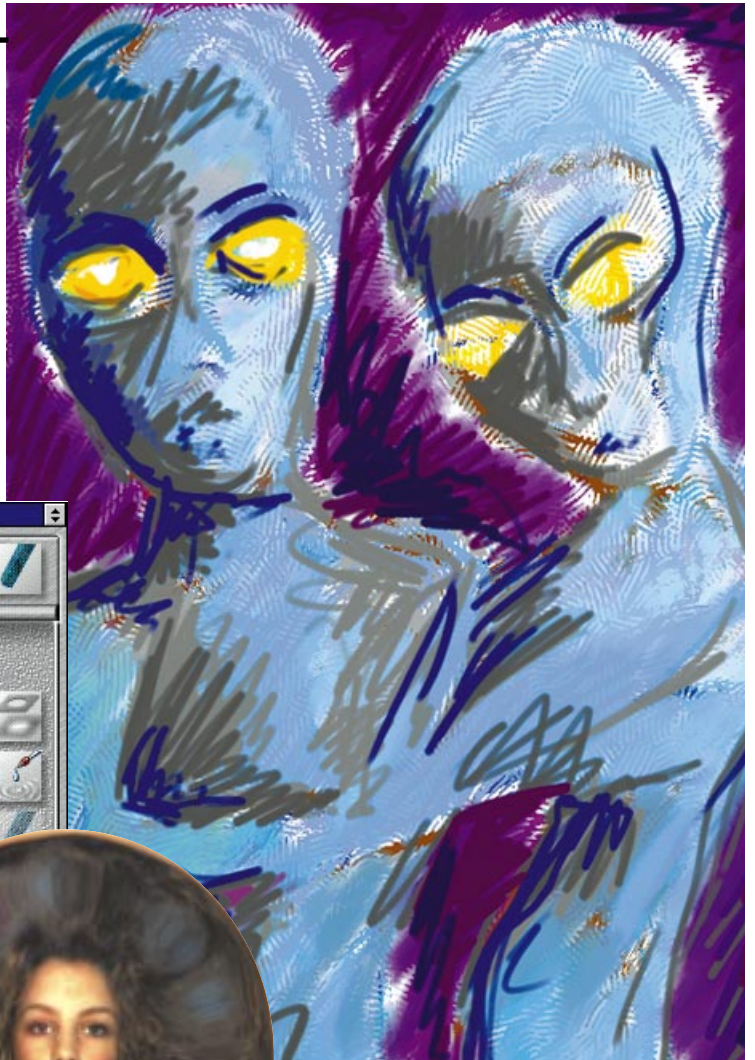
Painter was first launched in 1991 and although mind-numbingly slow, seemed like a refreshing antidote to the austerity of the other professional art packages. As time went by people found that Painter's ability to create messy oil paintings without getting your hands dirty was not enough, and lost interest. Later versions responded to this, appearing with added image editing facilities, in an attempt to win over users of the already established Adobe Photoshop.

The interface consists of five large and somewhat clumsy palettes which tend to dominate the desktop, even at a resolution of 1024 x 768. They offer tools, brush types, brush controls, paper types and a colour picker. In the Brushes palette, among the oils and charcoal, is The Image Hose, a cloning tool which allows you to paint with different objects such as trees and coins. Each hose contains variations of the same image which the user can change in size and angle to create irregular patterns.

Photographs can be imported in and traced over in oils or other natural media. There are also photo-editing facilities and auto-effects, but little to rival dedicated photo-retouching packages. Vectors, such as those in Adobe Illustrator files, can be imported and manipulated in their original format, rather than being rasterized into bitmaps.

Two other features that make Version 4 unique from other paint packages are the animation and Net Painter facilities.

**Right** *Painter offers very convincing natural brush strokes and textures*  
**Below** *Creating seventies record-sleeve artwork is easy using Painter's image distortion features on an existing photo*



large clumsy palettes make high resolutions a must. You'll also find that Painter only really comes into its own with some kind of pressure-sensitive graphics tablet.

Painter is great fun and the facilities on offer work really well, but do consider how many pencils, brushes, paint pots and sheets of paper you could buy for £400.

**Jon Mason**

## PCW Verdict

**Price** £399

**Contact** Computers Unlimited 0181 200 8282

**Good Points** Great fun, and offers unique computer painting tools.

**Bad Points** Still requires decent hardware, including graphics table.t

**Conclusion** No competition for the cheaper use of paper, paint and scanning.

## SOFTWARE

## Easyflow Version 3.0

Obviously, the only choice for serious flowcharting.

There are two tasks which every flowchart program should achieve. It should be easy to use, and do all the work involved in creating good-looking flowcharts. It is incredible that of the dozen or so programs around, there is only one which fulfils both aims. There are only two programs which actually do the routing of lines properly, one being AllClear, a great program but very much one for the computer programmer.

The winner on all counts is Easyflow. This not only routes lines, it does the obvious. When you type text into a shape, it constantly resizes to fit, whereas programs like CorelFlow 3 just let the text run on. Until now, Easyflow didn't work under Windows 95. Version 3.0 not only sorts that out, it offers a few improvements to what was already the best program around.

Few people use flowcharting software every day. Flowcharts are the kind of thing you only run up at the beginning of a project, making ease of use more important than clever options. Often less is more, and the features which are present need to be easily discoverable.

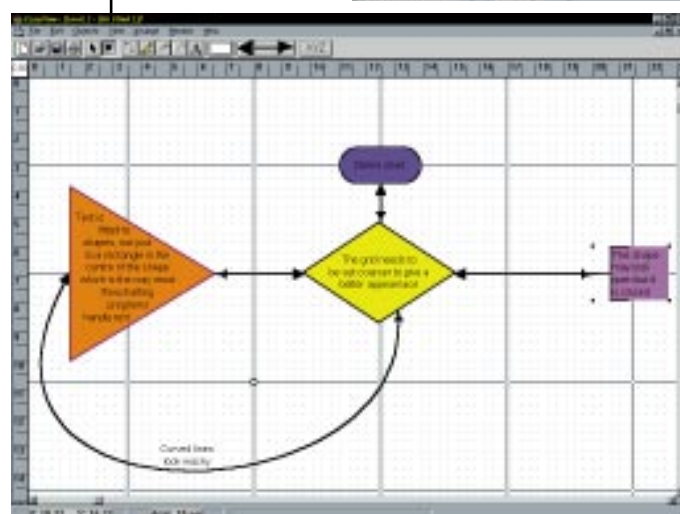
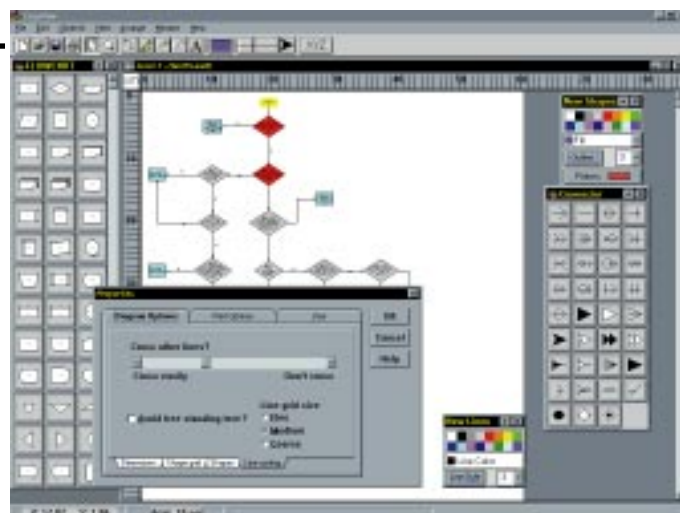
It's quite fun to learn about Easyflow, because the manual is excellent. The authors, Haventree, have a flippant attitude to the usually po-faced business of learning: there are happy and sad faces for good and bad points, and they reserve a special scepticism for the copyright notice. However, this can become annoying, with far too many tools referred to as "gizmos".

The basic program is simple, with a drawing area and palette of shapes. The shapes snap-to a position on the grid, and you join them up with lines. Text can then be inserted into a shape, which will then grow to accommodate it. The font size is set, although you can modify it from shape to shape.

Shapes can either be set to overlap or to replace existing shapes. Overlapping is useful for some effects, such as drop shadows (there is no automatic drop shadow feature as with AllClear), but for ease of editing, drag and drop with replace makes sense. If you know what

Right Easyflow is simple, but has a comprehensive range of the options you want

Below The grid makes placement easy. Curves are easy to shape



shapes, although less than some other packages. Some of the shapes which look open have a text area which allows them to be filled, but if you really want to add text to an open shape you can do it by using free-standing text and grouping it with the shape. Lines can be set to route through or avoid free-standing text. Many of the aspects of the design of a chart can be stored as a template, so once you have an appearance you're happy with, you can

you want to draw, Easyflow is quick to use.

There are several types of line, including simple lines which stay in place when the shapes are moved and smart-lines which stay attached. You can also have curved lines. All lines snap to a separate grid. The manual gives good advice on using the grids, pointing out that a coarse grid is faster, and that with simple diagrams the coarse line grid makes for simpler diagrams since the lines will snap to the obvious place. If you want to move a shape so that it is off the shape grid, you hold down control when you drag it. When you move a shape, you can get a dotted outline of it by clicking and waiting an instant before dragging. This helps with positioning.

Shapes can be open or closed, and when closed can be filled with a colour or text. The comprehensive library has a good selection of both open and closed

produce several flowcharts.

If you are a heavy user of flowcharting, then Easyflow is for you. Without much effort you can rapidly produce the graphs you want. If you are an occasional flowchart, it is still for you. Along with Power Point, it's one of the few programs you can pick up 20 minutes before a presentation and produce credible results. The price is a little high for a program which might only be used occasionally, but none of the cheaper programs are worth the difference. If you must buy something cheaper, get a pencil and stencil.

Simon Rockman

## PCWVerdict

Price £149

Contact Rodderick Manhattan 0181 875 4400

Good Points Easy to use, does the job.

Bad Points Manual writers on Prozac.

Conclusion Sensible software.

## SOFTWARE

## HOMEwise

If you can't remember where you put the guests, you need this.

HOMEwise is a family organiser package designed for completely inexperienced users and seasoned screen-gazers alike, enabling them to record almost anything, including what houseplants they have, how many bottles of wine are in the cellar and what books are in the kitchen.

It will work under Windows 3.1 or Windows 95, requiring 3Mb hard disk space and 8Mb RAM minimum, to run well. The "Quick Start" manual (the only one supplied) accompanies a CD-ROM and two floppies. Installation is easy, and after selecting the setup program you're up and running inside a minute.

Under Windows 95 the program does a very strange thing: when started, it takes over the desktop, pasting a non-moveable, non-sizeable Window on a black background. You can still switch between your other applications using the Alt-Tab keys as per normal, however. Presumably, this is done to avoid confusing inexperienced users who may be frightened by using Windows directly.

The layout of the system starts with a control centre, a front panel which divides the system into various rooms. There is the kitchen, study, cellar, garage, bedrooms, a computer room and others. There is even a family room in addition to the living room; in what sort of houses do these people live? Still, perhaps

it's better to err on the side of largesse.

A separate section of the control panel covers such things as records held on house plants, emergency telephone numbers, pets, home safety and medical information. In this latter section there is a "More" button for the addition of new users, defining in which bedroom they sleep so that they can be assigned personal journals. Password protection for each user is also possible.

When you click on the buttons representing rooms, the control centre goes down a level, offering a number of functions associated with that room. Clicking on the Kitchen icon, for example, lists icons for Recipes, Things To Do, a Microwave Snacks list, a Party Planner and Meal Planner among others. There are up to 15 separate functions for every room. These functions, which are generally store and recall-type functions for listing information, invariably enable the user to produce a printout of any stored information with just one icon.

The printing function is just one example of the system's extreme ease of

use, with large buttons and easy-to-understand icons pointing you in the right direction. This is why it doesn't need a manual — it is completely self-explanatory. For those people who have never used graphical user interfaces before, however, there is an introductory screen which takes you right down to the basics, including the use of scroll bars and radio buttons.

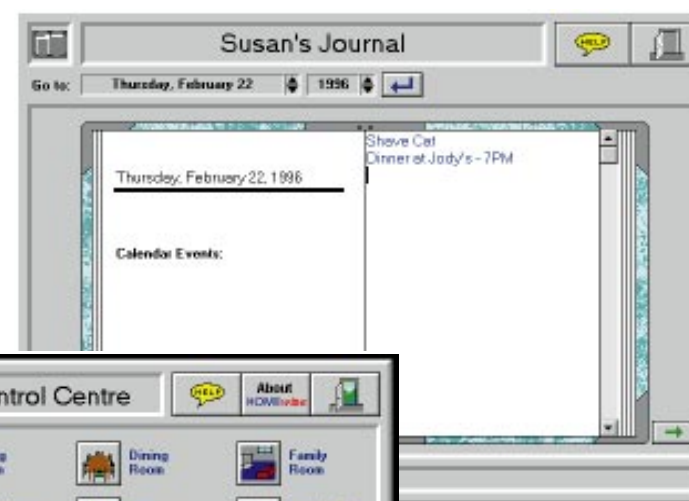
You quickly realise that HOMEwise replicates many of its elements. This means that while the control screen promises many internal functions, closer inspection reveals that many of the functions are structured identically but with different labels and names.

An example of this is the Traffic Log system which appears in the garage. It enables you to list and recall information about your journeys such as miles travelled, petrol cost and the time taken. It displays entries in a tabular format, and accepts them on a screen filled with text boxes. It bears more than a striking resemblance to logging facilities on pretty much every screen, however, and when analysed in this way the program boils down to around five different functions.

Other irritations include a lack of date validation on many screens but not on others, which could cause problems for inexperienced users. There are no links to other programs, either. For instance, an automatic program launcher from the Computer Software database would have been an advantage, as would modem-based dialling from the phone book.

It's not a bad program, though. Although a decent spreadsheet could do all HOMEwise does and much more, it would be more expensive and not at all intuitive. It's a simple matter of horses for courses.

Danny Bradbury



Above Each bedroom has its own private journal for its occupant to use  
Left An easy-to-use control centre gives you access to different rooms in the house

## PCWVerdict

Price £19.95

Contact Global Software Publishing 01480 496666

Good Points Easy to use, quick to set up and extremely affordable.

Bad Points Flexibility is limited, and experienced users may become bored.

Conclusion Not bad for £20, but it won't stretch very far.

## SOFTWARE

# SSeyo Koan Pro

This could be the biggest musical revolution since the birth of Rock'n'Roll.

**K**oan Pro is best described as a creative music tool capable of taking a handful of musical ideas and transforming them into accomplished musical pieces. Brian Eno, who is currently using the software to write an album, describes the package as "the most promising idea in musical technology for many years."

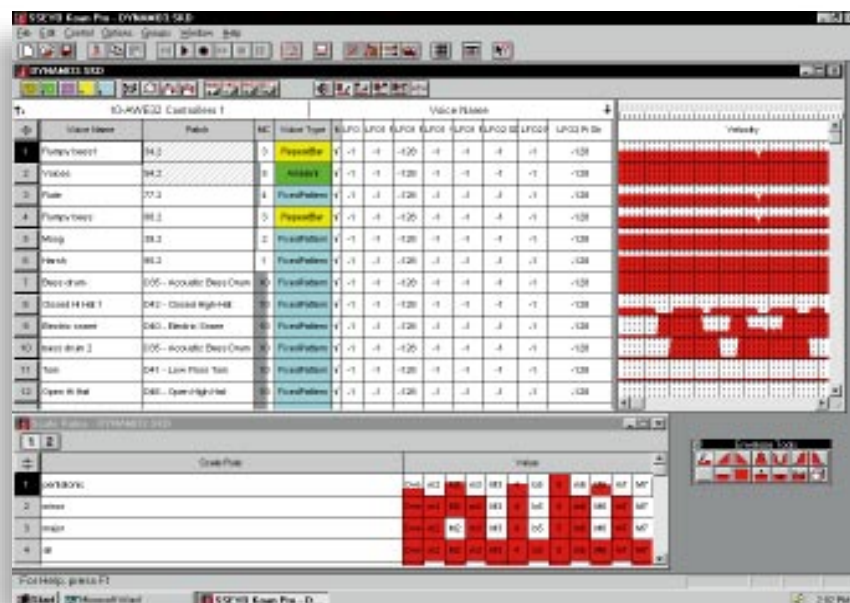
Although a degree in music theory will go some way towards helping you compose with Koan, little musical knowledge is actually needed to get you started. You will need a General MIDI sound source, though. A Creative Labs AWE-32 sound card is recommended.

Koan Pro cannot be likened to any other software package, so a few hours need to be invested reading the manual. The learning curve is steep, but even at the bottom it's possible to create a half-decent tune.

Koan Pro makes music by randomly selecting note values. These include note lengths, pitch and a host of other parameters. Templates are provided that cover several musical, and some not so musical, styles. Opening the normal template allows you to hear a random melody. Two fundamental parameters determine how the melody develops — pitch and note lengths. The normal template plays the notes that occur in any one of 13 scales. You choose the scale and determine the probability and strength of how often each note will occur. For example, if you only want the root and the fifth note in a scale to play (C and G in the key of C major, for example) you would give each note in that scale a 0 percent chance of occurring. C and G can be given a strength of 1 to 100 percent. If these notes are set to 100, each has an equal chance of playing.

The same rules can be applied to note lengths to determine the rhythm. From a selection of note lengths (minims, crotchets, quaver, etc), you determine which note lengths you want and the probability of them occurring.

Mozart developed a similar method for writing music. By rolling a dice, the



outcome would determine the order for which musical phrases should be played. With Koan the variations are infinite, and because the calculations are determined in real time, the music will sound different every time.

By adding a second part you can either repeat the above process entering new "rules", or copy the part and transpose, offset and apply micro-level controls for subtle, random-changing effects such as panning, start time and modulation. Koan has 150 parameters to play with. The software will also harmonise patterns, with sometimes very musical and inspirational results.

There's room for up to 50 parts, and each can be played on 16 different instruments simultaneously. When used with the AWE-32, the software provides access to all 25 oscillators, envelopes and LFOs, enabling subtle changes to be made to instruments. It also allows sound banks to be loaded, opening endless creative possibilities.

One example would be to download a human voice. By applying "rules" to that part, the software can generate an ever-changing choral piece in real time for up to nine hours.

To store nine hours of music recorded at CD quality on your hard drive, you'd need a massive 5.4Gb of free space. The same file in Koan format would typically

*Use the envelope tools to create mountain landscapes. You can edit all 150 parameters, too*

occupy 100Kb. This offers interesting prospects for music on the Internet. A Koan file can be downloaded in just a few seconds, so you can have tunes wherever you decide to snowboard, surf or jet-ski.

There are new opportunities for games developers, too. By implementing the Koan API into new titles, different tunes can be heard each time the game is played.

It has taken SSeyo the best part of five years to get this product off the ground. Time well spent, as it now has the potential to change the way in which music is written. Whether you're a games developer or just interested in computer-aided composition, Koan Pro has a wealth of features to offer, far more than we have space to write about here.

**Steven Helstrip**

### PCW Verdict

**Price** £129.95

**Contact** SSeyo 01344 712017

**Good points** Versatile and fun.

**Bad points** Tricky to learn at first.

**Conclusion** Loads of potential.



## SOFTWARE

# Signal Box Neuro-Predictor

Specialist neural network facilities in a standard Windows environment.

**N**eural Networks are software architectures inspired by biological nervous systems. They are particularly useful in applications where traditional analysis would be difficult, and have proved invaluable in the solution of such diverse problems as finger-print identification, robotic arm control and horse race form interpretation.

Neural networks interpret data in a different way to statistical methods or expert systems. In statistical analysis the human assumes a model or data structure and then uses a computer program to test its validity or accuracy. In expert systems a program is used to apply rules which reflect the know-how of experts.

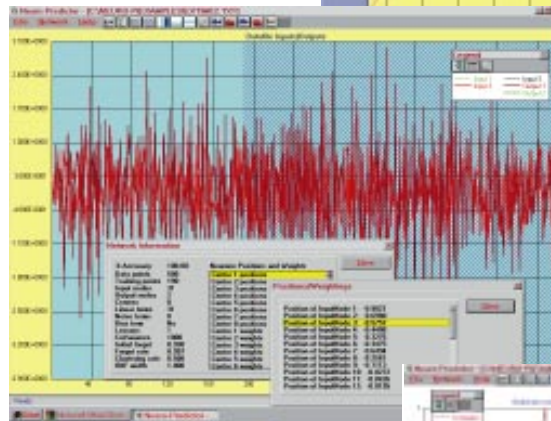
Neural networks do not require the user to make assumptions about the data. They work by generating nodes which mimic synapses in a biological brain. The computer learns from the data and builds models which reflect its structure.

While far more processor intensive than traditional methods of data analysis, neural networks are usually at least as good and in many cases thought to have a slight edge over other forms of analysis, especially for complex or changing situations. In difficult dynamic situations such as these, the neural network program exhibits flexibility, adapts and learns from the data, where traditional methods would require a complete rethinking of the situation.

The spectrum of currently available neural network software stretches from packages such as Cortex Pro and Matlab Neural Network toolbox, which are designed for computer scientists with expertise in the subject, to business application add-ons such as Neural Connection, which require almost no specialist knowledge. Neuro-Predictor is somewhere in the middle of this spectrum and provides specialist neural network facilities in a standard Windows environment.

Data can be imported from spreadsheets and results output to other Windows programs. Despite the friendly Windows environment, Neuro-Predictor requires familiarity with the essential concepts of neural networks in order to produce and interpret results.

*Neuro-Predictor can deal with large data sets. Although interpretation of the output requires a degree of expertise, results can be excellent*



The architecture driving Neuro-Predictor is an advanced Radial Basis Function (RBF), which means that the package is limited to data pattern recognition and time domain modelling. Neuro-Predictor has features which forecast and find relationships in data. Noise models can be estimated to cope with noisy data sets where other methods may be inapplicable. The RBF is considered to be one of the most efficient routines currently available and this is a well constructed implementation.

Software for specialist application areas such as neural networks often has an experimental feel to it — indeed, some packages are little more than a collection of developer's tools. Neuro-Predictor is well constructed quality professional software and has little competition in terms of price. Other neural network packages which offer a wider range of functions tend to be either command-line driven or far more expensive.

The point must be made however that many neural network specialists expect to find a choice of routines such as back propagation with adaptive learning, Levenberg-Marquardt back propagation, Kohonen and Multi-Layer Perceptron so as to have a choice of learning rules and design methods available, not just the RBF. The developers of Neuro-Predictor

claim that by concentrating solely upon RBF they have achieved a level of ease of use and functionality which leaves the competition trailing. This is probably the first serious neural network software in its price range which can be used as a standalone product in a Windows environment to generate sensible results.

Neuro-Predictor has full online help and a 200-page manual. Technical support is a further £250 per year and consultant services are available.

**Eric Adler**

## PCWVerdict

**Price** £399; technical support (optional) from £250 p.a.

**Contact** Signal Box 01709 889900

**Good Points** Relatively quick and easy to use with clear output.

**Bad Points** Limited range of algorithms.

**Conclusion** Reliable neural network routines in a Windows package

## SOFTWARE

## PictureAlbum

PictureAlbum is a good choice for home multimedia use, but be prepared to splash out on the kitchen sink as well.

**M**ultimedia albums have been around for some time. Kodak has Shoebox and New Media Solutions has ImageAXS, but PictureAlbum is specifically aimed at the home market. It can store various media, including image files, PhotoCD, video, text and sound, either your own voice or audio CDs.

The press release for this product hails it as a great way to create landmarks of your family's greatest events — births, marriages, Bar Mitzvahs and Christmas. To quote: "You can record those first precious words 'spoken' by your new-born on to a page showing early pictures. Or you could include a recording of your own voice to remind you of the heady emotions you felt at that moment."

The look of the product is very much like a paper album. You can import the

various media on to a series of pages which you can flick through later, or view as a slide show.

You will need a fair amount of equipment to get started in the first place, including a scanner or digital camera for your photographs, and a video capture card for home movies.

Otherwise you will have to put your photos on PhotoCD or compile other people's images, which defeats the point of a package with such a personal feel. There are other packages



*Standard and wallet-sized pictures can be pasted anywhere on the pages of the album to build up a collection*

on the market which are better suited to compiling a professional collection — ImageAXS, for instance.

As it is aimed at the home user, PictureAlbum is easy to use. The desktop area has an array of buttons to import the media, but you have very few choices as to *how* you import it. Pictures can either be wallet, snapshot or standard-sized (covers the whole page of the album). It would have been handy to be able to resize the images once they were in the album to build better-looking pages.

Adele Dyer

### PCW Verdict

**Price** £19.99

**Contact** Linefeed 0171 474 1765

**Good Points** Easy to use, very reasonably priced.

**Bad Points** Limited in its scope, and you will need a plethora of equipment to use it properly.

**Conclusion** Lets you make good, if not professional, looking pages.

## HARDWARE

## Iiyama Pro Lite 31

This good-looking LCD monitor for desktop PCs makes a bold fashion statement.



**T**he death of the CRT (cathode ray tube) has long been predicted, but LCD screens have so far made a big hit only on notebooks. There have been LCDs designed for desktop PCs in the past, but few were capable of

better than 640 x 480 resolution and remained prohibitively expensive.

Enter Iiyama with the first decent specification LCD for a desktop PC. Capable of displaying 18-bit colour depth (262,144 colours) at 1,024 x 768, the Iiyama Pro Lite 31 can match most CRTs in terms of performance.

The display requires its own supplied proprietary video card (PCI or ISA). This is because LCDs are digital devices, so it does not make sense to take an analogue signal from a VGA card and convert it to a digital format in the monitor. Instead, Iiyama utilises a straight-through digital path from the bus in your PC to the monitor.

The picture quality is excellent with a high contrast and wide viewing angle. The Pro Lite 31 does use an external power supply, though, which is something of a nuisance. Even though 12 inches may be large for an LCD panel, it's small when compared

with the average CRT.

The market in which the monitor might sell is rather limited at present — it's more of a fashion accessory than a serious monitor. Nevertheless, it could well find a place in city dealing rooms or other crowded areas where fitting monitors presents a problem, or where space is, literally, money. In most people's case, however, their monitor sits on top of a PC which has just as large a footprint as a 17in monitor, so the space saving is minimal.

Simon Head

### PCW Verdict

**Price** £2,299

**Contact** Iiyama 01438 745482

**Good Points** Ideal where space-saving, or good looks, are vital.

**Bad Points** Same price as a very good 21in CRT monitor.

**Conclusion** The first decent LCD display for desktop PCs.

## 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

## lomega Zip 100 drive

Stave off deleting files or upgrading your hard disk with this rarely-sighted backup device.

**I**T'S ONLY A DISK DRIVE BUT I've found the lomega Zip Drive to be a godsend. I no longer agonise over whether to keep files on my hard disk or archive them on multiple floppies. If something is invaluable I put it on the hard drive, but if I tire of it then it is relegated to a Zip.

I can back up my hard disk on a single Zip disk. Given the age and size of my hard drive, the Zip's speed is not a worry and I happily run applications on it. Using the Zip drive has let me put off upgrading my hard disk for a while yet.

Getting hold of a Zip wasn't easy — they are widely advertised but rarely in stock. I was lucky to find a SCSI model at Technomatics and then discovered that the Zip-Zoom interface card is practically impossible to source in the UK.

Adaptec's excellent Web

site revealed that its 1505 and 1515 cards share a Mac-type micro-D 25-pin connector that is compatible with the lomega external cable. I opted for the cheaper 1505 that is sold as the Altra CD Connect Kit. The only disadvantage is that you cannot boot an operating system from any device connected to the card. I gained an internal SCSI connection, however, which the Zip-Zoom lacks and was later able to add a CD-ROM drive to the chain.

Setting up was easy. You can plug in the card, run the lomega installation disk and start working without any recourse to Adaptec's EZ-SCSI. Similarly, Adaptec's ASPI SCSI drivers are well up to the task of handling the Zip-drive, but they can't unlock and reformat the supplied Zip-Tools disk. This disk is locked since it is initially partitioned with software for both the Mac and the PC: the lomega setup routine wipes one and uses the other. You'll need to run the lomega setup *au naturel* and add in EZ-SCSI later if needed.

Much has been made of the Zip-Tools suite of utilities but I've found them to be fairly superfluous. However, lomega's support is good and Windows 95 drivers are ready to download at its new, improved Web site (although I'm still hanging in with 3.1).

In my view, the "war of the super-floppies" is a non-starter as the Syquest EZ-135 is equally scarce at present. Whatever the relative technical merits of each, I suspect the winner will be the first to get them on the PC superstore shelves in bulk.

Allan Toombs



*The elusive lomega Zip 100: perfect for those little (or large) backup jobs*

**6** MONTHS  
TEST

### PCW Verdict

If you can get hold of it, this is the perfect intermediate solution before you have to upgrade your hard disk. It's easy to install, but not fast.

**Price** £162.85

**Contact** lomega 0800 973194



## SOFTWARE

# Microsoft Encarta 94

**2**  
 YEAR  
 TEST

The original multimedia encyclopedia is still an invaluable reference work, and a bargain to boot.

**T**HE AUGUST 1993 EDITION OF *Personal Computer World* featured a review of what is now one of the most successful CD-based encyclopedias — Microsoft's Encarta. It wasn't the first encyclopedia on CD-ROM, as it followed offerings from Hutchinson and Software Toolworks, but it was the first to harness the capabilities of true multimedia, with sounds, pictures, animation and video.

Back in those days when a 386 with 4Mb of RAM was a tall order, Encarta cost around £300, the same price as Word 2. Word still maintains its price tag around this mark, but Microsoft's latest offering, Encarta 96, can be snapped up for less than a sixth of the price it was then. Nearly every new computer now comes with Encarta, and its formidable success relies on the fact that Microsoft has drastically undercut all its competitors as well as on the quality of the product.

Unlike many people, I actually bought Encarta 94 as a product in its own right, rather than having it bundled with a new computer or CD-ROM drive — usually more of an obligation than a choice.

Encarta is essentially a huge database, comprising 26,000 articles ranging from AA Milne to Zymys (a type of rodent). The articles vary in length from a few lines for John Major to about 60,000 words for the United States. The importance that Microsoft and the Funk & Wagnall's Corporation (the people who wrote the text) place on a subject can be judged by the length of the text and whether there are any other multimedia elements — diagrams, tables, photos, sounds, animations or video (in increasing order of prestige). These additional elements are generally of a very high standard. Due to their huge size, video files, however, are scarce, numbering only 22.

One of the first things I did when I got Encarta was to watch the entire selection of videos (using the gallery feature) which, incidentally, took only about 10 minutes. Maybe it would have been a

*A world of information at your fingertips: for research, education, or those little quizzes between friends*



better idea to include the videos on a separate disk, which adds the hassle of changing disks but increases the space on the main disk for pictures and text and the amount and quality of video which could be offered.

Maybe this is what should have been done with the rather pathetic Mind Maze game too. Along with the fairly limited Dictionary/Thesaurus, there is also the Timeline and the Atlas. The Timeline details events from the year dot to the present day (actually, 1992) and the Atlas provides a selection of maps with somewhat limited detail. Interestingly, with Encarta 96 Microsoft now markets the atlas separately from the encyclopedia, which apart from making the company more money should also increase the quality of the two products.

Encarta can be used in three different ways. First, there's the individual question, like: What is the gestation period of the African Elephant? To find the answer to this frequently asked question, you can either go to the Contents and select "elephant" and then scroll through the text looking for the word "gestation", or more practically, hit the Find button and type in "elephant: gestation". A Found box then reports all the articles with these two words, highlighting the word gestation, and there you have your answer — 21 months. Second, you can use Encarta to find information on a broad topic, for example the eye. On selecting "eye" in the contents, you are presented with several

pages of text on the eye with diagrams and an animation which can be printed or copied to your word processor. Or the third way, which is the most fun, is just jumping aimlessly from topic to topic using hypertext links and taking in the show along the way.

Encarta's content is pitched at about GCSE level. Much of the text is lucid and condensed, giving a good overall impression of the topic.

The later Encarta 95 is not very different from Encarta 94, except for an updated interface and some updated articles. However, Encarta 96 seems to hold the trump card: it is an English version, and the American feel and emphasis of Encarta 94 was one of its main disadvantages. For example, the Labour party gets only about half a page compared to Bill Gates' two, complete with sound and photograph — obviously someone's jobs was on the line there.

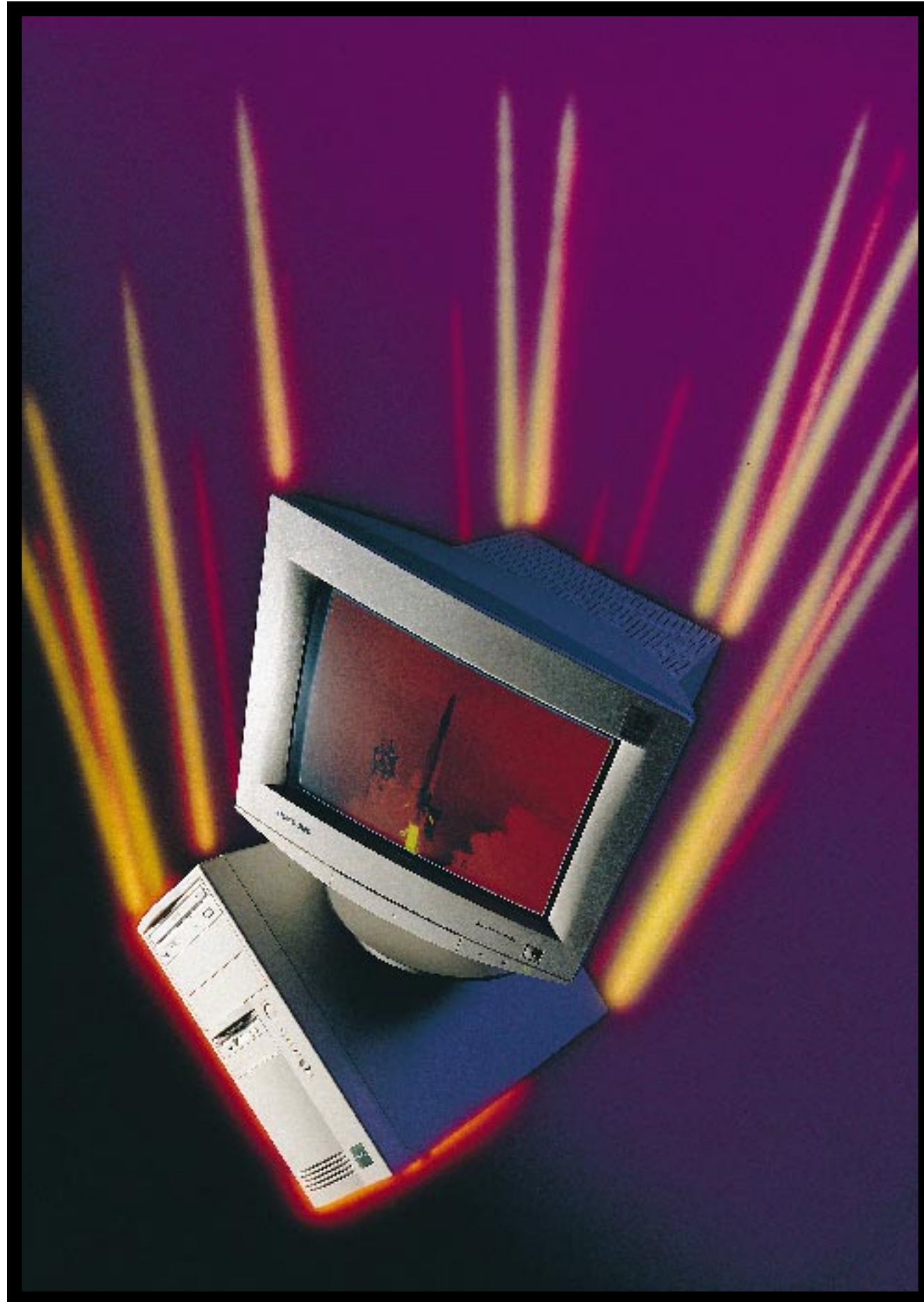
For general research, education and entertainment, Encarta is highly useful. It is reliable, thorough, interesting and accessible, and at a new shelf price of about £50 it represents stunning value.

Jonathon Thaw

## PCW Verdict

A vintage multimedia encyclopedia, incorporating a host of features and frills all built around a solid text base. At the new low price, the latest version, Encarta 96, must be a winner.

**Price** Encarta Encyclopedia 96, £49.99  
**Contact** Microsoft 0345 002000



# HOT ONE HUNDRED

P100 chips are at the heart of these 17 entry-level machines.

**J**UST A YEAR AGO THE entry-level machine was a DX2/66, a solid little plodder which could deal with most things but would take its time doing it. Then, P100s were regarded with some awe as fast and furious machines — sex in a chip.

Now, P100s are viewed as entry-level chips and a recent announcement by Intel bears this out: with the launch of the Pentium 166, the company expects to see 133MHz move into the mainstream, which in turn will make P100s more affordable than ever before. For all that, though, the chip has lost none of its original cachet and is still highly desirable as the best trade-off between price and performance.

The spec chosen for the P100 machines has otherwise been decided by market trends. While Windows 3.1 was happy to plod along on a 486 with 4Mb RAM, Windows 95 makes more demands of the system, needing at least 8Mb RAM although it makes sense to opt for 16Mb, especially as memory prices

are falling fast.

One-gigabyte hard disks are fast becoming standard. Applications are increasingly space hungry and it makes sense not to overload your hard disk, as this is like putting a millstone round its neck. Also, hard-disk manufacturers are ending the manufacture of smaller disks in response to the trends, so prices are plummeting. Finally, what would a machine be today without multimedia capability?

We have expanded our usual suite of tests to evaluate the machines in this review. There are the usual Windows applications tests, comprising business packages including Word, WordPerfect, Excel and FoxPro. On top of this we run the Doom2 tests to see how the machines perform on games, and we have added a CorelDraw test to see how they do on graphics.

We have tested 17 machines in this review. So whatever your budget, there should be something in there for you.

**Adele Dyer**

## P100MHz CONTENTS

- 83** Adams Accura Premium Plus
- 83** Amstrad Professional P100
- 85** Armari eXPS-100
- 85** Atlantic Pro 96
- 86** Carrera Panther P100AM
- 86** Dan Ultimate PC 100MHz
- 88** Dell Dimension P100t
- 88** Digital Celebris GL 5100
- 92** Gateway 2000 P5-100
- 92** Mesh Elite Pro 100
- 93** Mint Conqueror P100
- 93** Oasis Lightning P54/100
- 94** Panrix Micron P100
- 94** Vale PlatTriton P100
- 96** Viglen Genie PCI P5/100
- 96** Vobis HighScreen Skycase P100M
- 100** Zenith Z-Station VP100 model 1200
- 98** Hardware components/RAM
- 100** How We Did The Tests
- 103** Monitors
- 104** Performance Results
- 105** Editor's Choice
- 105** Buyer's Guide
- 106** Table of Features

**PCW Opening** Photography by David Whyte  
**Pentium PC** Photography by Bruce Mackie

## Adams Accura Premium Plus

Computer  
World  
HIGHLY  
COMMENDED

The first thing that strikes you as you get the Adams out of the box is how good looking it is. The keyboard is also one of the few decent ones we saw in this test.



Once you have easily slipped off the case, the insides are neat and compact, but sensibly put together. Part of this is due to the design of the Micronics motherboard. On this board the SIMMs sockets are on the outside edge next to the processor, so upgrading the RAM should be relatively painless.

As for expansion room, there are four PCI and four ISA slots, one shared, as well as one free 5.25" bay under the CD and floppy drives — a little inaccessible — and one internal 3.5" bay for a spare hard disk. The Connor hard drive was less fast than some in this test, notably the Quantum hard drive. It is located over the power supply, but more worryingly the cables were wedged between the hard disk and the power supply itself — just pray you don't have a meltdown.

The manuals were sadly rather skimpy. There is a description of how to set up your machine, but no diagrams and the technical and upgrading information is sparse. You do, however, get a manual for the motherboard.

The speakers which fit on the side of the monitor are surprisingly good for such little things. The sound is not huge and rounded, but it is hiss free and not overly tinny. However, once you have put the speakers on the monitor, there is no way you can pull them off again.

### Monitor

This ADI monitor is one of the better ones we saw in this test. It has a reasonable black screen and a thin surround. It does not suffer unduly from distortion or interference and performed adequately if not outstandingly.

### Details

#### Adams Accura Premium Workstation Plus

**Price** £1,599

**Contact** 0161 282 8822

**Fax** 0161 283 1001

**Software Bundle** Windows 95, Perfect Office std

**Hardware Bundle** ADI speakers

**Warranty Terms** 3 years, first year on-site. Optional 2nd year on-site for £150

**Technical Support** Free telephone and fax support

**Good Points** Well built, good keyboard and monitor

**Bad Points** Skimpy manuals

**Conclusion** A good machine

Scores	
Bundle	3
Build Quality	7
Warranty	8
Value	8

## Amstrad Professional P100

Amstrad is one of the most recognised names in the PC industry, but in recent years its fortunes have been somewhat mixed, and highly publicised. Recently, however, Amstrad has redirected its



forces. The company bought Viglen and in May will close their Shoeburyness factory and move production down to Viglen's new factory in Alperton. They will operate as a subsidiary of Viglen.

First impressions of the machine are disappointingly dull, starting from the case, which is definitely a plain Jane. Inside, the approach is far from systematic. There was a jumble of cables and the RAM was right under the hard drive, which would have to be removed to do any upgrading.

The graphics card runs off an S3 chip. S3 make the chips used by most of the graphics card manufacturers, people like Number Nine and VideoLogic. The soundcard is that old staple, the Creative Labs SoundBlaster 16, perhaps not the best card on the market anymore, but still a safe bet for games and multimedia. There were no speakers supplied, so we could not test the sound properly.

The software bundle is a little out of the ordinary, including games such as Descent and Links Pro, a golfing game. The office package was Lotus SmartSuite, which seems to crop up in more and more bundles.

Performance was mixed. The office application scores were disappointing, but the Amstrad made up ground with a very fast Doom2 test. If you are going to use a machine primarily for games, this one might be worth considering.

### Monitor

Typical of CTX monitors, this one was characterised by being relatively free of distortion and the colours were not bad, but suffered from some fading at the edges.

### Details

#### Amstrad Professional P100

**Price** £1,699

**Contact** 0800 338844

**Fax** 01277 209009

**Software Bundle** Windows 95, Lotus SmartSuite, Encarta, Links Pro, Descent, Destination Saturn

**Hardware Bundle** Warranty Terms Optional 1 — 3 years £149, 5 years £299

**Warranty Terms** 1 year on-site.

**Technical Support** No free

telephone and fax support

**Good Points** Very good Doom score

**Bad Points** Poor build quality

**Conclusion** Average office performance, but good for games

Scores	
Bundle	5
Build Quality	5
Warranty	4
Value	4

## Armari eXPS-100

Personal  
Computer  
World  
EDITOR'S  
CHOICE

Armari have surpassed themselves on extras on this machine. We asked for a simple quad-speed drive, but instead we got a CD changer and as the icing on the cake, the machine came complete with tape backup. While neither the NEC MultiSpin or the HP Colorado tape backup are the best of their kind, they are extremely useful options to offer on the basic machine. Add to this a Quantum Fireball hard disk, a Matrox Millenium video card and an AWE 32 sound card and you have a very highly specced machine.

Inside the PC, the SuperMicros motherboard has been used, with its eight slots — four PCI and four ISA slots. The board is American built and is considered much more reliable than many around. It is capable of running at up to 200MHz, so can be upgraded for future chips. The RAM is reasonably available, but at the expense of expansion room. There is only one 5.25" bay, but then the machine is so well specced to start with you would have difficulty finding anything else to put in there.

The hard drive has been partitioned, and on the smaller section are a load of games and updated drivers. The idea of putting them here is to prevent configuration conflicts. You have the option to partition or not to partition when you buy, and your decision depends very much on what you want to do with your machine. It is useful for running more than one operating system, or for games, but otherwise has limited use.

The speed of the machine proved that the whole thing has been well put together. The added extras pushed up the price. The basic system with no tape backup and a standard CD-ROM drive would be £1655.

### Monitor

The Iiyama monitor was relatively free of distortion and flicker. It was clean and clear, giving good colour definition and has a pleasant look to it.



### Details

#### Armari eXPS-100

**Price** £1,899

**Contact** 0181 810 7441

**Fax** 0181 810 5783

**Software Bundle** Windows 95, MS family pack

**Hardware Bundle** Jazz Hipster speakers, HP Colorado T1000 tape back-up

**Warranty Terms** 1 year back to base and options

**Technical Support** Free

telephone and fax support

**Good Points** Very well specced and fast

**Bad Points** Limited expansion room

**Conclusion** Editor's Choice

Scores	
Bundle	4
Build Quality	8
Warranty	5
Value	9

## Atlantic Pro 96

This was only the second machine from Atlantic Systems we have seen. They are a small to medium-sized company based near Swansea. Like the P120 from Atlantic that we looked at in the January group test, this machine had a SOYO motherboard. The board has Triton, Socket 7 and a CELP socket, with 256Kb of pipeline-burst cache. It also has the older type of secondary level cache sockets. There are four PCI and four ISA slots, one of them shared.

The peripherals are mostly quite standard, Diamond Stealth 64 Video VRAM and SoundBlaster 16, but the CD-ROM drive is a six-speed Aztech. This makes a huge difference to performance, especially when installing software. The case is smaller than the one we saw in the last group test, being an ordinary mini-tower, but there is still enough room for expansion, in one 5.25in and two 3.5in bays.

The machine came loaded with an impressive array of software, including Lotus SmartSuite, Quicken, Adobe Acrobat and Corel 4. However, none of these was supplied on disk as well. One other curiosity about the way Atlantic had set-up the machine was that Windows 95 did not have all the usual shortcuts floating around on the desktop. There was no Briefcase and no Inbox, only the My Computer icon and the Waste Basket. These can be put back, but it seemed strange not to let the user decide what they do and don't want. The Doom score was impressive, one of the fastest in the test, although as in common with other machines containing the Diamond Stealth 64 Video VRAM, the Corel test was a little slow.



### Monitor

This ADI had problems with pincushion, which the controls could not right and reacted badly when switched on and off. This marred an otherwise sharp monitor, which had good colour separation.

### Details

#### Atlantic Pro 96

**Price** £1,548

**Contact** 01792 700002

**Fax** 01792 792888

**Software Bundle** Windows 95, Lotus SmartSuite, CorelDRAW! 4, Quicken Accounts

**Hardware Bundle** SoundWave 40 speakers

**Warranty Terms** 1st year on-site, 4 years back to base.

Options: 3 years on-site

**Technical Support** Free telephone and fax support

**Good Points** Six-speed drive

**Bad Points** Fault on the monitor

**Conclusion** Not a bad bundle

Scores	
Bundle	8
Build Quality	8
Warranty	8
Value	6

**Carrera Panther P100AM**

Carrera are fairly regular entrants in our group tests and so we have seen quite a few of their machines over the past year or so. It is interestingly to see a real improvement in the quality of the machines they put forward.



The midi-tower they put in for review this time may not be the design they will be selling by the time this is on the newsstands as they are considering changing their cases. However the insides — the really interesting part — will stay the same.

Carrera have opted for the SuperMicros board — an increasingly popular choice as it is designed with upgrading in mind. There is plenty of room with a total of four ISA and four PCI slots, none of them shared and two 5.25" and two 3.5" bays. However, the expanded number of bays does mean that the RAM is trapped under the hard disk, which hangs in a drop-down bay.

The Turtle Beach sound card was a nice surprise. It comes with a good software bundle, including manuscript, sequencer and mixer and was quite highly regarded in our last soundcard group test. The wavetable sound on it is second to none, but cannot at present be expanded. The sound was good and round when played through the excellent Typhoon 120W speakers.

The manuals were well written and easy to follow, including most things you would want to know from beginners to advanced users. There is also a manual for the motherboard.

The excellent all round performance results were the icing on the cake making this a very good machine.

**Monitor**

The Goldstar monitor is quite pleasant to use, with knobs rather than buttons to change the brightness and contrast. However, there was some distortion of the colours and the screen pulls a little towards the edges.

**Details**

**Carrera Panther P100AM**

**Price** £1,789  
**Contact** 0171 830 0486  
**Fax** 0171 830 0286  
**Software Bundle** Bundle Windows 95, Lotus Home Executive, CD Bundle, MS Encarta, PC Check  
**Hardware Bundle** ADI speakers  
**Warranty Terms** Typhoon 120W speakers  
**Technical Support** Free

telephone and fax support  
**Good Points** Fast performance, good sound card  
**Bad Points** RAM trapped under hard disk  
**Conclusion** Good all round

Scores	
Bundle	5
Build Quality	7
Warranty	5
Value	10

**Dan Ultimate PC 100MHz**

Come the summer, Intel fully intends the P100 to be the entry-level chip and many of the machines in this test have been specced accordingly. It was therefore encouraging to see the Dan come up with two upmarket components.



Firstly it was the only one to have a 17" monitor. We only asked for a 15", but to the mind of everyone in the office a 17" is much easier to work with, especially if you are going to be sitting in front of it for long hours. The Aztech six-speed CD drive, the Matrox Millenium graphics card, the Creative Labs Awe 32 sound card and last but not least, the 512Kb of cache all make this a well specced machine.

The Asus motherboard is something of a hybrid. So as well as a CELP socket for the cache, there is also the old type of cache connectors. So if current cache sources were to dry up, you could still add cache to your machine. Dan say they chose this board over the Intel as they consider it an all-round better board. It is reliable and it offers the options Dan needs. The board of course features the PCI bus, Triton chipset and Socket 7, plus four PCI slots, one of which is extended and three ISA slots. The RAM was within easy reach.

Other plus points include a 14.4 modem, powerful speakers, four expansion bays and a useful sticker on the back telling you the DMA and IRQ addresses of all the devices in the system.

**Monitor**

The 17" version of the Iiyama Vision Master is excellent. It is almost completely flicker-free and is sharply defined, although it does suffer a little from some slight misalignment of horizontal lines.

**Details**

**Dan Ultimate PC 100MHz**

**Price** £1,938  
**Contact** 0181 830 1100  
**Fax** 0181 830 1122  
**Software Bundle** Windows 95, Works 95, Lotus Organizer  
**Hardware Bundle** Hi-fi speakers  
**Warranty Terms** 1 year back to base. Options from Coracplan  
**Technical Support** Free telephone, no fax support  
**Good Points** Well specced,

good speakers  
**Bad Points** 14.4 kbps modem  
**Conclusion** Seems expensive at first glance, but is reasonable considering monitor and CD-ROM drive

Scores	
Bundle	8
Build Quality	7
Warranty	4
Value	7

**Dell Dimension P100t**

Dell are one of the few genuine OEM manufacturers in operation today. They make their own motherboards and many of their own components. Dell have opted to put many of the usual peripherals straight on the motherboard.



The video was taken care of via an S3 chip on the motherboard with a riser card for the connections. Dell have not, however, opted to put the sound on the motherboard, as have Intel with their Endeavour boards, but rather to use a Creative Labs Vibra 16 card. Also on the motherboard are four PCI and three ISA slots, one shared. The RAM is easy to get to. Overall, however, the makeup was quite messy with cables littering the internal space.

It was a surprise that the Dell did not perform better. They normally put up a reasonable, if not outstanding, test result, but this time they were well down on all the tests we rang. This we put mainly down to the lack of cache. Although there was a CELP socket on the motherboard, Dell had not fitted any secondary cache. This was not a typical Dell bundle. Normally with 16Mb RAM you get 256Kb cache, 2Mb of VRAM on the graphics card and Office Professional. This brings the price up to £1549. Dell also now include six-speed CD-ROMs as standard, rather than the quad-speed we saw.

The manuals were nothing if not thorough. There were three updates to the double pack of manuals which were all quite technical, but there are also two booklets of frequently asked questions which are of more use to the beginner.

**Monitor**

The monitor was good, with very little distortion and being quite sharp. It pulled a tiny bit to the left, but otherwise was free from faults. The screen was a good shade of black.

**Details**

**Dell Dimension P100t**

**Price** £1,459  
**Contact** 01344 720000  
**Fax** 01344 723699  
**Software Bundle** Win95, Office 95  
**Hardware Bundle** Altec Lansing ACS5 speakers  
**Warranty Terms** 1 year back to base and options  
**Technical Support** Free telephone and fax support  
**Good Points** Good monitor,

good manuals  
**Bad Points** Slow performance, perhaps due to lack of cache  
**Conclusion** Disappointing overall, but with a better hardware bundle could be much better value

Scores	
Bundle	3
Build Quality	6
Warranty	7
Value	10

**Digital Celebris GL 5100**



The most striking fact about the Digital is the way it manages to cram so much into such a tiny case. The answer is that everything is on Digital's own motherboard, with all



connections handled via a thin line of ports on the back on the case. The quality of the installed components is impressive, as is the way the whole machine is built. The video is controlled via a Matrox chip, the sound with a 16-bit ESS chip and the network capabilities are also on the board. You have a choice of either twisted pair or thick wire connections and the thick wire can be converted to thin wire via an attached unite interface connector.

There is only one PCI and one ISA slot, and one shared slot, on a riser card. Any improvements you want to make on the installed components will have to come here. If you do not like riser cards this is something of a disadvantage, but there is plenty of room to fit full-length cards into a very small space.

The bays and power supply are on a tip-up section, so the parts of the motherboard tucked under the bays can be easily reached, including the RAM. The swing-out mechanism also makes it easy to get at the bays. The Maxtor hard disk, for example, is at the bottom of the bays, but looks relatively easy to replace.

The accompanying documentation was very well written, with some excellent numbered diagrams showing how to set up. The performance of this machine was very good, showing its configuration to be equal to its build quality.

**Monitor**

Although the picture was fairly sharp, the screen was very rounded and barrelling was apparent. There was also a slight flicker which made it less than ideal.

**Details**

**Digital Celebris GL 5100**

**Price** £2,640  
**Contact** 0345 227228  
**Fax** 01789 200290  
**Software Bundle** Windows 95 or Windows 3.11  
**Hardware Bundle** None  
**Warranty Terms** 3 year limited warranty  
**Technical Support** Free telephone and fax support  
**Good Points** Very well built

**Bad Points** Expensive  
**Conclusion** Highly recommended

Scores	
Bundle	1
Build Quality	9
Warranty	4
Value	8

**Gateway 2000 P5-100**

This was one of the few desktops in the test and is obviously intended as an entry-level machine. As a desktop, expansion space is limited to two 5.25" bays under the CD-ROM drive. Inside, the Intel motherboard is rather small, which has certain drawbacks. The



full-length Ensoniq sound card took one of the ISA slots, but there was no room for a second full-length card here, as they would be blocked by the batteries or the processor (under a jazzy electric blue heatsink). The STB (Simply The Best) video card is unfortunately not the best one around and this showed on the poor Corel and Doom2 scores.

The RAM has been fitted in 4Mb blocks, taking up all four SIMMs sockets, which will mean having to junk SIMMs as and when you want to upgrade. The performance of the Gateway was also a little sluggish, perhaps due to lack of cache. Gateway does not consider the home user would benefit enough from cache to make it worth putting it in an entry level system. They are probably right if all you want to do is play games, but for office and graphics applications the situation is a little different.

One thing we found quite annoying was the display control screen which pops up whenever you reboot. The use of this is something of a mystery, as it does the same thing as the Windows 95 control panel and is no easier to operate. The manuals were all quite basic, apart from the 29 pages on CMOS settings. The backup disks were comprehensive and all given the corporate treatment, coming in Fresian cow covers.

**Monitor**

The Gateway Vivitron monitors are actually rebadged Sonys and the quality of the choice shines through. They are stable and flicker-free and the colour is exceptionally good for a bundled deal.

**Details**

**Gateway 2000 P5-100**

**Price** £1,699  
**Contact** 0800 973120  
**Fax** 00353 1 848 2022  
**Software Bundle** Windows 95, Office 95  
**Hardware Bundle** Altec Lansing ACS31 speakers  
**Warranty Terms** 1 year on-site, 2 years return to base. Options: 2nd and 3rd year on-site  
**Technical Support** Free

telephone and fax support  
**Good Points** Very good monitor  
**Bad Points** Very slow and some below average components  
**Conclusion** Not up to Gateway's usual standard

Scores	
Bundle	3
Build Quality	5
Warranty	8
Value	5

**Mesh Elite Pro 100**

Mesh make themselves memorable through their suspect adverts. Remember the Christmas one with a scantily clad female Santa Claus bending over a sack containing a Mesh PC, or the one of a Marilyn Monroe lookalike with her skirt billowing up. Sexist? Surely not.



The case looks at first glance as if it has built-in speakers. In fact there is simply a bit of mesh covering (geddit?). The CD-ROM drive did not seem to fit properly and was a different colour, but the case does allow for easy upgrading, with the three free bays easy to get to. The board is by PCI, and is fitted with 256Kb of pipeline-burst cache on board. It has Socket 7 and a VRM slot with nothing in it. There are four ISA slots and three PCI. None of them are shared, but one of the PCI slots is pointlessly blocked by the serial and parallel ports, when there are perfectly good positions for them away from the slots.

The software bundle was quite extensive, including Works, Accent Express and a promise of Lotus SmartSuite to arrive in a few days. Nothing was loaded except Windows 95. However, one rather vital thing they did forget to put in the box was the keyboard.

The performance was good. The Doom score was the fastest we had, perhaps down to the graphics card/hard disk combination of a Diamond Stealth 64 Video VRAM and Quantum Fireball which proved so fast in the last group test of P120s.

**Monitor**

The ADI monitor was quite good, although it suffered very slightly from all the problems of distortion, flicker and indistinct colours. However, overall it is still acceptable.

**Details**

**Mesh Elite Pro 100**

**Price** £1,745  
**Contact** 0181 452 1111  
**Fax** 0181 208 4493  
**Software Bundle** Windows 95, SmartSuite 3.1 on CD, Accent Express, Works 4, MS Money, Encarta 96 US, others including Doom  
**Hardware Bundle** Mesh OEM speakers 80W per channel  
**Warranty Terms** 1 year on-site. Options: upgradeable to 2 years or 3 years.  
**Technical Support** Free telephone and fax support. Will

respond to any call or fax within two hours. If a hardware fault is diagnosed, an appointment with an engineer is agreed within two hours.

**Good Points** Very good performance all round  
**Bad Points** Sloppy build in some areas  
**Conclusion** Good value

Scores	
Bundle	9
Build Quality	7
Warranty	7
Value	10

**Mint Conqueror P100**

We have not seen a Mint machine since the end of 1994. The company has been in operation for 10 years and up to now has concentrated mainly on the education and commercial markets. The machine itself



was a very pleasant surprise. It was extremely fast on the office applications tests and only slightly slower on the graphics tests — a good all-round performer. The case is attractive, and the build quality of the machine itself is very good.

The US SuperMicros motherboard is considered by many to be much better than many of the Far East boards. It has a good reputation for being reliable with a very low failure rate, as well as being quick. There are four PCI and four ISA slots and the RAM is clear of bays. There is 256Kb cache in a CELP socket for easy upgrading. Bays are not thin on the ground. The hard disk is actually under the power supply in the mini-tower case, which leaves room for one 3.5in and two 5.25in free external bays and two free internal 3.5in bays.

The peripherals chosen are also extremely good. The Matrox Millenium graphics card and the Creative Labs AWE 32 are both regarded as among the best of their kind. The Yamaha speakers complete the deal to give very good sound output. Disappointingly, the manuals are quite skimpy. There is a brief explanation of how to set it up, but little otherwise. There is a manual included for the motherboard. Plenty of software, including lots of games, made up for this, however.

**Monitor**

This Samsung monitor is not immensely attractive on the outside, but makes up for this with its Star Trek control panel which glides down from the underside of the monitor. The colours were good, but there was some distortion.

**Details**

**Mint Conqueror P100**

**Price** £1,794  
**Contact** 0181 965 5151  
**Fax** 0181 965 3243  
**Software Bundle** Windows 95, MS Works, MS Dangerous Creatures, Golf, Encarta 95  
**Hardware Bundle** Yamaha speakers, Microphone/headset  
**Warranty Terms** 1 year back to base, 1 year on-site £35  
**Technical Support** Free

telephone and fax support  
**Good Points** Good build quality and performance  
**Bad Points** Skimpy manuals  
**Conclusion** Excellent all round

Scores	
Bundle	4
Build Quality	8
Warranty	3
Value	6

**Oasis Lightning P54/100**

Oasis are a very small company, operating since 1991. In the past, they have specialised in high-end systems for large corporations and government. The Oasis had, to my eyes, one of the ugliest cases in the test. It has a door on the front concealing the drive bays, with a large black plastic stripe as decoration. Inside the case there was one internal and one external 5.25 bay, but both were under the CD and looked hard to get at.



Despite this there were some extremely good peripherals included. The VideoLogic GraphixStar 700 is regarded as one of the best cards around. This was connected to one of the better, if cheaper, video capture cards — the VideoLogic Captivator. The machine came with a Miro soundcard fitted, but the sound produced was very broken up. Oasis can also supply you with the excellent Turtle Beach cards. There was also a Miro modem. Unlike many of the bundled modems, this one was a V34 28.8 fax modem, so you should get good transfer rates from it.

The motherboard is a small TMC model, which none the less allows enough room for all the components to be within reach. The RAM was clear of immovable obstructions, but was under reams of cabling.

Software bundled with the machine included TopLevel Complete Works (another integrated office package) and a Miro phone dialling link to go with the modem. One thing worth a mention is the ergonomic keyboard. While not everyone will like using a bent keyboard, I found it remarkably easy to adapt to and pleasant to use.

**Monitor**

This monitor was one of the better ones for running with no distortion and the colours were reasonable. However the picture was not entirely square at the top and bottom.

**Details**

**Oasis Lightning P54/100**

**Price** £2,139  
**Contact** 01707 329801  
**Fax** 01707 336468  
**Software Bundle** Windows 95, TopLevel Complete Works v2  
**Hardware Bundle** Yamaha YST10 10W speakers  
**Warranty Terms** 1 year on-site. Options: 2nd and 3rd year on-site  
**Technical Support** Free telephone and fax support

**Good Points** Good graphics card, 28.8 modem  
**Bad Points** Ugly case, problem with the sound card  
**Conclusion** A reasonable all-round performer

Scores	
Bundle	2
Build Quality	6
Warranty	6
Value	7

**Panrix Micron P100**

**P**anrix consistently turn out very fast machines and this one is no exception. It was one of the top performers on all three of the tests, proving itself a good all-rounder.

There are quite a few similarities with the Adams. Both have similar cases, the same

very good keyboard and the same motherboard. All these components are of a sensible design. The motherboard is from Micronics. The RAM is located by the processor and so within easy reach. There are three PCI only, three ISA only and one shared slot.

In these slots nestle a Diamond Stealth 64 Video VRAM graphics card and a Creative Labs Vibra 16. The former was considered the fastest card on the market before the advent of the Matrox MGA Millenium and its pioneer WRAM technology. However, the Diamond still gives stonking performance, as demonstrated in the Doom test.

The desktop case limits expansion room, with only one free 5.25" and one free 3.5" bay. The hard disk is over the power supply. The hard disk was relatively clutter-free when it arrived with us. Only the basic operating system, drivers and Works for Windows 95 were loaded. These also came on disk and CD, although unlike some manufacturers, there was no start-up disk for emergencies.

The manuals were very good. They covered everything from the basics right up to some quite complicated system set-ups. They tend to assume you are thick as a plank, but that is what you need if you are going to delve around in your machine. There is also a useful card showing you how to connect your set up your PC when you first get it out the box.

**Monitor**

The Iiyama monitor that we saw with this machine has a fault. It had a bright line down one side and was interlocking furiously. However, Iiyama VisionMasters like this one are usually quite good monitors.



**Evesham Vale PlatTriton P100**

**E**vesham have opted to use the Intel Endeavour board in this machine. This is Intel's latest all-singing all-dancing motherboard and has the capacity to handle those functions usually taken care of by cards. So there is a space for an S3 Trio 64 PCI video

controller, which Evesham have forgone, and a Vibra 16 chip to handle sound. Evesham argue that most buyers want a good graphics card. By not including the S3 chip the customer has greater flexibility in what they choose. In this case the graphics card is the Matrox Millenium, regarded as the best graphics card around. Evesham has loaded it with a whopping 4Mb of WRAM.

The Vibra 16 chip can be disabled to add a separate sound card, although this may be an unsatisfactory option. All chips on a motherboard are disabled via the BIOS, which can impede performance of any new peripherals you use instead. However, later this year Yamaha are planning a wavetable extension on an ISA card, so you should be able to ginger up the performance of the Vibra chip using this card.

Also included on the board is a CELP socket, here with 256Kb of cache. The RAM is also clear of obstructions. On the processor, Evesham have put a very shallow heatsink, allowing plenty of room for full-length cards without having them melt down between the prong of the heatsink.

One new feature on this machine comes from the power supply and before you fall asleep, let me just tell you it is an uninterruptable power supply which prevents data loss from split-second power interruptions.

**Monitor**

The monitor, from Smile, is not the best we saw. The brightness and contrast controls give limited variability and the colours were not that clear.



**Details**

**Panrix Micron P100**

**Price** £1,765  
**Contact** 0113 244 4958  
**Fax** 0113 244 4962  
**Software Bundle** Windows 95, MS Works 95  
**Hardware Bundle** Yamaha M10 speakers  
**Warranty Terms** 2 years on-site  
**Technical Support** Free telephone and fax support  
**Good Points** Fastest all round

performer  
**Bad Points** Limited software bundle, faulty monitor  
**Conclusion** A good machine let down only by its limited software bundle

Scores	
Bundle	2
Build Quality	8
Warranty	6
Value	8

**Details**

**Evesham Vale PlatTriton P100**

**Price** £1,719  
**Contact** 01386 765500  
**Fax** 01386 765354  
**Software Bundle** Windows 95, Media 96  
**Hardware Bundle** Zyfiz speakers  
**Warranty Terms** 1 year on-site, and options  
**Technical Support** Tel/fax  
**Good Points** Well built

**Bad Points** On-board sound may not suit everyone  
**Conclusion** A very reasonable machine

Scores	
Bundle	4
Build Quality	8
Warranty	6
Value	8



**Viglen Genie P5/100**

Viglen is known for producing well-built machines that are invariably good performers and this machine is no different. Viglen has again gone for the Intel Endeavour motherboard, as in all the machines we have seen from them in the recent future — the P150 and the P166. Like Vale, they have opted to leave off the on-board video and have included a Matrox Millennium card. Once again, sound is dealt with via the Vibra 16S chip on the board and connections are put on a riser card. The board comes complete with a CELP socket, so upgrading the cache to 512Kb will be painless. The overall impression is of a very clean built machine. The only downer is that the EDO RAM is just under the hard drive and so slightly inaccessible.



Multimedia options on this machine are entry level but quite adequate. The quad-speed CD-ROM drive is by Mitsumi, a very common choice among PC manufacturers, and the soundcard is that perennial favourite, Creative Labs SoundBlaster 16. Played through the standard Viglen speakers the sound is a little thin, but acceptable for those who are not looking to replace their stereo with their PC.

The documentation and back-up disks that come with the bundle are comprehensive, covering almost everything you would want to know. The setting up card when you open the box is very useful, as is the Viglen boot disk for when you inadvertently trash your system. The Viglen performed well on all tests, showing itself to be a good all round machine.

**Monitor**

The monitor was acceptable, but not outstanding. It is quite attractive to look at, but faded a little to the edges and was a little blotchy. However, the colour separation was good.

**Details**

**Viglen Genie PCI P5/100**

**Price** £1,787  
**Contact** 0181 758 7000  
**Fax** 0181 758 7080

**Software Bundle** Windows 95, MS Works 95, Windows 95 Multimedia CD-ROM bundle

**Hardware Bundle** Standard Viglen speakers, Hands free microphone

**Warranty Terms** 1 year collect and return, and options

**Technical Support** Free telephone, no fax support  
**Good Points** Strong performer  
**Bad Points** Speakers a little tinny  
**Conclusion** A good bet

Scores	
Bundle	4
Build Quality	7
Warranty	4
Value	7

**Vobis HighScreen Skycase P100M**

Vobis is the biggest seller in Germany, operating in very much the same way as Escom in that they are both manufacturer and retailer, but over here they are little known. The company has been around for over 20 years, but has only operated in the UK for about 18 months.



The case on this machine was not desperately attractive to my eye. Its novel design makes it look more like a mini-tower on its side than a desktop. However, the shape is determined by the location of the spare bays. There is one expansion bay on the side of the others, so you can easily slip in an extra device without disrupting everything too badly.

Some of the components are a little out of the ordinary. The Trident graphics card usually comes with 1Mb VRAM, but we asked for 2Mb. Vobis admit it is not the most fantastic card, but it is adequate. The sound card is by AudioStar. The AudioStar card we looked at in the April soundcard group test had a wavetable daughterboard, unlike this one.

The Intel board allows for a cache upgrade in a CELP socket. However, Vobis has not filled this with anything, perhaps partly explaining its slower performance. Vobis say that EDO RAM with no cache is faster than FPM RAM and standard cache, but they have plans to introduce pipeline-burst cache in the next few months. The RAM is under the drive bays, but there is plenty of room for full-length cards.

The speakers are better than one might expect, if a little muffled on the extremes of the high and low tones.

**Monitor**

The Vobis monitor had a few problems, namely that the picture would go to the edges of the screen, leaving about an inch on either side. Despite this the screen itself was fairly flat and a good dark shade of black.

**Details**

**Vobis HighScreen Skycase P100M**

**Price** £1,499 inc VAT  
**Contact** 0181 207 7000  
**Fax** 0181 953 8209

**Software Bundle** Windows 95, Word 7, Lotus Organiser  
**Hardware Bundle** Screenbeat Pro50 speakers

**Warranty Terms** 1 year on-site. Options: up to 5 years warranty  
**Technical Support** Free telephone and fax support

**Good Points** Easy to upgrade  
**Bad Points** No cache, not a very pretty case  
**Conclusion** Not the fastest machine, but it is cheap

Scores	
Bundle	2
Build Quality	8
Warranty	8
Value	6

## Video Cards

Video or graphics circuitry, usually fitted to a card but sometimes found on the motherboard itself, is responsible for creating the picture your monitor displays.

This picture is stored in dedicated video memory. The higher the resolution or greater number of colours, the more memory you'll need, but since it is a shared resource, reducing one will allow an increase of the other.

- One megabyte of video memory is capable of providing a resolution of 1,024 x 768 pixels in 8-bit colour; offering 256 colours.
- Alternatively, dropping to an 800 x 600 pixel resolution will free up enough video memory for 16-bit colour; offering 65,536 colours.
- All the PCs in this group test have at least 2Mb video memory capable of 1,024 x 768 pixels in 16-bit colour; 1,280 x 1,024 in 8-bit; or 800 x 600 in 24-bit — just under 16.8 million colours.

Photographic images or coloured blends look best in 16- or 24-bit. DTP and CAD applications work best at high resolutions where fine detail can be seen.

The type of the video memory highly affects performance: DRAM (Dynamic Random Access Memory) is slowest, but cheapest; next up is the more expensive, but faster VRAM (Video Random Access Memory); fastest and most costly of all is WRAM (Windows Random Access Memory), currently only available on Matrox cards.

It's no good having a video card capable of ultra-high resolutions at flicker-free refresh rates if your monitor cannot lock on to the signal frequency. Try to get the most out of your monitor, but don't drive it too hard. All monitors in this group test should be able to display 1,024 x 768 pixels in a flicker free, non-interlaced mode.

Gordon Laing

## Hard disk

The hard disk is the area where all the information on your PC is stored, including the system files that the PC needs in order to operate, your applications and, of course, the data you input. This is permanent memory. When you close down the machine, this data is stored, ready to be accessed the next time you power up.

The larger the disk the better the performance you can get from it. Hard disks are made of a series of magnetic platters which spin at around 5,400rpm. Heads read the data from the platters — the larger the hard disk, the more platters you have and the more heads to access the data, thus speeding-up transfer rates.

In addition, as applications grow ever-larger the need for a big hard disk becomes more pressing. If your hard disk becomes overcrowded it takes longer to search and becomes increasingly fragmented, so will not operate at its optimum rate. By buying a large disk now, you are prolonging the life of your machine by ensuring it will continue to operate well with future applications.

Adele Dyer

## RAM

RAM is an impermanent data storage area and is the main memory area accessed by the hard disk. It acts, if you like, as a staging post between the hard disk and the processor. The more data contained in the RAM, the faster the processor can access that data and thus the faster your machine will run.

Windows 95 and many current applications are extremely memory hungry and gobble up RAM. To run Windows 95 successfully you will need an absolute minimum of 8Mb, preferably 12Mb, but to do justice to a processor as fast as a P100, you should really run with 16Mb.

EDO (Extended Data Out) is now pretty much standard. It clearly performs better than standard DRAM or FPM-RAM and as EDO-RAM prices fall, so you can expect to see all machines with EDO-RAM in six months' time.

Adele Dyer

## Sound Card Sense

There are many ways of reducing the cost of a PC. In such a price-sensitive market the sound card is often the first budgetary victim so it's worth spending some time looking at the capabilities of the sound card included in your overall deal.

Most sound cards, today, use Wavetable technology which gives you sampled sounds of real instruments, instead of the synthesised sounds in use a few years ago. DSP (Digital Signal Processing) technology is also becoming more widespread on sound cards and this allows reverb, delay, and other digital effects to be applied to instruments or samples.

- Check the size of the samples in ROM. A bog-standard card should have at least 1Mb but more sophisticated cards can have as much as 4Mb. Some cards, like the AWE 32, support the use of additional sample memory which allows you to add up to 28Mb of your own sounds, thus improving the variety and quality of the overall selection. Even if you're not deadly serious about the sound

capability of your machine, it's worth checking to see whether the card has a Wavetable daughterboard connector, as this can dramatically upgrade your sound card if needed at a later date.

- List the compatible sound modes supported by the card. Most sound cards in new PCs these days should support General Midi, SoundBlaster, and Adlib and should be capable of recording and playing back 16-bit stereo, with sampling rates up to 44.1KHz.

• The sound card you get with your PC should be happily pre-installed and ready to go, but it's worth checking that it conforms to Plug and Play standards.

You may change the components in your system, or even move your sound card to another machine. If so, Plug and Play compatibility should make your life much easier. Plug and Play sound cards have been slow to appear but there are some around including the new AWE 32 and Soundblaster 32 from Creative Labs, and Orchid NuSound (all reviewed in last month's Sound Cards group test).

Eleanor Turton-Hill

## Cache

Cache is where the processor stores data which it will frequently need, so as to access it more quickly. It has the advantage of being much faster than RAM, especially as it cannot hold many bytes, and so search times are significantly reduced.

The benefits of cache are much debated: many PC manufacturers are not currently bundling cache as standard, preferring instead to rely on EDO-RAM for increased performance. When playing games there is no advantage to having cache, as games use only main memory. However, when running office packages there can be performance improvements of up to 20 percent.

Adele Dyer

## CD-ROM drives

A CD stores digital information which could include audio, photographs, video, or plain computer data such as files or applications. Most CDs not containing pure audio or video are termed CD-ROMs (Read Only Memory) and you'll need a CD-ROM drive to read them. About the only things which differ on today's CD-ROM drives are their speeds and means of connection.

The most common connection is IDE (Integrated Drive Electronics) or Enhanced IDE (EIDE). It is possible to connect an IDE CD-ROM drive to most existing IDE hard disk controllers but older PCs may need a newer, EIDE, controller. (IDE controllers are found on many sound cards, too).

All PCs in this group test featured EIDE, with the hard disk connected to the first channel, and the CD-ROM drive to the second. Using the separate channels of EIDE prevents the CD-ROM drive from slowing the hard disk and is highly recommended.

The first CD-ROM drives spun the disc at the same speed as an audio CD and were known as single-speed, delivering a sustained data transfer rate of 150Kb/sec. Later, double-speed drives spun twice as fast, doubling the data transfer rate to 300Kb/sec, and now, quad-speeds are twice as fast again, raising the rate of data transfer to 600Kb/sec.

Quads are the current standard but six-speeds (900Kb/sec) are becoming increasingly common. Additionally, manufacturers are beginning to release eight-speed drives, offering up to 1200Kb/sec. (All figures are theoretical maximums).

As important as speed is compatibility. All drives will play yellow book CD-ROM and red book audio discs, but only those labelled "white book compatible" will play Video CDs.

Gordon Laing

PCW Photography by David Whyte

**Zenith Z-Station VP100 model 1200**

Zenith are owned by Packard Bell, bought from Bull very recently. They are mainly known for their business and corporate market and this machine is obviously designed with this client in mind.



The case is very flat, but quite wide. The proprietary motherboard at the bottom is fitted out with a Cirrus Logic chip, so there is no need for a separate graphics card. Sound is through a Creative Labs SoundBlaster Pro card.

The slots go on either side of a riser card. On one side are two ISA and one PCI slots, where there is room for only one full length card. This would have to be in the top slot and would have to be removed to get at any parts below it. On the other side of the riser card are one PCI and one ISA slot. Any card you put in the lower PCI slot would have to be 8-bit, card as it sits behind the hard disk and floppy disk, where room is short.

Unlike in the Digital the drive bays are fixed in place and so getting in to replace them would be difficult. The RAM is placed in four 4Mb SIMMs, so you would need to dump at least two SIMMs to upgrade.

The performance was marred by not having EDO RAM and pipeline burst cache, but only fast page mode RAM and (genuine) write-back cache. However by the time this review appears, EDO will be available as an option on a new model of the Z-Station VP. While upgrading this machine will be fiddly, the manual does offer plenty of help with lots of good diagrams.

**Monitor**

The monitor, made by Zenith themselves, is good and sharp with very little distortion, although the controls were uncomfortably placed right at the bottom of the monitor.

**Details**

**Zenith Data Systems Z-Station VP 100 model 1200**

**Price** £1,749  
**Contact** 01442 211811  
**Fax** 01442 884080

**Software Bundle** Windows 95, Norton navigator Anti-virus  
**Hardware Bundle** Labtec LCS600 speakers

**Warranty Terms** 1st year on-site. Options: 2nd and 3rd year return to base, optional 2nd and 3rd year on-site

**Technical Support** Free telephone and fax support  
**Good Points** Good monitor  
**Bad Points** Jumbled build  
**Conclusion** Slow performance and generally disappointing

Scores	
Bundle	■ ■ ————— 2
Build Quality	■ ■ ■ ■ ■ ■ ——— 6
Warranty	■ ■ ■ ■ ■ ■ ——— 7
Value	■ ■ ■ ■ ■ ——— 5



**How we did the tests**

Different types of applications measure different aspects of a PC's performance so it's important to use more than one benchmark to gain an accurate and rounded picture of each machine. Here, we've put each PC through three separate performance tests.

1. The first test assesses performance in three key areas: word processing, spread-sheets and databases. It installs a selection of popular office applications including Word, Excel, WordPerfect and FoxPro. A collection of macros are then run in each application and every process is timed and recorded. When a copy operation in a spreadsheet is about to take place, the macro containing the {COPY} instruction will first trigger the stopwatch. When the copy has completed, the time taken is written into a database file. Every test is run three times, to provide a consistency check and the three scores recorded are averaged out to produce one overall figure.
2. The second test, run in Corel Draw, records the time taken to open a series of large graphics files. This is a simple but revealing test which measures how each machine performs when using memory-intensive applications in Windows 95. The wide spread of results produced from the 16 machines included here shows the importance of this test.
3. Thirdly, a low-level benchmark is run in DOS using the frame-rate performance test from Doom II. It tests the graphics card and hard disk, and it is noticeable from the list of results that certain combinations of components produce exceptionally high scores. The three highest results in this test came from machines with both a Quantum Fireball hard disk and a Diamond Stealth 64 graphics card.

- A final test runs the program pccheck.exe, which is an analysis tool rather than a performance test. This interrogates the system and verifies the existence of all claimed components giving the exact speed of the processor and size of the cache. Any deficiencies reported by this program help the tester to explain freak results produced by any machine.
- A separate monitor test, DisplayMate for Windows, tests each monitor for distortion, sharpness and horizontal resolution of images, colours and grey scale clarity and consistency of colour across the screen.

**Eleanor Turton-Hill**



## Monitors

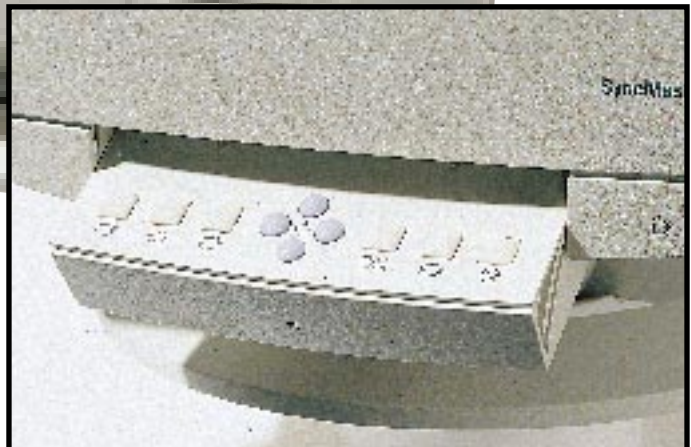


**R**egardless of your computer application, you'll be looking at your monitor for long periods so it's important to have a good one. Some people claim not to see monitor flicker, but your brain will, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors. Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes.

The term "resolution" refers to the number of dots (pixels) horizontally and vertically on-screen. Standard VGA mode runs at 640 x 480 pixels while other, typical, modes include 800 x 600 and 1,024 x 768. The more pixels there are, the more you'll be able to fit on screen but everything will be smaller and may only be suitable on a physically larger screen.

Putting all this into practice, a buyer should go for a monitor capable of running a resolution of 1,024 x 768, non-interlaced, at 70Hz or higher. A 15in monitor is a big improvement on a 14in, not only in terms of size but also because many companies only start supplying the decent models at 15in and upwards.

Typically, you'll have the option to "add £100 for a 15in quality monitor". This, or a more expensive 17in monitor, is certainly the one to go for since most 14in monitors supplied today are



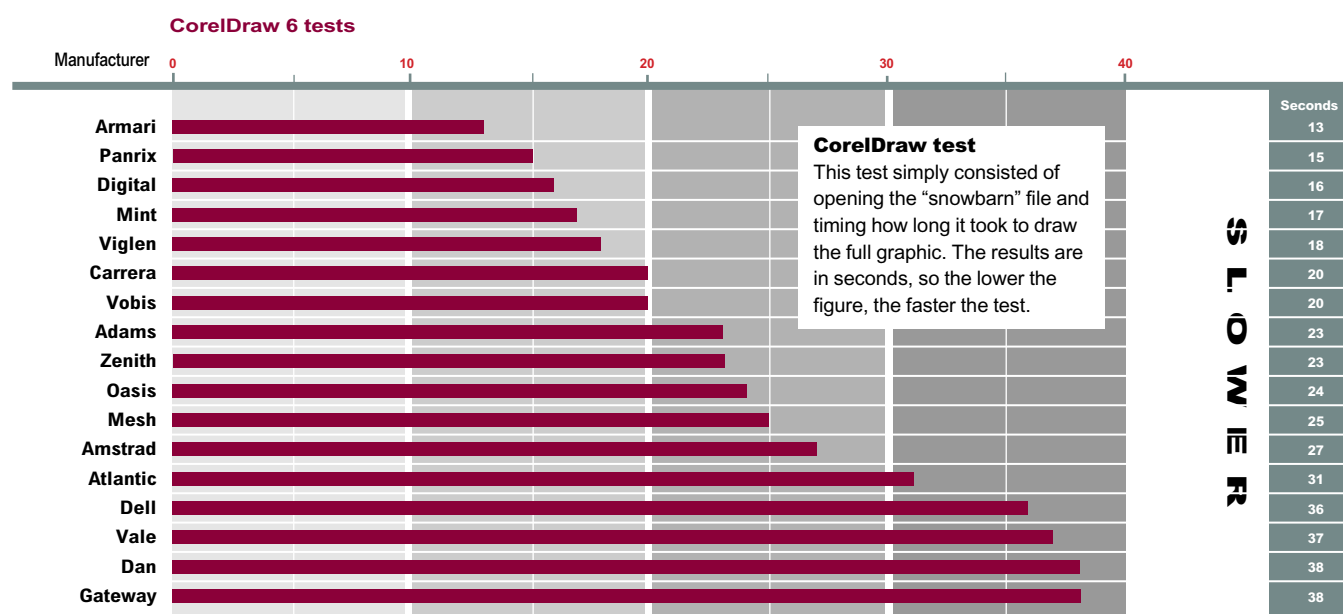
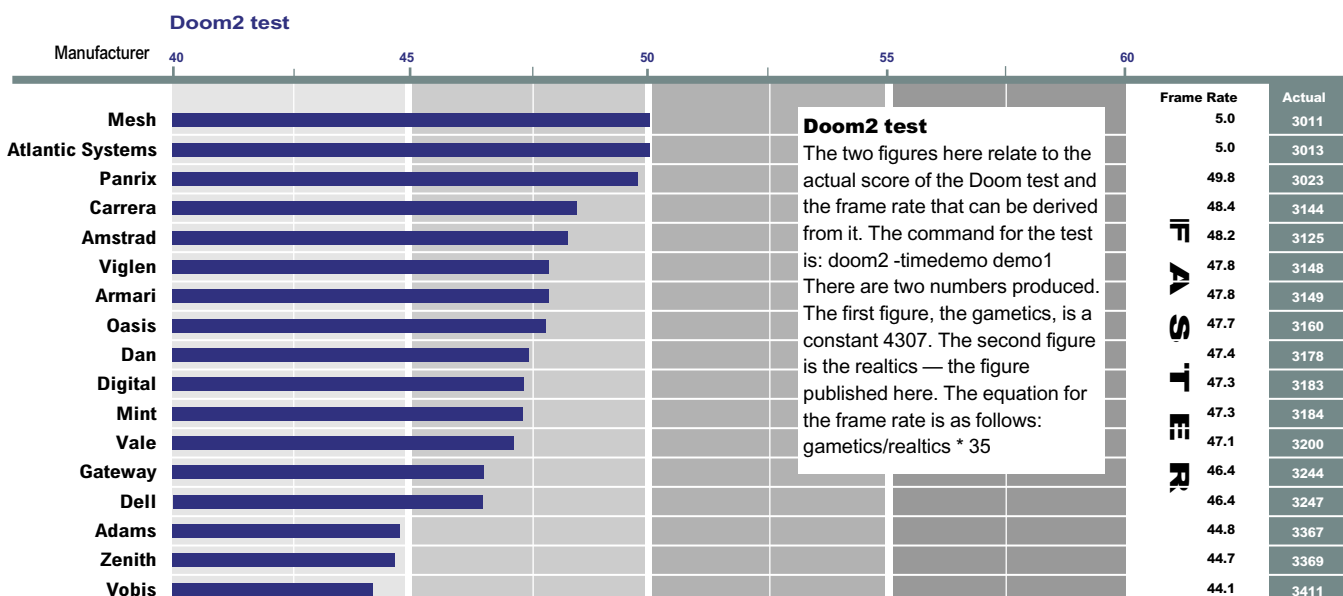
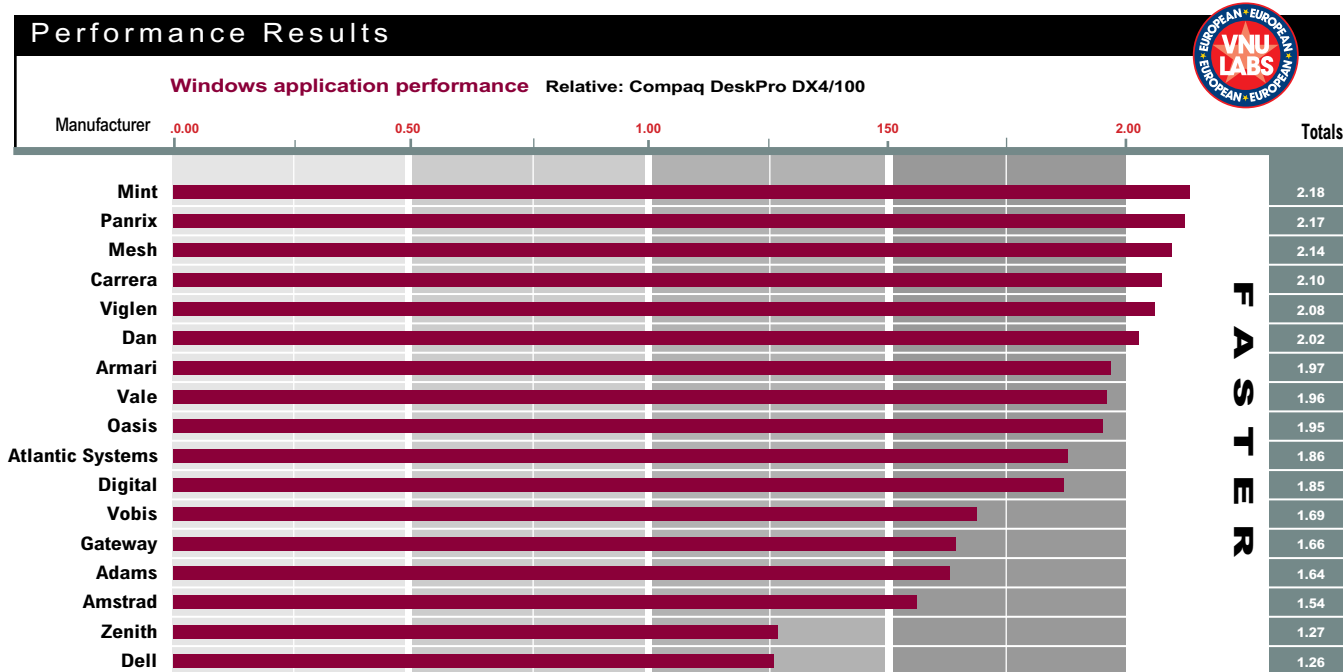
*Typical controls on a monitor. From left to right: position; size; barell and pincushion; controls to adjust the above; colour temperature; recall settings; manual degauss*

unsuitable for serious Windows work.

Be aware that the visible, usable area of most monitors (and TVs for that matter) is in actuality smaller than the model implies; perhaps only 14.5in on a 15in model, or 16in on a 17in version.

**Gordon Laing**





## Editor's Choice



Entry level systems are not what they used to be. In fact, they have improved out of all recognition. Components are becoming increasingly standardised and the prices of all types of memory are falling, so the machines offered today as entry level are not in the same league as those entry level machines we saw, last July, in the DX2/66 roundup. All but one of the machines came with EDO RAM and most had pipeline burst cache. All had quad-speed or even six-speed CD-ROM drives and most had excellent graphics cards.

The first of the Highly Recommended awards goes to Digital. Although its machine was the most expensive in the test and would not suit many people, the innovative approach to design together with its build quality makes it a very good business machine.

The Adams wins the second Highly Recommended award. Although it was not the fastest machine in the tests, it was well-built, with a good warranty and it bundles PerfectOffice. Add to that a six-speed CD-ROM drive and you've got very good value for the excellent price of £1,599; a good £150 less than other systems of this spec.

The Editor's Choice, however, goes to Armari both for a very fast machine and for the inclusion of components which go above and beyond the call of duty. The basic machine is among the cheaper ones in the test, but for a mere

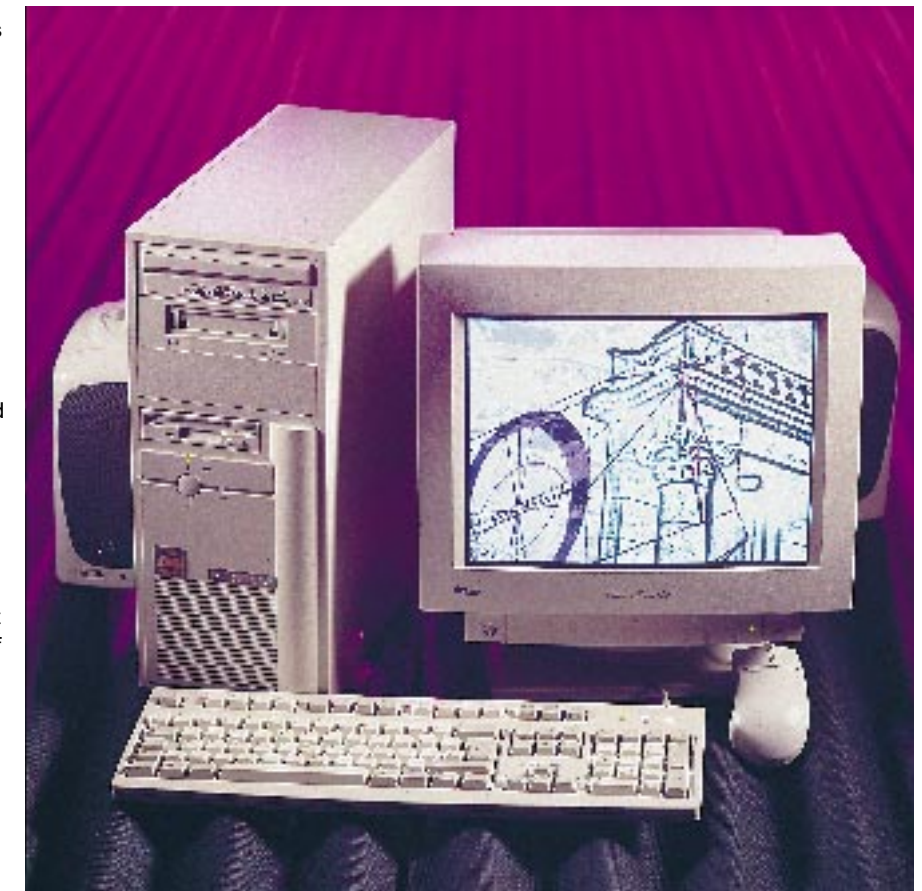
£300 extra you can opt to have both tape backup and a CD changer.

The tape backup is especially useful. With increasingly large hard disks, backup is a time-consuming business if you are using floppies. The tapes can

also be used to store large, little-used, files which clog up your hard disk but are nonetheless vital.

On price, performance and spec the Armari is a clear winner.

Adele Dyer



### Buyer's Guide to buying a PC

When you buy a PC there is more to the deal than simply a machine about which you can boast to your friends in the pub. As with any piece of electronic equipment the warranty is vital, but so is the backup in the form of technical support. In addition, there is the important factor of software which, if not bundled, can be costly to acquire.

The cost of the machine is affected by all the considerations covered here, and there is no one answer. What is important is to find a deal that suits your requirements.



● Warranty options vary wildly. The two main options are either back-to-base or on-site repairs. Which will be right for you depends very much on how you use your PC. Back-to-base usually involves returning the PC yourself, while "collect and return" means the manufacturer arranges the courier and pays the cost of carriage. Back-to-base is fine if you do not mind waiting for your PC and it can work well if your live close enough to the manufacturer to ferry it back and forth yourself.

● A few manufacturers offer lifetime labour guarantees. This sometimes includes the labour costs for upgrading your PC for you — you only have to pay for the upgrade kit. Optional extra years may be worth considering, especially for PC beginners. While if you depend on your PC for your livelihood, it might be worth discussing guaranteed call-out response times with your chosen manufacturer.

● The question of software bundles is a vexed one. Many of the smaller manufacturers will not include anything but the operating system in the price; in many cases because they cannot negotiate the kind of deals wrought by larger companies.

However, buying the large office packages separately can knock out any price advantage you gain when buying a non-bundled machine. Think carefully about what you need. Some of the integrated packages are quite adequate for most people's needs, while multimedia bundles are often regarded as a tad unnecessary by others. Or the incentive of Internet software might be attractive to some although it does tie you down to one service provider.

## PENTIUM 100MHZ TABLE OF FEATURES

	 Adams Accura Premium Workstation+	Amstrad Professional P100	 Armari eXPS-100	Atlantic Systems Atlantic Pro 96	Carrera Carrera Panther P100AM	Dan Dan Ultimate PC 100MHz
Model Name						
Tel	0161 282 8822	0800 338844	0181 810 7441	01792 700002	0171 830 0486	0181 830 1100
Fax	0161 283 1001	01277 209009	0181 810 5783	01792 792888	0171 830 0286	0181 830 1122
Price (excl VAT)	£1599	£1699	£1,899	£1,548	£1,789	£1938
<b>Basics</b>						
Processor	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100
<b>Expansion Bus</b>						
Local bus Architecture	PCI	PCI	PCI	PCI	PCI	PCI
Free PCI only slots	2	3	3	2	3	3
Free ISA only slots	2	2	3	3	3	0
Free shared PCI/ISA slots	1	1	0	0	0	0
Motherboard manufacturer	Micronics	Intel	Supermicro	Intel	SuperMicro	Asus
Chip set	Triton	Triton	Triton	Triton	Triton	Triton
No. of spare 3.5in bays	1 internal	2	1	1	1	2
No. of spare 5.25in bays	1 external	2	1	2	1	2
<b>Hard disk</b>						
Manufacturer	Conner	Seagate	Quantum	Quantum	Quantum	Quantum
Size	1.2Gb	1.05Gb	1Gb	1Gb	1.2Gb	1Gb
Interface	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
Average access time (ms)	10	11	12	10	11	10
<b>RAM and Secondary Cache</b>						
Main RAM	16Mb	16Mb	16Mb	16Mb	16Mb	16Mb
Max RAM	128Mb	128Mb	128Mb	128Mb	128Mb	128Mb
RAM Type	EDO	EDO	EDO	EDO	EDO	EDO
SIMM Type (pins)	72	72	72	72	72	72
Secondary cache	256Kb	256Kb	256Kb	256Kb	512Kb	512Kb
Max secondary cache	512Kb	512Kb	512Kb	512Kb	512Kb	512Kb
Cache type	pipeline burst	pipeline burst	pipeline burst	pipeline burst	pipeline burst	pipeline burst
<b>Multimedia</b>						
CD-ROM Manufacturer	Mitsumi	Sony	NEC	Aztech	Toshiba	Aztech
CD-ROM Model	FX-400	77E	4X4C	ZETA-CDA-668	5302B	ZETA-CDA-668
CD-ROM Speed	4X	4X	4X	6X	4X	6X
Sound Card Manufacturer	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Turtle Beach	Creative Labs
Sound Card Model	Pro16	SoundBlaster 16	AWE 32	SoundBlaster 16	TBS2000 Wave Table	AWE 32 Value
<b>Graphics card</b>						
Manufacturer	Matrox	S3	Matrox	Diamond	Matrox	Matrox
Model	Millenium	S3 868	Millenium	Stealth 64 Video VRAM	Millenium	Millenium
RAM/max RAM	2Mb / 8Mb WRAM	2Mb	2Mb / 8Mb WRAM	2Mb/4Mb	2Mb / 8Mb WRAM	2Mb / 8Mb WRAM
Max non-interlaced resolution	1600x1200x256	1024x768	1600x1200	1024x768x256	1600x1200x256	1600x1200x256
interlaced resolution	at 72Hz		at 85Hz	at 70Hz	at 72Hz	at 72Hz
Monitor manufacturer	ADI	CTX	Iiyama	ADI	Goldstar	Iiyama
Monitor model	4V	1565D	8115	4AV	1505	8617E
Monitor size	15in	15in	15in	15in	15in	17in
Monitor max refresh rate @ 1024x768 (Hz)	72Hz	72Hz	72Hz	72Hz	72Hz	80Hz
<b>Other Information</b>						
Software supplied	Windows 95 Perfect Office std	Windows 95, Lotus SmartSuite, Encarta Links Pro, Descent, Destination Saturn	Windows 95 MS family pack	Windows 95 Lotus SmartSuite 4 CorelDraw 4 Quicken Accounts	Windows 95 Lotus Home Executive CD Bundle, MS Encarta PC Check	Windows 95 Works 95 Lotus Organizer
Speakers	ADI	Yamaha YST-10 14.4bps internal	Jazz Hipster	SoundWave 40	Typhoon 120W	Hi-Fi Dan 14.4 internal
Any added extras		fax modem	HP Colorado T1000			fax modem
Standard Warranty	3 yrs, 1st yr on-site	1 yr on-site	1 year btb	1st yr on-site, 4 yr btb	1 yr parts, 3 yrs labour, btb	1 year back to base
Warranty options	£150 for 2nd yr on-site	1 - 3 £149, 5 £299	1 yr on-site 8 hr response 2 yr extended on-site 3 yr extended on-site	3 year on-site	on-site first yr - £25 on-site 3 yrs - £149	Coracplan
Free tech support line	Yes	No	Yes	Yes	Yes	Yes
Fax support	Yes	No	Yes	Yes	Yes	No

## PENTIUM 100MHZ TABLE OF FEATURES

Model Name	Dell Dell Dimension P100t	Digital Celebris GL 5100	Gateway 2000 Gateway 2000 P5-100	Mesh Mesh Elite Pro 100	Mint Conqueror P100	Oasis Lightning P54 Series
Tel	01344 720000	0345 227228	0800 973120	0181 452 1111	0181 965 5151	01707 329801
Fax	01344 723699	01789 200290	00353 1 848 2022	0181 208 4493	0181 965 3243	01707 336468
Price (excl VAT)	£1,459	£2,320	£1,699	£1,745	£1,794	£2,139
<b>Processor</b>	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100
<b>Expansion Bus</b>						
Local bus Architecture	PCI	PCI	PCI	PCI	PCI	PCI
Free PCI only slots	3	1	3	2	3	2
Free ISA only slots	2	3	2	3	4	0
Free shared PCI/ISA slots	1	1	1	0	0	1
Motherboard manufacturer	Intel	Digital	Intel	PCI	SuperMicro	Intel
Chip set	Triton	Triton	Triton	Triton	Triton	Triton
No. of spare 3.5in bays	0	1	0	2	1	1
No. of spare 5.25in bays	1	2	2	2	2	1
<b>Hard disk</b>						
Manufacturer	Quantum	Maxtor	Western Digital	Quantum	Quantum	Quantum
Size	1 Gb	1.2Gb	1 Gb	1Gb	1.2 Gb	1.28 Gb
Interface	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
Average access time (ms)	12		11	11	11	11
<b>RAM and Secondary Cache</b>						
Main RAM	16Mb	16Mb	16Mb	16Mb	16Mb	16Mb
Max RAM	128Mb	128Mb	128Mb	256Mb	128Mb	128Mb
RAM Type	EDO	EDO	EDO	EDO	EDO	EDO
SIMM Type (pins)	72	72	72	72	72	72
Secondary cache	0Kb	256Kb	0	256Kb	256Kb	512Kb
Max secondary cache	256Kb	512Kb	0	256Kb	512Kb	512Kb
Cache type	pipeline burst	pipeline burst	n/a	pipeline burst	pipeline burst	pipeline burst
<b>Multimedia</b>						
CD-ROM Manufacturer	Mitsumi	Toshiba	Sanyo	Goldstar	Mitsumi	Toshiba
CD-ROM Model	FX-400	XM-530ZTA			FX400	XM5302
CD-ROM Speed	4X	4X	4X	4X	4X	4X
Sound Card Manufacturer	Creative Labs	on motherboard	Ensoniq	Creative Labs	Creative Labs	Miro
Sound Card Model	Vibra 16	ESS 1688	Ensoniq SoundScape	AWE 32 Value	SoundBlaster AWE32	Connect 34
<b>Graphics Card</b>						
Manufacturer	S3	Matrox	STB Systems	Diamond	Matrox	VideoLogic
Model	Trio 64+	Millenium	Powergraph 64 DRAM	Stealth 64 Video VRAM	MGA Millenium	GrafixStar 700
RAM/max RAM	1Mb/2Mb	2Mb / 8Mb WRAM	2Mb/2Mb	2Mb/4Mb	6Mb	2Mb/4 Mb
Max non-interlaced resolution		1600x1200x256 at 72Hz	1280x1024x256 at 60Hz	1024x768x256 at 70Hz	1600x1200x256 at 72Hz	1280x1024x256 at 90 Hz
Monitor manufacturer	Lite-On	Digital	Sony	ADI	Samsung	CTX
Monitor model	01524-LS	PCXBV-SX	Vivtron 1572	MicroScan 4V	GL115	1565GSM
Monitor size	15in	15in	15in	15in	15in	15in
Monitor max refresh rate @ 1024x768 (Hz)	75Hz	100Hz	75Hz	72Hz	75Hz	75Hz
<b>Other Information</b>						
Software supplied	Windows 95 Office 95	Windows 95 or Windows 3.11	Windows 95 Office 95	Windows 95, SmartSuite 3.1 Accent Express, Works 4 MS Money, Encarta '96 US others including Doom	Windows 95 MS Works, MS Golf Dangerous Creatures Encarta 95	Windows 95 TopLevel Complete Works v2
Speakers	Altec Lansing ACS5		Altec Lansing ACS31	Mesh OEM	Yamaha	Yamaha YST10 10W
Any added extras					Microphone/headset	
Standard Warranty	1 yr btb	3 yr limited warranty	1 yr on-site, 2 yrs rtb	1 yr on-site	1 yr btb	1 yr on-site
Warranty options	1 yr on-site, extended to 2, 3, 4 or 5 yrs	3 yrs, first yr on-site	2nd and 3rd yr on-site	Various options	1 year on-site £35	2nd and 3rd yr on-site
Free tech support line	Yes	Yes	Yes	Yes	Yes	No
Fax support	Yes	Yes	Yes	Yes	Yes	Yes

## PENTIUM 100MHZ TABLE OF FEATURES

Model Name	Panrix Micron P100	Vale PlatTriton P100	Viglen Genie PCI P5/100	Vobis HighScreen Skycase P100M	Zenith Z-Station VP 100 model 1200
Tel	0113 244 4958	01386 765500	0181 758 7000	0181 207 7000	01442 211811
Fax	0113 244 4962	01386 765354	0181 758 7080	0181 953 8209	01442 884080
Price (excl VAT)	£1,765	£1,719	£1,787	£1499 inc VAT	£1,749
<b>Processor</b>	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100	Intel Pentium 100
<b>Expansion Bus</b>					
Local bus Architecture	PCI	PCI	PCI	PCI	PCI
Free PCI only slots	3	2	3	2	2
Free ISA only slots	3	2	2	1	3
Free shared PCI/ISA slots	1	1	1	1	0
Motherboard manufacturer	Micronics	Intel	Intel	Intel	Zenith Data Systems
Chip set	Triton	Triton	Triton	Triton	Triton
No. of spare 3.5in bays	0	2	2	1	0
No. of spare 5.25in bays	2	2	2	1	2
<b>Hard disk</b>					
Manufacturer	Quantum	Seagate	Quantum	Quantum	Conner
Size	1.2Gb	1Gb	1Gb	1.2Gb	1.2Gb
Interface	EIDE	FAST ATA2	EIDE	EIDE	EIDE
Average access time (ms)	11		10	10.7	14
<b>RAM and Secondary Cache</b>					
Main RAM	16Mb	16Mb	16Mb	16Mb	16Mb
Max RAM	128Mb	128Mb	128Mb	128Mb	128Mb
RAM Type	EDO	EDO	EDO	EDO	FPM
SIMM Type (pins)	72	72	72	72	72
Secondary cache	256Kb	256Kb	256Kb	none fitted - CELP socket	256Kb
Max secondary cache	256Kb	512Kb	512Kb	512Kb	256Kb
Cache type	pipeline burst	pipeline burst	pipeline burst	n/a	writeback
<b>Multimedia</b>					
CD-ROM Manufacturer	TEAC	Panasonic	Mitsumi	Goldstar	Sony
CD-ROM Model	56E	CR-581	FX400B	GCD-R540C	
CD-ROM Speed	6X	4X	4X	4X	4X
Sound Card Manufacturer	Creative Labs	Creative Labs	Creative Labs	Audiostar	Creative Labs
Sound Card Model	Vibra 16	Vibra 16S	SoundBlaster 16	16 bit Audiostar	SoundBlaster Pro
<b>Graphics Card</b>					
Manufacturer	Diamond	Matrox	Matrox	Trident	Cirrus Logic
Model	Stealth 64 Video EDO 2001	Millenium	Millenium	TGV19440AGI	5434 64 bit
RAM/max RAM	2Mb	4Mb / 8Mb WRAM	2Mb / 8Mb WRAM	2Mb	2Mb/2Mb
Max non-interlaced resolution	1280x1024 at 70Hz	1600x1200x256 at 72Hz	1600x1200x256 at 72Hz	1024x768x64K at 75Hz	1024x768x16 million at 72Hz
Monitor manufacturer	Iiyama	Smile	Viglen	Highscreen	Zenith Data Systems
Monitor model	8115	CB1516SL	Envy 15P	MS1585P	ZCM-1440-XT
Monitor size	15in	15in	15in	15in	14in
Monitor max refresh rate @ 1024x768 (Hz)	72Hz	75Hz	75Hz	86Hz	72Hz
<b>Other Information</b>					
Software supplied	Windows 95 MS Works 95	Windows 95 Media 96	Windows 95 MS Works 95 CD-ROM bundle	Windows 95 Word 7 Lotus Organiser	Windows 95 Norton Navigator Anti-virus
Speakers	Yamaha M10	Zyfiz	Viglen speakers Hands free microphone	Screenbeat Pro50	Labtec LCS600
Any added extras					
Standard Warranty	2 yrs on-site	1 yr on-site	1 yr btb	1 yr on-site	1st yr on-site
Warranty options		2nd yr £69, 2nd and 3rd yr £149		up to 5 yrs warranty	2nd and 3rd yr rtb 2nd and 3rd yr on-site
Free tech support line	Yes	No	Yes	Yes	Yes
Fax support	Yes	Yes	No	Yes	Yes

# Taking Notes

Lotus Notes Release 4.0 ships in the UK claiming improved usability and Internet integration. Does it measure up?

**S**IX YEARS AFTER INTRODUCING Notes Release 1.0 with a \$64,000 price tag, Lotus has started to ship Release 4.0 in the UK at a price level that will appeal to small to medium-sized businesses.

The latest release of Lotus Notes is easier to use, easier to administer and faster than ever before, but it's still an enigma to people who haven't seen it in action. Is it a workgroup application? A workflow tool? A document database? A client/server application development environment?

In fact Notes is all of the above. The best description I've seen is one that Ray Ozzie, the creator of Notes, gave in 1985 when Notes was just a glint in his eye. He said then that he wanted "to produce a product that would help people use computers more effectively and enjoyably in their business".

Ozzie's image of Notes as a means to automate business processes — workflow if you like — and its broad communications support for teleworkers gelled at Lotus. He joined to head up the late but not very lamented Symphony integrated suite but disliked the amount of time wasted commuting to work. Jim Manzi listened to Ozzie's description of what would become Notes and agreed to Ozzie setting up Iris Associates, an independent company contracted to Lotus to provide Notes. Late in 1989, Ozzie delivered. By 1995 Notes was enough to convince IBM that Lotus was worth \$4 billion.

Ray Ozzie, just turned 40, is seen as something of an icon by Notes believers, and this doesn't only include Lotus

employees — over 10,000 Lotus Business Partners sell applications based on Notes and they make a tidy 6:1 ratio of profit on services over sales of the base product.

IBM bought Lotus last July. Former Lotus boss Jim Manzi left after deciding he couldn't work with IBM chairman, Lou Gerstner. Notes people weren't all that interested in what the new Lotus leadership or IBM had to say on the matter — they wanted to know what Ray thought. And they jammed the Internet with joy when he confirmed that he was staying with Lotus and Notes.

### So what is Notes?

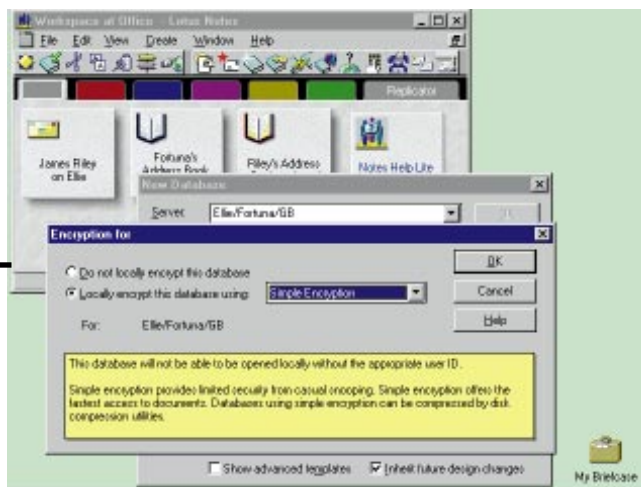
At heart, Notes is a document database. A Notes database is a container for multiple objects which may be any combination of text, images, sound, video, graphics, OLE objects, links to other applications. You name it — Notes stores it. It isn't a relational database and it doesn't support transaction processing, but a plethora of associated tools allows Notes to front-end SQL databases and TP monitors.

Notes databases are hosted by Notes Servers and accessed by Notes clients. There are servers and clients for just about any operating system that you might have in mind — OS/2, Windows, NetWare, Unix and Macintosh — and they can all communicate using standard networking protocols. Notes 4.0 supports TCP/IP, IBM/Microsoft NETBEUI and Novell IPX/SPX and transmission media ranging from LANs through the Internet to wireless communications.

Notes databases have embedded security which is independent of your network security. There are several levels of access control for individuals and groups, and Notes also offers digital signatures, 64-bit RSA encryption for databases and transmitted data including email.

Notes Release 4.0 databases can be linked to many external databanks and applications. A document may accept responses which trigger a series of

*Choosing an encryption level for databases that will be stored locally on the user's system*







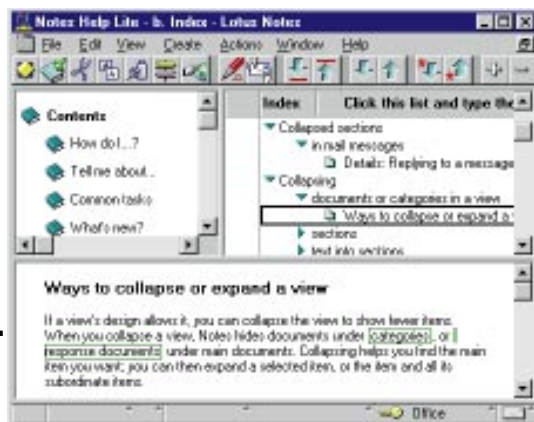
**Above** Starting the Lotus Notes Release 4.0 client on Windows 95

actions involving queries to an external database, query processing by the Notes server, and routed responses both to the original enquirer and to other interested parties. Everyday Windows applications can be used as a front end to Notes, so a user query against a sales database could be triggered by a button in a word processor form. The same query might also trigger a memo which would be delivered to a voice mailbox of a response team requesting a follow-up call.

As Notes runs on so many different platforms, any Windows, Macintosh, OS/2 or Unix Notes client with appropriate access rights may access a Notes server. And if the server runs out of steam you can simply move it to a more powerful system because Notes applications run on any supported platform. A Notes application can be piloted on a Windows 95 server supporting about ten test clients, moved to an OS/2 or Windows NT or NetWare server for production and scaled up to an SMP server or Unix box when the going gets busy.

Another way of scaling performance with Notes is to provide copies of the same database (known as replicas) at multiple sites. Notes replication, once configured, occurs automatically in the background but can be manually overridden. Replication conflicts (when replicas are simultaneously

*Navigating through a Notes database, in this case the Help file, with the preview pane open*



altered at two or more sites) are flagged as such, stored together with the original and all copies are replicated.

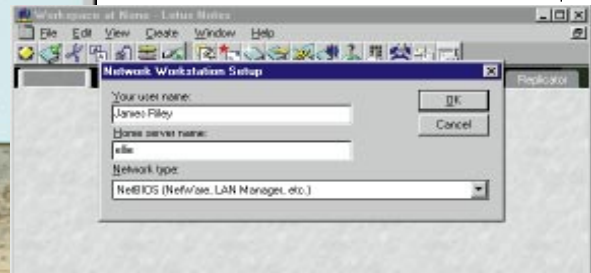
**And Release 4.0 does what?**

Release 4.0 addresses issues that made earlier releases difficult to administer, but it also improves security, speed and usability through improved development tools and a friendlier user interface.

For the client, Notes Release 4.0 has new graphical navigation tools, action buttons which stay visible when you scroll down a document, collapsible sections in documents so that readers can view a document in outline and then expand the sections that interest them. A preview window has been added so that a user can now view a document's contents while retaining the document hierarchy on-screen.

With these new features, a company could provide a totally customised user interface with three panes: the navigator pane on the left of the screen might have the company logo overlaid with icon images of various company services — sales information, help desk, personnel data and so forth. Each icon is a "hot spot". When clicked, the relevant

**Below** Entering user name and server details for the initial workstation setup



documents would appear on the right. The "view" window can be configured to show documents in a variety of formats and sort orders. Underneath the document view pane the Preview pane displays a scrollable image of the document.

The macro tools of prior releases have been replaced by Agents which can easily be assembled from set actions which are part of the LotusScript language. Some simple actions are already built into the graphical Agent Builder.

Notes developers also benefit from the new graphical features known as design elements (the improved security and faster performance), all of which help them to create better applications. LotusScript, a structured programming

**Main improvements for Notes Release 4.0**

- Single Document Interface; scrollable Navigator, View and Preview windows
- Action Bars, Navigators and Collapsible sections for ease of use.
- Common cc:Mail and NotesMail user interface
- User Limits raised, SMP support, 32-bit multi-threading, removed 64Kb limits.
- OLE 2.0 server, OLE automation, OXes. Notes/FX 2.0 and OLE integration.
- Field level replication, simpler replication management.
- Agents replace macros, personal or public.
- Actions extended to non-Notes applications via Notes/FX 2.0.
- Full text search of attached and embedded documents.
- Subforms store reusable form components.
- Location settings enable quick setup for mobile users.
- Mail support for MAPI, CMC (Common Mail Calls), SMTP and X.400.

**cc:Mail**

With Release 4.0, Lotus has unified the cc:Mail and NotesMail user interface. They now share the same look and feel, making NotesMail more fully-featured. Meanwhile, cc:Mail will still use the old file structure mailbox system, except that it has been decoupled from the mailboxes so that it can run continuously without having to be closed down for maintenance.

Notes 4.0 has its own "single copy" mail database where all mail is stored only once. A future release of cc:Mail is meant to give it access to the Notes mail database while retaining the cc:Mail directory-orientated structure. The aim is to ease migration from cc:Mail to the more powerful Notes client/server mail system.

A new, simple, Notes client called NotesMail, released concurrently with Notes Release 4.0, provides the easiest migration step between cc:mail and Notes. A cc:mail system can be upgraded to Notes client/server mail by adding a Notes server and Notes Mail clients. From there the path to Notes applications is via the Lotus Notes Desktop client which runs Notes applications but has no design capabilities. For that you need the full Lotus Notes client.



*The new mail interface based on cc:Mail is more informative and more flexible*

language similar to BASIC is included in Release 4.0 and will eventually be included in all of Lotus's desktop applications too. LotusScript provides easy access to the Notes API allowing rapid development of Notes applications which will run on all Notes platforms. It also interfaces with ODBC, giving access to external databases.

Notes is now a full OLE 2.0 server and more tightly integrated with Notes/FX 2.0. Notes/FX Field Exchange enables bi-directional communication between Notes documents and OLE 2.0 applications. Notes/FX 2.0 allows Notes developers to export Notes actions to OLE 2.0 applications, so an Excel spreadsheet or WordPro document can be used as a front-end. Users can initiate Notes actions such as searches and

**Internet integration**

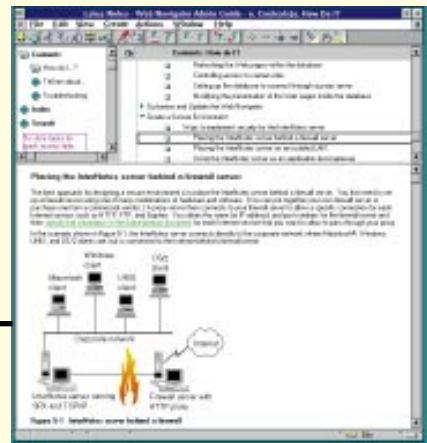
When Sun produced Java, a lot of people thought that Notes was dead. Instead of implementing an entire Lotus Notes suite of servers, clients and applications, one could bang out a browser and a few applets. Maybe, but there are a lot of issues this approach will stumble over.

Things such as data security while your server is hanging out on the Internet and database connectivity for interactive Web publishing will need to be arranged. So too will automatic updates and user access controls cause additional work. With Notes, these are part and parcel of the package.

Lotus is actively engaged in refining Notes as a Web tool. There are already a number of public and private Lotus Notes networks which can be used for intra- or inter-company publishing. Some are provided by AT&T under the AT&T Network Notes name and others on the IBM Global Network.

Lotus also offers the Lotus InterNotes Web Publisher. Because it is under Notes security control, the InterNotes Web server can act as a firewall and filter for data on the Internet. Currently there's one running publishing demonstration on the Internet with all the interactivity that Java promises. It's a case of jam today or Java tomorrow.

The InterNotes Web Publisher is an extra, but Notes 4.0 clients can access the Internet through the InterNotes Web Navigator which is part of Notes Release 4.0. Any Notes network can connect to, or host, a Notes server running the Web Navigator and give its clients access to the Web.



*A Notes Release 4.0 server can deliver Web access to Notes clients who do not need to run the TCPIIP protocol*

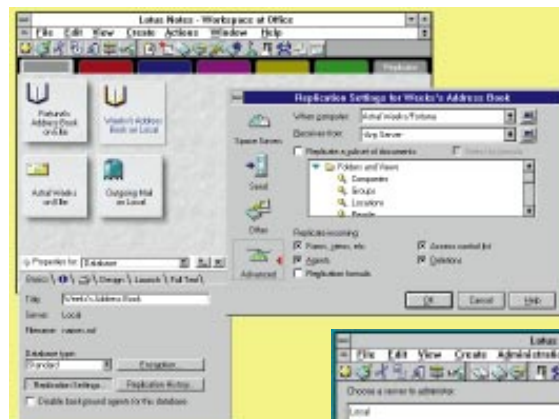
agents from their applications but the data is stored in Notes under full security control.

Administering Notes has always been a tricky operation. Low limits on users (around 70 for an OS/2, Windows NT or NetWare server under Release 3.1) meant plenty of servers in large

organisations, lots of password and user maintenance, many server communications configurations.

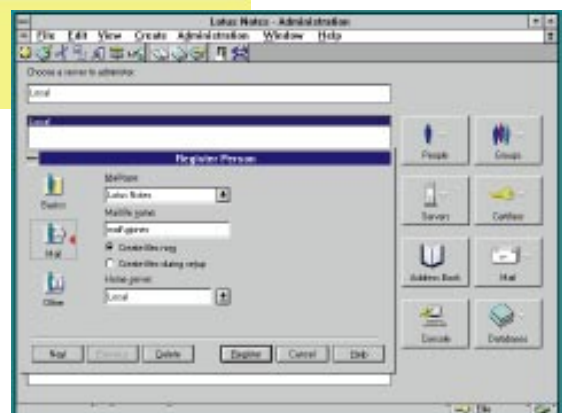
Additionally, there were multiple points at which administration was controlled. With Release 4.0, most of the administrative features have been gathered under a single Administrator's

Control Panel and the user limits have been expanded to 1,000 "light" users (mostly email) when running on an SMP server or 500 concurrent users. Lotus does however charge a lot more for an SMP server, currently only OS/2 and Windows NT, than it does for a uniprocessor Notes server.



*Above New properties dialogue boxes make configuration tasks much easier than with previous versions*

*Right Notes Administration details for all features including servers, mail and users, are now gathered in one screen*



## Notes Timeline

**1989** (December) — Lotus Notes Release 1.0. Notes R1 is pitched at major corporates as a LAN-based group conferencing tool; priced in 200-user units at \$62,500 the Notes Server and client run only on OS/2.

**1990** — Lotus does a deal with Soft\*Switch which connects Notes to nearly all existing electronic mail systems. Most Notes sites still running pilots but users total 35,000 at the end of the first full year.

**1991** — Lotus Notes Release 2.0. Lotus describes Notes R2 as an information sharing tool and lowers the gate price to an affordable \$4,950 for a package containing one server and nine clients which it describes as a "workgroup". The Notes server is still OS/2 only but a Windows client is added.

**1992** (January) — With 50,000 users (or "seats" in Notes parlance), Notes 2.1, an "open workgroup computing environment", starts shipping in the UK. Notes R2.1 mail-enables Windows applications via DDE.

**1992** (December) With 130,000 seats in over 400 companies, the world's "first and leading group collaboration software" now has its first Companion Product, Lotus Notes: document Imaging; an image processing extension developed with Kodak.

**1993** (April) Lotus Notes Release 3.0. Now with added Macintosh client and Windows 3.1 Notes server users can purchase a Starter Pack for Windows which includes a server and two clients for £795.

**1993** (December) Over 1,500 companies with a total of 360,000 seats use Notes which now runs on OS/2, Windows, Macintosh, HP/UX, SunSoft Solaris, IBM AIX, SCO and NetWare.

**1994** (June) With more than 4,000 Business Partners now developing Notes-based workflow applications, Lotus introduces Notes Release 3.1 and adds Lotus Forms routing, Phone Notes and Video Notes. The crowd goes wild — 3,200 companies cover 750,000 seats — even though any server or client still costs a hefty £435. Lotus buys Soft\*Switch.

**1994** (December) By the year end, Lotus has shipped a Windows NT Notes Server, Notes Express (an entry level Notes client), NoteSuite which packages SmartSuite and Notes, and the Developer version of Notes Release 4.0. AT&T Network Notes goes into trial service.

**1995** (January) Nearly 1.5 million users now and Lotus introduces a £115 Notes Desktop client which runs all Notes applications but has no design capability. The server price is reduced to £199. Both are for volumes of 50 or more, though, so Notes is still expensive for small to medium- sized businesses.

**1995** (July) IBM buys Lotus for \$4 billion.

**1996** (January) Lotus Notes Release 4.0 ships. Notes Mail £38 (50 unit quantities). Notes Server £341 (uniprocessor), £1,584 (SMP). Further details at [www.lotus.com](http://www.lotus.com)

There are also significant changes in the performance and manageability of major administrative headaches such as replication, security access lists and the name and address book which is Notes' central directory. Once again, many of these new features benefit users as well as administrators. Replication in particular is also far easier to manage from the user side, more flexible, and through field-level replication much faster. Previously, each document changed in a database was replicated. Now only the changed fields are replicated. Notes has been criticised for the strain

remote users place on the replication servers and for sometimes requiring mobile users to dial into several servers in

succession. Now, if administrators set it up, a mobile client can make a single call to a server which will pass on and coordinate the transfer of replication data from several servers.

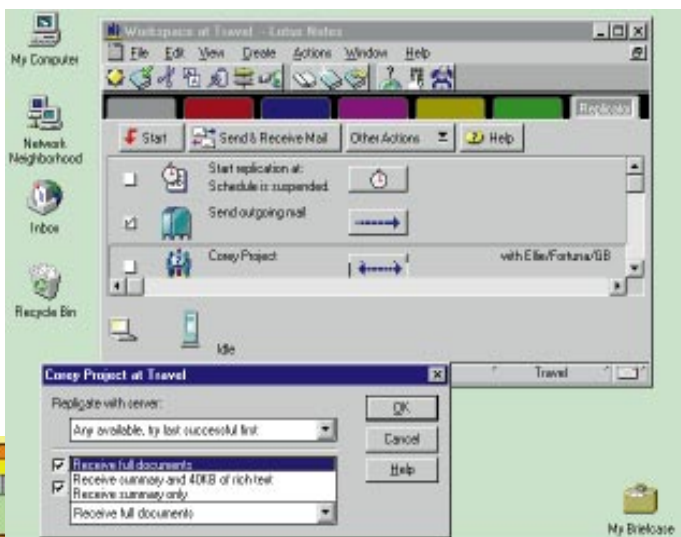
### Conclusion

Lotus Notes Release 4.0 is a significant improvement in terms of usability, administration, performance and application development. It is particularly improved for administrators and mobile users.

However, it remains a technical product which requires a significant administrative and development input to create compelling workflow applications.

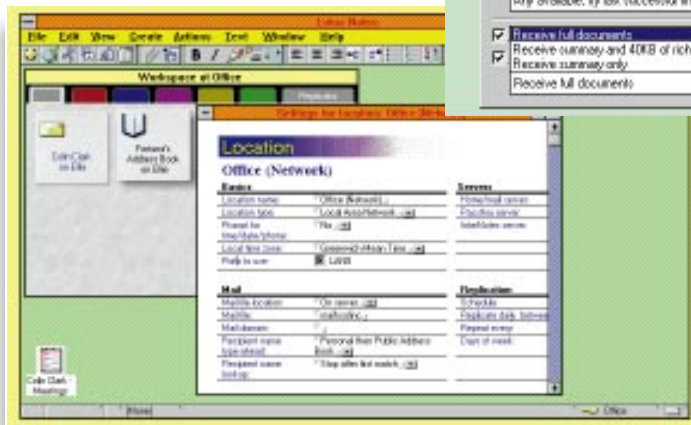
Even so, the new pricing schemes, together with the lightweight Windows 95 Notes server, open Notes up to a much wider audience who, once they've an inkling of what it can do, will then have the choice of developing an application themselves or buying one off the shelf.

Terence Green



*Above Setting replication options for a mobile user so that dial-up connections can be used efficiently*

*Left All system configuration settings are made using documents stored in the main Name and Address file*



# Rising star

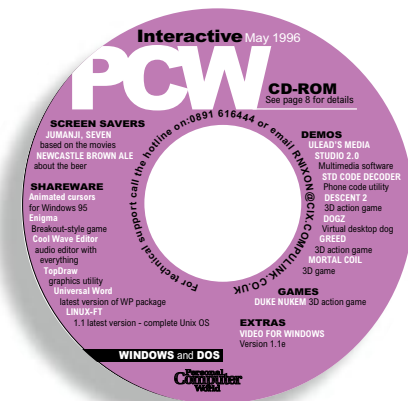
Linux is the highlight of this month's *PCW* Interactive CD. It is a non-proprietary operating system that is gaining worldwide acceptability.

**T**HOSE WHO HAVE BEEN following Chris Bidmead's 32-Bit section in *PCW Hands On* during the past year will have at least a vague idea of what Linux is about.

To bring everyone else up to speed, and by way of a prelude to the quite astonishing contents of this month's *PCW* Interactive, here is Linux in a nutshell.

Linux is the software phenomenon of the nineties. Quite simply, it brings all the power and flexibility of a Unix system to anyone who possesses the computer hardware capable of running it.

At the same time as the PC marketplace has blossomed and then virtually standardised on software technology from a single company, (namely Microsoft) the independence of mind found in the Unix-using world has taken the way in which software is



developed and used, in a rather different direction.

### The borrowers

The whole ethos of the Unix community is to abhor needless duplication of effort. Getting a computer to do what you want

### The universal appeal of an OS like Linux

The meteoric rise of a global Linux movement has many parallels to a new religion. In it, people are seeing the pioneering ideals of the early days of the Unix system re-awakened. I would not go so far as to say that everyone should be using Linux rather than a proprietary operating system, even one with "Windows" somewhere in the name. The fact remains that Linux is the nearest thing we have to a universal Open System (and it's getting nearer).

If you are the sort of person who wants to understand what you are doing with the computer, you can invest in learning skills and software based on Linux with the knowledge that the ground rules are not going to be changed under your feet just because it suits somebody else's corporate plan.

The new age of a broad-based computer industry beckons, based on tailored service rather than just paying large amounts of money for "packaged" software.



Using the Linux-FT distribution on our *PCW* Interactive CD, you will be able to develop programs in various languages, use the X Window system, and much more besides

is a hard enough job at the best of times, and it has become acceptable to use and build upon the programming work of others. Mike Gancarz in his book *The UNIX Philosophy* has the quote: "Good programmers write good code; great programmers 'borrow' good code."

This Unix tradition, where a successful piece of software for one application is re-used for another, different, purpose leads to great productivity. The revolutionary insight is that the resulting growing family of derived programs is owned by all the people who have contributed to them.

This "collective ownership" of software is not the same as the programs being orphaned in the "Public Domain". If software is in the public domain then anyone is free to do exactly what they like with it — even incorporating 99 percent of the content into hit commercial applications — and without having to admit to its public domain origins!

### On a legal footing

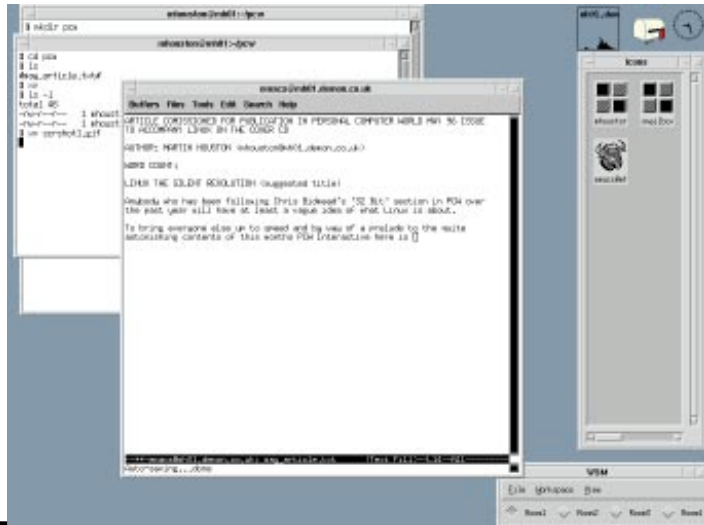
Collectively-owned code is the property of the many authors. To prevent the unscrupulous cashing in on the hard work of others, the legal status of such code was clarified by the formation of the Free Software Foundation (FSF) and its General Public Licence (GPL).

The General Public Licence is a subject that justifies a whole article on its own but the basic effect of it is to give a solid legal framework to allow the code sharing and on-going development that was already happening, to continue to happen with the knowledge that the contributors were not going to be ripped off by somebody stealing their ideas without due credit.

GPL programs must be freely distributable. That is not to say that you have a right to have them supplied to you for free but you do have a right to pass those programs on to somebody else for a fee, or even no charge at all should you see fit. These rights can never be rescinded.

GPL-licensed software cannot be pirated in the normal sense, as anybody has a right to pass on programs, or even their own derived versions, to other people. This freedom, like any worth having, carries some weighty responsibilities: if you do change a program, you should be prepared to clearly document what changes you have made, in a standard way and using provided tools (also free) and be traceable by name and email address so that users of the code further down the

*A general screenshot, taken while composing the article with emacs*



line have a chance to ask you questions about your work.

You could say that GPL programs are truly developed and supported by the very people who have the need for those programs to exist, rather than by some remote software house looking for ideas that "might sell".

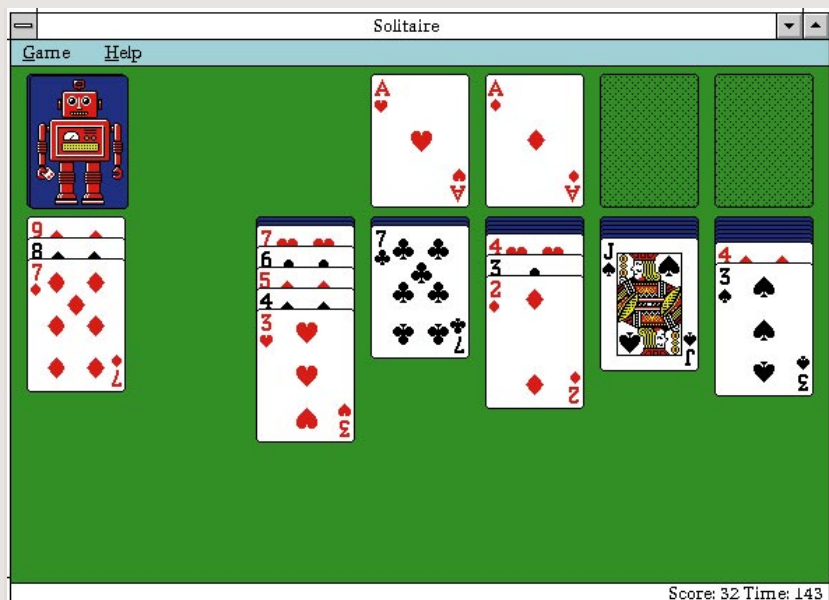
The two great pillars that support the

GPL way of doing things are: the emacs editor, which provides an easy way to work on other software (and, incidentally, what I am using to write this article); and the GNU C compiler for getting the software source code into a form the machine can understand. On top of this base there are many high-quality tools. By the early nineties there were GPL

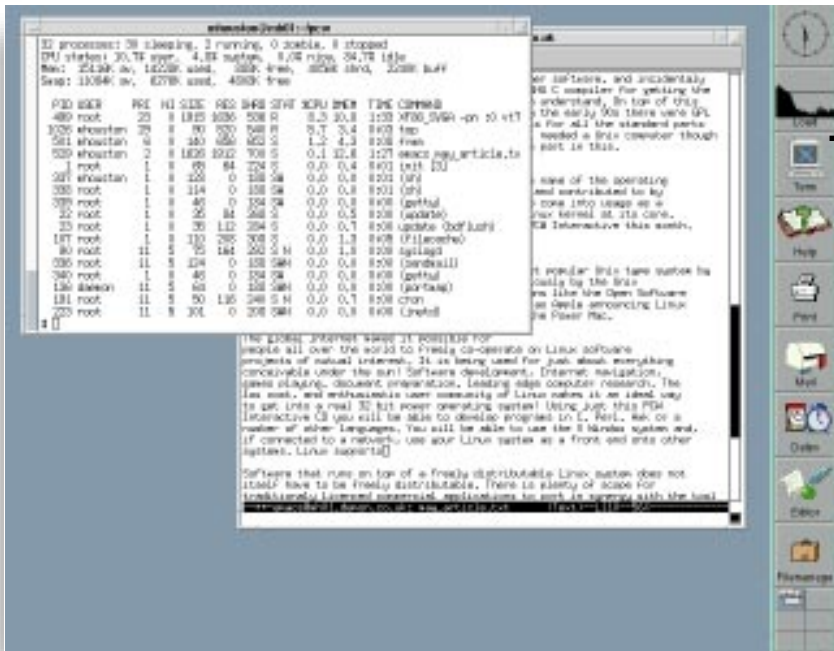
## How Windows/DOS programs run under Linux

Linux is a fully 32-bit or 64-bit operating system. It is not derived in any way from DOS or Windows. Nevertheless, emulator programs are provided that allow the running of many DOS programs under Linux (and an increasing number of Windows programs).

The dosemu program is a "virtual86" machine and actually requires you to have a real copy of DOS to boot up. The Windows emulator "wine" (although not included on our CD) is more exciting as it does not require the presence of any Microsoft-licensed components, apart perhaps from the program actually being run. The version of wine included with Linux-FT can run simple Windows programs like the Solitaire game. The latest version of wine "in the lab" is rumoured to run Word, Excel and Access, and this without needing a copy of the Microsoft operating system at all.



*The Linux Windows emulator, "wine", running Windows solitaire*



The Linux-FT desktop manager. Again, emacs is in the background, while the button bar on the right contains some handy utilities

versions that could act as "slot-in" replacements for all the standard parts of a Unix system and far more besides.

Although OS/2 and Windows versions of many of the FSF tools had appeared over the years, you really still needed a Unix computer at a cost of many thousands of pounds to gain maximum benefit from this productive way of working.

**Not any more — Linux is here!**

The term "Linux" has two usages. Firstly, it is the name of the operating system kernel, started in 1992 by Linus Torvalds and contributed to by Unix "gurus" and other enthusiasts throughout the world. And secondly, it has additionally come to be used as a term for the whole software system based on a Linux kernel at its core. It is, of course, this form of Linux that graces this month's PCW Interactive CD-ROM.

Linux is already being used by millions of people, worldwide. That makes it the most popular Open (i.e. non-proprietary) Operating system by a wide margin. Linux is also now taken seriously by the Unix establishment. Open Systems software organisations like the X/Open and the Open Software Foundation, and even hardware manufacturers such as Apple are announcing Linux availability as an operating system choice for the PowerMac.

The global Internet is where Linux was nurtured and now makes it possible for people everywhere to freely co-operate on Linux software projects of mutual interest. Linux is being used for just about everything conceivable under the sun.

Software development, Internet navigation, games playing, document preparation, leading edge computer research. The low cost, and enthusiastic user community of Linux makes it an ideal way to get into a real 32-bit power operating system.

It is so efficient, it even makes 8Mb 386-based systems look good. On a Pentium or Pentium Pro it should really fly. There is even a multi-processing variant of Linux for those of you who have multiple CPU Pentium Pro-based systems.

Using just this PCW Interactive CD you will be able to develop programs in C, Perl, Awk or a number of other languages. You will be able to use the X Window system and if connected to a network, use your Linux system as a front-end on to other systems. Linux supports the TCP/IP networking protocol that is the native language of the Internet and also works well on Ethernet LANs. A simple Web browser and server is built in — it's how the online documentation is provided.

Because you are allowed to share Linux with others you could even install a whole office full of PCs from this one CD. The first machine you install has to have a CD drive but subsequent machines only need a floppy disk and a network connection.

Software that runs on top of a freely distributable Linux system does not itself have to be freely distributable. There is plenty of scope for traditionally-licensed commercial applications to work in synergy with the tool-orientated approach of the Linux system itself.

The Linux-FT distribution on the CD is just a small selection from state-of-the-art Linux software. The new FT1.2 release, from Lasermoon, holds a place in history in that it is the first time that the Linux operating system has been submitted for, and passed, formal POSIX 1 (FIPS 151-2) certification.

Lasermoon, the UK company that supplies Linux-FT, is already taking its Linux distribution through POSIX and XPG certification. This enforcement of standardisation will make Linux systems even easier to support and maintain in the future.

● I don't have space here to cover the installation of Linux-FT or all its features, so do read the full installation guide on our free CD-ROM.

Martin Houston

**PCW Contacts & Bibliography**

Linux-FT is provided and supported in the UK by Lasermoon. info@lasermoon.co.uk  
Tel 01329 834944. Fax 01329 834955

If you have an interest in learning more about Linux, then join the UK Unix User Group Linux SIG. See the file usergroup.txt on the CD or phone the UKUUG secretariat on 01763 273475, fax 01763 273255. The directory /UKUUG contains lots of information about the group in html format. To view it with a Web browser start at /UKUUG/home.html

There are many megabytes of indexed, searchable Linux documentation already on your CD (the command to start the browser is "documentation"), and there is a growing number of useful books about Unix and Linux in print.

● **The UNIX Philosophy** by Mike Gancarz, ISBN 1-55558-123-4, Digital Press: Not a technical book but an ideal introduction as to why Unix systems work in the way they do and why they are so productive and efficient.

● **Running Linux** by Matt Welsh & Lar Kaufman, ISBN 1-56592-100-3, O'Reilly & Assoc: A good general introduction to the capabilities of a Linux system and the sort of things you can hope to achieve with one.

● **Linux Network Administrators Guide** by Olaf Kirch, ISBN 1-56592-087-2, O'Reilly & Assoc: Covers the topics of networking your Linux systems together and connecting them to the Internet itself.

Martin Houston can be contacted by email. [Martin.Houston@UKUUG.org](mailto:Martin.Houston@UKUUG.org)

# Balancing act



Personal finance managers can help you keep tabs on the increasingly complex business of home and small business budgeting. With Paul Begg.

*"Annual income twenty pounds, annual expenditure nineteen ninety six, result happiness. Annual income twenty pounds, annual expenditure twenty pounds ought and six, result misery."*  
— Charles Dickens

PCW Coin Photography by Phil Ward

**D**OES LIFE EVER seem like an endless round of getting up, going to work, coming home, going to bed, getting up, going to work, coming home...? Do you seem to spend all your time working, yet have no money to show for it? If so, maybe it's time you took your personal finances in hand.

Personal finance management software is here to help. It has been extremely popular in the United States because of online banking and because most people in the US have to prepare their own tax returns for the IRS. In the UK the take-up has been less dramatic because we are taxed at source, don't have on-line banking and generally know exactly how little we have coming in, how much is going out and how we have nothing left to worry about.

But these days managing your finances is tougher than ever before. Not only are you likely to have your money spread across several accounts, such as Credit Card, Visa, Current Account, Savings Account and so on, but demands on your disposable income seem to increase almost daily. Personal finance software can help you to do some serious budgeting, set financial goals and generally help you to spend your money more sensibly so you can enjoy some of the finer things in life.

It can do this in a number of ways. Most obviously it can make sure that you know *exactly* how much you have in the bank. There are dozens of ways in which your bank statement does not tell you this. It doesn't take into account standing orders to be paid after the issuing of the statement but before your salary cheque goes in. It doesn't take into account money you may be setting aside for that continental holiday or for a deposit on a new car. And it doesn't take into account unchashed cheques. If you live on a tight budget, knowing the exact state of your finances is essential.

*"The advantage of keeping family accounts is clear. If you do not keep them, you are uneasily aware of the fact that you are spending more than you are earning. If you do keep them, you know it."* — Robert Benchley

Do you worry about where all your money has gone? It can be scary to find out, but the only way to budget effectively is to know what you spend your money on so you can decide where you can best make cuts. Personal finance software should let you assign a category (such as "eating out"); by reviewing the categories you can see exactly where your money has gone, and where, with ruthless pruning, you can cut down without seriously hampering your lifestyle.

So personal finance software should be part of every reasonably financially ordered home. It is also useful for the self-employed and small businesses. In a few minutes a day, you can not only keep a tight control over your income and expenditure, but also save yourself hassle in preparing VAT returns and accounts, giving yourself a little more

time for money-making jobs, and cutting down on your accountant's bills.

*"I went to the bank and went over my savings. I found out I have all the money that I'll ever need. If I die tomorrow."*  
— Henry Youngman

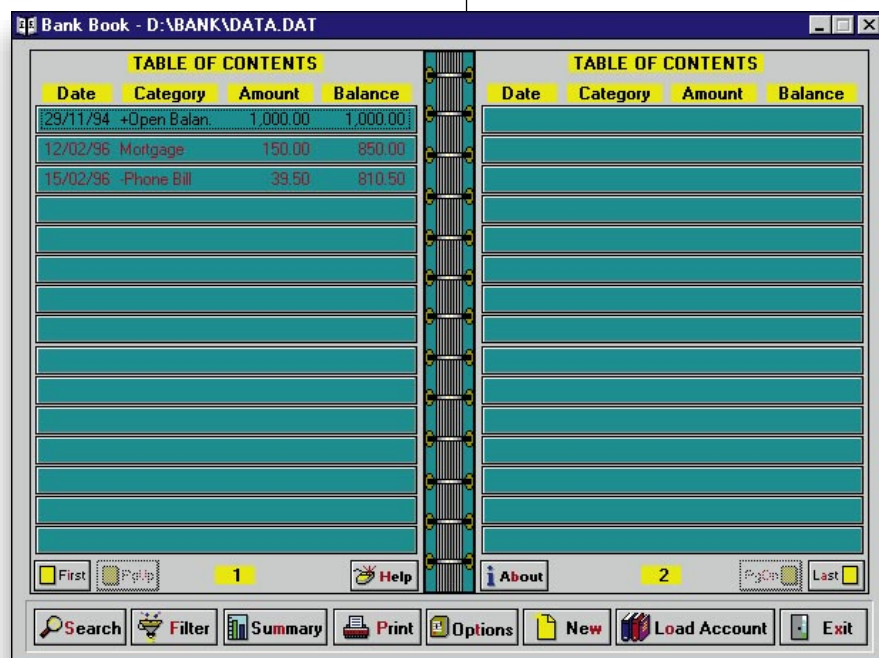
## Bank Book

This is a very, very basic program from VCI's inexpensive range of utilities which includes an address book, Internet address book and virus checker. There is no manual or online help worth mentioning, and no real need for either. Bank Book doesn't do much, and what it does do could be written on the back of a postcard with a chunky crayon.

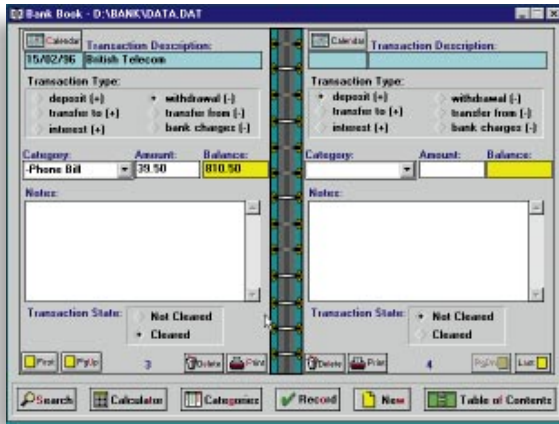
You just enter your opening balance, then note your incomings or outgoings on a form, assign each one a category such as "phone bill", and the program immediately subtracts or adds the outgoing or incoming to the total.

Making entries on a form is a slightly long-winded process: you select the date of payment from a calendar, type in the person to whom the payment is made or from whom it has been received, and choose a transaction type, whether outgoing or incoming. Then type in the category and the amount. You can add fairly detailed notes and reconcile the transaction with your bank statement by checking cleared instead of not-cleared. That's it. If all you want is a very simple

*Bank Book: A simple way of just reconciling your bank statement*







*Bank Book makes entering your incomings and outgoings a little long winded*

to-use personal finance manager. From the main screen you have access to the account register, payment calendar, account manager, investment portfolio, report and chart gallery, the payees and categories section, and the planning wizards.

bank statement checking utility, look no further.

*"Money can't buy friends, but you can get a better class of enemy."  
— Spike Milligan*

**PCW Details**

**Bank Book**

**Price** £14.99 (inc VAT)  
**Contact** VCI Software 01923 255558  
**Good Points** Very basic.  
**Bad Points** Expensive for something this basic.  
**Rating** £ £ £ £ £

Starting Money is simple: just enter the type of account, which is usually a current account, and enter the closing balance of your statement. Then all you have to do is enter the details of subsequent transactions in the account register. Transaction details, such as how much you paid and to whom, are entered on a form and to each transaction you attach a category and a subcategory, such as "telephone" followed by "home phone" and "mobile phone". All your transactions are listed at the top of the screen and you can view these in various ways, such as by date or cheque number.

The new payment calendar is the place where you enter the details of standing orders and direct debits, giving the time of the month when the transaction is usually made. Money automatically transfers the outgoing (or incoming) to the account register at the appointed time. In this way, your records will always be up to date. The calendar can also be used to record reminders of single transactions.

If you have more than one account, such as a bank account and a Post Office Giro account or a building society account, the account manager is where you can switch from one to another. The investment portfolio is surprisingly good for a home package. It will meet the needs of users with fairly specialised

*Money has a smashing opening screen. This is software you actually want to use*

requirements, even those with such esoterica as PEPs and personal pension schemes, shares, gilt-edged stocks or bonds. For other sorts of assets, such as property, you can open a tailored asset account.

The report and chart gallery is where you can get a complete overview of your finances by creating a report or chart. There are eight standard reports, including income and expense, net worth, and loan payments.

The section called payees and categories is a particularly useful feature where you can 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, such as what the payment is for. You can also use this feature to note details such as product serial numbers and so on. It's a feature that I'd like to see expanded to provide a detailed list of possessions; not so much a home inventory, as provided with Quicken, but a place where you can log all the details of a purchase, such as the phone number



*Money: Nice charts and graphs*

of the authorised service agent and the insurance policy number.

Finally, Money has five planning wizards to take you step-by-step through performing various tasks such as calculating loans and mortgages. And if you need help in any other way, there's loads of help in the shape of cue cards and wizards and online help.

**PCW Details**

**Money for Windows 95**  
**Price** £39.99  
**Contact** Microsoft 01734 270001  
**Good Points** Everything. Great for the home user.  
**Bad Points** Windows 95 specific.  
**Rating** £ £ £ £ £

**Microsoft Money for Windows 95**

Microsoft Money is a superb program and very nearly won our Editor's Choice award. It missed only because it is Windows 95 specific and won't run under Windows 3.1. Of course, it is also less feature-packed than Quicken, but this should not be regarded as a weakness; Microsoft's Money is firmly targeted at home users and consequently doesn't need all the business-related features and abundant financial advice that for many has made Quicken somewhat cumbersome.

Money for Windows 95 is the easiest-



## MoneyBox

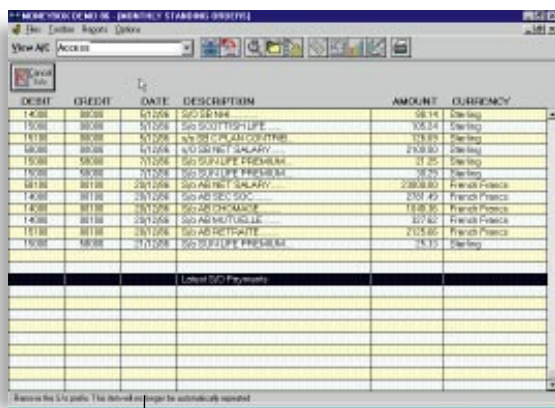
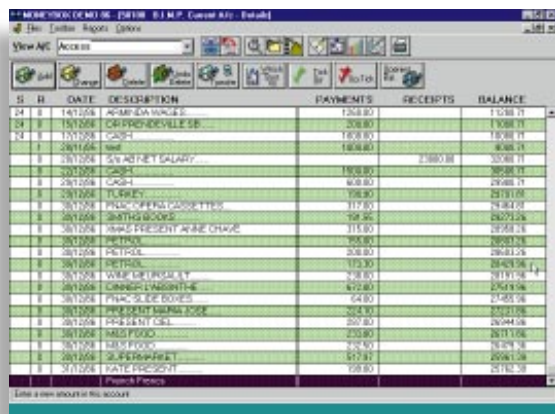
When MoneyBox is first started it takes you to an empty bank account called current account. This is the default – MoneyBox will always start up by displaying this account – but you can easily change it to another account if you want to.

You can make entries right away, which is useful if you can't find a recent bank statement from which to enter an opening balance. Otherwise you begin as with the other packages reviewed here.

When you have completed all the entries MoneyBox will produce a statement window which should show exactly the same information as the bank statement, including opening and closing balances. Double-clicking against each entry – effectively adding a tick – shows that the money has appeared on your bank statement. Any transactions not on the bank statement, such as payments made after the statement was issued, remain unticked. You can then ask MoneyBox to show you only those items that are not on your statement. This way you get a true picture of your current finances.

You attach categories to entries with MoneyBox, but it is distinguished by having three category types – student, householder and business professional; householder. It is also singular, and perhaps unique, in letting you choose a beginner, expert, or professional skill level, from basic bank and credit card account management through to VAT calculation together with both summary and detailed VAT accounting.

Help features include cue cards and context-sensitive help. DOS and Windows versions are supplied in the box.



**Top** The ledger screen for transaction entry in MoneyBox  
**Below** MoneyBox: Want to know what standing orders you pay? It's easy

*"Saving is a very fine thing. Especially when your parents have done it for you."  
 — Winston Churchill*

## Money Matters

In common with Bank Book, Money Matters has a disconcertingly empty opening screen – all you get is an empty desktop and an account bar with a single scroll button. As usual, you begin by entering the opening balance given on your latest bank statement and copying

in all your transactions, making sure that the closing balance is the same as on your statement. You then enter all the transactions since the statement was issued.

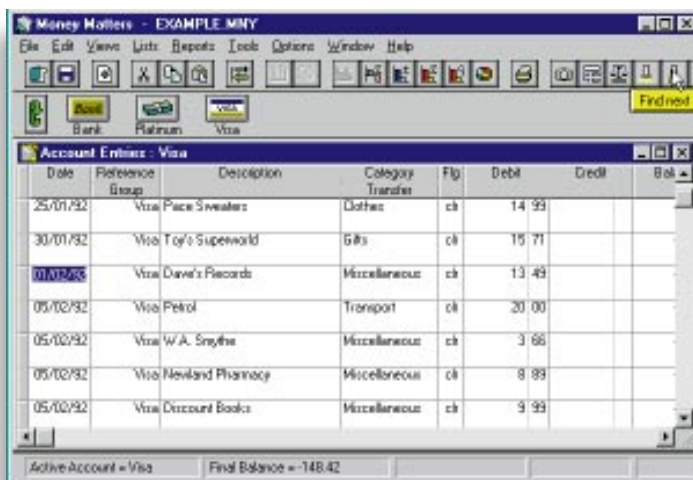
You can have as many as 40 accounts in Money Matters and automatically transfer between them. You can also automate regular payments such as standing orders or direct debits, so that they appear in your account register on the appropriate date.

Money Matters lets you assign categories and groups and supplies a default list of categories whenever you start a new file. You should modify, delete, or add to these until you have a list that is right for you. The feature is optional. When it comes to budgeting, Money Matters is strong, offering a monthly budget comparison graph and report which will total the value of entries in each category so that you can see where your money has gone and spot any trends. You can even attach a budget for each category – say, £100 a week for food – and Money Matters will compare the budgeted figure with your actual spending.

Groups is another way of viewing your expenditure. Money Matters comes with two, personal and business, but you can modify or add to the list. This is very useful if you have various sources of income, like a friend of mine who has a day job but teaches music in the evenings and at weekends. He uses a single bank, but wants to keep track of his account for both business and personal transactions.

You can easily transfer money between accounts, for example from a bank account to a building society, and display six types of graph; they include an income-expenditure graph showing the total incoming and outgoing amounts for each month over a chosen period, and a

category pie chart showing how your income or expenditure is



*Money Matters: A familiar way of entering transactions*

## PCW Details

### MoneyBox

Price £14.95 (inc. VAT)

Contact Database Direct

0151 356 8000

**Good Points** Solid and mature. DOS and Windows versions in the same box. Inexpensive.

**Bad Points** Not as exciting to use as Money or Quicken.

**Rating** £ £ £ £ £

"The man who tips a shilling every time he stops for petrol is giving away annually the cost of lubricating his car."  
— J. Paul Getty

distributed among the categories. There are also six types of report.

**PCW Details**

**Money Matters**

**Price** £19.95 (inc. VAT)  
**Contact** GST Software Publishing  
01480 496666

**Good Points** Inexpensive.  
**Bad Points** Not the easiest to get to grips with.  
**Rating** £ £ £ £ £

**Moneywise**

You may still find Moneywise in the shops, although Sage has abandoned the personal finance market to concentrate on its business accounting software. This leaves about 20,000 registered users in the lurch. Support will continue for those who pay for it (Sage charges for technical support) and there are discounts for users who wish to shift up to the entry-level instant accounting or beyond.

Business users might benefit from Sage's pioneering electronic banking services: deals with Midland Bank, Dun & Bradstreet credit management and BACS Payments from Active Business Services mean Sage offers secure online banking, users of any size being able to access account balances, transaction details, salary and supplier payments and financial market information. The deal with Dun & Bradstreet lets users access credit information (to avoid bad debts).

*"A lot of people will urge you to put some money in a bank, and in fact — within reason — this is very good advice. But don't go overboard. Remember, what you are doing is giving your money to someone else to hold on to, and I think that it is worth keeping in mind that the businessmen who run banks are so worried about holding on to things that they put little chains on all their pens."*  
—Miss Piggy

**PCW Details**

**Moneywise**

**Price** £57.58 (inc. VAT)  
**Contact** Sage 0191 255 3000  
**Good Points** Users can move on to Sage heavyweight accounting packages  
**Bad Points** Discontinued by Sage  
**Rating** £ £ £ £ £ £ (because discontinued)

**Quicken**

Quicken now comes in three flavours. You can get plain Quicken; a home package called the Deluxe Home Pack which contains Quicken 4, Quicken Home Inventory and QuickTax Planner 96; and the Deluxe Business Pack, which is the same as the home pack except the home inventory module is replaced by QuickInvoice.

Quicken is the world's most popular personal finance manager. There are versions for DOS, Windows 3 and a non-dedicated Windows 95, among other platforms, and it is available for a HP palmtop. In the US version 5.0 has recently been released, but it isn't yet available in Britain.

Quicken works in exactly the same way as most other personal finance managers; indeed, it set the pattern which most others have followed. All transactions are recorded in the account register, a ledger-book lookalike which is slightly more intimidating than the form offered by Money, but is quicker to use. It displays in chronological order all the transactions that you have entered in the currently active account.

You can split a transaction into a maximum of 30 parts (or 16 if you are tracking VAT) and each split can be assigned a category — useful if you visit a supermarket, say, and buy things across a range of categories such as clothing, magazines, DIY equipment, music CDs, food, all paid for with a single cheque.

You can schedule transactions like standing orders and even direct debit with an amount that varies with each payment. Quicken comes with a financial calendar. Schedules transactions are automatically registered here, but you can also add one-off payments such as when you have to pay the tax man, VAT man or when other bills become due.

On the subject of the VAT man, Quicken has quite extensive tools to simplify VAT bookkeeping. You dictate which accounts and categories are subject to VAT, then enter your



The main screen in Quicken is attractive but not all that friendly

transactions in the usual way. When you need to see the total of your VAT liability, Quicken simply prints a report.

Like Money, Quicken has a number of nifty tools for finance management. They are separated into the two areas of budgeting and forecasting. For budgeting Quicken lets you assign a certain amount of money to a specific category and then keeps you informed about how well you are keeping to that budget. For example, you could limit your annual clothing expenditure to £X and Quicken will keep a running total of what you spend on clothing, alerting you before you exceed your budget.

Forecasting lets you estimate future probable expenditures with known outgoings to see how the best economies can be made. Once you have set money aside for that summer sun, the savings goal status bar shows your progress without actually having to move money into a real savings account.

If you have shares and investments you can track tax-exempt securities, tax credits and multi-currency investments. You can also define a financial year instead of a calendar year and create reports, graphs and budgets based on that year.

**PCW Details**

**Quicken**

**Price** Quicken alone £39.95 (inc VAT); Quicken Deluxe Home and Quicken Deluxe Business £69.96 (inc VAT)  
**Contact** Intuit 0181 990 5500  
**Good Points** Everything.  
**Bad Points** Getting a little complicated to use.  
**Rating** £ £ £ £ £ £

**Editor's Choice**

**P**ersonal finance management software easily separates into three categories: home, self-employed and small business, and bigger business. And because we can only bestow one Editor's Choice, it has to go to the product which best services user needs across all three categories.

Quicken therefore gets the award. It is a powerful, near-perfect product, it is available for Windows 3.1 and will work with Windows 95, DOS and Mac, and there is a version available for the HP palmtop. We may even get to see a dedicated Quicken palmtop if the machine available from Franklin Electronics in the US makes it across to the UK. Who knows, we may even see a Quicken for the Psion 3a.

Having said this, a very honourable mention goes to Money. It is a cracking product, it looks attractive and unintimidating, and is very easy to use. It is unquestionably the best buy for home users wanting only to keep track of their finances and not interested in the more heavyweight business features of Quicken. Sadly, it works only under Windows 95 and currently that places the burden of an operating system upgrade on home users.

**Tax and self assessment**

**W**e pay taxes because the Government sends you to prison if you don't. Of course, taxes pay for the prisons, so if we all refused to pay tax then there wouldn't be any prisons to send us to. The trouble is, all the thieves would be on the streets stealing the money we'd saved by not paying tax. Overall, it is better to pay the tax.

As from April 1997 those who complete tax returns will notice a difference in the tax returns sent out by the Inland Revenue. The emphasis is now on self assessment of taxable income and the new system is designed to make working out

tax liability more straightforward and efficient. If you are self employed, a company director, an employee or a pensioner with complex tax affairs or a person with substantial investment income, you need to be aware of how these changes will affect you. If you require further information contact your local tax office (in the telephone directory under Inland Revenue) or alternatively phone the following response line as they will be happy to send you details on how self assessment will affect you. The number is 0345 161514.



*"The creed of the Inland Revenue is simple: "If we can bring one little smile to one little face today – then somebody's slipped up somewhere."  
— David Frost*

**Who pays VAT and why**

**VAT** (Value Added Tax) is a transaction tax and not a tax on your income or profits. This form of indirect tax is chargeable on supplies of goods and services purchased in or outside the European Community. In simple terms, to be a taxable person your business turnover should exceed £47,000 per annum. This calculation is based on the preceding 12 months turnover. However, if your turnover is currently below this sum but your business is expanding, it may be wise to register with Customs and Excise earlier rather than later.

A taxable business pays VAT on the supplies received and charges VAT on the sales made. At the end of an accounting period (usually three months) the trader should account to Customs on the difference between the VAT charged to

*"He fell into a vat of pudding mixture and was found battered to death."  
— Kenneth Horne  
(Okay, it's the wrong vat, but you find something amusing to say about VAT.)*

customers and the VAT incurred on purchases. Hence the net VAT paid to Customs relates to the "value added" by your business when goods or services are sold.

The VAT treatment of the supplies you make is dependent on your type of business. It is important before registering for VAT that you consult with your local Customs and Excise VAT office for their advice. Look in the telephone directory under Customs and Excise.

**FINANCE SOFTWARE**

FEATURES	Bank Book	Microsoft Money	MoneyBox	Money Matters	Moneywise	Quicken Home/Business
Operating system	Windows	Windows 95	Windows & DOS	Windows	Windows	Windows
Calculator	●	●	○	○	●	●
Calendar	●	●	○	○*	○	●
Context Sensitive Help	● - minimal	●	●	●	●	●
On-line tutorial	○	●	○	○	○	●
Memorise recurring transactions	○	●	●	●	●	●
Schedule future transactions	○	●	●	●	●	●
Reconcile account	●	●	●	●	●	●
Split transactions	○	●	●	●	●	●
Budget features	○	●	●	●	○	●
No of reports	None	26 **	8	6	17	22

KEY ● Yes ○ No

\*(there is a special loan calculator) \*\* you can create your own





# It's **Life** *but not as we know it*

**A** MAJOR achievement of computers has been the insight they have offered into why life looks as it does. They have revealed unsuspected structures within chaos and the subtle dynamic geometry underlying organic growth. They have become almost like a sixth sense, projecting mathematics into graphics to show what we could not otherwise see.

Some of these mathematical models are rather more than abstractions; they are entities with form, movement and the ability to reproduce. If a computer is an ecosystem, then they are something approaching a life form.

On the threshold of this eerie meta-reality works cyberartist William Latham who explores the aesthetics of evolution within computer space. There is nothing new about artists exploiting technology; if they hadn't always done so we would hardly have progressed from cave paintings. But perhaps not since the time of Leonardo da Vinci, who saw nothing strange in being as much of an engineer as an artist, has the distinction between technology and art been so blurred.

Latham, born in 1961, has long had a foot in both camps. His father, an industrial chemist, was head of research for Esso and a lecturer at Reading University. "So as a child I was brought up with a lot of scientific books around.

Cyberart explorer William Latham has seen where art and technology conjoin and has evolved techniques to imitate organic growth.

Many artists are very anti-science, but I didn't have that hangup," says Latham.

He took a traditional fine art course at the Royal College of Art in London at a time when interest in 3D computer graphics was growing. In his spare time he studied Basic programming at the City of London Polytechnic. "I was never going to be a great programmer, but I learned enough to realise what could be done."

He became fascinated by the computer's capacity for indefinite repetition, or iteration. He also spent a lot of time studying natural forms at the Natural History Museum, just down the road from the RCA. These are themselves the product of iteration, being the reproduction either of the cell or of the whole organism, which is why computers became crucial to their study.

There is an odd parallel between the pre-computer mathematician, who could not calculate fast enough to explore



*Latham: "Many artists are very anti-science, but I didn't have that hangup."*

iteration, and the pre-computerised Latham, who could not draw fast enough to explore evolution.

"I started to draw an evolutionary system independent of the computer. The

rules were written down on a piece of paper and I used my own brain as a drawing device and carried them out.

"So I started out with a few metrics and a set of geometricals and a limited set of deformations. And then I'd deform those, and pick one from the list and deform it. So I'd quite quickly end up with something that had all sorts of imaginative connotations, completely different from the starting point.

"These drawings got bigger and bigger, and became more and more detailed. So at the top you had these geometrical forms and at the bottom were these extraordinary, ornate, complex structures. But each of the deformations was extremely simple."

**IBM and the avant garde**

Latham had played with simple computerised deformations using text instructions under BBC Basic but he realised he needed heavyweight help to take his ideas further. He turned to IBM, which has a history of backing avant garde projects. Benoit Mandelbrot, for example, carried out his pioneering work on fractals, one of the great fruits of iterative maths, at IBM laboratories.

"I just rang them up," recalls Latham. "Finally, I got through to this chap called Peter Quarrendon who was an ex-atomic physicist. He said: 'This sounds really interesting. Come and see us'."

Latham took the train to IBM's labs near Winchester. "I had this big roll of drawings under one arm and just rolled them out, and they were all really interested. They said: 'We are involved in 3D modelling. Why don't you come along and work with us?'"

This move was to make Latham famous. He worked with Stephen Todd, who had developed a language called ESME, implemented in Pascal, for

scripting the drawing of 3D models. The pictures they produced of lifelike forms were exhibited throughout the world and their animations were filmed and featured on TV. They wrote a book on their techniques called *Evolutionary Art and Computers*.

Latham's method begins with hand drawings which are translated into mathematical primitives. He and Todd developed an interface called Mutator which allows the artist to evolve forms by selecting preferred distortions. It can be used as a tool to design almost anything, as well as for pure art.

Latham was with IBM for six years. "It was a good time: lots of money, lots of resources. IBM assigned a student to help me. We published papers; and patents and all sorts of things came out of it. I retained the copyright of everything I did, including the user interface of Mutator. Then the climate changed at IBM and by that time there was so much interest from outside, I thought it was time to get out."

**Cult following**

In 1994 Latham formed a company called Computer Artworks and took on Mark Atkinson, a young artificial-life specialist. Atkinson, now co-director of the company, had begun programming 6502 machine code at 11 years old, and



"Mutation T1 on the Plane of Infinity"

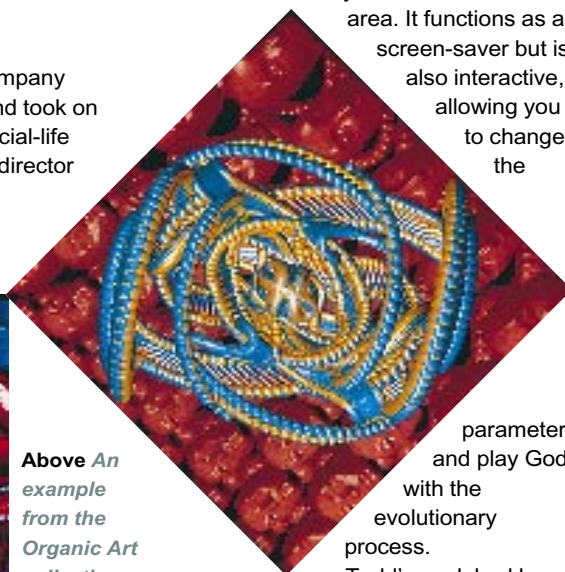
© W. Latham & IBM

was 16 when he started his computer science degree at Glasgow University.

In 1995 Sony released a Playstation demonstration of Latham's work called Evolution X, and he acquired a cult following on the rave circuit after designing the cover for a Shamen album.

Now, Time Warner is releasing the first of what Latham says will be a series of software products. The Organic Art CD-ROM looks like being a must-buy for anyone interested in this

area. It functions as a screen-saver but is also interactive, allowing you to change the



parameters and play God with the evolutionary process.

Todd's work had been done on an IBM minicomputer with huge amounts of memory and Atkinson had to port it to C++ on a PC. "It was a horrendous piece of software engineering to get something that was ten times faster into a tenth of the size."

Organic Art is the first product to use



Above An example from the Organic Art collection of screen-savers  
Left Latham is on the threshold of an eerie meta-reality

the real-time rendering engine from RenderMorphics, the UK firm bought out by Microsoft last year. "We knew Rendermorphics when they were just two people, so in terms of beta code we have had a favoured position," said Latham.

Atkinson stresses that the CD doesn't just display an image file like an ordinary screen-saver. The starting point is a piece of code. "It uses the system to grow a form or shapes. Within that form there are a number of genes defined — you know, how twisty or how long... how much it bends round, or whatever. By attaching all these genes to this thing we're able to free-run modes of evolution whereby it goes ahead and changes by itself."

So what is the position of the artist, when the computer appears to be doing the creating? Latham likens it to that of a gardener selectively breeding preferred versions of a plant: "It is like bringing human creativity and natural evolution together."

He says traditional artists, which on the whole means hard-up artists, envy his money and recognise his work as pioneering. But it makes them, and many other people, uneasy.

"It is attacking the one domain that humans believe is unique to them — being creative. They can understand computers doing accounting and things like that but they do like to feel that the world of novels and painting is safe, because as soon as that is obliterated, the computer is becoming better than the human, or starting to be."

### Behaviour patterns

Future plans would seem to threaten the artist's role in the process. Atkinson is keen to program "behaviour" into the entities thrown up by the Latham Mutator.

"What you have currently is the interaction between the user, or the artist, and the system. The selection process is the survival of the most aesthetic; the fittest are the things that look the most interesting.

"But by putting behaviour patterns into the system, it is going to start running itself. In real life the driving force is reproduction; in this system it is about an aesthetic from an outside point of view. By designing a system you can get to change the rules yet again. You get to decide what is your primary criterion for success and then see how these things behave and form themselves.

"We are thinking of applying some of these ideas to computer games. The driving force is going to be something that is enjoyable to play against and which is



Above "Bleeding Forms on the Plane of Infinity"

© W. Latham & IBM

Right Another example from the Organic Art screen-saver



going to adapt to whoever is playing it."

This sounds alarmingly like crossing the threshold into an ecology of computer space. "That's what artificial life is all about," says Atkinson. "At its most fundamental, life is a process and the process is implemented in software. That was proved by [cellular automata pioneer] John von Neumann in the forties.

"People have this notion that there is something divine about life, that there is something magical about reproduction. Von Neumann proved, using cellular automata, that you could have self-reproduction in a purely mathematical system and that there was nothing special about life forms."

Atkinson predicts, emphatically: "Proper artificial life forms will happen, as will proper artificial intelligences. That is not a separate process, it is a natural process that continues from where we are. In the same way as DNA succeeded

RNA, so more efficient ways of life will succeed hereafter. Life is defined by reproductive success. That's the only criterion in which DNA is interested."

But Latham is not given to such extrapolation. "These are the kind of questions this work raises," he says. "I am as fascinated by evolution as a genetic engineer is. But I am interested in looking at the mechanism and then using that creatively. That is quite spiritual; using it for something artistic.

Clive Akass

### PCW Details

**Organic Art** costs £29.99 and is available at Dixons, HMV and other major outlets. *Evolutionary Art and Computers* is published by Academic Press, 1992, ISBN 0-12-437185-X.

# A little local colour

Translating software is no easy matter — a look at the SDL company shows there is more to it than you might think.

**M**ICROSOFT'S GLOBAL marketing strategy has focused other software companies' attention on the need for localisation: taking a piece of software written with English (or at least, American English) on-screen text and documentation and reproducing it in a local language version.

Whereas Microsoft launches its 30 or so non-English versions more or less simultaneously with the English release, the majority of software houses prefer to attack the English-speaking markets first. Only when they have a success on their hands with English markets will they think about selling to Europe or Japan.

The conversion of an existing product is handled by localisation organisations such as Maidenhead-based SDL, which works on products for many major software houses including Corel and Broderbund. SDL has a whole floor of translators, software engineers, and drawing and DTP specialists working on some 15 different projects at any one time. Most of the translations are into German, French or Japanese, so there are a number of in-house native-tongue translators who are technically-minded and able to think in software terms.

## Approaching the hurdles

On first pass you might consider localisation a simple matter of taking the help files, toolbars, dialogue boxes and documentation and just translating them into a different language. But it's not that straightforward, especially as few software companies develop their software in a localisation-ready format.

"Typically, a company starts up, gets a hit, ships a lot of product and then wants to go into Europe," says Mark Lancaster, managing director of SDL. "But most companies don't think about it until long after the software has been produced, with the localisation hurdles already built in to them."

Instead of keeping all the text stored separately in specific resource files, it tends to get merged within the software and artwork elements, so half the localisation work involves locating and extracting the English text elements.

## Bank statement

After translation, any text that isn't held in the resource files is re-embedded deep within the program and can cause problems, such as hotkey conflicts. These are identified by running the software on a bank of assorted PCs which are used to check that the localised software is working correctly.

Background and menu graphics incorporating elegant text elements make software look great, but can be time-consuming to convert. Only a few software developers think of creating the text as an overlay on the graphics, which would then make it easy to remove the English words and replace them. In all other cases, a graphic artist has to manually erase the text from the image, fill in the holes in the backgrounds and then find a suitable typeface to add in the new language version.

Alongside the graphics specialists are the translators working on the manuals using DTP. Converting from English



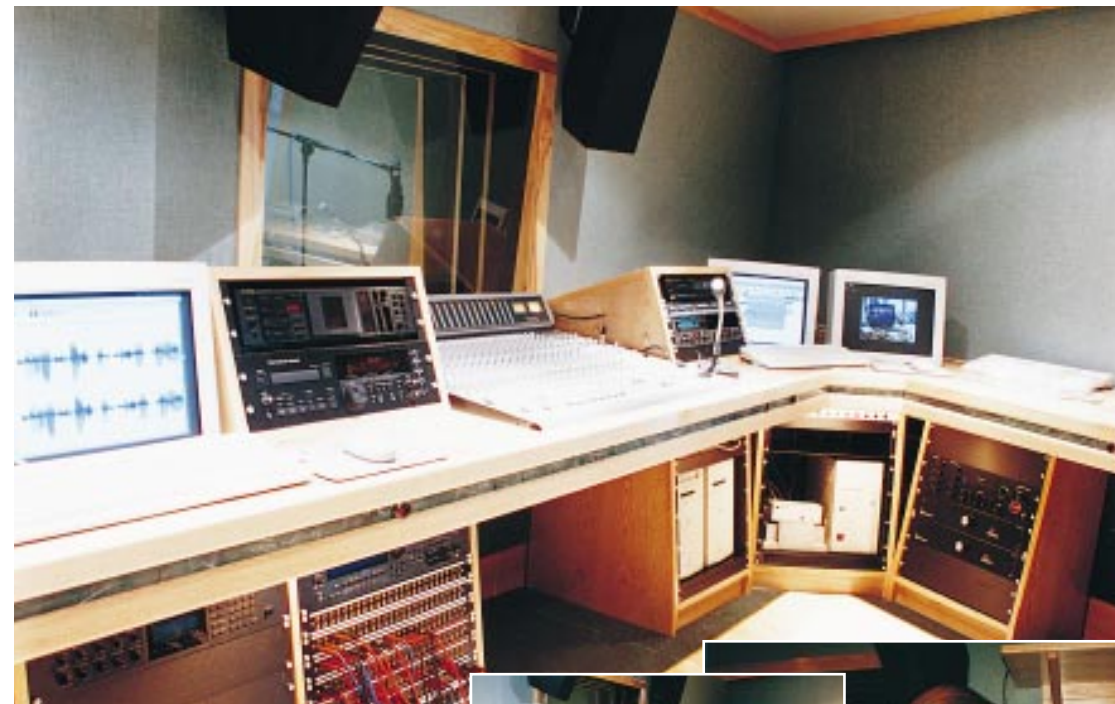
Lancaster: sees multimedia translation as the way forward, in the home and in education

inevitably means a re-jigging of layout.

"Documentation has a lot of screenshots, and also because English is so concise; when you translate it the number of words increases. You have to be careful to anchor the screenshots to the matching bit of the text, or the text and the images can end up on different pages."

The company's computer systems are substantial, linked together in one NT and three Novell networks. "In a sense, Novell is more mature, but NT is better at cross-platform," explains Lancaster.

The networks talk to the outside world via a range of telecoms systems,



SDL has built two recording studios, specifically for translating voice clips in games and CD-ROM office software



including several BBSs and direct links to clients. SDL has access to some 300 freelance translators scattered across the globe, as well as clients wanting to move huge files back and forth, so the comms links are an essential part of the hardware system

"With the BBSs, people can drop or pick up files. We are now putting a 64Mb/sec line into the company, because at this rate we can get a 400Mb file transferred to or from the US in 11 minutes. When you are dealing with files of a million words, this is important."

## Looking ahead to automation

In the future, there is the possibility of automating the translation process using dedicated software. But the translation products available fall short of the requirements for real-world work.

"There is machine translation where, in theory, you feed in English and out comes German or French. It is a technology in which we are very interested but unfortunately it is not at a level where it can be used. The area where it works well is mechanical translation — things like a maintenance manual where it simply states: 'Take spanner No 2. Tighten bolt. Replace cover'. If you try and translate more complex sentences, it won't produce usable results. There has to be a

real time means the network needs to be fast. While the current system can handle 10Mb/sec, SDL has found a hub/server technology that will give them transfer rates of up to 100Mb/sec and this will be installed at the heart of the recording system in the near future.

Translating for multimedia presents its own problems. The text is often more colloquial, and has to be matched on a syllable-by-syllable basis so it can be lip-synced to the software's video or animation elements; just in the same way movies are dubbed.

In the movies, though, the voice track is kept entirely separate from any background effects and atmospheres, so that the new voice can be overlaid onto the existing effects. So far, multimedia developers put it all on to one track. This means that while recording the

translation, the engineers have to simultaneously add the atmospheres and equalisation to match the game's original soundtrack.

## Multimedia matters

SDL's localisation encompasses multimedia projects, too. It has built two recording studios specifically for translating voice clips in games, edutainment and CD-ROM office software, which is increasingly adding audio, animation and video inserts.

The recording is carried out directly to hard disk using a 24-track analogue mixer in one studio, and Yamaha's latest all-digital mixer, the 02R, in the other. The computer line-up is half a dozen PowerPCs in a network with a 70Gb Pentium server running on NT, which Lancaster feels is "the best server mechanism to Macintosh stuff. We don't really need to go to Unix boxes, which are somewhat unfriendly."

All the audio (mostly single words or phrases) is recorded at CD quality in separate voice files and stored on the server's hard disk array. A major multimedia game like Myst will have up to 4,000 separate voice files, which can easily run to several gigabytes of data.

Moving this level of data around in

When the files are all done they are down-converted from CD quality (44.1KHz sampling/16-bit) to the 11kHz/8-bit used by CD-ROM games to conserve space and speed up the transfer of audio during gameplay. The conversion is handled with more sophisticated software than you'd find in a normal recording package so that some semblance of quality can be maintained.

## Home and away

But multimedia localisation is only a small part of the market — maybe only 15 percent of SDL's localisation work at present. But Lancaster says it's growing. "Look at what's happening in the US with the spread of PCs — the same will happen here.

"As the price of multimedia PCs comes down, the number of PCs in the home rises dramatically. As that happens, people will want to have their multimedia software translated, especially in the education market where nobody wants software in anything but the local language."

Tim Frost



# PCW online

<http://www.vnu.co.uk/hc/pcw>

**W**E'VE BEEN ON THE INTERNET for several months now, but decided to wait until we were happy with our site before blowing our own trumpet, in print.

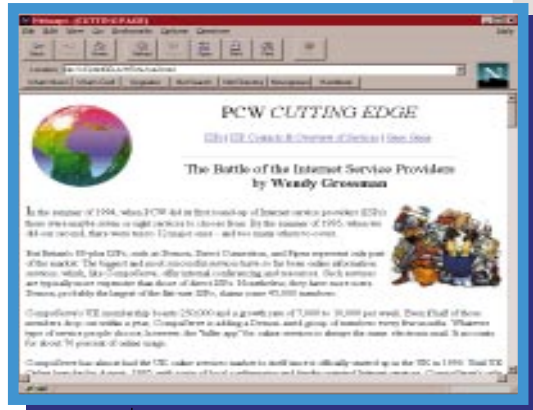
In the Internet nineties, you can enjoy Britain's favourite computer magazine in any of three ways. There is, of course, the nice fat printed version you have in your hands at this moment. But if you have a modem there are two, new, exciting options: using the Internet, you can visit our Web site; or if you're a member of AOL, you can check out our AOL site.

#### The PCW Web site

Our Web site is backed by the worldwide resources of VNU Business Publications, which includes VNU European Labs and the Matrix Publishing Network.

Our Web pages are served from the latest Sun Workstations and join the backbone via ultra-fast leased lines.

Our in-house facilities mean that PCW does not have to rely on third parties to deliver online services, which means a better service for our readers.



Check out the hotlinks and funky Web sites

#### PCW on AOL — no extra charge

An exclusive partnership with the UK's fastest-growing online service, AOL, means that PCW is fully available to AOL members at no extra charge. Simply click on our logo on AOL's main screen and be taken to the PCW area.

If you haven't got an AOL account, ring AOL on 0800 37 65 432 for a free trial disk.

#### Experts

The pages on our Web site, and our exclusive area on AOL, are written by the same industry experts and opinion formers that you have come to expect from the magazine. And remember,



The whole world of Personal Computer World is here

PCW is still the only UK PC title to cover all computer platforms, from DOS, Macintosh and Windows 3.11, all the way up to esoteric systems such as Linux.



The latest news, reviews and features. You can respond to our hot news items in our chat areas



**Above**

*Our new online home page*

**Above right**

*Dishing the dirt — all you've ever wanted to know about PCW. And read our "rogues gallery" of editorial staff!*

**Access on the Web**

From now on, you can access us via the World Wide Web on the brand new, improved, *PCW* Web site. **Simply point your browser (Netscape 2.0 or Microsoft Explorer) at <http://www.vnu.co.uk/hc/pcw> and indulge yourself.**

And, unlike rival publishers, we know that download time is precious, so we have designed our Web pages to keep download times to a minimum.



forums — and there will be surprises from time to time in both areas.

We hope you'll enjoy *PCW* Online. See the panel below for a taste of what you will find.

**New technologies**

Our intention over the coming months is to make our Web site state-of-the-art by including the new technologies ShockWave and Java.

You will also notice a synergy between our Web site and the AOL

**Watch our space**

This is just the start. *PCW* will continue to develop both AOL and Web sites to take advantage of new technologies as and when they come along. We look forward to seeing you on our sites.

**PJ Fisher** 

**What's in store on PCW Online**

☆ **Newsprint**

Edited by industry veteran Clive Akass. New products, industry trends and alliances are all actively monitored. From now on, the hottest news stories will be selected and re-edited for online. But the real advantage of *PCW* Online is that the news becomes interactive; you can respond in our chat areas and, as in the case of the fake cache scandal (March issue), even download software to check whether your PC is affected.



If it's hot news, you'll find it on our new online sites.

☆ **Cutting Edge**

*PCW* was the first UK PC title to devote an entire section to the Internet and leading edge technology. If it's happening on the Internet, you can be sure that *Cutting Edge* will tell you about it. And now, with *Cutting Edge* online, you can check out funky new Web sites and hotlinks for yourself.

You need no longer just read about hot, new Web browsers and HTML tools — you can download them instantly.

☆ **Features**

Each month, we will put up at least two key features from our current issue. These will range from complete group tests, to industry analysis, to interviews with industry figures such as Bud Colligan of MacroMedia, and Ed Krol, author of *The Whole Internet*.

Look out, too, for our exclusive round-up of the 50 best utilities in the world — coming soon!

☆ **Reviews**

*PCW* is renowned for the breadth of its software and hardware reviews in our *First Impressions* section. As with all sections on both AOL and the Web site, all WWW addresses mentioned in

copy will be converted to hyperlinks.

☆ **Shareware**

As a new service, *PCW* is building a comprehensive new shareware library which will be accessible from both the Web and AOL, which means that you will be able to download software and games at any time. And if you have missed any of *PCW*'s cover CD-ROMs we will put everything from those into the shareware library, too. And, we will provide links to key shareware sites around the world for you to check out.

☆ **Back issues**

As the months progress, each online issue of *PCW* will be stored in a "back issue" section on the Web site and on AOL so that you can search for vital reviews, features or news stories you may have missed first time around. Just click on the icon at the start of either our Web site or our space on AOL, for the library of back issues.

We also plan to include the full text of all back issues as Adobe Acrobat files (PDFs). Once you've downloaded the Acrobat viewer, also available on our site, you will be able to view and print out *PCW* articles, exactly as they appeared on the printed page.

☆ **Subscriptions**

You can now subscribe to *Personal Computer World*, online. No more hassle with fax machines or envelopes.

☆ **Feedback**

Sending email to *PCW*'s editorial staff is now just a couple of clicks away. We always welcome feedback on the printed, and now online, versions of *Personal Computer World*.

☆ **Best of British**

*Best of British* contains our selected listings of the best UK-based Web sites. Now over a year old, it's proved one of the most popular areas on our Web site.

# Chip Wars

Intel and Cyrix are the two main contenders in the battle of the chips. *PCW* looks behind the hype at what they have to offer, and asks: how serious a threat is Cyrix to the Intel crown?

**A**CCORDING TO MOORE'S Law (formulated in 1965 by Gordon Moore, co-founder of Intel), CPUs double their capacity and capability every 18-24 months. A perfect example of this is the development of the x86 line of processors.

A mere 18 years ago, the 8086 ran at a "speedy" 4.77MHz and had under a million transistors. Now we have the Pentium Pro with a clock speed of 200MHz and an on-chip total of 21 million transistors.

Cyrix and Intel are continuing this trend. Over the past six months each has released chips that appear to have almost identical performance abilities and similar prices, although both claim their chip is better than the other's. If this is true, it will be the first time in many years that there has been genuinely equal competition in the processor market.

One of the hardest choices facing the PC buyer today is what kind of processor to get. Issues such as future-proofing, compatibility with hardware and software, and above all, cost, mean the right choice can be a gut-wrenching experience.

Most consumers have tended to

purchase chips from Intel (the dominant player in the market) due to familiarity, cost and availability. Intel supplies roughly 80 percent of the CPUs in the world's desktop PC market.

This situation has been complicated by the emergence of the new Cyrix 6x86 chips. These are touted to outperform Intel's Pentiums, even though they don't run at the same clock speed. This indicates Cyrix's ambitious plans to capture ten percent of the processor market before the year is out.

## Pentium — the standard

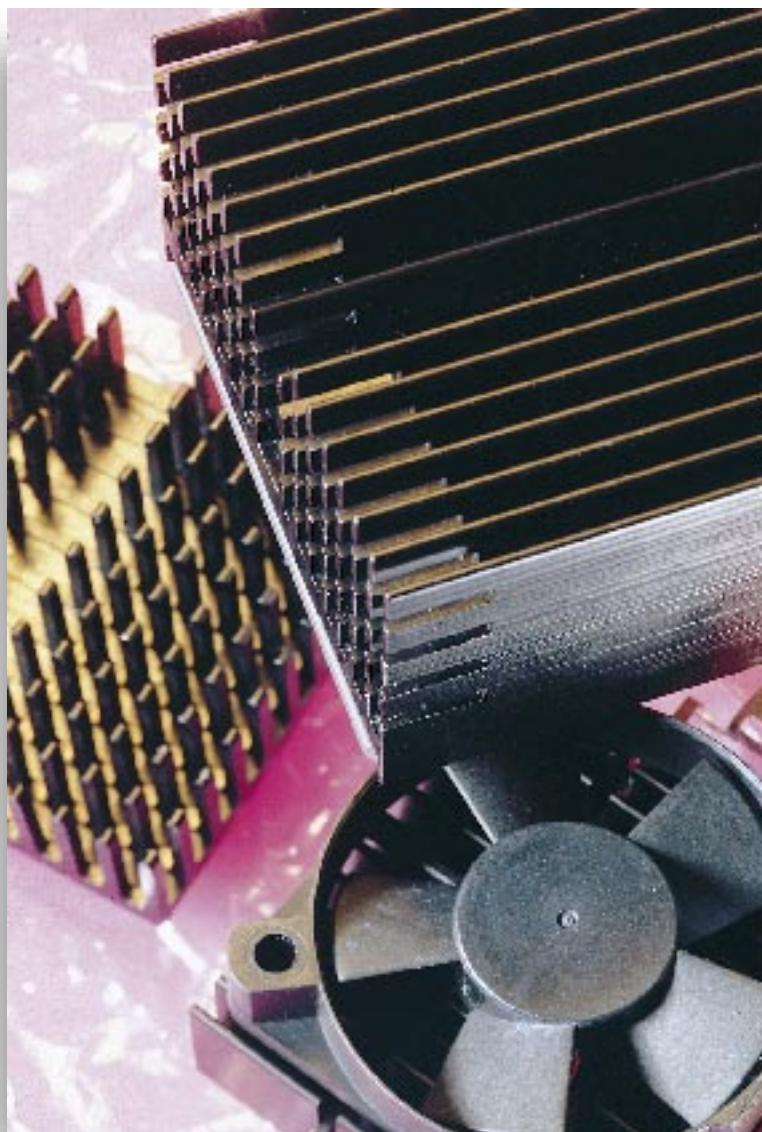
In every computer showroom or major sporting event across the world you'll find the advertising legend "Intel Inside". And why not? Intel is the dominant player in the processor market and there's a good reason for it. It has managed, over the past ten years, to doggedly follow Moore's law and stay ahead of the competition by releasing more powerful chips for the PC before any other

company. The Pentium is a prime example of its guile and success. With an estimated output of 50-60 million CPUs a year, Intel has a near world-monopoly.

The introduction of the Pentium revolutionised the PC market by putting more power into the case of your average PC than NASA had in its air-conditioned computer rooms in the early sixties. The Pentium's architecture is a leap forward from that of the 486. What exists on the Pentium, as we will see later, now exists on practically all PC-based processors, including the Cyrix 6x86 and especially the Pentium Pro.

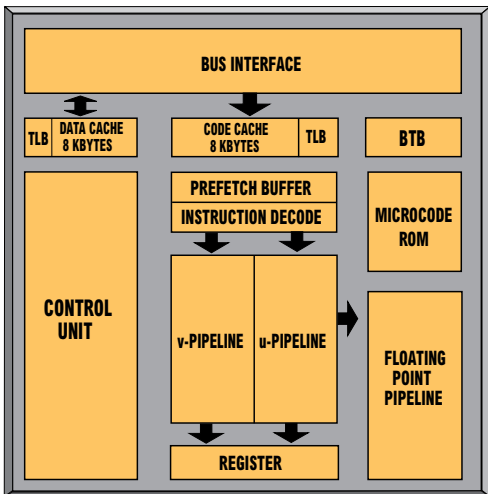
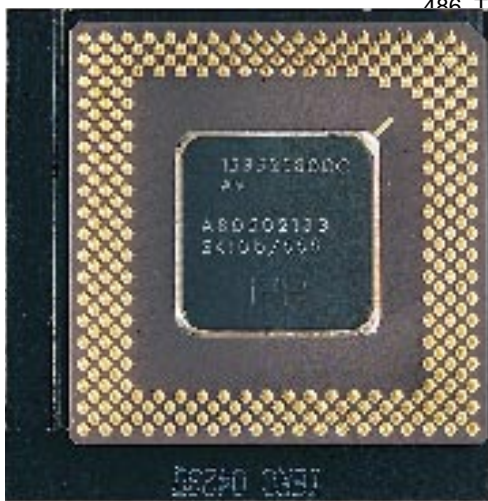
First off, it is a CISC-based chip with over 3.3 million transistors and is currently fabricated on a 0.35 micron process. Internally, the processor uses a 32-bit bus but externally the data bus is 64 bits wide.

The majority of Pentiums (75MHz and above) operate on 3.3v with 5v I/O protection. The Pentium has a dual pipelined superscalar design, allowing it



PCW Chip Photography by David Whyte

**Pentium**



Intel's Pentium architecture set the standard by including a dual pipeline and branch prediction.

486. These caches contribute to improved performance because they act as temporary storage place for data and instructions obtained from the slower main memory. The Branch Target Buffer (BTB) provides branch prediction. The BTB reduces instruction execution by "remembering" which way an instruction branched and applying the same branch target time the instruction is used. If the BTB makes a correct prediction, performance is improved. An 80-point Floating Point Unit provides the arithmetic capability to cope with the calculations used in software such as AutoCAD and 3D rendering applications. A System Management Mode (SMM) for controlling the use of the processor and other peripherals rounds out the design. Pentium's architectural features have now become the standard for all PC chips. Few PC buyers would settle for anything less than what is currently on offer.

Pentium is fast. Ever since the introduction of the Pentium 75MHz chip and now with the expected arrival of the Pentium 200MHz chip, its performance has never been concurrently equalled, only followed. Now, though, there is a serious challenge to the Pentium in the form of Cyrix, its traditional competitor.

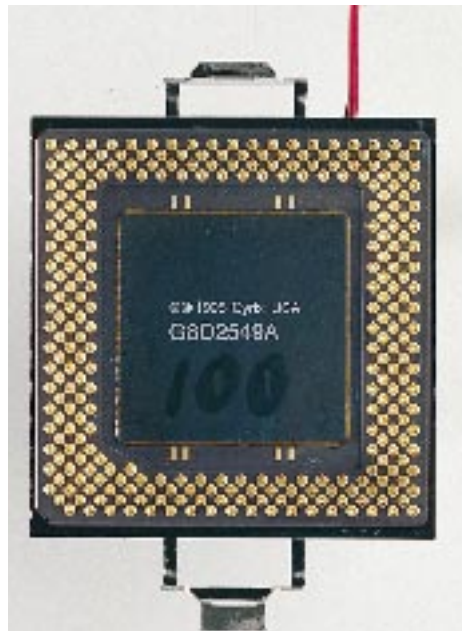
**Cyrix — the challenger**

Even though Cyrix has been

around for a long time, the company always comes across as a contender. This is due to the dominance of the market by Intel and the fact that Cyrix was never able to take the lead in the processor market.

The tide may be changing in Cyrix's favour. During the last four months, Cyrix has announced four new chips in its 6x86 P-plus line that are touted to equal or

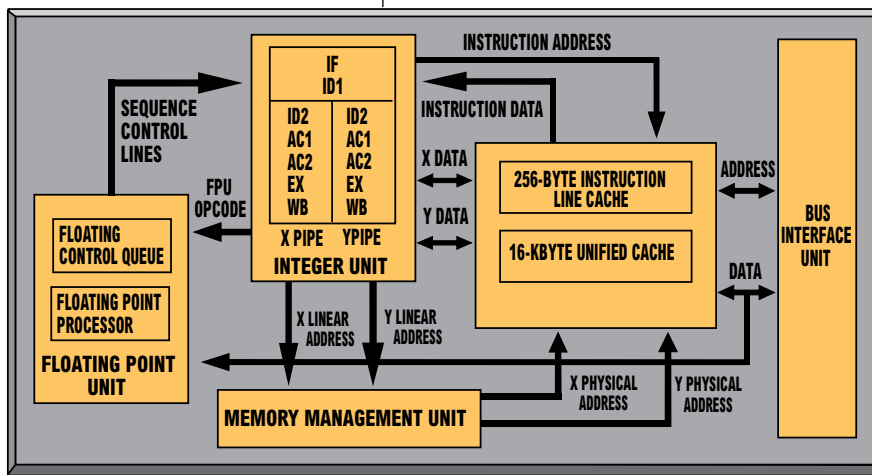
**Cyrix**



The 6x86 incorporates Pentium Pro-like architecture that fits into a 296-pin P54C socket

to execute more instructions per clock cycle. There are still five stages (Prefetch, Instruction Decode, Address Generate, Execute and Write Back) in the execution of integer instructions, like that of the 486, but because there are two pipelines the processor completes two instructions per cycle. An important aspect of superscalar design is that the pipeline is always ready for another instruction: once past the prefetch stage, another instruction can be fed in.

The Pentium also uses two 8Kb, two-way set, associative buffers (also known as primary or L1 cache), one for instructions and another for data. This is twice the amount of its predecessor, the



surpass Pentium performance.

The chips that have been released are the 6x86 P120+, P133+, P150+ and P166+. Cyrix has chosen to implement the new P-plus rating (see *Newsprint*, April 96) as a way for the consumer to compare Cyrix and Intel chips. What makes the 6x86 chips unique is that they run at a much slower clock frequency than their respective Pentiums, yet they can outperform them. The P120+ runs at a clock speed of 100MHz, while the P133+, P150+ and P166+ run at 110MHz, 120MHz and 133MHz respectively.

The reason for this performance gain lies in the chip's architecture. The 6x86 differs radically from the Pentium; in fact, it's almost identical to the Pentium Pro. It's a sixth-generation superscalar, superpipelined processor, able to fit a Pentium P54C socket. It contains 3.5 million transistors and is manufactured on a 0.5 micron five-layer process. This is larger than a similar Pentium, but Cyrix expects to optically shrink this to 0.35 microns by late 1996, to increase clock speed. It has a 3.3v core with 5v I/O protection.

The 6x86 features, like that of the Pentium, are: superscalar architecture, 80-bit FPU, 16Kb L1 cache and SMM. Its differences become apparent when you look at what's been added. The 6x86 is superpipelined, meaning there are seven, instead of five, pipeline stages (Prefetch, two Decode, two Address Generation, Execute, and Write-back) to keep information flowing faster and avoid execution stalls. Also present is Register Renaming, providing temporary data storage for instant data availability without waiting for the CPU to access the on-chip cache or system memory.

Other new features include data dependency removal, multi-branch

prediction, speculative execution and "out-of-order" completion. The presence of these architectural components helps prevent pipeline stalling by continually providing instruction results: predicting requirements, executing instructions with a high level of accuracy and allowing faster instructions to exit the pipeline out of order, without disrupting the program flow. All this boosts 6x86 performance to a level beyond a similarly-clocked Pentium.

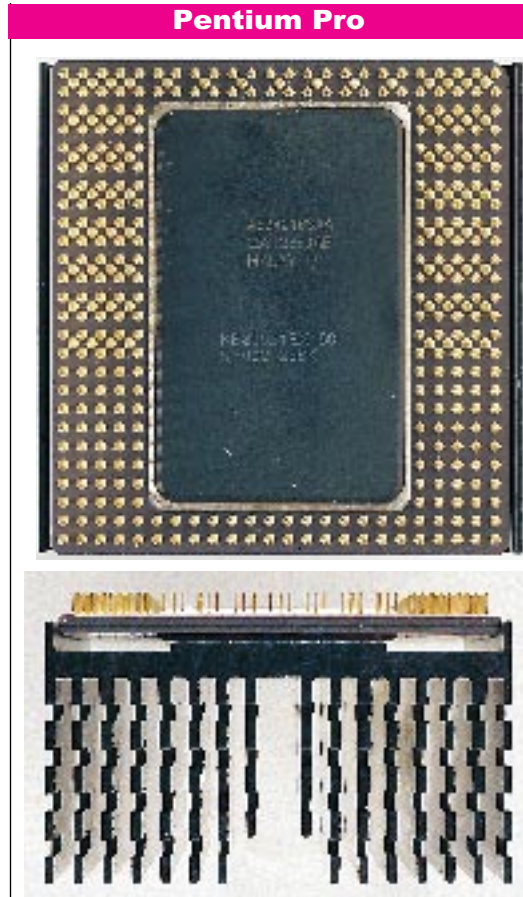
The real key to the 6x86 is its processing of code. It handles code in "native mode"; it fully optimises the x86 CISC instruction set. This applies to both 16- and 32-bit code. The Pentium does this, too, but by contrast a Pentium Pro requires the conversion of CISC instructions to RISC (or micro) operations before they enter the pipelines. Consequently, the 6x86 execution engine, unlike the Pentium Pro, doesn't take a performance hit when handling 16- or 32-bit applications because no code conversion is required. The Pentium Pro, on the other hand, is known to be designed as a pure 32-bit processor and 16-bit instructions can stall considerably while in its pipeline.

All of these additional architectural features add up to one thing for the Cyrix 6x86: better performance at a lower clock speed. Compared with a Pentium on a clock-for-clock basis, the 6x86 is a

more efficient chip.

### Pentium Pro

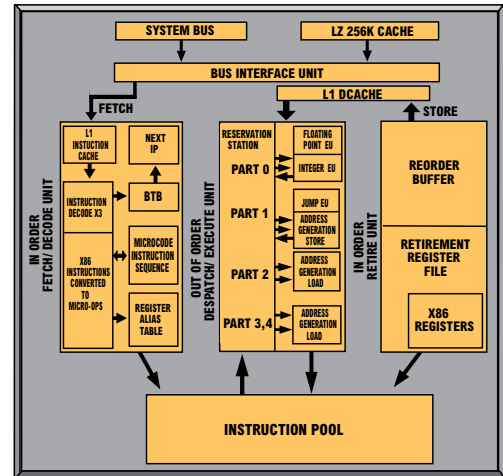
The Pentium Pro is still the big chip of the bunch. With a CPU core consisting of 5.5 million transistors and 15.5 million transistors in the L2 cache, it easily out-muscles both the Pentium and the Cyrix. The 6x86 and Pentium Pro may be superscalar, superpipelined, register renaming, out-of-order executing, multi-branch predicting, number-crunching



More features equals more silicon. The Pentium Pro's complex architecture means a larger package and 91 more pins

### TABLE OF FEATURES

Architectural Features	Pentium Pro	Cyrix 6x86	Pentium
Superscalar	●	●	●
Superpipelined	●	●	○
Register Renaming	●	●	○
Multi-branch prediction	●	●	○
Speculative execution	●	●	○
Out-of-order completion	●	●	○
80-bit FPU	●	●	●
Data dependency removal	●	●	○
Full x86 instruction set optimisation	●	●	○
16Kb (or more) L1 cache	●	●	●
KEY ● Yes ○ No			



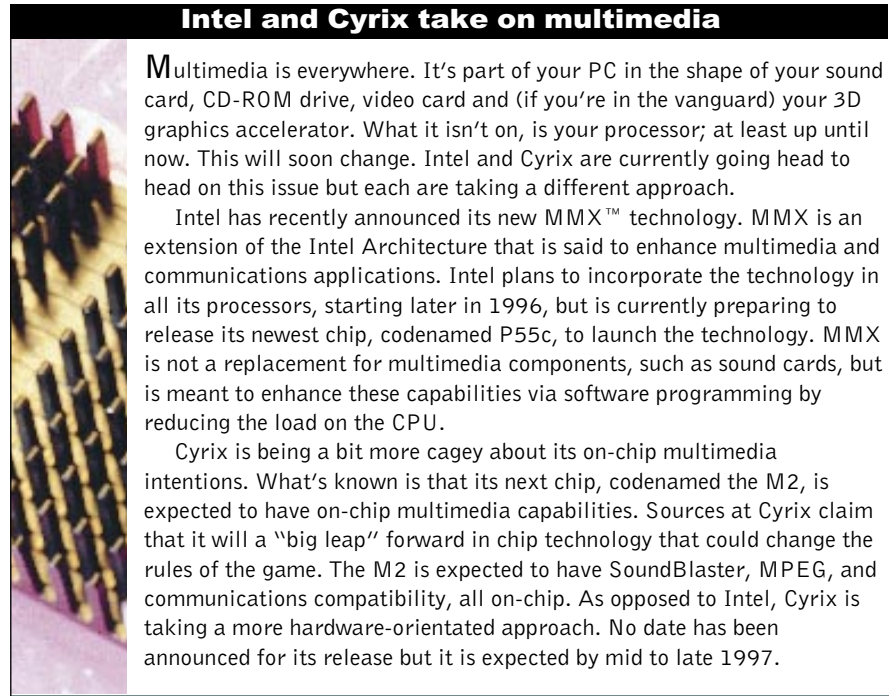
mamas but they still have their differences.

A key feature of the Pro is the size of its L2 on-chip cache. Starting at 256Kb, it is the largest of any PC-based processors. Because the L2 cache is on the processor it runs at the internal clock speed, which means faster access to a larger pool of stored instruction data. Also different from the Cyrix and the Pentium is the number of stages in the pipeline. At 14 stages, divided into three sections, the Pentium Pro gives true meaning to superpipelining.

The in-order front-end section, which handles the decoding and issuing of instructions, consists of eight stages. An out-of-order core, which executes the instructions, has three stages and the in-order retirement consists of a final three stages.

The other, more critical distinction of the Pentium Pro is its handling of instructions. It takes the CISC x86 instructions and converts them into internal RISC-like micro-ops. The conversion is designed to help avoid some of the limitations inherent in the x86 instruction set, such as irregular instruction encoding and register-to-memory arithmetic operations. The micro-ops are then passed into an out-of-order execution engine that determines whether instructions are ready for execution; if not, they are shuffled around to prevent pipeline stalls.

There are drawbacks, though, in using the RISC approach. The first is that converting instructions takes time, even if calculated in nano or micro seconds. As a result, the Pentium Pro inevitably takes a



## Intel and Cyrix take on multimedia

Multimedia is everywhere. It's part of your PC in the shape of your sound card, CD-ROM drive, video card and (if you're in the vanguard) your 3D graphics accelerator. What it isn't on, is your processor; at least up until now. This will soon change. Intel and Cyrix are currently going head to head on this issue but each are taking a different approach.

Intel has recently announced its new MMX™ technology. MMX is an extension of the Intel Architecture that is said to enhance multimedia and communications applications. Intel plans to incorporate the technology in all its processors, starting later in 1996, but is currently preparing to release its newest chip, codenamed P55c, to launch the technology. MMX is not a replacement for multimedia components, such as sound cards, but is meant to enhance these capabilities via software programming by reducing the load on the CPU.

Cyrix is being a bit more cagey about its on-chip multimedia intentions. What's known is that its next chip, codenamed the M2, is expected to have on-chip multimedia capabilities. Sources at Cyrix claim that it will a "big leap" forward in chip technology that could change the rules of the game. The M2 is expected to have SoundBlaster, MPEG, and communications compatibility, all on-chip. As opposed to Intel, Cyrix is taking a more hardware-orientated approach. No date has been announced for its release but it is expected by mid to late 1997.

performance hit when processing instructions. The 6x86 with its native mode processing, however, is free from this conversion load.

A second drawback is that the out-of-order design can be particularly affected by 16-bit code, resulting in stalls. These tend to be caused by partial register updates that occur before full register reads and they can impose severe performance penalties of up to seven clock cycles.

The Pentium Pro is Intel's most powerful desktop chip available. With clock frequencies ranging from 150MHz to 200MHz, on-chip L2 caches of 256Kb

or 512Kb and advanced architectural design, it out-muscles all before it. But its weakness with 16-bit applications currently limits its appeal to high-end users. In contrast, the Cyrix incorporates Pentium Pro-like features without sacrificing performance of either 16- or 32-bit applications.

## The results

Admittedly, we were sceptical about the hype surrounding the 6x86. All the Cyrix publicity and previously published benchmarks point to the 6x86 processors with equivalent P-plus rating outperforming the Pentium. However, our tests did show that the hype was true. With the subsystem components identical, there was little room for error.

The VNU Windows 95 test showed that the Cyrix 6x86 chips outperform the Intel Pentium processors by an average of two percent. This is an amazing feat if you consider that 6x86 chips run at a much slower clock speed than the Pentium. Cyrix's use of advanced architecture such as superpipelining, speculative execution and out-of-order completion make their mark.

The test results prove that the 6x86 is far more efficient at processing instructions than the Pentium. As expected, the Pentium Pro performed poorly under the Windows 95 test, showing that it is a chip designed solely for 32-bit applications.

The only odd result occurred with the Doom2 test. The 6x86 test scores came up about two to six frames slower than

## Benchmarks: what does it all mean?

How do the Cyrix 6x86 and the Pentium really compare? Both companies have their own benchmarks which show that their processors are better, but how real are these results considering they are benchmarked on highly-specified PCs? Consider the MDR labs P-plus benchmark. The subsystem of the MDR benchmark PC consists of 32Mb 60ns EDO-RAM, 512Kb pipeline-burst cache and a Matrox Millennium graphics card with 2Mb of WRAM — this is not your typical home or office PC.

We tested the processors under Windows 95 on what we considered a fairly average PC. We ran a Doom2 test, too. The 6x86 chip was compared with the Pentium using its relative P-plus ratings, not its actual clock rates, because this is how Cyrix has been marketing them. So, the Cyrix P150+ was compared to a Pentium 150MHz chip, even though it has a clock frequency of 133MHz.

The chips were tested on an Amari Fusion P-series PC with an Elite Group TR5510P motherboard and Award BIOS. The subsystem consisted of a Quantum 1208 1.2Gb IDE HDD, 16Mb 60ns EDO-RAM, 256Kb pipeline-burst cache and a Matrox Millennium graphics card with 2Mb WRAM. A Dell XPS Pro 150 Pentium Pro rounded out the test. Although there is no way to achieve a direct comparison with a Pentium Pro due to socket, BIOS and motherboard incompatibilities, we included it to give a good idea as to how it performs under Windows 95. All the major subsystem components were used in both machines (except L2 external cache and the EDO-RAM for compatibility reasons) to ensure consistency.

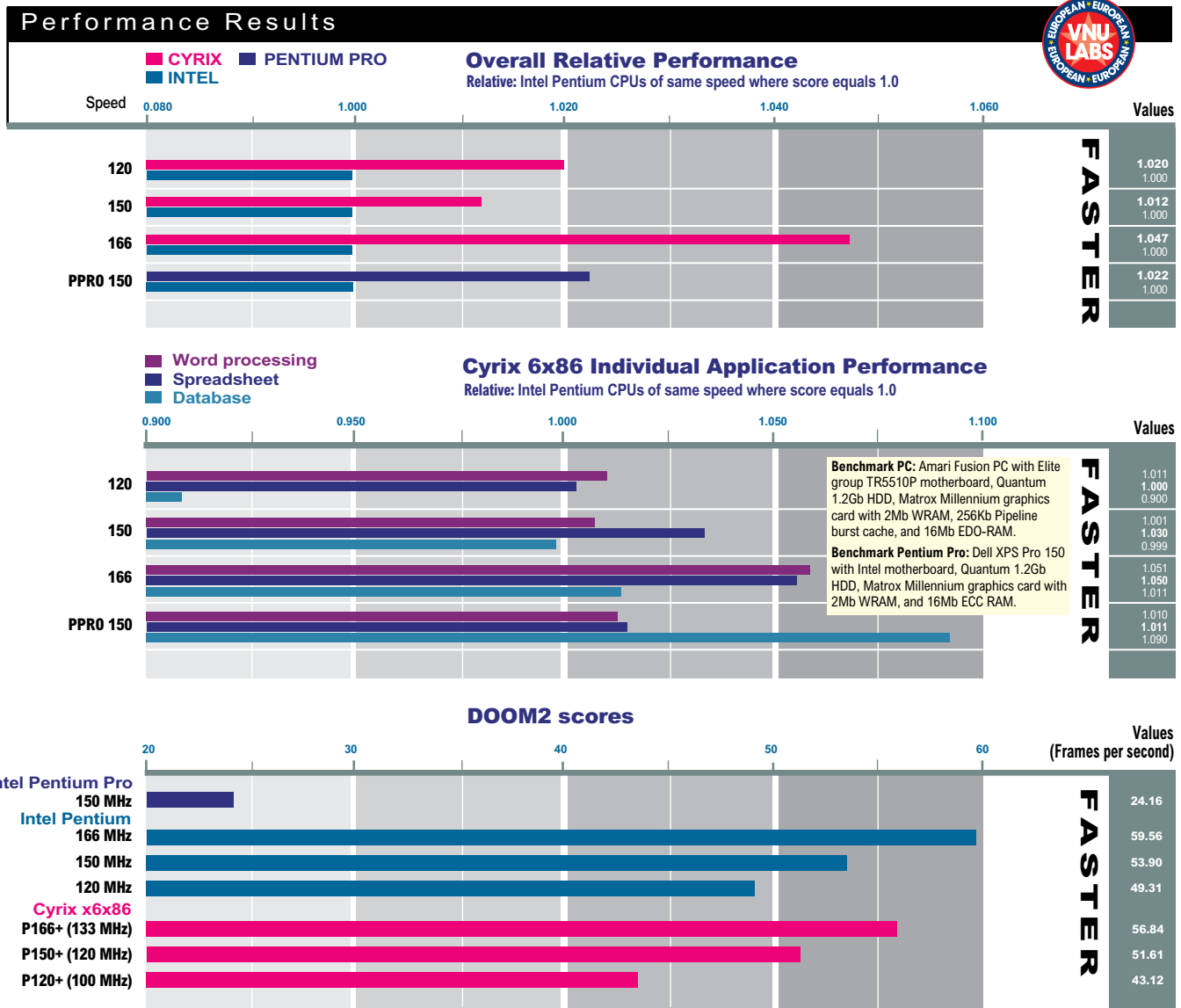
the Pentium. According to industry sources, this has more to do with the Doom2 software and the way it identifies processors, than the chip itself.

Of course, the proof of the pudding is in the processing of applications, not games. So on this front, the Cyrix 6x86

beats the Intel Pentium and could be considered a serious threat to the Intel hegemony. The question that remains is: will Cyrix be able to convince the average PC buyer to change loyalties and make the switch? With its top performance, some good marketing and a competitive

price, it might just pull it off.

Dylan Armbrust



FASTER

FASTER

FASTER

Lab Tests

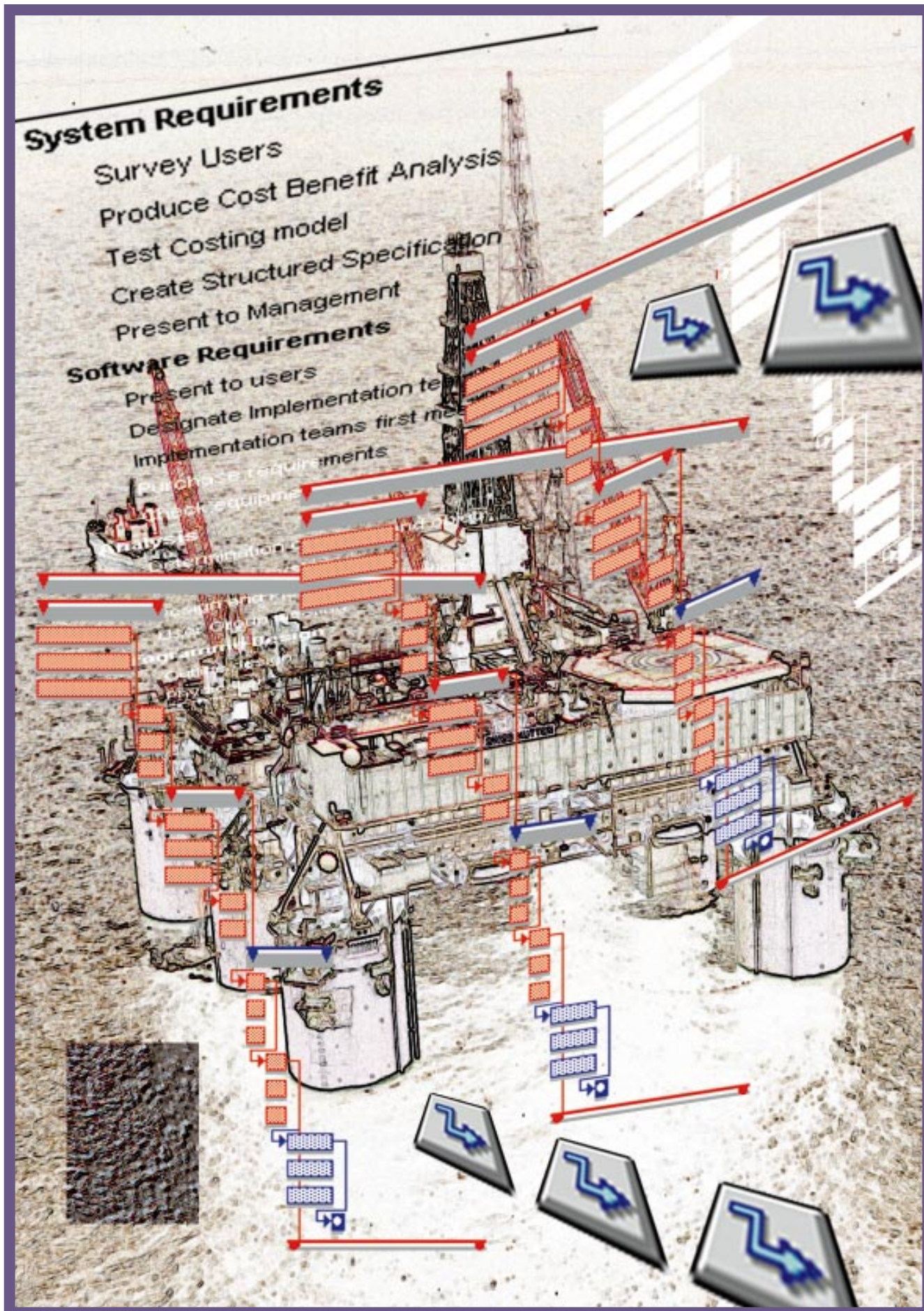


Ensuring that like really is being tested with like is tricky when evaluating processors. Although Cyrix's CPUs really are Intel pin-compatible, after switching processors you need also to ensure that the motherboard jumper settings are matched to the processor clock speed. This caught our testers out on more than one occasion and rendered results way below par for the Cyrix chips. Although the processor may boot, incorrect motherboard and core speeds can turn in performance up to 43 percent below the comparable Intel benchmarks.

So much for performance: compatibility is the other serious concern if you decide to go with non-Intel processors. As well as the standard range of Windows applications used to measure speed, we also ran all the tests in an NT environment to double check that there were no hidden nasties: luckily, the Cyrix chips ran without

errors. As we only ran these tests once, the data collected is probably too scanty to be a reliable performance benchmark, but the indications are that the Cyrix processors hold up very well in a 32-bit environment.

The area in which we did notice a slight performance hit was with older DOS applications running in the Windows 95 DOS box. These went slightly slower than we expected and were marginally beaten by Intel's offerings. A speculative reason for this is that the predictive branching and other, more advanced, Cyrix features have been fine-tuned for the more popular Windows-only environment. The Pentium would not attempt such aggressive optimisation of the same code at all, and may therefore suffer from fewer cache misses than the Cyrix. In any case, the differences are too small to be noticed by any real-life application users.



# Taken to task

Whether you're a project management neophyte or a corporate wizard, our 11-strong software review assesses a range of packages to suit all pockets.

**O**FTEN SHROUDED in mystery and jargon, Project Management (PM) software can play an important part in your busy life. For private or professional work, it can help you plan, allocate and complete individual tasks to achieve your goals.

In its simplest form, it's quick, easy to learn and ideal for occasional or home use. At its most complex it can be infinitely customisable to handle corporate projects; planning thousands of activities over hundreds of years. It's also becoming increasingly accessible, with prices starting at under £200.

If you're completely new to project management — don't panic, there are sections to explain all: *Steps in Project Management*, on page 190, takes you through the construction of a simple project; and our *Glossary of Project Management Terms*, on page 193, will help you decode the PM lingo.

The background to modern project management stems from the 1950s:

- 168 Acos Compact 6.0
- 169 Asta PowerProject 3.1
- 170 CA-SuperProject 4.0
- 172 Microsoft Project 95
- 174 Open Plan Professional 1.1
- 176 Primavera Project Planner 1.1
- 179 Project Scheduler 6 for Windows
- 181 Project Workbench PMW
- 182 Schedule Publisher 4.2
- 185 SureTrak 1.5
- 186 Timeline 6.5
- 188 **Editor's Choice**
- 188 Table of Features
- 190 Step by step guide
- 193 Glossary of Terms
- 193 Case Study: The Plymouth Rescue Boat Team
- 195 Case Study: Atlantic Power and Gas

project planners developed methods to help them manage very complex projects and control expensive resources and materials to ensure they delivered their projects on time. The first nuclear power stations, space missions and submarines were constructed using project management tools. The software that can be bought today uses the very best methods from this work, combining them with ease of use, powerful processing and informative graphical displays.

Windows project management software helps you to control the factors that will affect a project: the time, the materials, the cost, and the progress. It helps you to see where the problems and difficulties lie. It helps you to track the progress of a project and maintain the schedule.

In this group test we review the latest packages costing from less than £200 to £12,500, to help you find the one best suited to your needs.

PCW Artwork Illustration by Fred Salmon

Michael Eagleton



# Compact 6.0

Acos Compact is a derivative of the professional package, Acos Plus 1, developed and used within major organisations in Germany. This low-cost package provides all the basic project management tools and applies its own approach to project management processes.

Acos Compact requires a 386 or higher with 12Mb of free disk space. There's nothing in the front of the manual about installation, so I popped in the first diskette and ran Setup from within Windows. The installation routine prompts you for a choice of languages (German, English or French), then asks for default directories to be allocated. I promptly typed in the relevant information and the PC locked up.

Having tracked down the installation requirements in the manual, I discovered that directories need to consist of exactly six characters — not exactly user friendly, especially in this age of long filenames. When you're past this hurdle, a single icon appears on your desktop and a double click starts

the application.

Acos Compact approaches projects in a unique way by asking you to map out the Work Breakdown Structure before task entry, applying a top downwards approach to construction. The first thing you are required to do is to build the mask or template for your WBS coding. Instructions suggest you set the level structures to two, five and eight, representing the character spacing for codes such as 11,11-11 and 11-11-11, including the separators. Another screen lets you input the WBS codes in graphical format.

Input of the WBS Boxes consists of un-intuitive left and right mouse clicks, followed by a textual input screen. Strangely, the input screens work in type-over mode which can cause problems when entering new data if the new bits are shorter than existing ones. The graphical construction is a novel approach, but fiddly.

The next stage in the input process gives you a bar chart view. Again, right



and left mouse clicks allow you to clear and make selections. Relationship linking is a right click to check deselection, a left click on another bar to bring up the confirm link dialogue, and a right click to deselect again.

When you add New items to the libraries, the text of the last item remains displayed, again requiring you to type over and delete the unnecessary.

An interesting feature of the product is its conversion (or aversion) to Windows. Views disappear regularly (as part of the program) and you yearn for a Windows menu to try and find it again. You also long for the Edit menu, or some kind of Undo, to undo things that have accidentally "happened".

Acos Compact jumps from menu options without warning, occasionally on change of view, and in other unusual ways sometimes locking you into list screens with only a couple of buttons allowing an escape route — and these are hidden among the normal buttons. Strangely, modifications to tasks do not update but delete over the original task, which can make you nervous about losing data and make you quick on the cancel button.

To its merit, Acos does allow for a WBS approach to project management in its top downwards construction and some people will find this exactly to their liking. It is also quite capable with its time analysis, resource allocation and graphical interpretation. However, it hasn't made the transition to Windows very well and its translation from the German is verbatim and, hence, often bizarre.

### PCW Details

**Acos Compact 6.0**  
**Price £190**  
**Contact D&L Computer Services**  
 01775 768287

**Good Points** WBS approach to project management.

**Bad Points** Obstructive, idiosyncratic, error-tempting interface.

**Conclusion** Competent, but enormously frustrating to use.

# PowerProject 3.1

Asta PowerProject is a mid- to high-range tool aimed at people who need to produce schedules in some detail. It comes as two, shelf-boxed, A5 ring folders that you can get your arm through and looks tough enough for departmental reference and abuse (in the same vein as older mainframe manuals) — PowerProject is certainly designed to last.

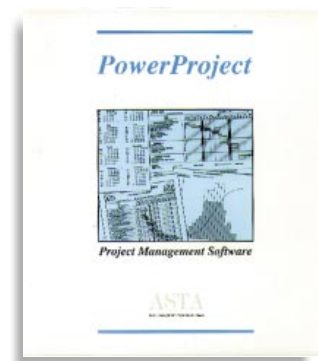
The first job is to assemble all the bits of paper, section dividers and software, into the relevant sections. Once this has been done, you plug a dongle into the printer socket and install the software. PowerProject requires a 386DX with 4Mb of RAM and at least 10Mb of disk space. The installer routine also installs an application called Borders, along with the main program.

Having started PowerProject, you're taken straight to the bar-chart screen. Projects are built by entering tasks, which are labelled and coloured simultaneously (a nice feature) and displayed in a column on the left-hand side. The activity bars are drawn on to the screen, across

from their relative text, using a crosshair cursor with the start and end detail appearing, momentarily, in an adjacent box. Linkages and relationships are set by clicking on hotspots around the bars, and multiple bars can be positioned on a horizontal, if required.

The fundamentals of PowerProject, task entry and manipulation can be picked up quickly and the manual acts as a good accompaniment. An Admin Menu item holds the key to setting up resource libraries, cost code libraries, calendars, and preferences for more detailed control. Resources can be set up as permanent or consumable and designated as one-off costs or per-hour costs, and have availability profiles which are customisable for working hours and future days. Cost codes can also be built in and handled, as can the modelling of consumable resources over time allocation.

PowerProject's greatest strength, after the deft entry of tasks, task bars and their relationships, is its



comprehensive range of histograms — especially the histograms produced covering

resource allocation and work done analysis. The package is also quite meticulous about the way in which it handles baselines and has a Baseline Manager for looking after the historical changes. Historical baselines usually allow quite detailed analysis of project modification over time, particularly for analysis of earned value, but it is a shame that PowerProject does not invoke earned value analysis.

Its LAN connectivity is good and it's easy to install. It's easy, too, to quickly train those who need to use it. For many projects it would be a suitable scheduling aid and possesses the wherewithal to produce some intricate graphs, given dedicated personal application. The emphasis is definitely on the graphical abilities of the product to produce detailed schedules, and it comes with a range of useful graphics for the job.

The additional Borders application allows even more customisation of reports and views using scripts and formatting to create personalised templates for work — a simple but effective feature.

PowerProject is designed to put together a project as swiftly as possible, thereby providing a canvas on which to put clipart and textual descriptions: urging extra effort here, highlighting problems there, before communicating it to other staff. It is suitable for advanced scheduling only.

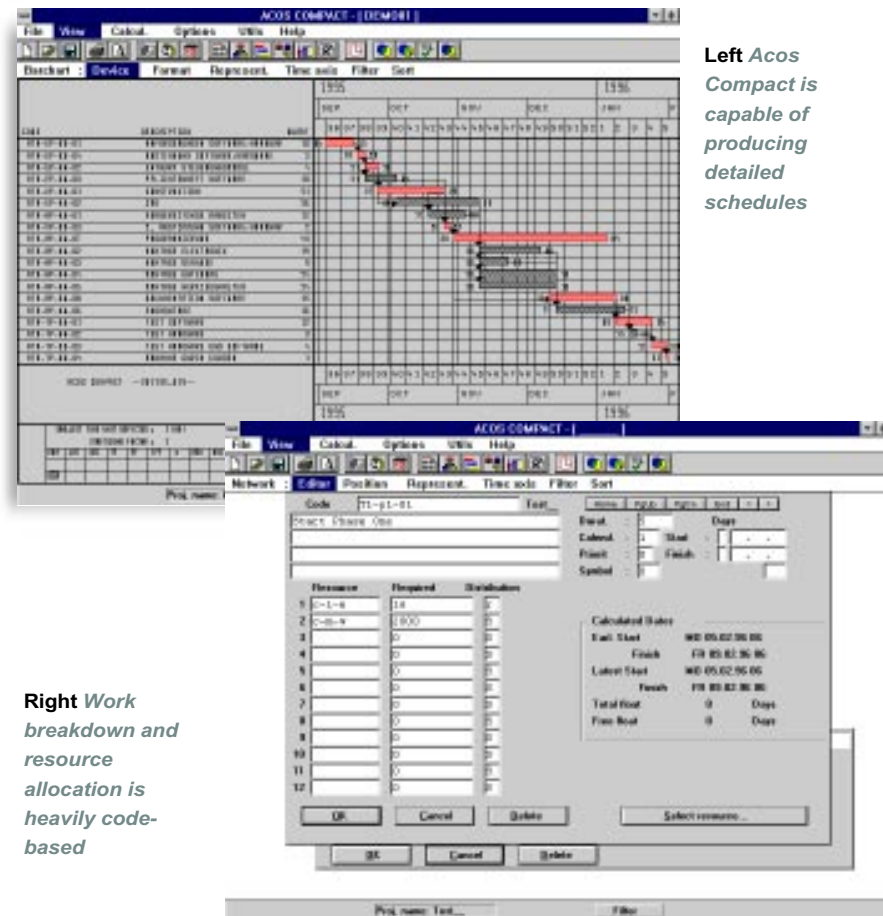
### PCW Details

**Asta PowerProject 3.1**  
**Price £845 standalone; £995 for server version; £395 each additional**  
**Contact Asta Developments Corporation**  
 01844 261700

**Good Points** Simple graphical interface, with basic project management functions and good graphing. Good "Beginners Guide".

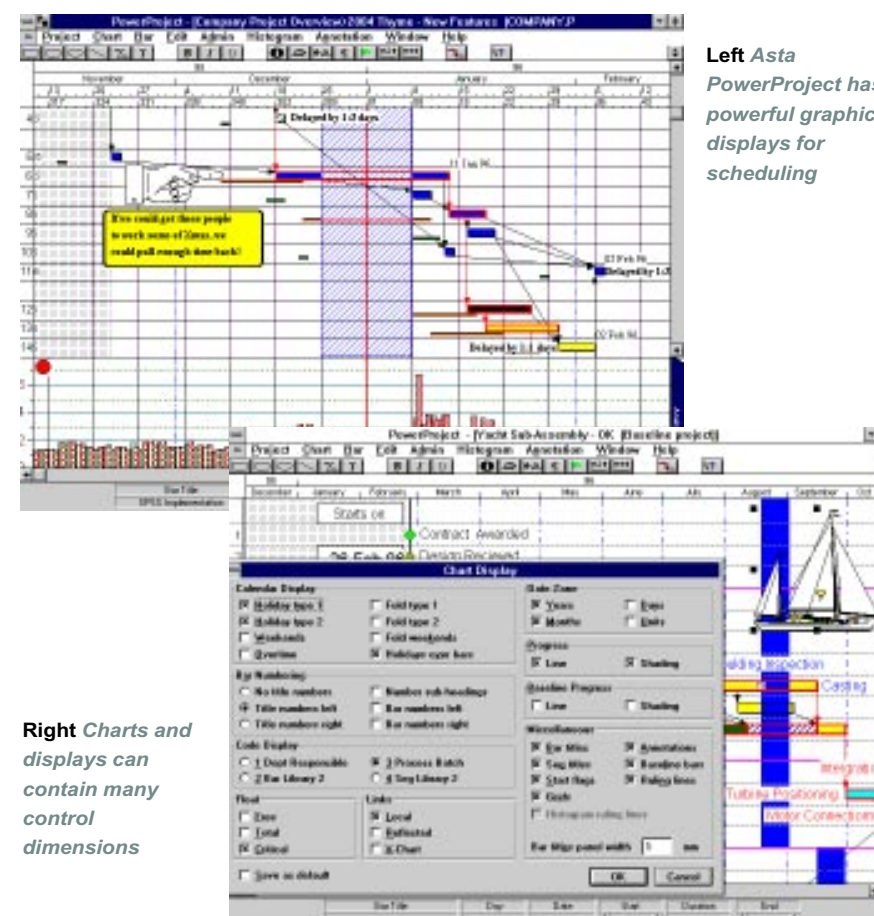
**Bad Points** Limited specification and generalised resource handling.

**Conclusion** More a project management drawing canvas than a numerical gridsheet.



Left Acos Compact is capable of producing detailed schedules

Right Work breakdown and resource allocation is heavily code-based



Left Asta PowerProject has powerful graphical displays for scheduling

Right Charts and displays can contain many control dimensions

# CA-SuperProject 4.0



CA SuperProject has consistently progressed through its revisions, keeping abreast of the demands of mid-market project management software while giving the high-end a run for its money. This new version improves the interface, help, and custom tailoring, while maintaining the product's performance and integrity.

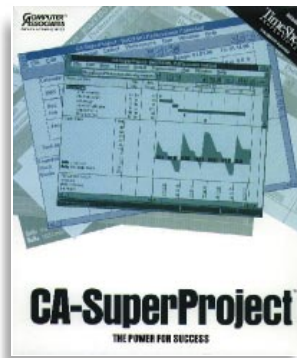
Minimum requirements are a 25MHz 386 or better, with 4Mb of RAM and 18Mb of hard disk space.

There are a number of ways to approach this professional product. On startup it lays out an immense area of task, Gantt chart and data columns. The toolbar is laden with functional-looking buttons and the menus seem well-appointed. While the brash will bash away at the first screen, trying intuitively to get data and links into the project, the studious will read the "getting started" manual providing the sublime: "Install, handles the installing", to the ridiculous: "File, properties dialogue with -n option", which bypasses the startup logo.

The "Getting Started Manual" correctly

asserts that you need to plan things and understand that at stages you will need to provide the computer with information. It tells you the program is going to help you every step of the way, performing logical automatic calculations, but it needs advice. The online tutorial is superb. There are many steps to using CA SuperProject: many views, each one essential, each one interlocking data in informative ways, each one vital to your role as project manager, and they can be learnt quickly and simply using these support materials.

The process for using CA SuperProject begins with entering tasks, durations, and start/end times with hours and minutes on them — a nice detail. If you want the task to start at 8am you tell it so (and if nobody starts work till 9am, you can force it to indicate overtime or it will compensate). The tasks are built and can be displayed in outline fashion, the main heading being the project title heading and allowing it to be directly linked as a sub-project in the much grander scheme of things.

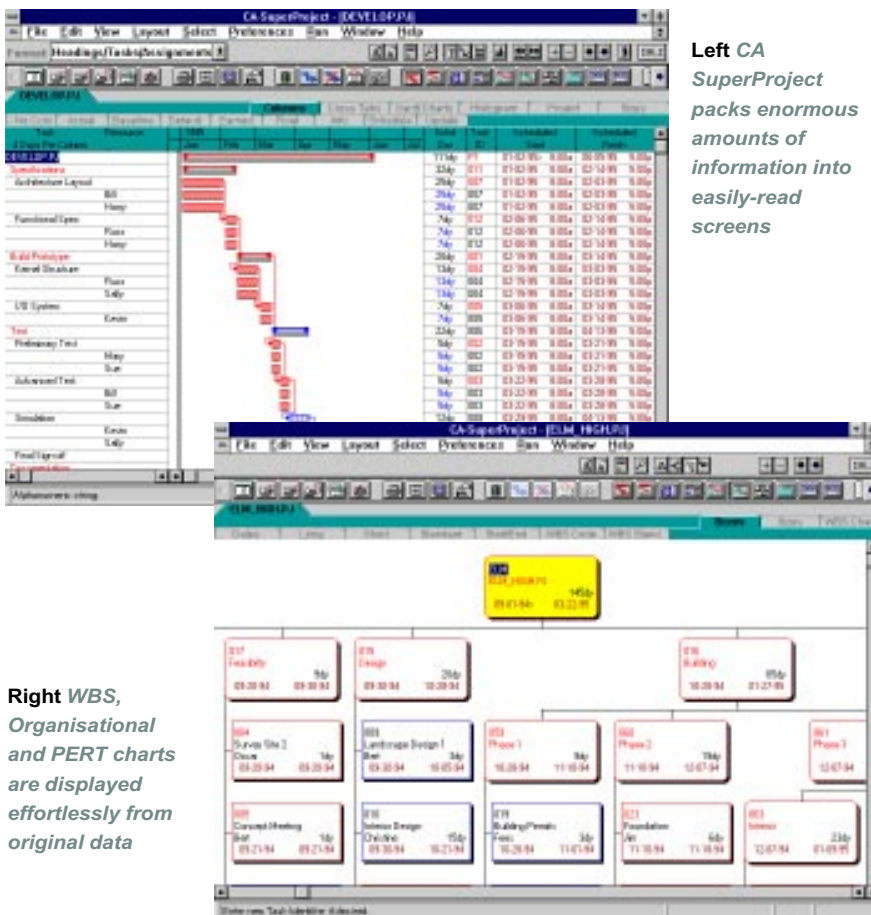


Once you've input the tasks, resources can be entered and cardfile-like calendars control each resource's

work availability, based on a parent calendar. These provide you with plenty of information and in fact one of the really pleasant things CA SuperProject does is to bombard you with information, on-screen. The text is small but perfectly readable. The graphics are small and perfectly formed. You can see a great deal in enormous detail, simultaneously.

The most significant feature of CA SuperProject after its tasks and resource handling is its application of given information to produce project management devices and reports. Given the WBS codes, or outline descriptions of resources, the program builds WBS charts perfectly, and organisation charts and PERT/CPM charts in impressive detail. They look so right, positioned perfectly on the page/screen. The detail handled by CA SuperProject is impressive and its views and reports are fully customisable. The reporting aspects are quite superb and the tracking of projects in progress is just as detailed and numerically precise.

Intricacy is the forte of CA SuperProject. If you need to manage projects on which someone can work for two hours this weekend, a short day of four hours on Monday, off for a birthday on Tuesday, and a long day on Wednesday of 12 hours (and whose rate of pay is variable) and much more besides, CA SuperProject 4.0 is designed for you. It is a detailed, competent product aimed at those requiring precision and absolute control in their daily work.



Left CA SuperProject packs enormous amounts of information into easily-read screens

Right WBS, Organisational and PERT charts are displayed effortlessly from original data

PCW Details

**CA SuperProject 4.0**  
**Price £495**  
**Contact** Computer Associates  
 01753 679679

**Good Points** Presents masses of information with ease and in detail.  
**Bad Points** It's a challenge to get started.  
**Conclusion** Very well developed product with an eye for real-world detail.

# Project '95



Microsoft Project rules the lower end of the project management market, providing ease of use and power at a cheap price. As its name suggests, Project '95 is the Windows 95 version. It is every bit as good as its predecessors. (Project 4.0 for Windows 3.1 is still available for those who've yet to see the 32-bit light, and it works in the same way.)

Project 95 requires at least 6Mb of RAM and 10Mb of hard disk space. Installation is a straightforward affair. All you have to do is Run Setup from the File Manager, complete your registration details and you're away.

The look and feel of Project '95 will be familiar to anyone who is used to Microsoft Office: you may know nothing about project management but the way in which Microsoft has laid things out makes you think you may just be able to crack it blindfold. At the outset you are greeted by a cartoon Einstein, Cue cards and tutorials, that lead you gently through the stages of project management. The cue cards are very informative and at the end

of this gentle journey you are presented with the main view — a Gantt table, and Gantt chart — and have the warm feeling that you know it all.

Tasks are entered simply by typing into the area for tasks, and durations of tasks are entered by typing into the area for durations using the week-day-hour-minute notation. Inserting task information lets you set dependencies (the start-end relationships vital for Critical Path identification), percentage complete, and priority.

A change of view allows resources to be set up. These can be assigned as part of a group and the cost of each resource allocated on a per-use, per-normal hour, or per-overtime hour basis. Returning to the Gantt view, the resources can then be allocated for each task and identified as fixed duration or resource dependent. Microsoft Project then goes away and checks for the same resource being used at the same time, and makes the scheduling adjustment for you based on the priority of the tasks — a process



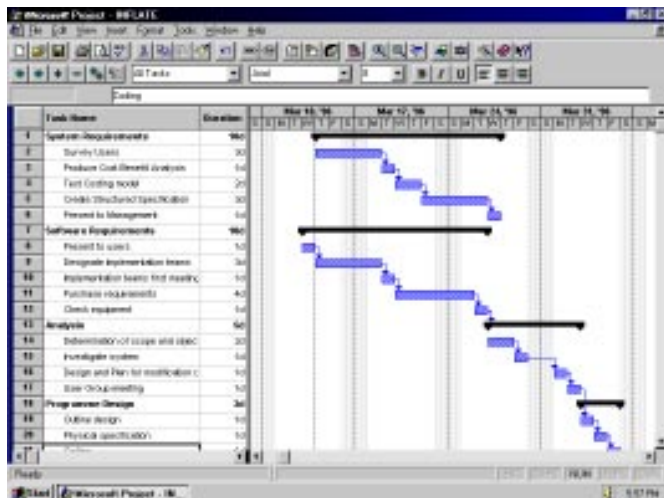
which is called "levelling".

With Project '95 you quickly find that you have entered all the tasks for a

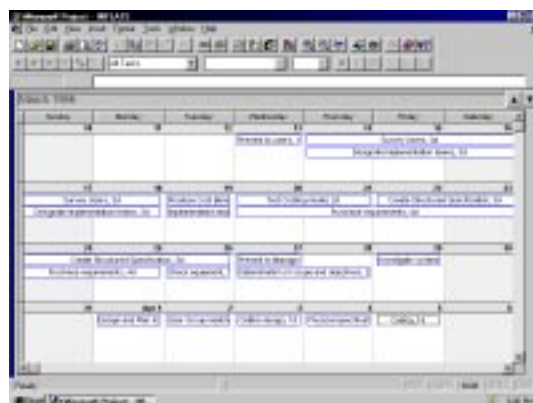
project, estimated durations, allocated resources, and levelled the resources. Your Gantt chart looks good and you can see the basis for your project. If you want to know what the cumulative cost of the project will be, a change of view shows you. If you want to see the daily costs by resource, another change shows you the values. When a task has been completed, you can easily drag the progress indicator to 100 percent. If you want to produce a wall calendar, identifying what activities are taking place on which day, another menu click will allow you to do so.

Microsoft Project is very, very, good but it simplifies things for your use and occasionally you may find that it doesn't reflect real-world situations. Nevertheless, it can be set up to handle fairly complex resource allocation, complex task relationships and priority levelling. The bars and displays can be customised and it performs a capable job. I know, from experience, that it is possible to work and grow with Microsoft Project for many years, and be very satisfied.

If you are putting together a business plan or project proposal, Project can be used to quickly estimate the times, task orders, resources and costs, and calendars working with predictable values where hourly rates and salaries are set, and steady progress is assumed. It is also the best starting point for project management packages and has applications to every aspect of life — anyone can use it to make planning simple.



Left Microsoft Project's screen is clean, familiar and functional



Right Work scheduling calendars are produced quickly and simply

PCW Details

**Microsoft Project '95**

**Price** £295

**Contact** Microsoft Connection  
0345 002000

**Good Points** Very simple to use and very capable for basic operations. Value for money.

**Bad Points** Heavy-duty use will reveal its shortfalls.

**Conclusion** For the basics, nobody does it better.

# Open Plan Professional 1.1

Open Plan Professional 1.1 from Welcome Software Technology is a high-end corporate package, hiding its sheer power and capacity behind simplicity and a clean, informative facade.

Installation of the 12 disks in a standalone setup requires at least 10Mb of disk space (full installation is 25Mb) and a 386 with at least 4Mb of memory (8-12Mb is recommended). It installs simply enough and the manual describes exactly what is going to happen during installation.

The manual has been meticulously prepared. The stages of building a project are presented in well-written chapters and appear in the software just as described. It does not assume prior exposure either to projects or project management software, or even working in Windows, and so takes you effortlessly to inserting tasks, dates, and project codes.

The software opens to a blank activity gridsheet with a ClipNote to guide you through the early stages of creating a project. Neither the software nor the manual build to a crescendo at any stage; the emphasis is on a logical, achievable progression through the tools and facilities on offer. Resources and calendars are built in to the project without drama. You are doing all the things you feel you should be doing in a project management situation, broken down into well-explained and mapped procedures. Relationships and resources are defined with precision using calendars, resource profiles, and code libraries.

The basic operations are actually quite easy to perform. A desktop metaphor, which includes icons representing data objects and views, makes it easy to manage your activities, resources, calendar and code data for multiple projects. Yet it is customisable to reflect the way in which your organisation works. Key information is stored in filing cabinets and Project Notebooks.

Another nice feature in Open Plan Professional is that it allows you to enter some information using real-world terms rather than formulas. For example, a 16-hour task doesn't have to be described as a certain percentage complete: you can instead state "worked on for 5.25 hours so far", which makes a bit more sense. Open Plan Professional also provides time-phased monitoring of saved baselines for generating S-curves, graphs of progress and earned value analysis.

The basics of Open Plan Professional can be quickly learnt but there are many more features available for controlling the project constraints, and two other important features: the Project Management Director (PMD) and



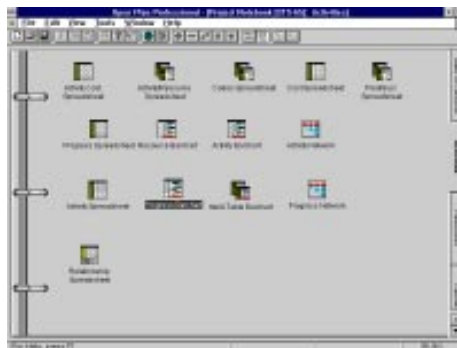
Background Customisation utilities.

The Project Management Director is like having a non-executive director on your desktop: policing your project for the good of the corporation, automating your procedures, documenting them, applying templates of activities and checking "Project Management Body of Knowledge (PMBOK)" — as defined by the American Project Management Institute Standards Committee.

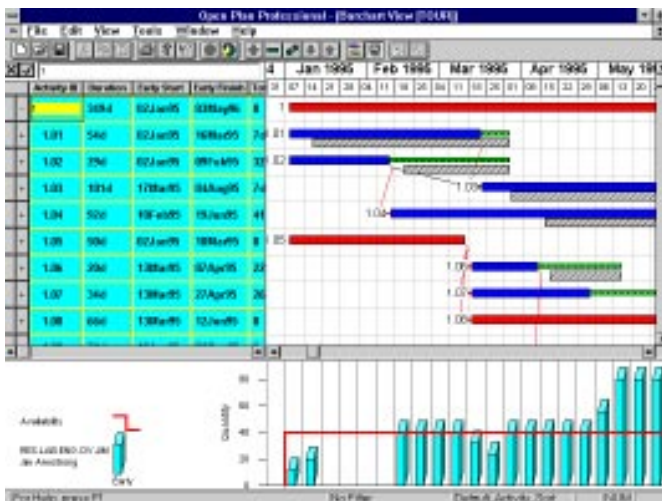
The PMD covers the Scope, Quality, Time, Cost, Risk, Human Resources, Contract/Procurement and Communications aspects of a corporate project. Each step in your routine project processing is checked for completion and if you need to produce regular, standardised reports the program can communicate with applications like Microsoft Word, through OLE. This is powerful support and you step effortlessly into using it.

The Background Customisation utilities give you access to the deeper workings of Open Plan Professional and allow you to alter a project's access rights, set protection levels and distribute complex projects across network installations.

Open Plan Professional costs a great deal of money but it performs the bog-standard operations of a project management package very well and can grow to deal with even the most complex of projects. Its desktop metaphor makes it easy to use and the whole package is ideally suited to corporate users.



Above *Open Plan Professional's* project filing cabinets and notebooks provide useful desktop facilities



Left *Split displays* are informative and powerful

## PCW Details

### Open Plan Professional 1.1

**Price** £12,500 for a three-user LAN

**Contact** Welcome Software Technology  
0171 401 2626

**Good Points** Does everything you'd need with infinite customisability. The PMD provides an excellent framework.

**Bad Points** £12,500 for a three-user LAN. Effort is required to use it fully.

**Conclusion** In regulated, controlled, demanding environments Open Plan Professional excels.

# Project Planner 1.1

Primavera's Project Planner, otherwise known as P3, is a heavyweight high-end package designed for the most arduous and complex projects. Version 1.1 boasts many new features and improvements.

Installing P3 as a single-user version requires a 486 or better with 8Mb of RAM and a minimum 30Mb of disk space. It works on a number of operating systems and networks. Its solid shelf display box comes with six scaled manuals (some lightweight, others extremely thick and extensive) which lead you through the process of installing and opening P3, the task list and Gantt chart view.

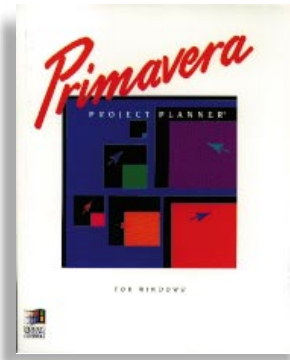
P3 works around combining dictionaries and coding structures to provide filtered and grouped views of tasks and activities which are displayed in split screen Gantt-type views. Durations and start/end dates can be set and P3 will make the relative modifications to schedules based upon dependency, time-based calculations or resource levelling, and then it goes a little further. For dates and times that need to be pinned, fixed or

nailed to the spot, so that they can't move, P3 gives you a little hammer tool with which to nail down times; light relief, heavyweight application.

It is features like these which provide the human aspect to what is a massive number cruncher. Many projects can be integrated and planned within P3 and it is quite happy resolving resource allocations and scheduling difficulties. One feature that's a bit overworked is P3's over-use of colour on its main displays, but thankfully, as soon as you switch to more serious activities such as levelling, the display changes to a sober black and white.

When levelling, P3 produces a text report auditing every dependency, lag, float and relationship, and reporting how each pass altered the schedule. If you are running multiple projects and making changes that could affect people throughout your entire organisation, this is a change-tracking tool of some calibre.

New features in version 1.1 are the utility programmes: ReportSmith, for building and controlling customised



reporting processes; and Buy the Hour, a new utility for collecting and controlling timesheet information before integrating it with P3.

Using ReportSmith, project updates can be sent via email and easily incorporated into the master projects — communications work just as effectively the other way around to provide good two-way control.

Buy the Hour can be integrated through managers and workers for monitoring availability and hours worked; providing workforce access to keep your Earned Value Analysis and budgets on target. Buy the Hour handles multiple levels of reporting, and its security prevents unauthorised access to data. P3 also has security passwords and administrator control for projects and sub-projects, and resource files. Especially useful for things like salary information.

P3 is customisable, so if you want to see time-scaled graphics over your Gantt chart, or resource/cost/activity matrices, you can. It supports database connectivity, OLE and DDE, allowing for your word processing documents to sit within your project task area for ready access.

The only problem I came across with P3 was with the handling of multiple baselines, called Target Plans, which make it difficult to track your progress, historically — there must be a way to do this but I couldn't find it.

Primavera Project Planner is a peerless product, commanding the high-end of project management software, and is particularly suited to integrated applications involving SureTrak.

PCW Details

**Primavera Project Planner 1.1**  
**Price** £1,995 single version  
**Contact** Primavera Systems  
 0181 748 7300

**Good Points** Powerful, multi-project management and total control.  
**Bad Points** A little too colourful sometimes.  
**Conclusion** An excellent corporate application for demanding situations.

**Left P3's colourful displays provide detail and grouping by task category**

**Right For detailed, audit-type reports the display is simple and informative**

# Project Scheduler 6

Scitor's Project Scheduler 6 comes with glowing recommendations from the project management community. It fits into the mid-range of project management software while offering a fair number of high-end functions.

PS6 will install on anything from a 386 with 4Mb of memory and 4Mb minimum disk space, upwards. The process is straightforward and our review package contained disks for v1.5, and a separate patch disk for an instant upgrade to v1.53.

The program's main work screen is a combined Gantt and datasheet, with an informative toolbar across the top and functional toolbar down the left-hand side. A further powerful touch you notice later is the toolbar across the bottom of the screen.

From this interface you can switch quickly to any view. A button labelled P cycles through open projects and resources are managed using the R button. The task spreadsheet, the textual companion to the Gantt chart, snaps into view on pressing the T button. Another button below this takes you to the Gantt view.

It is not derogatory to say PS6 has a gamer's facade — the interface is

**Right Project Scheduler's work breakdown structure codes are intelligently transformed into charts**

fast, responsive and rewarding to use, which interestingly speeds the learning cycle with the product. If you know roughly what you want, you can just smash buttons until it pops up. If at any stage you do happen to pause over a button or device, a small blue helper balloon appears.

Once your tasks have been entered, along with resources and relationships, they are plotted below on the Gantt chart and this is where the lower toolbar comes into play. By clicking through its Resource options you can change the display to show information by task, project or resource.

Every view is printable and PS6 comes with a report writer which works in a similar way to database report producers, whereby database field flags are placed into groups ready for the data to be composited into the body of the page. Table construction is simple,

though a little abstract when no data, or all constraints, on a project are undefined.

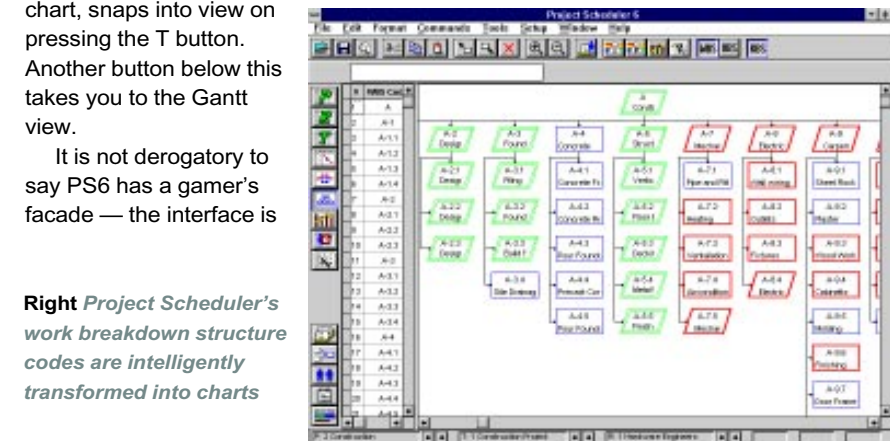
You can very quickly pick up the use and operation of PS6 and begin using it with ease. It puts WBS, OBS and RBS codes, hammocks, PERT analysis, levelling and baselines at your control, directly from the main screen. It treats advanced functions such as earned value analysis, and the brilliant Inflation Schedules (for future uniform price increases), with nonchalance.

PS6's displays are informative yet delicate, with petite baselines drawn below the activity bars. Its tracking skills are good, with group tracking facilities to update all activities as of a given date — highly useful.

PS6 crackles with functions and operations. It looks good and has the depth to handle some quite complex planning functions. It should fit in well with any kind of company and is increasingly popular in academic circles, thanks to an educational discount. If the functions or formulas you require are not there, there is a facility to create your own formulas as well as to customise most other parts of the program. Graphs can be generated simply and informatively, as can Work Breakdown Structures and Critical Path Maps. It is very easy to like this product.

Data can be shared, imported and exported with great flexibility, allowing for the distribution of project aspects and connectivity with ODBC databases.

With its easy-looking facade and lightning-fast work pace, PS6 packs fun with functionality into one colourful package. It suits small to medium applications for people wishing to plan fast but effectively, without long learning curves.



**Left Toolbars, sidebars and bottom toolbars make for very quick use**

PCW Details

**Project Scheduler 6**  
**Price** £645 (educational discounts available)  
**Contact** Tekware 01384 392121

**Good Points** Fast, easy and powerful.  
**Bad Points** Its colourful interface may give the wrong impression of its being a lightweight package.  
**Conclusion** A good, young-looking, fully-functioned project management tool.

# Project Workbench PMW

Project Workbench PMW 3.0, from Applied Business Technology International, is widely used by those needing high-end management tools. It has many strokes of genius mixed with a good balance of missed opportunity.

PMW requires a 386 or better and at least 6Mb of disk space, relatively small considering its ability, and installs with few complications. It competently requires a password before letting you in, imbuing security and exclusivity of access, and after that is the first flash of genius — the Process Flow window. This graphical process map lays the ground for creating projects, for defining projects, scheduling, refining and tracking activities. Clicking into each of the mapped-out areas opens dialogues and sheets for collecting project information; closing them returns you to the map.

Within the Plan area are buttons to define the project: WBS (which is actually where the tasks and activities go in), Resources and Dependencies. Strangely, when you attempt to set up dependencies after allocating tasks you are presented with a blank CPM chart and no obvious way of establishing relationships. It turns out relationships must be built from the WBS or Gantt view.

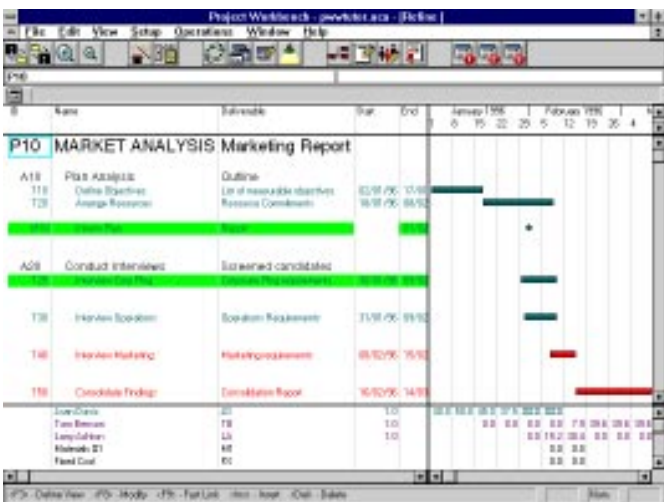
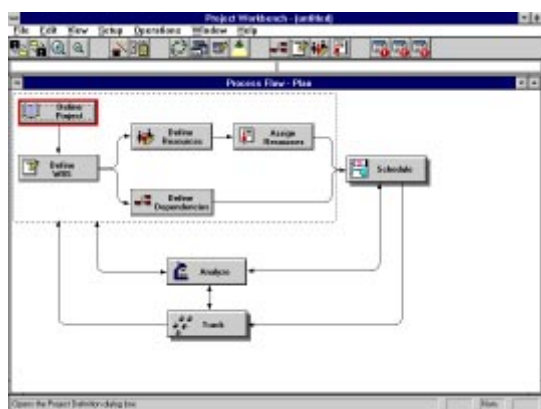
Tasks are entered in text

**Right PMW's Process Flow makes project creation extremely simple**

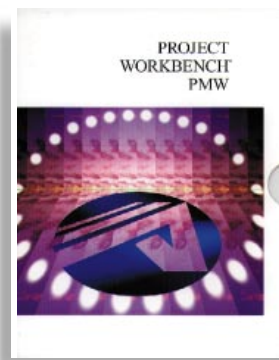
format using the structure Phase, Activity, Task, Milestone and Comment, and the whole thing uses outline formatting. Activity codes presumably come from your external planning as it does not generate any for you, even from the implied WBS structure.

When activities are entered they are automatically formatted in the outline font. Activities also have a column for Deliverable, wonderful for sharpening the mind to what is achievable within a project task. The Gantt view places the activities on the screen and allows mouse positioning and extension of activity times, but does not allow relationship setting, an oversight perhaps.

Relationships can be quickly handled by the FastLink button which, using default settings, I couldn't find on the toolbar, or by pressing the F9 key. To define a relationship you first select a task, press F9 and a dialogue appears. You select your second task and link the two using a button labelled Connect in the dialogue. The dialogue remains, giving a single option of disconnect, but



**Left Tasks can be formatted into Phase, Activity, Tasks and Milestones**



oddly there's no Done button for confirming your selection.

The fuller relationship functions of PMW allow lag and overlap, but only apply at the lowest WBS level which means more work for the project planner to correctly identify which tasks will finish last, to link to the next phase. Other packages allow linking of phase to phase, regardless of the internal ordering.

Unlike other packages, PMW doesn't show relationships graphically on the Gantt chart. There is no way of knowing if two are connected just by looking at it. An Autoschedule button transforms task scheduling using part levelling and part relationship criteria, at the resource allocation stage and Task stages respectively. The Gantt bars are shifted along and the critical path identified in red, but there are still no graphical links or obvious indication of relationships.

PMW has some nice features, including libraries which store standard views, sorts and filters. The timesheet function is deftly simple for collecting actual activity times and values spent on a project. Then there's QuickPlan, a spreadsheet for quickly allocating resources to your task list, and for allocating ETC (Estimated Total Cost) by day for the activities. When in spreadsheet view it acts like an accounting package, and in the split-screen view displays total resource cost allocations by individual resource, also a valuable control view.

Project Workbench is very clever but surprisingly limited graphically, and suited to numerically-focused applications.

**PCW Details**

**Project Workbench PMW**  
**Price** £1,250  
**Contact** ABT International 01727 888000

**Good Points** Powerful project-building assistance and control.  
**Bad Points** Not graphically interactive, limited capabilities in areas.  
**Conclusion** Numerically superb with limited graphical flare.

# Schedule Publisher 4.2



Schedule Publisher began life based on a sticky-tape planning board and, through its excellent use of graphics has held true to those real life principles and grown into a comprehensive high-end package. It maintains its ability to simulate the planning board, while allowing you to produce an enormous variation of publications involved with the project in a manner more akin to DTP. Its simple style makes it accessible to everyone — you don't have to be the head of a planning department to use it.

Schedule Publisher requires a 386 or better with 4Mb of RAM and at least 6Mb of disk space. Following installation, it opens to its task drawing screen which allows the placing of activities onto a Gantt-like chart. These items can be moved around, and the duration, start and finish can be manipulated. You are then able to annotate tasks on the left of the screen with activity names, codes, WBS structures and up to 90 other project-definable details. Milestones can be set and the connections between activities are made by clicking portions of the time bar and dragging the mouse pointer on to the related bar.

The hot spots on the screen are intelligent and functional. For example, dragging to the middle of the bar indicates a delayed (lag) start. Finish Starts, Start-Starts, and other

**Right** Schedule Publisher's graphical display is simple and effective to use; just like a planning board



**Left** The publishing aspect is reinforced with superb, informative reports

relationships are just as easy to enter. The keyboard appears superfluous to your needs once you have described the activities.

You can set multiple baselines and indicate how they change over time (keeping named historical records of each) for future reference. You can attach documents to tasks or files from other applications, too, and when you edit the latter they launch their native application. In the same way, process description documents can be attached to the activities and accessed by whoever requires them. One area in which this would be very handy is in the field of quality control, where changes must be communicated in control documents.

Resource handling is simple and applies at a generalised level: work days are indicated on basic calendars, and specific work availability on resource profiles. The intertwining of the two provides the ability for allocation and resource levelling. Conflicts of time and cost can be indicated with ease and suggestions of "still available skill pools" allow confident re-assignment of work. Schedule Publisher's strength stems from providing clear graphical and tabular



data: spread over possibly tens of thousands of activities, just as many sub-projects, and just as many years if needs be. Its report publishing aspect allows time scaling to include weeks, leading into months and years on the same chart. The focus and pagination is superb.

Other nice touches include horizontal positioning of tasks alongside each other, so if you want to display your entire project as one page high by 20 pages wide, you can do so. It handles 16 standard colours so projects can be intelligently colour coded without worrying that colours will appear different on other monitors within your organisation.

Schedule Publisher has a complement of accounting facilities and budget analysis functions. It excels in situations of relative predictability — the construction industry springs to mind. Manage all your projects by bid and contract and the costs will be relatively stable and immune to minute variation. Accrual and cashflow can be managed effectively and with the baseline "delay" indication, critical delays can be pinpointed and brought to book with the offending individual; an important process for delivery deadlines and penalty clauses.

The system is designed as a strategic tool for business, to sit across platforms, to be accessed by many users and to infiltrate all aspects of the company involved in developments. Master project files link to sub-project files and updates between the two preserve the integrity of the original as they should.

Schedule Publisher is simple and powerful. Although it's positioned at the high end of the market, volume implementation multiplies its competitive position against mid-priced, feature-lacking packages.

### PCW Details

**Schedule Publisher 4.2**  
**Price** £995 (quantity discounts available)  
**Contact** Advanced Management Solutions 01491 4119666

**Good Points** Graphically intuitive. Powerfully interpretive.  
**Bad Points** Sometimes a little unfamiliar in Windows.

**Conclusion** A well-evolved product, providing useful application.

# SureTrak 1.5

SureTrak 1.5 is a small but perfectly formed project management package from Primavera, a company which concentrates solely on project management packages. It's a dynamic and colourful package offering a wealth of features and functionality at very low cost.

SureTrak 1.5 needs a 386, or better, with 4Mb of RAM (8Mb is recommended) and 9-13Mb of disk space. After installation, it starts new projects by taking you through a help wizard for creating "dictionaries", describing Responsibility, Departments, Documents, all the elements of groups for a project. There is a button on the startup wizard asking if you want it displayed each time a project starts — the answer should be a definite "yes". After that, it presents the task and Gantt screen (for entering tasks).

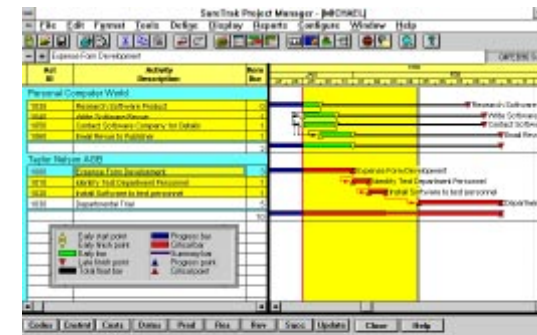
SureTrak's main screen displays the list of activities on the left-hand side and the time-dependent display across the page. Complex starts and durations can be set and graphically displayed as Gantt charts. Each activity can be linked in to the previously mentioned dictionary areas, allowing multi-project tasks to be grouped person-by-person, or department-by-department in an intelligent, filtering, way. This detail provides insight and allows aggregated analysis.

Among all the standard "expected" functions, SureTrak also provides automatic activity and resource levelling. It ably provides the framework to build your project; from

dictionaries, to activities with starts and ends. It allows you to set activity revenues, percentage complete, and "days still to do", combining costs to date with completion to date, to estimate final balance calculations. It handles res analysis and resource levelling, ensuring that over-allocation is identified and addressed. It can even identify specialised calendars and fiscal periods. The depth of the product, when approached as a long term aid, is immense.

Initially, using SureTrak is a little difficult because of its structured approach. Its intelligent features can confuse and frustrate until they have been fully grasped. The manuals and online tutorials provide excellent detail and information and are very helpful. Once understood, SureTrak works superbly. If you wish to question your timings and resource allocation, it allows you to do so easily.

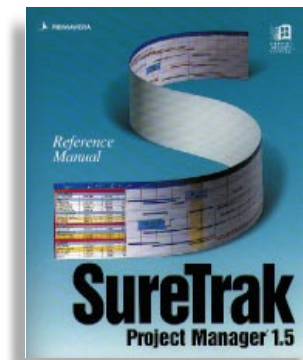
You can quickly identify bottlenecks and over-allocation, and identify when project revenues are expected to be due, against costs. Its displays are colourful,



**Above** SureTrak intelligently groups and "spotlights" scheduled activities

**Left** Detailed cost activities can be tracked accurately within SureTrak

Costs - MICHAEL		
1000 - Expense Form Development		
	Resource 1	Resource
Resource	MICHAEL	
Budgeted cost	500	
Percent expended	74.0	
Percent complete	80.0	
Actual to date	370	
To complete	1,630	
At completion	2,000	
Scheduled budget	0	
Earned value	400	
Cost variance	30	
Schedule variance	400	
Completion variance	-1,500	



enjoyable to use, and provide understandable information. For brightening up the displays even more, SureTrak comes with a clipart library of really useful project

It enables team access, even across different languages, and also supports email to communicate user-specific aspects to those involved. The split screens are customisable and can provide a wealth of charted information by combining data on histograms. The program saves an original baseline and allows for simple Earned Value analysis. It has a wealth of customisable reporting formats that ably help convey the status and priorities within a work schedule, and its flexibility and accessibility allow "what if"- type changes and tests to be carried out, providing extra planning options and aiding understanding.

Another good feature of SureTrak is its spotlight function which emblazons, under a brilliant yellow spotlight, all activities either started or current. This kind of highlighting focuses attention extremely well on the tactical task in hand and although its colours are bright, they are easy on the eye. SureTrak has its own function language, too — Softbridge Basic Language — for extra processes and ease of integration with the way you work.

SureTrak competes at the cheaper end of the market while employing mid-range project management functions. For this reason it is less easy to learn than Microsoft Project, but over time packs more power and functionality, and integrates with P3 (by Primavera) for very large projects.

### PCW Details

**SureTrak 1.5**  
**Price** £199 (£69 for upgrade from version 1.0)  
**Contact** Primavera Systems 0181 748 7300

**Good Points** A very competent, capable, professional package. Excellent value for money.

**Bad Points** Project management within the hour is unlikely.

**Conclusion** Encompasses all project management disciplines. A complete project management tool for Windows.

# Timeline 6.5

Timeline 6.5 from Timeline Solutions (a division of Symantec) comes complete with an SQL database engine and the database reporting package, Crystal Reports. It promises that you'll be successfully managing within minutes, so with my stopwatch ticking away I opened the packaging.

TimeLine recommends a 486 with 8Mb of RAM and requires a hefty 40Mb of disk space for a full installation. The full monte takes quite a bit of time to complete too, and you can't even go off and make the tea as it comes on ten diskettes which need swapping from time to time.

TimeLine's user interface excels at pulling the many pieces of a project on to your desktop, and managing multiple projects. The TimeLine Overview appears like a cross between a large file manager and a tab file, with sections divided into Projects, Calendars, Resource views, Layouts, Conditions, and Custom columns. Double-clicking within these areas opens them up to reveal your current projects.

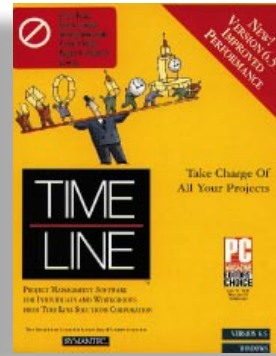
"Calendars" handles the standard and custom calendars that you may wish to apply to your projects, while Resource views provides the specific detail for each of the resources you could apply to projects. The conditions tab contains all the conditions that can apply to your selected projects, as well as any filters and customised sorts. Finally, the Custom Columns displays the names of all user-defined columns in the database, generated from formulas and functions.

All is thoroughly explained in the accompanying three manuals, which include easy-to-follow flow diagrams of the stages you go through when building a project. Overall, the manuals are well thought out and are a good aid.

There are two ways to construct a new project: either by following the procedures described in the user's guide; or by using TimeLine's own GuideLine, a project creation utility which asks you questions as you go. A "Co-Pilot" help facility is also provided with this, in case you need assistance, and frequently offers shortcuts and advice.

Tracking control was very good with TimeLine, allowing for resource usage to be metered in hours, complete with the drag and click "percentage" monitoring. The Reporting features are a little quirky with many pre-built, standardised reports, but facilities are available for generating your own.

Timeline approaches project management from a computing aspect and included in a full installation is a Structured Query language (SQL) database engine, as well as Crystal



Reports (a database analysis and reporting programme). This approach allows Timeline to be

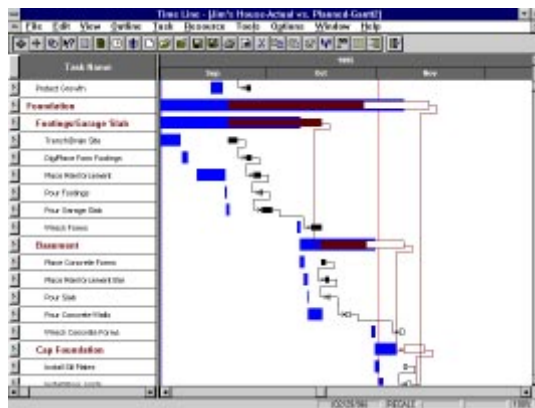
linked to external databases from other parts of your computing organisation, and for reports involving them to be produced.

TimeLine likes to take its time updating and opening projects. While being worked on, or modified, projects are not automatically updated; they have to be recalculated on demand by using the RECALC button. When you open a file, the program goes through many updating and calculating operations before you come face to face with your project. Nevertheless, the SQL database and recalculating makes your projects very up-to-date, especially when shared over a network, allowing for record locking; ideal for multiple, simultaneous access.

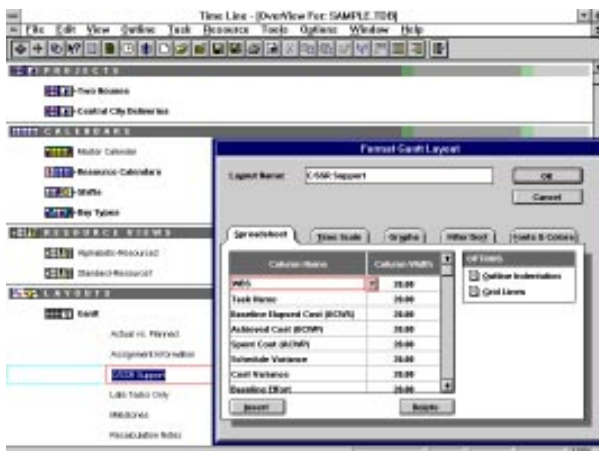
Timeline's interface, while informative and customisable, seemed a little jumpy especially on combined grid views, with mouse operations not always acting with the precision expected, so column sizing and positioning was a little difficult.

You can begin using TimeLine very quickly and it provides a great deal of power, particularly for managing multiple projects where a high level of access is required to each project or task. There's a plethora of computing tools, and its own macro scripting language (Symantec BasicScript), and it supports DDE and OLE.

TimeLine 6.5 provides a great many professional project management functions in a large package, but for smaller, less intensive users there is a TimeLine Lite package which offers much simpler project scheduling capabilities.



Above Timeline shows durations and delays of actual vs planned tasks on its Gantt chart



Left Project categories provide ease of access to data with customisable views. For example, the Earned Value display

**PCW Details**

**Timeline 6.5**  
**Price** Timeline 6.5 £359 (£305 per additional node); Timeline Lite £49.95  
**Contact** Deepak Sareen Associates  
 0181 423 8855

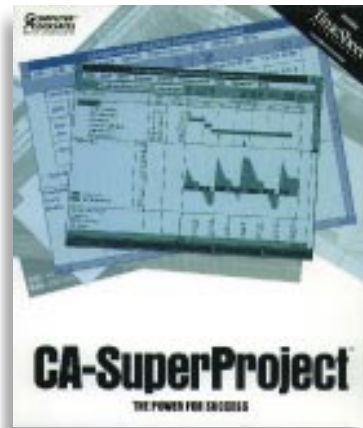
**Good Points** Open use of databases and external reporting tools. Manages multiple aspects well.  
**Bad Points** Large, slow, and a little too technological.  
**Conclusion** A programmer's project management package for frequent simultaneous access.



**Editor's Choice**

The range of project management software in this group test shows that there are many packages available. All are highly evolved and well designed. There are considerable differences in their specific strengths and abilities, as well as general approach, making it difficult to compare one package's methods with those of another and arrive at an overall winner. The key issue is whether the software can perform what is required to define, track and communicate a project; and is it helpful to use? But there are no losers in this group test, only winners and non-winners.

Among the cheaper products reviewed here, Microsoft Project and SureTrak provide enormous power and ability for little cost. Microsoft Project is incredibly easy to learn and use, and SureTrak provides comprehensive project tools for coding and communicating projects. Of the two, Project is Highly Commended.



From the middle range of packages, Timeline and Project Scheduler are both excellent, bursting with hands-on features. They are both easy to use and elegant, too.

Project Scheduler comes very close to being the best product overall and only misses out by a marginal lack of detail control. Other than this, it is a superb product. TimeLine employs the most modern access techniques and will be loved by programming project managers.

At the higher end of the market, the products vary greatly. The increase in price denotes a marked increase in the quality of the support materials and customisation. Histories also become trackable, allowing multiple baselines and scenarios to be saved.

Schedule Publisher is Highly Commended for its intuitive approach, its applicability and its competence at taking on the largest and most complex of projects. It, too, almost became our overall choice for best product. Open Plan

**Editor's Choice**

Professional, despite its price tag, offers unique formalising and structuring facilities and infinite reporting flexibility. Primavera's P3 is extraordinarily powerful, and offers the combination of communicating and combining with its daughter-product, SureTrak, to form a formidable partnership.

Our Editor's Choice has to be CA SuperProject 4.0 (albeit by the smallest of margins). It requires a little effort but grasps the complexities of forward planning, while maintaining complex resourcing and detail for day-to-day changes in the plan. It embraces the irregularity of the world in which we plan, and produces the insight and clarity of information required to plan and forecast effectively. Multiple projects can be combined easily and resource allocated and tracked.

- Highly Commended:**  
**Schedule Publisher 4.2**  
 • Planning board analogy.  
 • Document linking.  
 • Multiple historical baselines.

- Worth a look:**  
**Open Plan Professional 1.1**  
 • Filing Cabinet and notebook metaphors.  
 • Customisability.  
 • Knowledge-based support.

- Worth a look:**  
**Primavera Project Planner 1.1**  
 • Integration with SureTrak.  
 • Multi-project auditing.  
 • Powerful analysis tools.

- Loaded with functions.  
**Worth a look:**  
**TimeLine 6.5**  
 • SQL databases.  
 • Reporting and additional Crystal Reports.  
 • Shareability.

**Low-end packages**

- Highly Commended:**  
**Microsoft Project for Windows 95**  
 • Ease of use.  
 • Cheap.  
 • Powerful.  
 • Ideal for anyone.

**Eight of the best high-end performers**

- Editor's Choice:**  
**CA SuperProject 4.0** scheduling and resources.  
 • Clarity of information display. • Intelligent diagram production.  
 • Flexible real-world simulation of • Historical baselines.

**Mid-range power packages**

- Highly Commended:**  
**Project Scheduler 6**  
 • Innovative screen.  
 • Very fast learning.  
 • Very fast use.  
**Worth a look:**  
**SureTrak 1.5**  
 • Cheap.  
 • Powerful coding and dictionaries.  
 • Email communication.  
 • Powerful reporting.

**TABLE OF FEATURES**

	Microsoft Project for Windows 95	Acos Compact 6.0	Asta PowerProject 3.1	ABT Project Workbench PMW 3.0	Scitor Project Scheduler 6	Computer Assocs. SuperProject 4.0 for Windows
<b>Minimum Specification</b>	Win 95, 6Mb RAM and 10Mb hard disk space	386, 12Mb hard disk space	386DX, 4Mb RAM 10Mb hard disk space	386, 6Mb hard disk space	386 with 4Mb RAM	386 25MHz, 4Mb RAM. 18Mb hard disk space
<b>Win 95 compatible</b>	●	●	●	●	●	●
<b>Gantt Views</b>	●	●	●	●	●	●
<b>Work Breakdown Structures</b>	●	●	●	●	●	●
<b>PERT Views</b>	●	○	●	●	●	●
<b>Critical Path Identification</b>	●	●	●	●	●	●
<b>Resource Levelling</b>	●	●	●	●	●	●
<b>E-mail connectivity</b>	●	○	○	○	○	○
<b>LAN Application</b>	○	○	●	●	○	●
<b>Earned Value Analysis</b>	●	●	○	●	●	●
<b>Multiple Baselines</b>	○	○	●	○	○	●
<b>Passworded Access</b>	●	○	●	●	●	●
<b>Import/Export</b>	●	●	●	●	●	●
<b>Multiple Calendars</b>	●	●	●	●	●	●
<b>Distributor</b>	Microsoft Connection	D & L Computer Services	Asta Developments Corporation	ABT International	Tekware	Computer Associates
<b>Price</b>	£295	£190	£845 standalone £995 for server £395 each additional node	£1,250	£645 RRP Educational discounts available	£495
<b>Telephone</b>	0345 002000	01775 768287	01844 261700	01727 888000	01384 392121	01753 679679
<b>Facimile</b>	-	01775 713591	01844 261314	01727 888100	01384 378722	01753 679261

KEY ● Yes ○ No

**TABLE OF FEATURES**

	Primavera SureTrak Project Manager for Windows 1.5	Timeline Solutions Timeline 6.5	Primavera Project Planner P3 v1.1	AMS Schedule Publisher 4.2	Welcome OpenPlan Professional 1.1
<b>Minimum Specification</b>	386, 4Mb RAM 9-13Mb hard disk space	486DX, 8Mb RAM 30-40Mb hard disk space	486, 8Mb RAM 30Mb hard disk space	386, 4Mb RAM 6Mb hard disk	386, 4Mb RAM 8-12Mb hard disk space
<b>Win 95 compatible</b>	●	●	●	●	●
<b>Gantt Views</b>	●	●	●	●	●
<b>Work Breakdown Structures</b>	●	●	●	●	●
<b>PERT Views</b>	●	●	●	●	●
<b>Critical Path Identification</b>	●	●	●	●	●
<b>Resource Levelling</b>	●	●	●	●	●
<b>E-mail connectivity</b>	●	●	●	○	○
<b>LAN Application</b>	○	●	●	●	●
<b>Earned Value Analysis</b>	●	●	●	●	●
<b>Multiple Baselines</b>	○	●	○	●	●
<b>Passworded Access</b>	○	●	●	●	●
<b>Import/Export</b>	●	●	●	●	●
<b>Multiple Calendars</b>	●	●	●	●	●
<b>Distributor</b>	Primavera Systems	Deepak Sareen Associates	Primavera Systems	Advanced Management Solutions	Welcome Software Technology
<b>Price</b>	£199	£359, £305 per additional node (Timeline Lite £49.95)	£1,995	£995, discounts for quantity	£12,500 3-user LAN
<b>Telephone</b>	0181 748 7300	0181 423 8855	0181 748 7300	01491 4119666	0171 4012626
<b>Facimile</b>	0181 748 2846	0181 423 8992	0181 748 2846	01491 412723	0171 9228865

KEY ● Yes ○ No

### Steps in Project Management

**1** The first step with any project is to enter all the tasks that need to be completed, by first breaking them down into stages and then within stages into tasks. For each task, set the duration that you expect each will take. This task time information is displayed by horizontal bars on the Gantt chart (right-hand side). Start dates, expected end dates and other time-related information can be entered to structure tasks at the correct time

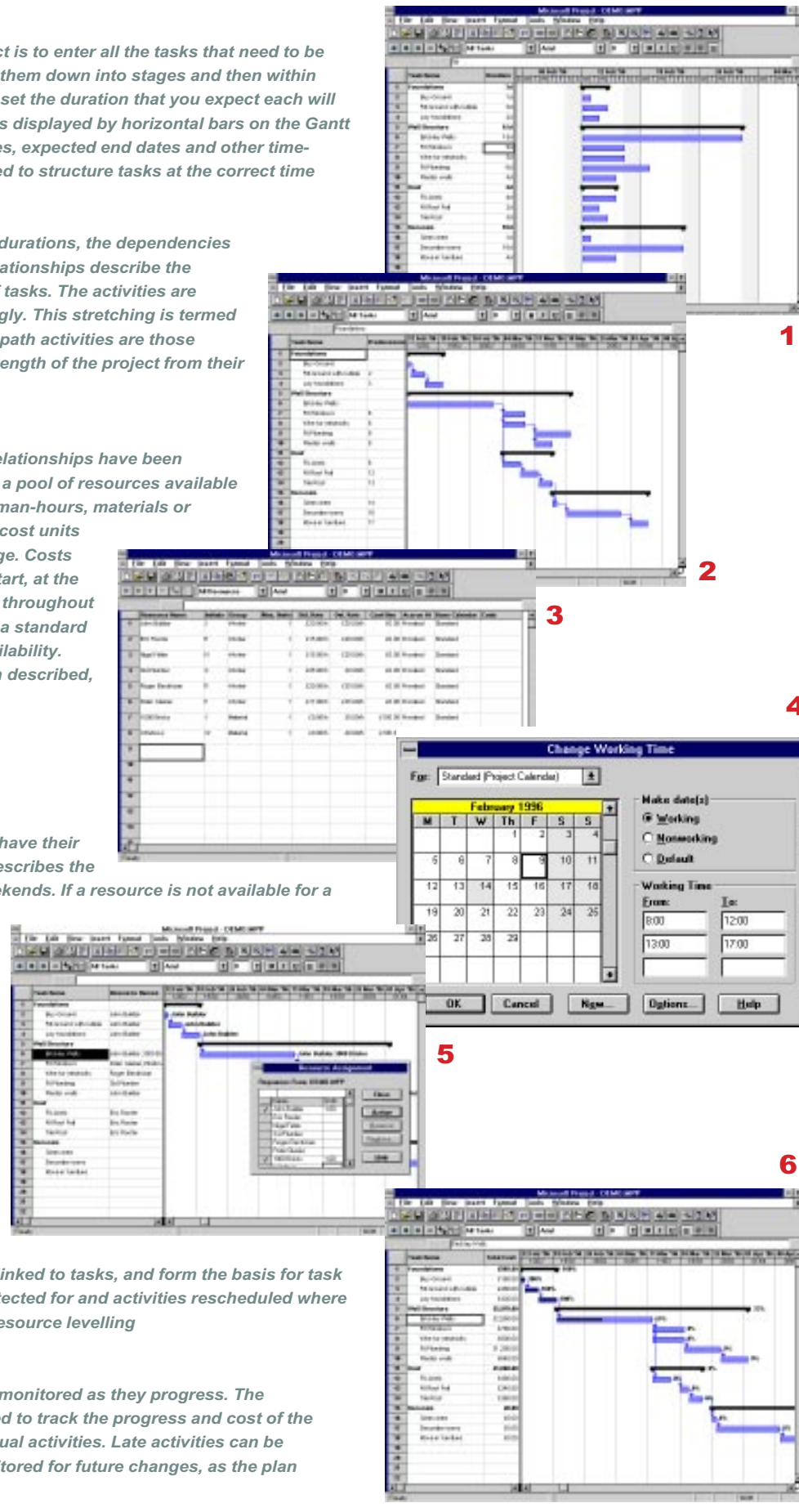
**2** After entering the tasks and durations, the dependencies must be set. Dependency relationships describe the successors and predecessors of tasks. The activities are stretched out over time accordingly. This stretching is termed activity levelling, and the critical path activities are those activities which dictate the total length of the project from their dependencies on each other

**3** When the tasks, times and relationships have been described, you can describe a pool of resources available for the tasks. Resources can be man-hours, materials or workspace and can be allocated cost units for regular time, overtime or usage. Costs can be set to be accrued at the start, at the end or prorated as they are used throughout a task. Each resource is set with a standard working calendar describing availability. Once the resource pool has been described, it can be used for many projects

**4** Each task and resource can have their own work calendar, which describes the working hours, holidays and weekends. If a resource is not available for a given day, the task is levelled to be carried out later, when the resource is available again. A standard working day is eight hours but can be customised for different working arrangements such as shifts

**5** When the task descriptions and resource descriptions are complete, resources can be allocated to tasks. Resources are allocated in the amounts they are required for each task. Materials and Manpower can be linked to tasks, and form the basis for task costs. Over-allocation can be detected for and activities rescheduled where resources clash; this is termed resource levelling

**6** Finally, defined projects are monitored as they progress. The resources and hours are used to track the progress and cost of the project whole and cost of individual activities. Late activities can be identified, rescheduled and monitored for future changes, as the plan changes over time



### Glossary of Project Management Terms

**Project Management evolved from the 1950s and developed using specialist techniques and operations, many of which sound more confusing than they are. Here is a glossary of the most commonly used terms.**

**Baseline** A snapshot of a project at a time to identify at a later stage how the plan developed.

**Constraints** The limitations on a project — Time, Cost, Resources, Tasks and Quality.

**CPM** Stands for Critical Path Method. A mathematical model that calculates the total duration of a project based on individual task durations and dependencies. After identifying which ones are critical, you can then only affect the duration of a project by reducing one of the critical activity times.

**Gantt Chart** A Gantt Chart is a sideways bar chart of Tasks with horizontal bars representing durations on a time axis. Basically, Bar charts renamed after use by Henry L Gantt for project management.

**Histogram** Graphical representation of project data.

**PERT** Stands for Project Evaluation and Revue Technique, a Scheduling system using statistical probabilities for task durations, presented graphically as a chart with linked

boxes. Developed from the Polaris Missile Project.

**SMART** Stands for Specific, Measurable, Achievable, Realistic and Time-bound. This is the way a project should be structured.

**Task** An activity.

**Milestone** An event as a result of achievement or tasks.

**WDMH** Notation for Weeks, Days, Hours and Minutes. For example, 52W7D24H60M.

**Relationships** This refers to the way in which tasks affect one another. They are normally either:

S-S: Start to Start, tasks start at the same time.  
F-S: Finish to Start, second task starts after first is completed.

F-F: Finish to Finish, tasks end at the same time.

Hammock: A task floating between two tasks in time.

**Scheduling** Scheduling is the placing of a task between two times or dates. Common terms used in scheduling are:

ASAP: As soon as possible

ALAP: As late as possible

Lag: Planned delay in an activity

Float/Slack: Spare time between tasks

**Resources** Refers to available people, materials and work space.

**Man Day** 8 hours of 100% effort by default, 160 hours per month.

**Accrual** When costs are added. Can be at the beginning or end of a task, or prorated.

**Over-allocation** Resources expected to work for more hours than they should in a given day.

**Resource Levelling** Moving over allocated tasks to times when resources are available.

#### Coding and Control Terms

**WBS** Stands for Work Breakdown Structure. This is a method of coding activities in a hierarchical structure: 1 for the first level, 1.1, 1.2 for its subordinates, 1.1.1, 1.1.2, 1.2.1, 1.2.2 for two successive subordinates each, providing accurate accounting and positioning within projects.

**RBS** Resource Breakdown Structure. A code for structuring resource relationships to each other.

**OBS** Organisational Breakdown Structure. A code for structuring the relationships between individuals or departments in an organisation.

**Earned Value Analysis** The cost assessment of project activity against scheduled work, and baselines.

**EAC** Estimated cost at completion.

**BCWP** Baseline Cost of Work Completed, a measure of cost to date.

**BCWS** Baseline Cost of Work Scheduled, a measure of scheduled cost to date.

**CSPEC** American military standard for governing the coding and planning of projects.

### Case Study

#### The Plymouth Rescue Boat Team

By day, Dave Morrish works for Social Services. His evenings and weekends are dedicated to the Plymouth Rescue Boat Team, which uses Microsoft Project 95 to keep their schedules in order.

The Plymouth Rescue Boat Team provide rescue boat support for raft races and other water-based activities, through to rescue support for the British Powerboat Racing Championships, a role that takes them travelling all around the country. Rescue Boat Teams consist of two paramedics, a rescue diver and a coxswain, and there is one team dedicated to powerboating and one specialising in sailing events. The whole operation relies on the voluntary work of skilled individuals and all-important sponsorship, which is where Microsoft Project 95 comes in.

Each member of the team contributes to finding possible sources of sponsorship. Regular mailouts and telephone calls could quickly become uncoordinated, so Microsoft Project 95 is used to map out the contacts and processes involved in following up every possible sponsor, from first contact through to mailout of sponsorship packs and follow-up meetings and calls. With no computer training, a lot of playing, and use of the on-line tutorial,



The Plymouth Rescue Boat team, out on the water three weekends out of four in the summer, uses Microsoft Project 95 to keep its schedules in order. (Picture — Plymouth Evening Herald)

Project 95 has become like another member of the team.

The sponsorship activities from each of the team members are added, and at fortnightly intervals progress is tracked, ensuring that no possible lead slips through the net. If there are any interested companies, they are progressed through to sponsorship as a subproject.

During the summer months the Rescue Boat Team are out three weekends out of

four, and can be busy working with the Off Shore Circuit Race Drivers Association around Britain, at Cowes for support of the sailing, or at local events around the Port of Plymouth. The winter months are taken up with sponsorship and event planning.

Planning started before Christmas last year for a Rescue Services Training Weekend in April 96, an event aimed at voluntary and rescue services, to allow specialist training and practice for the likes of the Devon Air Ambulance.

Organisations needed to be invited, the site planned, and as activities were allocated to members of the team and completed they were also ticked off as they went. The PRBT has also been planning the elements for an upcoming trade show, again using Microsoft Project 95, replacing the limited capability of a desk diary for planning.

The power of Microsoft Project 95 allows the Plymouth Rescue Boat Team to produce Calendars covering the upcoming months, allocate specialist personnel (i.e. a paramedic) to teams subject to availability, and manage the rest of their operation in an easy-to-use package.

● Many Thanks to Dave Morrish of the Plymouth Rescue Boat Team (sponsorship details on 01752 404779).

## Case Study

## Atlantic Power and Gas

Atlantic Power and Gas (APG) forms part of the integrated management operations for three oil platforms (Hutton, Murchison and Lyell) situated in the middle of the North Sea. Central project planning takes place at APG's Aberdeen headquarters, which is connected to the two manned platforms (Hutton and Murchison) by satellite communications.

APG uses Primavera's SureTrak 1.5 for offshore planning in combination with the more powerful P3 (onshore) for its "planned and corrective maintenance" scheduling, as well as other tactical projects.

The system was implemented about a year ago after the fields had been taken over by Oryx UK Energy. Project and planning management required detailed local planning on the oil platforms, allowing for feedback into a main plan, held onshore in Aberdeen, and giving hierarchical project and budget co-ordination. The specification required low maintenance and support (eliminating IT support divisions and the associated cost), and ease of use and training, so that planning activities could be designated to the engineers on the platforms.

The core crew of a platform numbers about 100, plus specialist contractors. Each platform has an operations controller, on a two-weekly rota, who uses SureTrak. Ninety percent of project activity is "planned and corrective maintenance": regular, weekly or monthly-scheduled maintenance activities to ensure the correct operation of the platform. These activities require the right people to be on-board, with the right work materials, at the right time.

APG plans around 3,000 activities per month: the planning designates the work to be carried out, the skilled staff required on-board and the planned mobilisation



activities. The planning system also produces on-board personnel lists. It requires about a week's notice to fly staff from the onshore, static crew to the platform where they are required, and specified materials travel by ship.

The offshore operations controller plans and monitors day-to-day platform activities, within a 14-day rotation window, and using SureTrak's unique email capabilities with Microsoft Mail, communicates the project activity updates to the P3 master — a function which was seen as critical when using fixed-bandwidth satellite communication. The monthly updates range 90 days ahead, with the master plan ranging 18 months ahead. At headquarters, each department performs its own low-level planning on sub-projects, with an overall senior planner working with P3. Project communications to specified staff, on specified projects, are routed via SureTrak's activity coding and email capabilities.

*The Hutton TLP rig (90 miles north east of Shetland). Atlantic Power and Gas uses Primavera's SureTrak 1.5 for offshore planning, in combination with the more powerful Primavera P3*

SureTrak's simplicity and localised application allows quick and flexible plans to be created in the event of a rig shutdown (whether planned or not). During a shutdown, most activities on an oil-rig get put on hold and SureTrak identifies those activities that can still proceed, or makes up *ad-hoc* work plans for the duration.

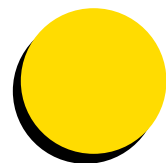
In this way, using Primavera's P3 onshore, and remote SureTrak offshore, Atlantic Power and Gas plans and controls the safe, effective operation of its North Sea oil-platforms, crews, materials, and logistics, despite unusual and taxing constraints.

• My thanks for this insight go to Jim Atack (operations manager) and Jim Christie (business planner), at Atlantic Power and Gas.



# CUTTING EDGE

On the



**W**elcome to Cutting Edge, the section in *Personal Computer World* that combines our regular reviews of games, books and CD-ROMs with features bringing you the latest news about computing, and consumer technologies and online services.

We now have the most comprehensive coverage of these topics available in a general computing magazine. Stay with us and we'll take the pain out of keeping on the cutting edge.

## PCW Online

- 1 9 8 **Focus** — Is the Internet really the pathway to home teleworking, or is the virtual corporation merely a passing fad? Richard Vadon investigates the fact and the fiction.
- 2 0 5 **net.newbies** — How to get online, the easy way.
- 2 0 6 **net.news** — Internet Studio delayed; mail-only Internet service announced; boost for Intercast... and more news with PJ Fisher
- 2 1 4 **net.answers** — Finding your way around the Internet throws up all sorts of queries. Nigel Whitfield has the solutions.

## PCW Futures

- 2 2 2 **Innovations** — Tim Frost on how ISDN is helping photo, sound and video libraries to move into the Net age.
- 2 2 3 **Horizons** — Sshh...! Mark Whitehorn on anti-noise technology.
- 2 2 4 **Bluesky** — Toby Howard gets his brain around how computers can help unfold the mysteries of the human mind.
- 2 2 6 **Retro Computing** — Simon Rockman plucks the feathers of a techno-turkey from four Christmasses ago.

## SCREENPLAY



## FOCUS



## CD-ROMS



## PCW Media

- 2 2 8 **Books** — A chance to win *Dummies* books, and the *PCW* bookworms face the future of science.
- 2 3 8 **CD-ROMs** — Cézanne, Jack Kerouac, MTV's unplugged stars... a mixed group in this month's review.

## PCW Fun

- 2 3 3 **Kids' Stuff** — Safer Internetting for kids; Paul Begg exercises his parental control. Plus maths, music and go, Granny, go!
- 2 4 3 **Screenplay** — Now you can Nukem in 3D, or Fire at Will (*but not Tom*), or zap Mr Dark if your name is Rayman. Plus, Screenplay news.
- 2 4 6 **Leisure Lines** — With JJ Clessa. If you're a prize puzzler, you could play the weighting game.
- 2 5 1 **Competition** — Win personalised mice, document scanners or multimedia bundles.



## NET NEWS

# Offices of the world unite

The Internet could make the whole concept of the traditional company obsolete. *PCW* looks at some emerging examples of virtual working and asks: "Is this the future?"

The idea of working from home has always seemed attractive. No commuting, no petty office politics and no need to shave. The Internet has made this dream a reality and taken it a step further. If you can work efficiently from home and communicate with your colleagues, clients and staff on the Net, why have an office?

The idea of teleworking has given birth to a new concept: doing business remotely from a company that may not even exist in the traditional sense. It brings into question traditional ways of doing business, storage, distribution and human contact.

This new business phenomenon has been called the "virtual corporation" and it represents a challenge to the way we live our lives. It started in Silicon Valley, but it is now developing around the world. The chief evangelist for the virtual corporation concept is American management guru Tom Peters. His work has looked at the virtual corporation in terms of its organisation rather than the technology involved. But it was the technology that gave the first virtual companies their structure.

Peters uses Verifone (<http://www.verifone.com/>) as a classic example of a virtual company. Mark McCurtie, Verifone's European marketing manager, explained how the company operates: "Verifone was founded in Hawaii and from day one operated as a virtual company. It operates on a global basis, with every employee linked together via a computer network. The company has

no head office and functions are spread around the world. In this way, resources do not need to be tied to a specific location, expertise can be shared, information can be transmitted instantly and decisions can be taken quickly. It also allows the company to have a very flat organisational structure and operate a culture where open communication is actively encouraged."

Verifone manufactures credit card transaction equipment. It uses its computer infrastructure and communications systems to link three manufacturing centres located in California, Taiwan and a new facility in China together. Often more than one facility will be involved in the manufacturing of a Verifone transaction automation system. The computer systems do however allow documentation, test utilities, inventory management, distribution and management to be located virtually.

All Verifone's internal communications are conducted via electronic mail; paper is not used internally. Verifone also communicates with its distributors, customers and suppliers

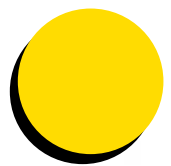
via email over the Internet. This is particularly helpful when working across multiple time zones and large geographic distances. Application programs are transmitted across the Internet between development centres and, once completed, to customers.

McMurtie stresses that although his company is based around a computer network, it is people that count: "Verifone recognises that human interaction is necessary and as such does not take the virtual office to extremes. The company does have offices, but employees can also operate from their homes, their hotel rooms whilst travelling or indeed wherever they are. A laptop computer is at the heart of a Verifone's office."

Verifone has development centres located across the globe, chosen for their high quality skills or expertise available. The company opened its smartcard development centre in Paris, largely because of French expertise in this area. By using the Internet, Verifone is able to work around the clock on critical application developments. As one office goes home the code is



PCW Illustrations by Nick Grant



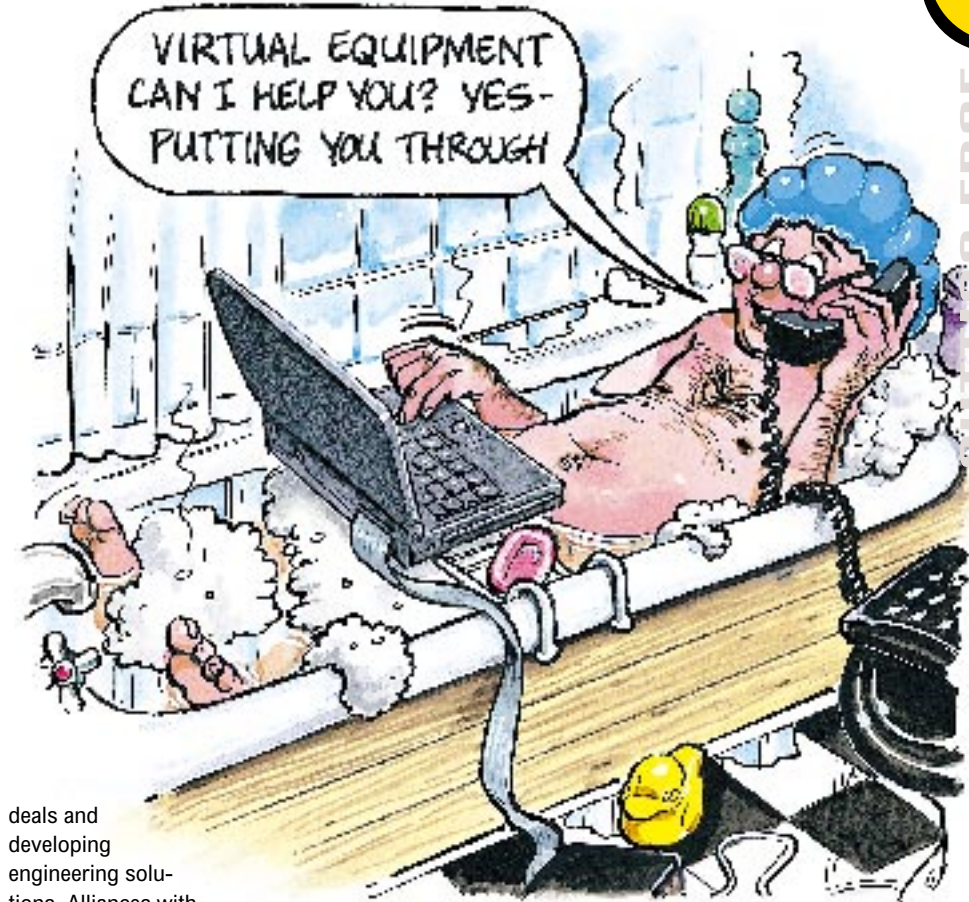
CUTTING EDGE

passed onto another country for testing and documenting overnight. This brings significant time benefits to the company and customers are pleased with the responsiveness.

Verifone plans to expand its use of the Internet. In 1995 it formed an Internet commerce division which has been busy making acquisitions and equity investments, and forming alliances with other organisations to provide Internet commerce solutions. Verifone, in conjunction with partners such as Netscape, will be providing methods of securing payments over the Internet.

Another classic example of the virtual company is First Virtual Corporation (<http://www.fvc.com/>). First Virtual works in networking hardware that turns ordinary local area networks into high quality multimedia networks. What makes the company unusual is the fact that it has no manufacturing staff, no finance or personnel department, and no PR or lawyers on the payroll.

FVC's founder Ralph Ungermann believes that its virtual nature allows it to concentrate on what it does best: making



deals and developing engineering solutions. Alliances with industry leaders and outsourcing deals make it possible to bring new products to the market faster and more affordably than within traditional organisations.

Ungermann explains: "This shows the incredible power of the virtual corporation concept. The networking business is too large and dynamic to do every-

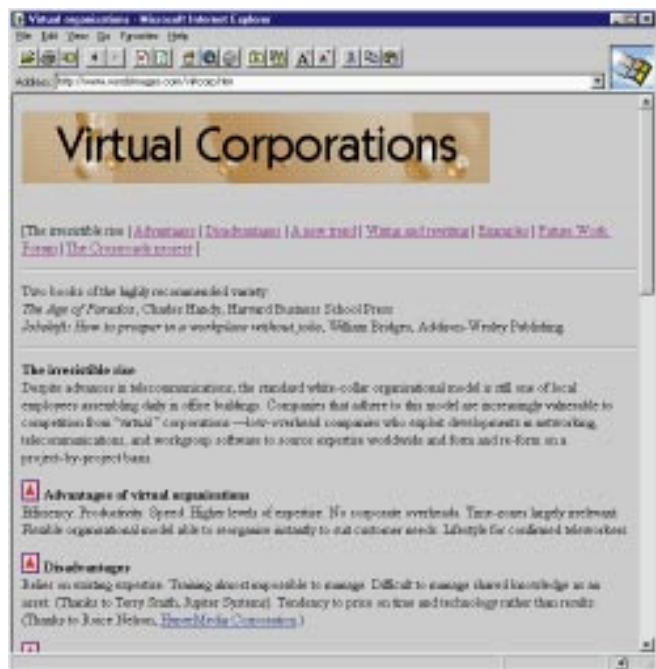
thing ourselves. Without our alliances our products would take several more years to reach the market."

Management theorists like Tom Peters are now looking at virtual corporations for the lessons they can teach other, more traditional companies. Multinationals are now starting

to employ virtual techniques — Reuters is perhaps the most famous example. Its Usability Group was set-up to improve the user friendliness of Reuters' financial information services. The aim was to give Reuters an advantage over its competitors by developing a highly intuitive graphical interface.



VeriFone uses the Web as a front door to its services



Information about Virtual Corporations is freely available

Garrison's start-up plan for the group asked for 24 full-time Reuters employees specialising in human interface design. His board would give him only two staff but allowed him the budget to bring additional staff on a non-permanent basis.

Garrison needed specialists in many fields — ergonomics, software prototyping, interface graphic design and artificial intelligence — so bringing in a consultancy firm or outsourcing were not viable options. It was from these restrictions that Garrison created a virtual organisation of employees from 12 different companies. Companies such as Microsoft, Logica, Admiral Computing and PA Consulting all provided staff.

Garrison's virtual team now consists of 83 people working around the world. About a quarter of these work on a regular basis at Reuters' London office. The virtual team works as a "just-in-time" skills pool, shrinking and growing to match the team's workload. When not required team members go back to their own companies.

Employing people in this virtual way means paying them more money, but Garrison calculates that savings on recruitment costs and staff benefits, coupled with the high calibre of the staff, makes the virtual team a bargain. The Usability Group makes extensive use of the Internet and video-conferencing. Customers can try out new products in the Hong Kong usability laboratory, while being observed on a video-link by specialists in Europe. There are members of the team working on their own in the USA and Europe.

Garrison is often asked to speak about his virtual organisation at conferences. Organisers

imagine he will praise the concept, but he takes great pleasure in saying he doesn't believe in virtual organisation. He thinks that to create you need to interact and that electronic communication does not give you enough "bandwidth" to interact fully with someone. "Any large multinational looking to adopt virtual techniques has to think very carefully about how it is to deploy its staff. If you want to have certain service parts of your business deployed remotely, no problem at all. But I can guarantee you if you are looking for breakthrough technology and truly creative thinking I don't believe that can happen. So much happens in-between the lines. The management gurus tell us that 92 percent of communication is non-verbal. We operate in a much wider bandwidth than we can currently squeeze down a copper wire. The Internet is a powerful tool but it is only suitable for low level communication."

Garrison opinions are based on a manager's analysis of virtual techniques. They like the flexibility but have

reservations about teleworking. Others have expressed reservations about the virtual company's effects on society. Job insecurity has become a major anxiety among adults in the western world. The virtual corporation means less job security. It's likely to be perceived by the majority as a bad thing. Politicians know that their constituents want the problem of job insecurity addressed. Already Pat Buchanan in the US has attracted considerable support for his attacks on multinational corporations who transfer jobs to the Third World at the costs of American jobs. Tony Blair has adopted the stake-holding concept as a means of urging employers to treat their employees as partners. Politicians may soon find that voters want them to turn the clock back and stop the virtual corporation.

For companies outside the new information industries — which cannot define their business as being about bits and bytes — the virtual corporation may be a fad or indeed

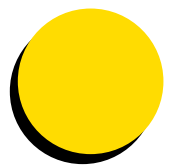
something to discourage. But for companies in the IT world, virtual corporations may become the standard way of doing business. Current trends in business and commerce suggest that there will be more and more of these companies. When the information dirt-track is developed into the a superhighway the virtual corporation may take over. But until then we will all remain commuters.

### Handy approach

One of the first people to write about virtual companies and their likely impact on society was Charles Handy, a former professor at the London Business School and author of the best-selling management book, *The Empty Raincoat*. His writings have focused on work organisation in the information age.

Handy's approach is more that of a philosopher than of a manager. He believes that in most of the interesting organisations today, there isn't much to see. Their physical assets are nothing — perhaps only a few desks. They rent their offices





and computers. The property that matters to these companies are the brains of their staff. These companies are virtual in the sense that their assets are not tangible.

"In the new economies we will not need masses of people churning out things in factories or offices. This will change all our lives and throw up questions about our society. How are we going get money to people? If the new world offers women new roles, what are men going to be doing? How should we educate people for their new roles?"

The virtual company idea is often based on the idea of people working as independent consultants, coming together for individual projects. Handy sees this as a natural step forward in industries which rely on people's brains. "In what sense, either legally or morally, can you say you own someone's brain? Marx wanted to see the means of production in the hands of the workers. I would argue that has now happened because the means of production are now in their brains, which belong to the workers and no-one else."

Handy believes that this change will result in a the reinvention of our economic system. On one level the change would seem to be in favour of the workers as they are no longer dependent on their employers. But independence unfortunately also means massive insecurity. All over the western world people are worried about their jobs. The old jobs-for-life system has broken down everywhere.

"People say to me 'I don't like this future you are predicting, so I don't agree with it'. I reply that I don't like it either but you can't go back. There will not be massive organisations that employ thousands of people indefinitely. These organisations used to provide the place, people and purpose in everyone's



*Charles Handy: "This throws up questions about society"*

lives. If you take the organisation away then the place becomes cyberspace for a lot of people. The purpose might be to earn a living but people want more than that nowadays."

Handy feels the Internet will make life worse for the worker before it makes it better. One of the main roles of middle managers used to be to collect, sort and distribute information. Now with the Internet (and Intranet) anybody can pass information on to anybody, so what is the point of middle managers?

But Handy cautions against too much reliance on the Internet: "Communication by email can be very superficial. You can tell lies and no-one can see the look on your face. The 'hi-touch' has to be put back into the 'hi-tech'. Organisations that are purely virtual and rely entirely on artificial communication have a hard time sustaining any kind of feeling of corporate togetherness.

"Of course you can't go back. People are not going to say 'we won't use email or the Internet and we'll all work together in one office.' We must concentrate instead on the good things that come from this technology. People can now do things on their own that they could never do in the past. It's now possible to write your own newspaper and have it read by people around the world.

"In many ways the Internet is like the penny post. One of my wife's ancestors, Rowland Hill, introduced the penny post to Britain where every letter cost a penny regardless of distance. Before this only the very rich could afford to send letters. So only the rich sent letters and the poor didn't even learn to read and write. The penny post gave people the incentive to learn to read and write because it gave them the means to communicate."

The Internet and other new technologies could in Handy's analysis make things better in the long run. Whether they do depends on us: "Technology itself is neutral. It is a power for good and a power for bad. For example, technology unites us. We are all citizens of one world to a much greater extent. But at the same time it is making us all

provide the means for the reinvention of society or accelerate its decline. Unless those who master the technology make it available to all, the information age could bring forward a new dark age bringing riches to the very few and poverty to the majority.

"Those who master the technology, the symbolic analysts, will make up only 20 percent of the population. The majority of the remaining 80 percent will be split between those who do ordinary jobs and beneath them, a growing underclass. Education is the key for incorporating this underclass into the rest of society. We have to look at the opportunities that the information age brings us and explain to people what is happening, because a lot of them are terribly frightened."


Handy's key concept in his writing is the paradox. He



unequal citizens of that same world, because those who rejoice in the technology will be few. There will be many who will find themselves impoverished by the technology because they get left behind and cannot keep up. It will empower some and leave others behind. That is its inevitable effect unless we do something about it.

"The technological advances of the information age will either

believes that there is no simple way of understanding society — that there can be no "theory of everything".

The Empty Raincoat is named after a modern sculpture of a bronze raincoat, standing upright and empty. This struck Handy as symbolising what he sees as society's most pressing paradox: that people were not destined to be empty raincoats, nameless numbers on a payroll, 



## CUTTING EDGE

role occupants, the raw material of economics or sociology, statistics in some government report. "If that is the price, then economic progress is an empty promise."

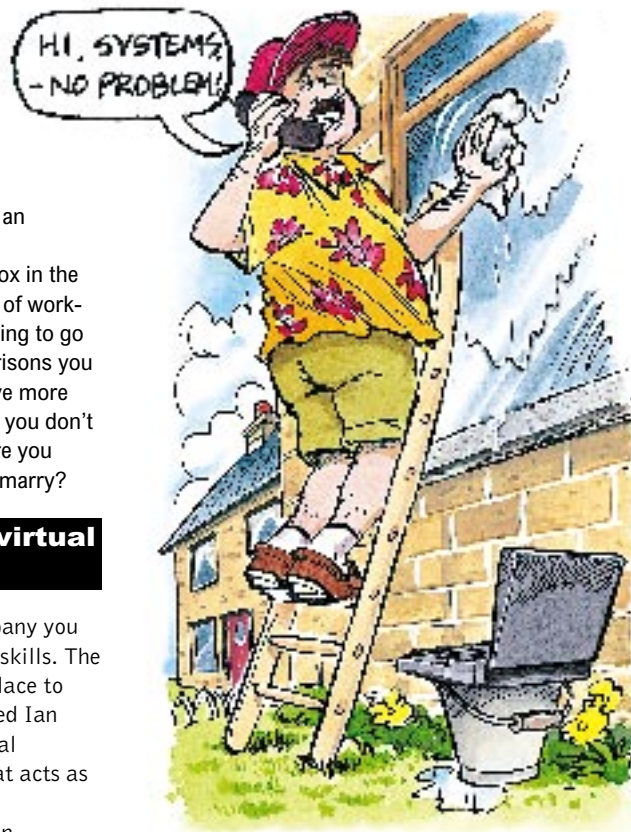
It is easy to see a paradox in the virtual company: a method of working that frees you from having to go to work in some ways imprisons you in your home; you may have more time with your family but if you don't interact with people how are you going to meet someone to marry?

### How to setup a virtual company

To set up a virtual company you need to find people with skills. The Internet is the obvious place to look. An Australian called Ian Taylor has set up a virtual corporation Web site that acts as a resource for would-be entrepreneurs. "The main difficulty is locating expertise. You need to find people that are good. That is why we've set up Professionals Online, a tool enabling rapid access to consultant and contractor details," he says. Another way to find people is through industry-related newsgroups and Web pages. The Finishing Com page, for instance, acts as a bulletin board for virtual company ideas.

Two other good sources are the Future Work Forum and the Crossroads Project. Henley Management College set up the Future Work Forum to study and promote teleworking and virtual associations. It includes case studies on IBM, Digital, Rank Xerox and Andersen Consulting; and additional material about British Telecom; Mercury; Oregon Health Science University; General Motors.

The Crossroads project explores the potential of virtual workplaces by creating a virtual organisation of its own. The project plans to use its acquired knowledge to help virtual companies compete effectively against large, conventionally-structured ones. Crossroads aims to resell its acquired knowledge and skills to other organisations, which wish to adopt elements of virtual operation to enhance the competitive position of their own businesses.



### Is it the future?

Is the virtual corporation just another Internet fad and management fashion? Ian Taylor of the Virtual Corporation Web site thinks not. "It's here to stay. And it will just get bigger with cheaper communications and bandwidth. It just makes sense. I think the term virtual corporation is a bit high-faluting for just a common-sense way to work if your company deals primarily with information. Translation agencies have worked this way for years."

He's probably right but at what cost? Taylor feels that the negative side effects of virtual companies is nothing compared to the social upheaval of outsourcing and downsizing. This is a technological view but a manager would see virtual techniques as being part of outsourcing and downsizing. After all these terms are simply American management euphemisms for sacking people.

**Richard Vadon**

### PCW Contacts

**Ian Taylor**

<http://www.wordsimages.com/virtcorp.htm>

**The Finishing Com**

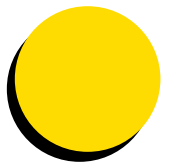
<http://www.finishing.com/virtuals/index.html>

**Future Work Forum**

<http://www.henleymc.ac.uk/fwf/fwfbook.htm>

**The Crossroads Project**

<http://www.idiscover.co.uk/rodz/>



# net.newbies

Getting started on the Net:  
what to do, where to go



CUTTING EDGE

**T**hese pages are designed to be an easy-to-use reference guide to the Internet for the novice.

## So 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 growing.

## What about this World Wide Web then?

It is *not* the Internet. It is a service on the Internet which uses special software known as Web Browsers (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.

## Sounds great. 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 PC to dial in to another computer with a modem and communicate with it. They come in different speeds, from 2,400 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 2,400 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 recoup 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*.

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.

## Why don't I just join CompuServe?

Or you could try AOL, Europe Online, UK Online and MSN who all 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 £5 and £10 per month, plus a charge per hour if you are online for more than a set number of hours in that month. But as the market becomes more competitive prices are falling — CompuServe has announced some significant reductions.

Demon Internet is the best known and most popular of the standard Internet operators but

doesn't cater too well for beginners. Perhaps better for the raw newbie is Easynet (although it only has PoPs in London and Edinburgh) or UK Online. The latter 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.

Any good service provider should provide you with appropriate access 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

<b>AOL</b> 0171 385 9404	
<b>CompuServe</b> 0800 289378 email: 70006.101@csi. compuserve.com	
<b>Delphi</b> 0171 757 7080 email: uk@delphi.com	
<b>Demon</b> 0181 371 1000 email: internet@demon.net email: sales@demon.net	
<b>Easynet</b> 0171 209 0990	
<b>Europe Online</b> 0171 447 3400	
<b>Global Internet</b> 0181 957 1003 email: info@globalnet.co.uk	
<b>UK Online</b> 01749 333333 email: sales@ukonline.co.uk	

If you don't understand what's written here or have any suggestions, please let us know. Contact **Paul.Fisher@pcw.ccmil.compuServe.com**, or "snailmail" (Internet-speak for the post) to the *PCW* Editorial address on page 12.



CUTTING EDGE



# net.news

with Web watchman PJ Fisher.

## Calling Linux fans

A new Linux-based server kit has been announced by SSC. Delivered on two CDs the package includes two versions of Linux (Red Hat and Slackware), NCSA and Apache servers, CGI facilities and a Web browser.

There is also an HTML quick-reference card and, in true Linux fashion, a scant set of installation instructions. Available now the kit costs \$13.95. Linux (pronounced "Leenicks") is a version of Unix that runs on Intel-based PCs and offers multi-user, multi-tasking facilities at a fraction of the cost of true Unix operating systems.

<http://www.ssc.com>  
sales@ssc.com



## UU-What?

**M**ailbox Internet has announced a mail-only service that uses the UUCP (Unix to Unix) protocol. Aimed at customers who have no desire to use any other Internet services, Mailbox say that users will get three months free access to the UUCP service. It will cost £35 per month afterwards. UUCP can be used to build gateways between popular LAN-based email packages such as QuickMail and Microsoft Mail.

"The best thing about UUCP is that most ISPs overlook it," said Justin Clements, MD of Mailbox Internet. "It doesn't require IP addressing on machines but instead acts as if both machines were directly connected," he added.

<http://www.mailbox.co.uk>  
0171 731 8558

## Webless Wonder

• Web publishers can now make WWW sites available to people without Internet access by loading their pages onto a floppy disk service available from Instant Access. The floppy uses a proprietary hypertext browser which can read HTML files including Netscape 2 extensions. Currently available only for Windows, a Mac version is under development.

0181 205 2596

<http://www.instantaccess.co>

## PCTV? No, TVPC

**T**he fledgling Intercast standard for the Web received a boost when four media giants decided to give full backing to the technology which blends TV signals into Web browsers. Tele-Communications, Time Warner, NBC and CNN have all given their support. A number of PC vendors have dabbled with conventional TV tuner cards to turn PCs into TVs, but with limited success. A new standards grouping, the Intercast Industry Group, has been formed to create a standard for displaying TV

signals on ordinary PCs.

The Intercast API was developed by Intel, Gateway 2000 and Packard Bell. Intercast will allow broadcasters to transmit TV signals at four times the speed of the fastest modems, and end-users will also be able to watch TV in one window and access the Web in another.

If all goes according to plan, broadcasters will be able to tailor programs for specific viewing on PCs. Information could be displayed as text relating to the show being watched and stored

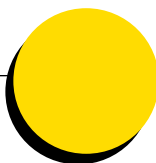
to hard disk. Another option would be for TV and Web information to be synchronised, so that in-depth statistics on a football match, for example, could be accessed while watching the game. Customised action replays are another possibility, according to the backers

Web information and the TV

signal are transmitted together and then separated at the PC end. Intercast claims a full screen image at a higher resolution than a conventional colour TV.

<http://www.intercast.com>





## Plug and View



Inso Corporation has released a Microsoft Word viewer plug-in for Netscape 2.0. Based on its QuickView utility which allows users to view virtually any file whether they have the application or not, the new plug-in allows users to view Microsoft Word 6.0 or Word 7.0 (Win 95) documents within Navigator without having to have the Word application installed. Inso claims that users can view attachments and Word documents embedded in HTML documents while in the browser. The plug-in is available for free download from Inso's Web site and a copy of QuickView is available for a month's trial. <http://www.inso.com>

## Fire! Fire! Wall! Wall!

**A** new version of the plug and play BorderWare Firewall Server is now available and includes a Secure Server Net (SSN) layer to enhance security.

BorderWare is a complete firewall and server package that runs in conjunction with local TCP/IP networks on Windows 95, NT or Unix. It is designed to allow companies to provide access to Internet applications and services including Web servers and FTP with full security.

The SSN serves as a LAN in its own right and sits on the inside of the firewall, but to the outside world the services it provides appear to reside outside it. Security is provided by network address transformation, internal domain information hiding and mail header stripping.

**Peapod Internet**  
01753 581800

## Germans don't go for graphics, says IBM

IBM's German subsidiary has published details of a major survey into user activity on the Web. Users were asked about how they used Web as part of a doctoral research paper.

Unsurprisingly, 97 percent of the 2781 respondents were male and the average age was 27. Over 40 percent had received a higher education of some kind. The study also found that the Internet has become the preserve of salary-earners and students, at 39 percent each with a 9 percent grouping among the self-employed. 62 percent were beginners with no more than 12 months experience of the Web. Forty-six percent spent up to three hours per week and 37 percent spent longer.

As far as information found on the Web, most wanted up-to-date, accurate,

concise information available at no extra cost. 65 percent considered a single screen page to be sufficient volume and a further 20 percent said their interest waned if a second page had to be accessed. Bad news for developers of those multi-page Web site extravaganzas.

The German respondents were not particularly impressed by graphics either — a massive 80 percent reported that they did not want more graphics on Web sites. The Germans however were not fazed by English as the lingua franca of the Web; 60 percent said it was immaterial whether the site was in English or German.

IBM says it has plans to repeat the survey at regular intervals to determine whether user patterns change with technical development.





## Net.surf

Rise is the name of a music/style Web site which acts as a holder for a number of street-cred magazines and bands. Though neatly designed itself, it's outshone by the excellence of the Dazed&Confused (<http://www.rise.co.uk/dc/>) contained within it. Based on the



magazine of the same name, it shares the same bold graphic design and still manages to come down the modem at a reasonable rate. Take a look at this and other Rise highlights including the online space invaders game on <http://www.rise.co.uk>.

More wacky and American is the SPIV site which looks fantastic. It won cool site awards just about everywhere in its first week on the Web. Just one point: what is it all about? Try and decipher it all on <http://www.spiv.com/spiv.html>.

Sports fans should take a look at Sky Sport's excellent site on <http://www.sky.co.uk/sports/center/index.cgi>. It includes links to every sport now covered by Sky and a special treat for Manchester United fans — the arrival of the official Man Utd home page (<http://www.sky.co.uk/sports/manu/meta.htm>). Well designed and with enough interest for any Red.

Finally, apologies to all those Netscape users who have been visiting my Web site (<http://horse.vnu.co.uk>) and are still waiting for exciting things to happen. They will, promise, but in the meantime get yourself a copy of Microsoft Internet



Explorer now available for Windows 3.11 and System 7.5 from Microsoft's Web site: <http://www.microsoft.com>.

**PJ Fisher**

## BT Watch

*All BT rumours and dirt gratefully received. It's good to talk.*

It's been good to talk. According to sources, Bob Hoskins is on the move. BT has decided to end its contract with the invasively irritating cockney in its (too) long-running TV campaign. But don't celebrate yet. Billy Connolly has been lined up as Bob's replacement. Come back, Busby, all is forgiven.

If you go to BT's Web site (<http://www.bt.com/home/>) make sure you sign up for the trials of Wireplay, BT's online gaming network. There are no charges, except 2.5p a minute off-peak (£1.50 per hour) and only 8.32p a minute at peak hours (£5.87 per hour). According to BT: "There is no standing charge for the duration of the trial, nor any intention to introduce one." But is that for the duration of the trial or after?



[pf\\_fisher@pcw.ccmil.compuserve.com](mailto:pf_fisher@pcw.ccmil.compuserve.com)

## Space — the final frontier

Responding to the demands of its customers, PIPEX Dial is to offer extra space on its Dial Space Extra service. Since it began offering free Web space to customers, PIPEX says that over 1000 people have taken up the offer.

An extra 2Mb of space is now available for £10 per month and £20 up to 5Mb.

PIPEX offers users online

HTML tutorials and guides and entry into a number of search engines.

**Dial Space Extra 0500 474739**  
<http://www.pipex.com>



## Internet Studio delay

Microsoft has confirmed that full release of Internet Studio has been delayed until late 1996, possibly later. The multimedia authoring software was originally intended as a proprietary content builder for MSN developers. However, following Microsoft's Internet strategy switch in December 1995, Internet Studio will now be redesigned as an HTML-compliant tool for general Web page development.

MSN is not to be abandoned, not yet anyway. Exclusive content deals are planned much like Sky TV licenses sport, and more

UK local content will be installed.

Although Microsoft is now fully supporting Java, the company is countering the threat from Sun's language by integrating Visual Basic extensions (VB Scripts) to work in Version 3.0 of Internet Explorer, now in Alpha development. This will enable online ordering, enhanced multimedia and support for virtually any TrueType font. VB Scripts might also be used to download TrueType fonts to PCs for display.

An Internet Action Pack for Visual Basic will allow developers to build applications, both for the Web and to incorporate HTML functionality in their own

Internet applications such as custom Web browsers. For end-users a new Internet Plus! Pack will be available by the middle of the year to extend the Internet capability of Windows 95.

Microsoft is also opening up MSN to the Web with a Beta programme for UK users. It will start in early March and end when the service goes mainstream in April. Users will be charged no more than the current charge but will be given unlimited free access to both MSN and the Internet. A new UK Microsoft home page is now accessible on

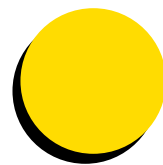
<http://www.microsoft.com/uk>.

## Java for Mac

Mac developers who have been feeling a little left out of the Java revolution will be pleased to know that Sun has finally released a Beta version of the Java Developer's Kit for Mac. It's available from Sun's Web site for free download.

An applet viewer is included for testing applets outside a Web browser and an API to create applets for use in Java-friendly browsers such as NetScape.

<http://www.sun.com>



## Symantec Java café is open

Users of Symantec's C++ 7.2 development tools who wish to start investigating the wonders of Java can download a copy of Symantec Café. This freely available update integrates Sun's Java Development Kit (JDK) with Symantec's own set of C++ tools.

Developers will benefit from a number of features designed to speed Java build times, including Wizard-like tools that allow projects to be built around a set of Java sources. A version for the PowerMac is also available. Café is available from Symantec's Web site at <http://www.symantec.com>

## ★ Net Opinion

The USA's Telecommunications Reform Bill contains legislation that some quarters have found unpalatable.

Ever since Bill Clinton signed the Telecommunications Reform Bill into law, the online industry has become vexed.

The Bill included the Communications Decency Act which potentially holds ISPs and online services such as AOL and CompuServe liable for knowingly transmitting indecent material over the Net. This was not the only piece of legislation contained in the bill, but it is the one that most have seized upon, because it spotlights an emotive area. Who has the right to judge what is indecent? The US government? The EU? Parents? These issues have yet to be decided, and this is just the start of the debate, not the end.

Such issues have traditionally not bothered an

Internet community that has got used to living somehow apart from the rest of the world. "It's a sad day for free speech in America," said a representative of the American Civil Liberties Union (ACLU) after the bill was passed. Well, maybe. As far as the Internet is concerned, a libertarian attitude has prevailed which allows anything a presence on the Net regardless of political or sexual persuasion. We all know that hard core content exists on the Internet, content that were it to appear in other media would result in prosecution. Why should this be so?

After its run-in with the Bavarian authorities CompuServe is in "co-operation" mode, i.e. if it receives a complaint about content accessed through its service it will investigate and remove

access if it proves to be offensive or illegal. But it maintains it is "not into censorship".

BT, which has just launched a new consumer Internet service, BT Internet, is treading carefully. It has stopped access to any newsgroups which it considers (by name only, it must be said) promote illegal activities (according to UK law) such as alt.rec.cockfighting. But it again does not see itself as a censor.

Both moves are sensible in the current climate. The Internet exists in the real world and is shaped by it — romantic Netheads must start acknowledging this fact. Little blue ribbons and black backgrounds on Web sites are a nice gimmick but proper debate is needed to resolve this issue. This isn't a call for censorship, it is a demand for realism.

## Battle of the planet of the online services — part two



**PLANET**  
INTERNET

The battle continues in the UK, and Planet Online has unleashed what must be considered a masterstroke: free 0800 access to its dial-up service.

"We have been able to

remove one of the biggest hurdles to going online, in one stroke," said Steve Nicholson for Planet Internet.

Dutch parent group KPN Multimedia says its own research shows that a major concern

among potential customers is the price of phone calls. Existing customers will be the first to benefit from the free phone numbers when the service goes national in May.

0171 345 4100  
<http://www.uk.pi.net>

## Register that domain!

NetBenefit has launched a Website that enables companies to register domain names. A form-based page allows applicants to check if the chosen domain name is already taken before registering.

Even if companies have not yet started using the Internet for business, the service gives them the opportunity to protect domain names for future use. Individual domain registrations cost £100 and all applications are ratified by the UK Naming Committee. Companies without Internet access can apply by contacting NetBenefit directly.  
<http://www.netbenefit.co.uk/register.html>  
0171 336 6777

# net.answers



**Nigel Whitfield** guides you through the Internet.

## Internet Mailbox

**Q:** "How do I set up Microsoft Exchange in Windows 95 to collect mail from my Internet service provider?"

**A:** The answer depends on exactly which version of Windows 95 you have, and whether or not you have the Plus Pack. If you bought a new PC that had Windows installed on it, you'll have the Internet parts of the Plus Pack anyway. If you bought a Windows 95 upgrade, you don't get the extra bits you need and you'll have to pay extra for the Plus Pack. If you're using a provider that delivers mail to you using SMTP, you'll also need an SMTP-POP converter, like the ones we've discussed before.

Once you've set up your Internet connection using Dial Up Networking, you'll need to ensure that the Internet Mail is enabled from the Mail and Fax control panel. Check that Internet Mail is listed as one of the services. If it's not, click on the Add button to install it. Now click Properties and you'll see a screen like the one on the right, where you should fill in the details of your Internet mail account; the ones we've shown are for Direct Connection. If you don't fill in a password, you'll be asked to enter it each time you start Exchange, before it tries to fetch your mail.

For sending mail you'll need to

click on Advanced, then type the name of your provider's outgoing mail relay in the box; again our example screen shows the settings for Direct Connection.

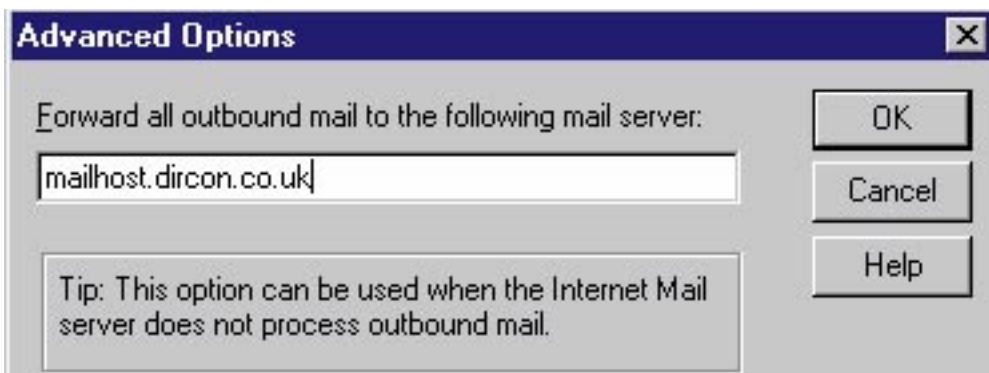
If you're not using Exchange to send mail to people on your network, you don't need to do any other configuration; if you do want to send to other people on your network, check the delivery options in Exchange to make sure that addresses are checked on the network before the Internet.

When you start Exchange, it will automatically connect to the mail server you specified in the Internet Properties screen, retrieve all the mail that is waiting for you, and then delete it from the provider's server, leaving everything in your Inbox. It will also attempt to check for new mail periodically — and if you haven't saved your password, you'll have to type it in each time.

## Strange attachment

**Q.** "When I post messages to the Internet using Exchange, people tend to complain that there are strange attachments on the bottom. How can I stop this happening?"

*Reached via the Mail and Fax control panel, this is where you fill in details of your Internet mail account*



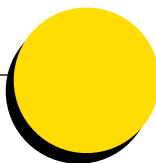
*To send all mail via a single gateway at your service provider, fill in the name of the gateway machine, reached by clicking on Advanced from the previous screen*

**A.** The attachments are created by Exchange and include information about fonts, colours and type sizes that you've used in your message. Other people using the same program can see exactly how your message looked on your own screen. Needless to say, the majority of people on the Internet aren't using Exchange and don't need the attachments.

In a public forum, such as a mailing list or a newsgroup, it's considered very bad manners to send attachments like this. Unfortunately, it is not possible to turn attachments on and off for a particular message. Attachments will only appear on your Internet mail if you have the address of the recipient in your address book.

When an address is not in the address book you can use colour, fonts and different styles in a message, but Exchange will silently discard it all before





sending the message. If an address is in the book, you can tell Exchange whether or not you want the information about colour, fonts and so on included when you send mail to that address.

To configure this, pull down the Tools menu in Exchange and select Address Book. Find the entry you want to change and double-click on it. If it's not on top automatically, click on the tab marked "SMTP — Internet". Check that the boxes labelled "Display Name" and "Email address" are cor-

rect, and then look at the check box below, which is labelled "Always send messages in Microsoft Exchange rich text format."

Unless you know that the people you are writing to also use Exchange, you should make sure that there is no tick in the box. When this box is ticked, Exchange adds attachments to your message. If you are in doubt about the mail program that someone else is using, or if you are posting to a public forum, you should make sure that this option is turned off.

## Information Manager for the Mac

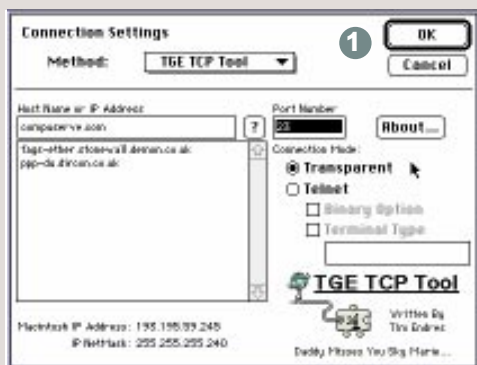
**Q.** "The Windows version of CompuServe's Information Manager can connect over the Internet. How can I do this on a Macintosh?"

**A.** If you have a copy of CIM for the Macintosh that's at least version 2.4.1, then you won't have any problems at all. As well as the software for your Internet connection, such as MacPPP, you'll also need one extra program, which is a "telnet tool". It's a system extension that is used by a part of your Mac's software called the Communications Toolbox. One of the most popular ones is called "TCE TCP Tool"; you'll be able to find it, and a selection of others, by searching the Macintosh software archive at <http://pubWeb.nexor.co.uk/public/mac/archive/welcome.html>.

As with other extensions, install it on your system simply by dropping it on top of the System folder. Now start CIM, and from the Special menu select Settings and then Connection. You'll see a screen like the one in Fig 1 appear, and if all is well, when you click on the drop-down menu in the top right of the bottom section, the TCP Tool will appear as one of the choices. If you've currently selected one of the serial ports on your Mac, the menu will be labelled "Port", but if you're already using the communications toolbox to connect, it will be labelled "Method" instead. Now you need to click on the "Network" menu and then select Internet. Now, CIM knows how to log on over the Internet, but you still have to tell the communications toolbox how to find CompuServe. Click on the Configure button and you'll see a screen like Fig 2 appear, with the names of any computers that you've already connected to, listed. In the box at the top, type "compuserve.com" and make sure that the connection type is set to "Transparent" before you click on "OK".

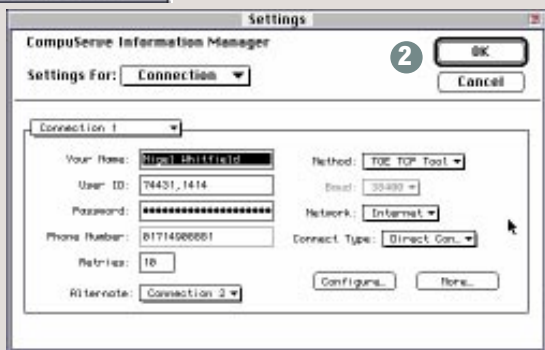
To connect, just dial up your Internet provider in the usual way, and use any of the CompuServe commands that would establish a connection, such as "GO MAIL".

Although this may save you money on long-distance charges if you don't have a high-speed local CompuServe number, it's not a very quick way of accessing the service.



**Fig 1** The TCP tool needs to be told the name of the computer it should connect to

**Fig 2** Connecting to CompuServe over the Internet from a Mac should be easy. Just select a TCP tool from your toolbox, and set the Network to the Internet







## Speed is of the essence

**Q.** "I have just hooked up to CompuServe using an external Microlin 14.4 modem and I am having problems running it at 14.4Kbits, though it seems quite happy at 9.6.

I have a 486 SX-40 with VESA bus. I have been offered a second-hand E-IDE disk controller with 16550 serial ports to replace my existing 8250 serial-based card. Is this likely to make a difference?"

**A.** In general, if you are offered a card with 16550 ports, then it will almost certainly give some improvement, though with only a V32bis modem such as yours, that may not be very marked. In the case of CompuServe, you won't be seeing very good performance anyway as the compression on your modem isn't being used, so the computer should be quite capable of keeping up with the modem. However, if you anticipate upgrading to a faster modem or a different service provider, it's worth adding the extra ports.

Given your difficulties in connecting at faster speeds than 9,600, it's probably worth trying the same modem on a different phone line — it's unusual for a computer to be so slow that it won't keep up with a modem at any faster speed. You should also ensure that you don't have any unnecessary software installed, which could slow Windows down.

If you do decide to install an additional card to provide faster serial ports, you should check carefully to make sure that it will be compatible with your existing PC, especially if your current disk controller or serial ports are fitted to the motherboard. If they can't be disabled, you may have a hard job installing everything so that it works together.

### Be properly addressed

**Q.** "What is the difference between http:// and ftp:// in Web addresses?"

**A.** The first part of a Web address is used to indicate what sort of server a connection will be made to. An http server is the main type of server you'll encounter on the Internet, and is usually used to send simple documents such as Web pages. An ftp server is designed specifically for transferring files from one system to another. You can connect to an ftp server using a dedicated "ftp client", as well as a Web browser, but you can only connect to an http server using a browser.

Although files were traditionally made available for download from the Internet using ftp, more and more sites are using http instead. Although there's not too much difference in the time taken to transfer a file, there is an important advantage to using http, in addition to the ease of use of the Web browsers themselves.

When a Web server sends information to your browser, it can include details of the kind of information it's sending. While it's sometimes possible to

work that out from the name of the file, this is not always the case, which is why your browser will sometimes say that it doesn't know what to do with a file and just save it to disk. By sending information about a file via http, it's possible to give extra hints to your browser so that, for example, a sound file can be converted to play on your PC, or a Mac file can be decoded automatically, regardless of what the file is called.

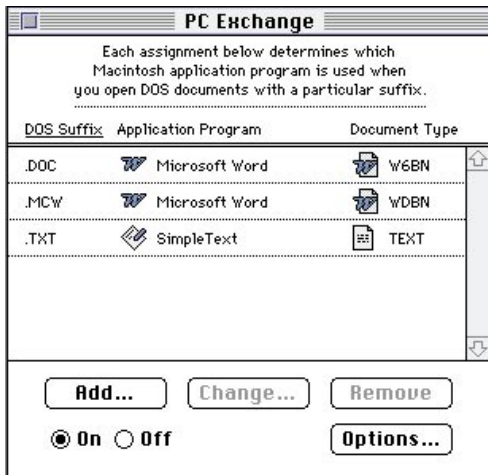
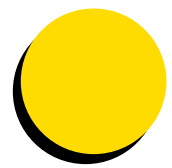
There's one other important difference: broadly speaking, when you retrieve a file using ftp, you'll always have to give a username and password (even if the name is just "anonymous"). With http you don't have to, though some servers can be set up to demand one.

### Gibberish unzipped

**Q.** "I have recently come across several files on the WWW which had the extension '.GZ'. While the instructions on the site claimed that these were 'Gzipped' files that would be recognised and unzipped by my browser, all I

*Gnu Zip is used to pack and unpack files with a .gz extension. It's available for most computers, including the Mac and DOS*

gzip suffix: <input type="text"/>		Default signatures for expanded files: <input type="checkbox"/> (?)	
Compression level: 6 <input type="button" value="↑"/>	<input type="checkbox"/> Force overwrite	Text files: <input type="text" value="txt"/>	Binary files (type & creator): <input type="text" value="????"/> <input type="text" value="????"/>
ASCII compress: <input type="text" value="Only for 'TEXT' files"/>	<input checked="" type="checkbox"/> ...and startup keys	ASCII uncompress: <input type="text" value="Use 'gzip' menu set..."/>	<input checked="" type="checkbox"/> ...and startup keys
Compress: <input type="text" value="All non MacGzip files"/>	<input checked="" type="checkbox"/> ...and startup keys	<input type="checkbox"/> Don't delete originals	
<input type="checkbox"/> Beep when done		<input checked="" type="checkbox"/> Quit when done	
		<input type="button" value="Cancel"/>	<input type="button" value="OK"/>



*For transferring files from a PC to the Mac you can use PC Exchange, but it's often simpler to use a program like MacEtte on the PC*

got was gibberish. Can you tell me how I should configure my browser to read them?"

**A.** GZip is a very popular form of compression on the Internet, and the program used to create or extract files in this format is called GNU Zip. It's available for all sorts of computer systems, including Macintosh, Windows, DOS and Unix.

You can find programs that understand the GZip format on [ftp.demon.co.uk](http://ftp.demon.co.uk). For a DOS PC, you should fetch `gzip-1.2.4.msdos.exe` from the `/pub/gnu` directory. Windows users can use version 5.6 or higher of WinZip, from `/pub/ibmpc/win3/apps/zip/winzip`, and Mac users can use MacGZip, which can be found in the `/pub/mac/Internet/Decoders` directory.

### The vital LINX

**Q.** "My Internet provider says it's a member of LINX. What is this, and is it important?"

**A.** LINX is the London Internet Exchange. It's an interconnection point between many of the different Internet providers in the UK.

The aim is to ensure that when a customer of, for example, Pipex accesses information on Demon's Web server, a reasonably direct connection can be made. Without a system such as LINX, there would have to be links between all the providers that want to exchange information, or traffic would have to pass from Pipex in our example, over their US link to an Internet exchange in the US, where it would then travel back across the Atlantic on Demon's link,

using up two transatlantic connections rather than a more straightforward route from Cambridge to London.

If a provider is a member of LINX, it means they meet certain minimum technical requirements, and that they have their own connection to the US. However, it doesn't necessarily mean they exchange Internet traffic directly with all the other LINX members.

Full details, including who connects to whom at LINX, can be found by looking at <http://www.linx.net/>.

Although there are definite benefits to LINX membership, remember that it's only half the story. Many of the smaller Internet providers, for instance, don't qualify for membership themselves, but are resellers of connections provided by LINX members such as Pipex.

### Transferring files to floppy

**Q.** "I've downloaded some Mac files to my PC. How do I transfer them to the Mac on floppy disk? DOS copy doesn't work."

**A.** Files on the Macintosh have two separate parts, one to hold data and one to hold resources, such as menus. If you copy files in the wrong way, you can lose one or other of the parts, and the file will be useless when it reaches the Macintosh.

To overcome this, you need

to download files from the Internet in MacBinary format; the extension ".bin" is often used for these files. With a PC program such as Mac-Ette you'll be able to copy files directly to Macintosh format disks.

When a MacBinary file is copied, it will automatically be converted into the two parts, so that when the disk is put in a Mac, all the files will appear with the correct icons.

You can use the same process in reverse to convert files to MacBinary format so that you can send them over the Internet using ftp or email.

In general, whenever you move a file from a Macintosh to another type of computer system, you should ensure that it's converted to BinHex format first — most Mac Internet applications can do this automatically.

### 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](mailto:nigel@stonewall.demon.co.uk).

If you have questions you'd like answered, please send them to [net.answers@stonewall.demon.co.uk](mailto:net.answers@stonewall.demon.co.uk). Please note that a personal response to every query cannot be guaranteed.

# Innovations

## Sound and vision

**Photo, sound and video libraries are moving into the Net age, with more and more multimedia products sold by ISDN.**

ISDN, the dial-up all-digital phone system that can be plumbed into any office or home, is making an impact on the way that information is moved about. Unlike the heavy-duty digital telecoms links which are permanently installed and cannot be accessed from outside, ISDN works in much the same way as an ordinary phone-line — you can dial it up from anywhere and start transmitting data at a rate of 128kb/sec, a speed that makes large file transfer and realtime multimedia realistic.

This capability has been attracting the attention of all sorts of multimedia information suppliers who would traditionally have relied on conventional mail to send photos or tapes out to customers. The business presentation world is gradually embracing the PC as an important tool for creating and displaying pictures and graphs. With the advent of multimedia PCs, it is popular to run audio and video clips into PC-driven shows for anything from just a few people gathering around a portable to large-scale commercial presentations.

Whether they are coming off a PC or from overhead projectors (OHPs), slides or video,

presentations need fancy artwork, photos and audio clips to add a bit of pizzazz. To avoid the expense of commissioning new photos and sound tracks, users go to commercial libraries that can supply exactly the shots and sounds needed. These are bought on a usage fee that depends basically on how many people are likely to see it.

Until recently, an image library would send out a printed catalogue of its pictures to choose from, but these companies are now also moving into the computer era, first by supplying thumbnails on CD-ROM and now taking advantage of the speed of ISDN to offer a look-and-try purchase system directly down the telephone line.

While the CD-ROM route, with its large storage capacity and sophisticated search engines, has been a big step forward, the process of actually obtaining the image hasn't really changed. Once you've chosen the shots or clips you want, you then have to call the library, which will send a photographic copy — a transparency if you are doing a slide presentation — in the post.

This is fine, but slow if you are going to be doing the whole thing from your PC. You've still

got to scan the image and you are probably still paying for high quality and large number usage when all you really need is VGA quality images to be seen by a few tens of people.

Enter the ISDN catalogue, which gives all the browse facilities of a CD-ROM remotely. Because it is geared towards computer users, those files come in two qualities, one for traditional display using slides or print, and a lower, "electronic" quality for computer display and playback.

Signing into these types of systems is much the same as setting up with an Internet service, a modem/ISDN link, some front-end software and a monthly subscription. Although the installation of ISDN lines has been slow to take off, partly because of the cost, many companies in the print and presentation market have installed lines for transferring large images to print houses.

One library service, Signpost, is supplying image sound and video clips through this style of browse-and-buy service. In its specific implementation, the front-end software is a departure from the normal "professional" Windows look, with more of a "creative artist" feel — large

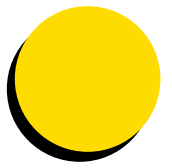
buttons representing each of the viewing and shopping functions.

Files are searched by category and then sampled over the line as smallish images or movies. When the client is happy with their choice they drop it onto a shopping basket icon which is taken to the checkout. At that stage, quality and usage options are chosen. Image clips can be delivered as high resolution 400dpi A4 images (glossy magazine quality) or as 1024 x 768 SVGA images, depending on how they are going to be used.

The consensus is that computer-based usage of media clips and images is likely to be a much lower-cost activity in general, so the usage fees start at around £20 rather than the £120 or so for a full print-quality download.

The same principles apply to the video and audio clips. All video is encoded using MPEG1 but for broadcast quality the data rate is nearly double that of standard CD-ROM MPEG video and to handle these a dedicated professional MPEG playback card on PC is needed. For users of both still and video clips the future looks to be carried along digital ISDN lines.

**Tim Frost**



# Horizons

## No noise is good noise

**Anti-noise technology: the sound of silence or something to shout about?**

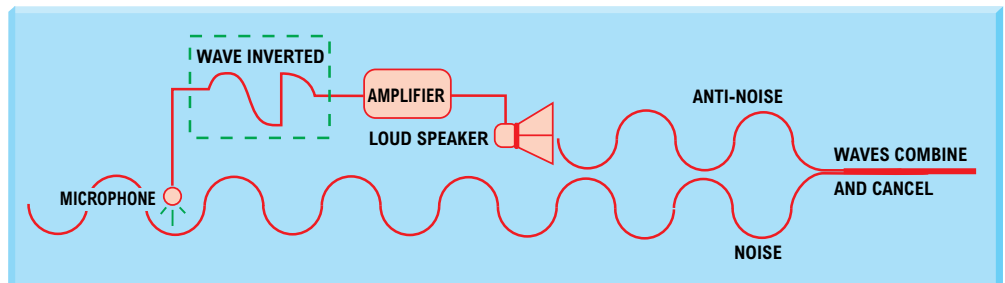
Noise pollution: most of us bear it but no-one likes it, so a technology which can reduce its effects *must* be attractive. I am talking about high-tech, active, anti-noise systems.

Noise is a wave, the amplitude of which defines the power (or volume). The length of the wave determines the pitch of the sound and is expressed as a frequency in cycles per second, or Hertz (Hz). Humans can typically hear a range of sounds from 20Hz to 20MHz (20 million cycles per second).

### An elegant concept

The concept of actively reducing noise is seductively simple and elegant. Since noise consists of a wave, all you have to do is generate a wave of the same amplitude and frequency, but 180° out of phase; the two waves will cancel each other out, resulting in silence. All you need is a microphone, some electronics to invert the wave, an amplifier and a speaker. But before we all start looking for a device that can instantly silence a tedious, lunchtime bore there are a couple of restrictions.

The first is that anti-noise is effective only against the relatively low frequency noise of a restricted bandwidth. To understand why, consider the mechanics of an anti-noise system (*see illustration*). The wave must be detected, inverted, amplified and re-broadcast (180° out of phase) in the time it takes for the wave to physically



*Anti-noise circuits work by inverting the noise wave at source and recombining it*

pass the anti-noise system. This isn't too big a problem since the wave travels at the speed of sound (about 340 metres per second), whereas the electronic signal travels much faster, at the speed of light.

However, the relative positions of the microphone and speaker are crucial. If the microphone remains in the same position while the speaker is moved half a wavelength in either direction, the signal it broadcasts will amplify, not nullify, the original sound. Given a low frequency noise, say 200Hz, the relative positions are not critical because the length of the wave is approximately  $340/200=1.7$  metres.

Even if mis-positioned by a couple of centimetres, the signal from the speaker will still be highly effective. But given a higher frequency signal, say 10MHz, the length of the wave is much shorter; approximately  $340/10,000,000 = 0.000034$  metres or 0.034mm. Such a short wave length makes it difficult to position the components with the required accuracy.

Secondly, anti-noise is not well suited to noise like that generated by a house party because this is composed of a huge range of frequencies, all travelling in different directions; anti-noise for one of the sources may reinforce sound from another.

Anti-noise is best suited to suppressing low frequency noise either at a point-source of noise (such as an engine), or at the target (your ears).

### Anti-noise at source

About 20 years ago, some static aero engine installations were proving particularly bothersome to local residents. An anti-noise system was installed which pumped out several kW (a domestic stereo runs at under 100W) and showed that anti-noise could be a viable solution.

Sadly, fitting the same system to engines actually mounted on aircraft is technically more difficult, although certain service aircraft do have anti-noise systems fitted inside cabins.

One reason that anti-noise is not used more frequently at source is that it has become a victim of its own success. To successfully implement anti-noise, you have to understand

exactly how the noise is generated. In turn, this leads to research which pinpoints the noisy components in, say, an engine. Often, however, the higher level of understanding that this produces allows you to reduce or remove the noise by physical means, to such an extent that anti-noise becomes no longer cost effective.

### Anti-noise at the target

Some good news is that anti-

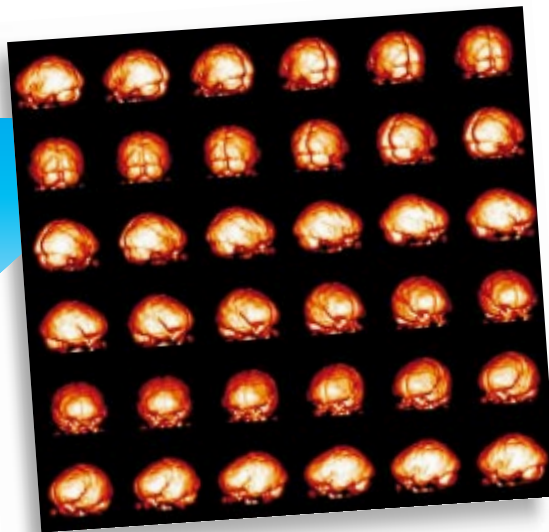
noise (or anti-sound as it should be called in low-power applications) has finally made the transition from the exotic (and expensive) to the commonplace (and cheap).

Recently, "active noise reduction headsets" have come onto the market (one such is the £99 NoiseBuster, from Powermark). These can reduce sound levels by 50 to 95 percent. They are surprisingly effective when used in the right environment, such as noisy cars, aircraft cabins and so on. Even better, since they operate in the 30Hz to 150Hz frequency range, the higher frequencies still come through so speech is perfectly audible. The headsets will even act as normal headphones with a CD/tape input.

The final word must come from someone I interviewed about anti-noise. He pointed out that anti-noise often has military applications and many interesting lines of research have appeared to end abruptly as they became engulfed by a country's military machine. As he put it: "Once the project is taken over, that particular aspect of anti-noise is never heard of again."

**Mark Whitehorn**

Bluesky



## Brain machines

**Volume rendering and stereoscopic viewing are just two ways in which computers can help us understand the mysteries of the human mind.**

The human brain is the most complex object in the known universe. With recent developments in scanning techniques coupled with the visualisation power of computer graphics, researchers are able to see inside the living brain as never before.

Dissect an arm and you can distinguish skin, bone, cartilage, muscle fibres and veins; dissect a brain and you find a fairly uniform substance. Where is the centre of passion, or the creativity organ? In the seventies, it was suggested (mainly by computer scientists) that the substance of the human brain was directly analogous to the hardware of a computer; and that our thoughts, feelings and desires were the software and data structures.

It's a compelling idea. But, on reflection, it explains without really explaining. In the eighties this analogy lost favour, and was superseded by a more holistic approach, stressing the anatomy and biochemistry of the brain as the only necessary explanation of us. With this shift of focus came the need for analysis and visualisation at an unprecedented scale of complexity.

There are two fundamental problems in understanding structures as complex as the human brain. First, how to obtain the data; second, how to visualise it. Traditionally, under-

standing human tissue has involved dissection and staining, then photography or drawing. These are essentially two-dimensional techniques, and they are invasive: to study the tissue, you have to kill it. When human brains are concerned, this is something of a drawback.

With the development of non-invasive scanning techniques such as Magnetic Resonance Imaging (MRI), Computerised Tomography (CT) and Positron Excitation Tomography (PET), it is now possible to capture the structure of organs without destroying them. These methods map two-dimensional cross-sections of tissue, which can then be combined into three-dimensional data sets. The breakthrough in visualising this data came with the technique of volume rendering, where stacks of 2D slices are rendered as collections of "voxels", the three-dimensional analogue of two-dimensional pixels.

With volume rendering, the structure of an object is represented as a truly three-dimensional data set, which can be processed with filtering algorithms to identify and extract 3D structures and surfaces. This technique is already yielding remarkable results. The Voxel-Man project from the University of Hamburg, for example, contains volumetric data of the brain, skull, heart and abdomen, and

enables researchers to perform virtual dissections by slicing the data set with arbitrary planes, to reveal the internal structure.

Another ambitious undertaking is the Visible Human Project from the United States National Library of Medicine in conjunction with the University of Colorado. Here data for a complete male cadaver is already available on the Internet, as raw images gathered from CT, MRI and cryosections. The data set is huge: each image slice is 7Mb, and there are 1,871 of them. That's 15Gb.

The future of computer graphical neuro-imaging is exciting. With the advent of volume rendering and stereoscopic viewing, researchers have access to true three-dimensional computer models of living tissue. But there are still major problems. Because of the huge quantities of data involved, generating images of 3D voxel data is very computer intensive, and much current work is concerned with speeding it up using parallel processing techniques and improved algorithms. The promise of ever-faster processors offers only a partial solution, however, because as soon as you obtain a faster CPU, yet more data will arrive.

Another exciting challenge is to create a single coherent database, perhaps distributed worldwide over the Web, where data

on the geometry of anatomical features are correlated with actual 2D and 3D images and other information describing their function and properties. Perhaps soon neuro-surgeons will wear lightweight virtual reality spectacles which superimpose computer-generated brain images and simulations over their field of view, perfectly optically registered to the actual brain of the patient on the operating table.

Today, computers play a vital role in the understanding of brain function. Computer graphics in particular enable us to visualise what we are in ways which have never before been possible. This is an exciting science without predictable end; as we delve deeper into the mysteries of our own brains there is no telling what we shall uncover. The likelihood remains, however, that whatever we find will be incomprehensible to us without the increasing power of computer visualisation.

**Toby Howard**

### PCW Contacts

**Toby Howard** is a lecturer in computer graphics at the University of Manchester, and co-editor of *The Skeptic* magazine.

An excellent collection of links about neuro-imaging research may be found at <http://ivory.lm.com/~nab/neuroimg.html>.

Retro

## Justa Momenta

**The Momenta was too far ahead of its time, even in 1992 when pen-based computing was touted as the future, yet even today it's still a techno-turkey.**

Today, a pen-based computer is a novelty, but back in 1992 any computer guru would have said it was the way forward. In 1991, Comdex was full of such machines — it was thought that by 1996 we would all be writing rather than typing. One of the greatest proponents of this was Momenta, a company started with \$40m of investment capital by the designer of the Atari ST and the founder of Cirrus Logic.

What we all failed to spot was that it didn't work very well. There is a clue to this in our March 1992 issue review: the handwriting recognition had picked up the "I" in *Personal Computer World* as a "1".

The design was wonderful. Crisp and uncluttered with no knobs, buttons LEDs or controls on the front — just a smart, copper, logo. The mouse and floppy drive were missing, although both could be plugged in. The processor was a 386SX aided by a custom version of the 6502 — which Momenta described as being a RISC chip. The standard machine had 4Mb RAM and a 40Mb hard disk and cost around £3,500. With this setup it was supposed to handle tasks which we still consider to be Pentium-taxing.

This was a machine to supplement the desktop, aimed at the professional who wanted to



carry a computer into the boardroom without looking like a nerd (you can't do it, not even with a Newton). Powering the device was a stick of batteries: the Momenta was one of the first machines to offer Nickel Metal Hydride, although it would take Nicads and ten ordinary alkaline batteries as well. A processor was dedicated to looking after the state of charge.

More important than the hardware was the software — remember this was back in 1992 when pen computing was about to be The Big Thing. Momenta wanted to steal a march on the market and it was clear that

Microsoft was being customarily laggardly with Windows for Pen computing. The solution Momenta adopted was to create its own operating system. The Momenta Software Environment was a pen-driven user interface which suited an LCD screen since the pen

showed where the cursor was, and it wasn't held up by submarining.

The Momenta software environment wasn't DOS-like but based on Smalltalk. The machine had to re-boot to run Windows.

It had its own novel features, though. One of these was the compass: when an object was selected by resting the pen on it, a compass appeared. This looked something like a playing piece from Trivial Pursuit. Moving the pen into one of the sections did different things: opening, copying, or highlighting depending on the nature of the object. Once you knew what was likely to happen this could be very quick although not

particularly intuitive.

The strength of the company (underlined by its huge stand at Comdex, with a giant hand holding a Momenta pen; flash offices in Frankfurt; and an impressive marketing company) inspired confidence and there was a good deal of support from third party software companies, including a special spreadsheet called PenCell.

Even my embarrassingly rave review commented that the handwriting recognition wasn't all that it might be, saying that it was the equal of the GO and Eden machines. Today, we lambast the Newton for not being usable but it's still streets ahead of the Momenta.

The hardware was complex, which justified the high price tag, and it did include a 2,400bps modem and plans for built-in networking.

Some of the ideas were way ahead of their time and this is partly the reason for the failure of the machine. Ultimately though, the mistake was in believing the market existed.

Without this column no-one would know that I had egg on my face for following the pen-based bandwagon. But you can be sure that the people who lost the \$40m are not quite so keen to be reminded.

**Simon Rockman**



# BOOKS

**Science is a dirty word, and we fear the future says Michael Allaby in *Facing the Future*. And the politics, sexism and jealousy surrounding the development of Windows NT would grace any blockbuster.**

**Facing the Future —  
The case for science**  
**Author** Michael Allaby  
**Publisher** Bloomsbury  
**Price** £7.99  
**Pages** 280  
**ISBN** 0-7475-2485-8  
**Rating** ★★★★★

We live in a society that is frightened, negative, self-indulgent and decadent, according to Michael Allaby in *Facing the Future*.

Science is a dirty word, and we fear progress. Consumerism has created a society that believes itself to be “doing alright”, shies away from rational attempts to improve itself, and retreats into escapism.

Allaby tackles a huge sweep of issues: from ozone depletion to overpopulation; from Chernobyl to consumerism. The Green movement comes under heavy fire, emerging at best as a motley assortment of Luddites. He points out that paranoia about the environment has led to misinformed fears: the quantity of ozone in the atmosphere changes significantly with the seasons, so ozone depletion is hardly the precursor to Armageddon that has been suggested.

Fears that disposable nappies contained a substance called dioxin led nappy manufacturers to adopt a “green” bleaching process, whose by-products killed more fish than did the original method.

The author reserves his fiercest venom for those who rejoice in the irrational — religious fundamentalism and New Age ideology in particular.

The cult of mother earth, for example, is described as: “A source of all-embracing, maternal cosiness, a goddess in whose arms we may happily be nourished and lulled into the deep sleep of complacency”.

At times, Allaby sounds reactionary. His use of the evidence available to him is sometimes “creative”, to put it generously. He would have us believe, for example, that the health threat posed by the Chernobyl disaster of 1986 was virtually non-existent and that the incident was largely a figment of environmental propaganda.

He dismisses the link between this accident and a rise in the incidence of thyroid cancers (from a previous level of two or three a year, to a total of 168 between 1986 and 1993) because, he writes; “...the link with the accident is far from established.”

Nevertheless, *Facing the Future* is a well-written and well-informed book. It is a refreshing corrective to environmental scaremongery and is guaranteed to shake the complacency of the most ardent science-sceptic.

You’ll certainly think twice about using the word “anorak” again in a hurry.

**Jessica Hodgson**

**Showstopper!**  
**Author** G. Pascal Zachary  
**Publisher** Warner Books  
**Price** £8.99  
**ISBN** 0 7515 1629 5  
**Rating** ★★★★★

“Some lost pieces of themselves along the way. Others saw the arc of their lives cross the blurry border that marks the unknown from the known. And in the end, they grasped that every worthwhile creation is at once an act of love and an act of violence.”

No, this is not the discovery of a cure for cancer but how a new operating system, designed to make a lot of money for Microsoft, was created.

Don’t be put off by this, however, as *Showstopper!* proves itself to be a valuable insight into not just how modern software is created but also how Microsoft functions. Its claims on debunking the myth of the lone software genius is more than justified.

By the end of this book you have been introduced to so many “characters” making little bits of NT, each with a paragraph of biography, that they begin to blur. Very few are interesting — they are just more of Coupland’s rich little microserfs. And that really is what comes across most in this book. This is a driven, pressurised, fabulously rich environment that is, despite it all, just like anywhere else.

There is Bill Gates, of course, who keeps a low profile

throughout the book and Dave Cutler, who doesn’t.

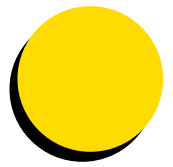
Cutler had been the star programmer at Digital for some time but was angry at having his latest project unceremoniously cancelled. Gates lured him to Redmond along with many of his Digital team. He dominates the story, particularly in the early days — a macho, boorish, insensitive man with no special love for Gates or his company despite his free rein on NT; a “scumbag company” is how he referred to his new employer.

The story is not just about technical genius. It is as much about the politics, petty rivalries, jealousy and sexism that surrounded the three-year battle to get NT to work. The Microsoft work ethic is alive and well throughout.

“Paul (Butzi) is a family man who happens to work at Microsoft. Other fathers work at Microsoft and happen to have families,” says one interviewee — certainly, Butzi was unusual.

This eclectic team somehow managed to build NT despite endless bugs, rewrites and shifting targets put forward by Gates and his right-hand man, Steve Ballmer, who although not a programmer himself had the final say on how NT should look.

It is reassuring to hear how one of the Microsoft’s code elite could barely operate a PC and how NT was delayed for days because a mundane piece of hardware had not been installed on a test PC.



Despite occasional lapses into cuteness, *Showstopper!* is a valuable insight into programming and the pressures of commerce to build a marketable product as well as a workable one. And unlike many Microsoft products, NT worked from day one.

**PJ Fisher**

The publication is designed not as a replacement for the original but as a valuable resource for all those wishing to connect to the Internet via Windows 95 and MSN.

Like its predecessor, this book is ideal for beginners and experienced users alike. It also includes the *Whole Internet*

*Catalog* which is a detailed guide to the best of the web and other resources.

What makes Ed Krol's writing so outstanding is that while he may not know any more than other experts, he manages to impart his knowledge to the reader much more effectively.

For example, his is the only explanation of the TCP/IP protocols and how they work that is instantly understandable, by anyone.

Krol also proves that you don't have to resort to cartoons and "jokes" (or appalling typography) to try and make people understand technical issues. No-one is frightened of technology when it is explained in clear English.

Being as up to date as possible with the Internet (inevitably the chapters on MSN are already out of date), this is without doubt an ideal reference book to every service the Internet has to offer without ever leaving Windows 95. No other Internet book will tell you more than this and few will tell you as efficiently. Altogether essential.

**PJ Fisher**

**World Wide Web Journal (Fourth International World Wide Web Conference Proceedings)**

**Author** Various

**Publisher** O'Reilly & Associates

**Price** £29.50

**ISBN** 1-56592-169-0

**Rating** ★★★★★

Strictly hard-core might be the best way to describe the potential market for this book. If you didn't make it to the Fourth International WWW Conference last December this complete collection of the proceedings is fine compensation.

Over 600 pages of information about the latest web developments deal with the low-level technology being quietly developed at research establishments around the world and which are likely to ignite the web in a few years' time.

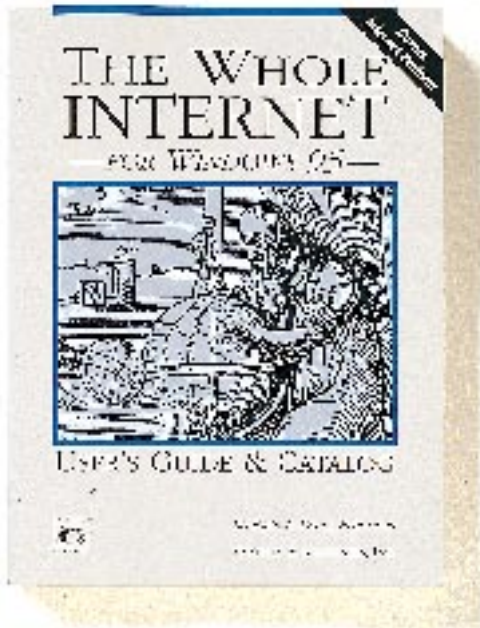
Take the paper on W3 Objects: a proposal to bring intelligent objects to the web and a RAD tool for building advanced web applications. And those who think the future belongs to NetScape/Microsoft might care to read the paper on Vosaic, a realtime video browser based around Mosaic.

Another Mosaic project proposes a Multi-Head/Multi-Tail (MHMT) link designed to allow users to define how they wish to browse rather than simply follow the designer's links. It also lets designers to create intelligent links so that multiple pages can be displayed simultaneously and "must-see-first" pages are displayed automatically: useful for Intranet-based training applications. An HTML extension, MHTML, running on enhanced Mosaic is proposed to enable all this and, clearly, many researchers see life in Mosaic yet.

The chapters on extending the X-Window system into browsers make for fascinating reading involving virtual GUIs residing within web browsers and contrast with Microsoft's plans to integrate web browsing into the OS itself.

Much of this is hardly bedtime reading and some of it won't see the light of day, but you won't read about it anywhere else. If you take the web seriously, this collection should be a definite addition to your Internet reference shelf.

**PJ Fisher**



**The Whole Internet For Windows 95**

**Author** Ed Krol & Paula Ferguson

**Publisher** O'Reilly & Associates

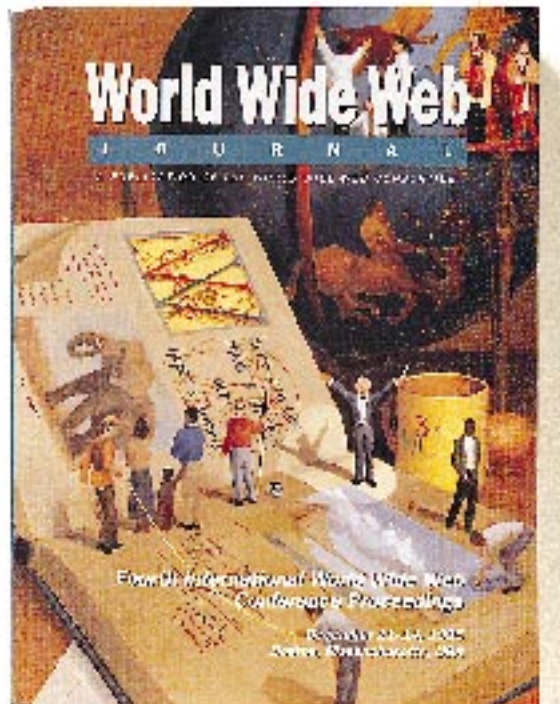
**Price** £18.50

**ISBN** 1-56592-155-0

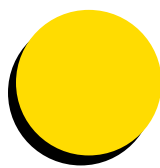
**Rating** ★★★★★

Ed Krol's original *The Whole Internet* is recognised as a classic text on the Internet. If a law were passed that only one book should exist on the subject, few would complain if this was it, given its clear focus and its mission "to explain".

Not one to sit back on his laurels, or indeed too miss a marketing opportunity, Ed Krol has come up with a revised edition that focuses on Windows 95 users and the advantages (or otherwise) that the new OS provides.







## Competition

# Don't be a dummy...



*Personal Computer World* in association with Transworld Publishers is offering the chance to win four of the excellent *Dummies* series of books, plus a widescreen video of Quentin Tarantino's *Reservoir Dogs*. The *Dummies* books have now sold over 19 million copies worldwide.

The books on offer are:

- *Internet for Dummies*
  - *Multimedia & CD-ROMs for Dummies*
  - *Windows 95 for Dummies*
  - The new *Sex for Dummies*, by Dr Ruth Westheimer — yes, *that* Dr. Ruth, and, yes, it is about sex.
- Altogether we're offering more than £100-worth of prizes.

To enter the competition, just send us the answer to this simple question, on a postcard or the back of a sealed envelope:

**Q.** Which one of the *Reservoir Dogs* actors also starred in *The Piano*?

- a) Harvey Smith
- b) Harvey Keitel
- c) Harvey Nichols

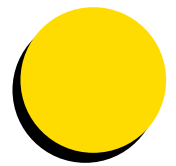
**Send your entry to:**

PCW/Dummies Competition  
Personal Computer World Editorial  
VNU House  
32-34 Broadwick Street  
London W1A 2HG

**Top Ten Books: May 1996**

1	Teach Yourself Java in 21 Days	Sams.net	£37.50
2	Inside Visual C++	Microsoft Press	£41.99
3	Hooked on Java	Addison-Wesley	£24.95
4	Doing Objects in Microsoft Visual Basic 4	Ziff-Davis Press	£37.49
5	Teach Yourself Web Publishing with HTML 3.0 in a Week	Sams.net	£26.95
6	Delphi How-To	Waite Group	£36.50
7	Microsoft Windows 95 Resource Kit	Microsoft	£46.99
8	Delphi Developer's Guide	Sams	£46.99
9	Teach Yourself Web Publishing with HTML in 14 Days	Sams.net	£37.50
10	Web Page Design Cookbook	Wiley	£22.50

List supplied by The PC Bookshop, 11 & 12 Sicilian Avenue, London WC1A 2HQ  
Tel: 0171 831 0022. Fax: 0171 831 0443



CUTTING EDGE

# Kids' stuff

**An educational month, this, with Safe Internet access for kids, as well as music, maths and swimming tutors. But there's a bit of fun, too.**

**W**e've spent a lot of time this month, Siobán and I, exploring the latest online

service to reach our shores: America Online (AOL), officially launched in the UK at the beginning of this year.

There's a great kids' area on AOL and a proud claim made by AOL is its family orientation: search for something naughty, even the procreation of the human species, and you'll be told in no uncertain terms to get your face out of the gutter!

AOL offers parental control features which enable the master account holder — in this family, that means Dad — to restrict access to certain areas and features on AOL.

There are four such features: I can block instant messages (the immediate, person-to-person conversations that can only be viewed by the sender and receiver); block access to interactive chat areas; block access to the member-created rooms within chat; and block access to special-interest rooms.

The excellent news for secondary schools and local education IT centres in England,

Wales and Scotland is that America Online is offering free unlimited access to itself, the Internet and the World Wide Web. Jonathan Bulkeley, AOL's managing director said: "We believe that it is imperative that schools become an active part of the wider electronic community, which is why we are opening up AOL free of charge for schools to use." I can only respond with two and a half cheers; what about primary schools?

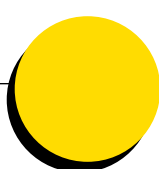
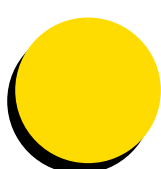
### Education

AOL has also done a deal with Anglia Multimedia, a partner of Anglia Television, to create a special National Curriculum-based at the online site Education Anglia.

It will be split into four main areas: Online Learning, providing help with all National and other curriculum topics; Parents



**(Top)** Get your head out of the gutter!  
**(Centre)** A good childrens' area already on AOL and it will only get better!  
**(Above)** CompuServe's new Parental Control Centre



and Teachers, an area for adults interested in education; Out and About, which encompasses travel; In the Playground, with an interactive bulletin board, chat areas, clubs and competitions, a changeable home project and a sports area.

**New controls**

Last February CompuServe, too, introduced new parental controls following a partnership deal with Microsystems, developers of the Cyber Patrol software.

Following a German investigation into Internet content, CompuServe suspended access to more than two hundred newsgroups. The discontinuation of this suspension for all except five newsgroups, each identified as containing explicit child pornography materials, coincides with the introduction of parental controls. Parents can now restrict access to Internet services and to several services on CompuServe itself

**Home PC restrictions**

Still on the subject of keeping the kids away from places, it's also a good idea to restrict access to some material on the home computer, such as the family accounts.

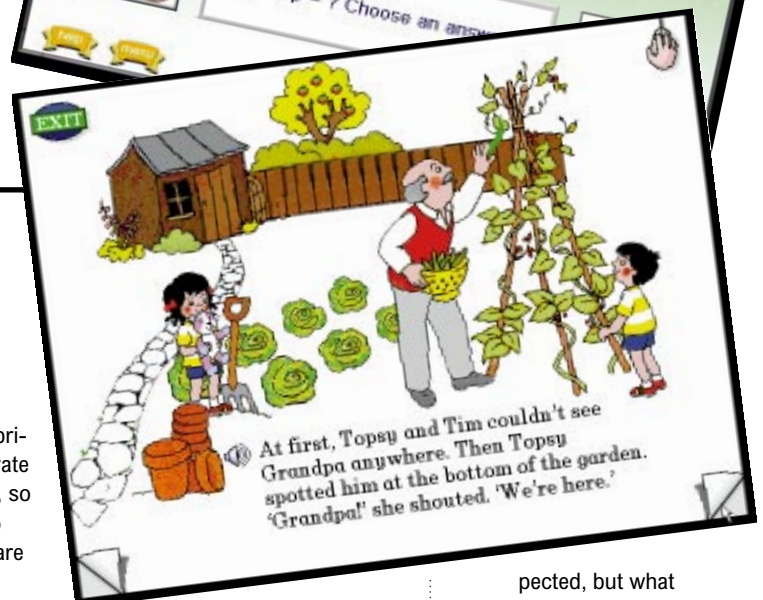
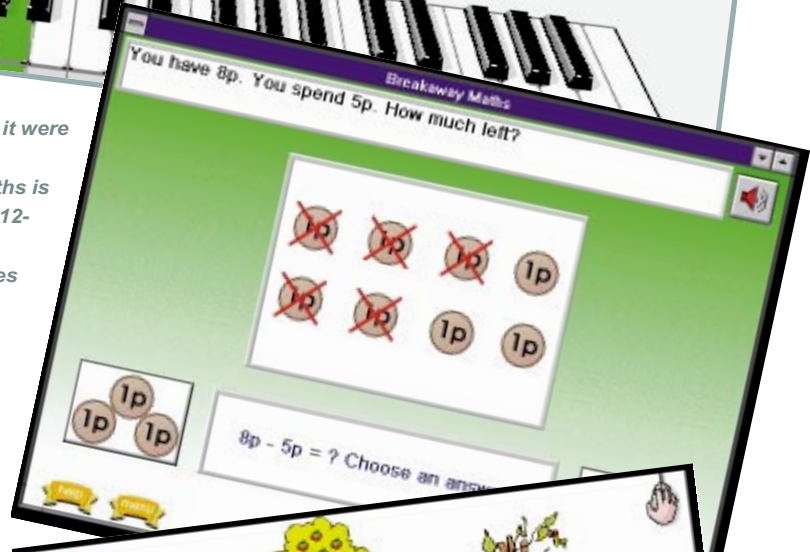
KidSecure for Windows 95 is designed to do just that. This nifty bit of software actually gives every computer user in the family their own desktop with access to their own applications.

This means I could have my personal finance manager and various utilities (highly danger-

(Top) You'll soon be reading music as if it were a book

(Right) Breakaway Maths is designed to help 7- to 12-year-olds who are experiencing difficulties with the subject

(Below) With over 20 million books sold, the adventures of Topsy and Tim now come to CD-ROM



ous in the wrong, small, hands) safe and secure from prying fingers.

The idea is that software is allocated to rooms; games to the games room and so on. There can be public and private rooms and even private sections of public rooms, so that I can block access to games like Doom which are too gritty and graphic for young users.

KidSecure could be the solution to letting the children near the computer — especially one that is also used for business.

**Music Ace**

Two of Siobán's favourite software packages this month were Music Ace and Breakaway Maths.

I must tell you a little story

about Music Ace. I'd loaded it up on Siobán's computer and was messing about with it. I had been called away for a while, during which time Siobán came in. I returned after about three-quarters of an hour to find her happily going through the various questions in the program.

She actually knew more about music than I had ever sus-

pected, but what impressed me was how quickly she took to the program — and stuck with it instead of switching to a game, or some other favourite software.

Music Ace teaches the fundamentals of music. During 24 comprehensive lessons, you are taken, step by step, through everything from an introduction to the staff, through key signatures and major scales, to an

understanding of music theory.

You would quickly learn the fundamentals of music and the relationship between written pitch and the piano keyboard: the staves, octaves, sharps and flats, key signatures and so on. The hard work of the lessons is rewarded by games but these are games designed to hone music skills.

The package also includes the "Music Doodle Pad": a software tool which gives you the opportunity to compose your own music and hear it played back as well as to listen to and modify sample musical pieces.

Music Ace uses an on-screen piano keyboard to present musical concepts, although this is really no more than a convenience.

Music Ace can be used by students of any instrument and you can select whether the instruction is presented for both treble and bass staves, treble staff only, of bass staff only.

Music Ace supplements traditional classroom teaching methods but is also inexpensive enough for the home — and since it is never too late to learn music, it can be used by the entire family.

**Music Works 2**

If you have a budding Mozart at home, a more heavyweight program is Music Works 2.

This is a serious bit of composing software which can be worked in two ways. Very simply, you can manually place musical notes on the staves — there are many annotations provided, including rests, dynamics, ornaments, guitar tablatures and so on.

You can then play back your composition — providing you have a Windows-compatible sound card. Alternatively, if you have a MIDI device, such as a keyboard, attached to your computer you can play your compo-

sition and the software will automatically notate it. Absolutely brilliant!

**Breakaway Maths**

Breakaway Maths is intended for schools and is, accordingly, on the more expensive side of the software market. This seems thoroughly daft to me since the tight budgets on which most schools seem to work these days precludes spending a lot on software.

Nevertheless, it is a great disc which Siobán really enjoyed using. This was especially good because it is designed to help children between the ages of seven and 12-years old who are experiencing difficulty with maths, which up to a point Siobán is, even though she really needs little more than a bit of confidence building.

In essence, the CD-ROM is set in the context of the rides at Breakaway Park (in reality, the Alton Towers theme park in Staffordshire). Children have a map which they must use to find their way around the 12 locations, getting help along the way from four friends; Rupa, Lisa, Nicky and David.

At each of the 12 locations, children encounter either an activity area or an investigation area. At the former, the child is asked a set of questions. If these questions are correctly answered the child is shown a video of half a ride as it would be experienced if you were actually on it. To finish the ride, further questions must be answered.

Investigation areas present maths in a problem-solving situation. There is a money-handling problem set in a toy shop, for example.

At the start, children are given a range of questions and the level of difficulty they encounter thereafter is dependent on their answers.

From an adult point of view, the CD-ROM would be spoiled by the stilted acting of the children, but Siobán got on with the program and her delighted grin when she got a particularly tough question correct is a memory that I'm sure will stay with me for the rest of my life.

**Looney Tunes on the mat**

Siobán is a big fan of some of the Looney Tune characters (a five-foot high Wile E Coyote sits in her bedroom!) and my eye was caught this month by a range of mouse mats and wrist rests featuring Bugs Bunny, Sylvester and Tweety, Wile E, and the Tasmanian Devil, among others. They are very colourful and good quality.

I was particularly pleased with the Mini Wristpads for use with a mouse — for some time now, I've been using the Microsoft Natural Keyboard which has a built-in wrist rest (which I now wouldn't be without) but I'd recently begun to feel a strain in my wrists when using the mouse for any extended period of time: the Mini-Wristpad has been a boon.

**Essential Steps to Swimming**

I came away from this CD-ROM with mixed feelings: Essential Steps to Swimming looked fun (Siobán being a keen swimmer) but I thought it was disappointing and expensive.

Only after having persevered with it did I really begin to see its values. Although I nevertheless thought it could do with at least a 50 percent cut in price.

The CD-ROM is recommended by several swimming associations and supports the National Curriculum Key Stages 2+ and 14+ Physical Education courses.

It can be used by absolute beginners, through experienced swimmers, to coaches and as a study aid, this CD-ROM could prove very useful.

You can watch a video of a swimming stroke with complimentary animations showing the stroke above and below the water-line. You can watch these repeatedly, until the body movement is perfectly fixed in your mind. You can even get to grips with complex theories such as counterbalancing, floating and levers.

In addition, there is a lot of information about water safety, constant reminders to reinforce the lessons learned and even a simple quiz.

**Topsy and Tim**

I'm glad to see that very young children are being increasingly catered for. It was a pleasure to discover that Penguin Children's Books has released three CD-ROMS based on the popular *Topsy and Tim* books by Jean and Gareth Anderson.

This series of pre-school books was written more than 30 years ago and sales exceeding 21 million copies are testimony to their popularity.

The nice thing about these books is that they deal with various things that happen in a young child's life and which can be disturbing at the time: such as having a babysitter for the first time, going to school and so on.

The CD-ROMs bring Topsy and Tim to life. They are traditional, animated storybooks. The stories can either be narrated, or you can read along with your child, clicking on difficult words to hear them again. Clicking on-screen "hot-spots" results in an animation of some sort.

A few additions give these CD's lasting appeal: there are six jigsaws (which help shape recognition) and six pictures to colour on-screen. Or the outline can be printed and coloured, with crayons or coloured pencils, away from the computer.

There are some games, too.

Three titles are currently available: Topsy and Tim At Granny and Grandpa's; Topsy and Tim at the Supermarket; and Topsy and Tim Go To School.

**Paul Begg**

**PCW Details****AOL**

**Price** £29.95

**Costs** £5.95 per month which includes five hours free online. Additional hours charged at £1.85.

**Contact** America Online

**Tel** 0171 385 9404

**Rating** n/a

**KidSecure**

**Price** £29.95 (plus VAT)

**Contact** Guildsoft

**Tel** 01752 895100

**Rating** ★★☆☆☆

**Music Ace**

**Price** £25.49

**Contact** Guildsoft

**Tel** 01752 895100

**Rating** ★★★★★

**Music Works 2**

**Price** £49

**Contact** Guildsoft

**Tel** 01752 895100

**Rating** ★★☆☆☆

**Breakaway Maths**

**Contact** Yorkshire International Thomson Multimedia

**Price** £65

**Tel** 0113 243 8283

**Rating** ★★★★★

**Essential Steps to Swimming**

**Price** £65

**Contact** Yorkshire International Thomson Multimedia

**Tel** 0113 243 8283

**Rating** ★★☆☆☆

**Topsy and Tim At Granny and Grandpa's;**

**Topsy and Tim at the Supermarket;**

**Topsy and Tim Go To School**

**Price** £19.99 (incl VAT)

**Contact** Penguin Electronic Publishing

**Tel** 0171 416 3000

**Rating** ★★★★★

**Looney Tunes Mousepad, Wristpad and Mini Wristpad**

**Prices** £5.85, £9.35 and £6.80 respectively.

**Contact** Fellowes

**Tel** 01302 885331

**Rating** n/a



CUTTING EDGE

# CD-ROMs

Get hip to the Beats, enjoy a private view of the Cézanne exhibition, and watch rock legends unplugged.



Stunning National Geographic photography by Russ Ressmeyer, in *Volcanoes*

- **Paul Cézanne: Portrait of my World**
- **Volcanoes: Life on the Edge**
- **Critical Mass: America's Race to Build the Atomic Bomb**

Corbis is entirely owned by Bill Gates and its main business is licensing images. The company archives material electronically and licenses it to anyone who needs it, including book publishers, newspapers and CD-ROM developers. The originals are not owned by Corbis, just the

rights to their electronic reproduction. The three CD titles just launched are taken from these archives. The titles are suggested by the archives, which certainly saves money in buying images for the development of a particular project. Despite having a core archive of one medium, Corbis has made these titles more genuinely interactive and multimedia than many of the CDs currently on the market. The release of the Cézanne CD is very aptly timed with the arrival at the Tate of that

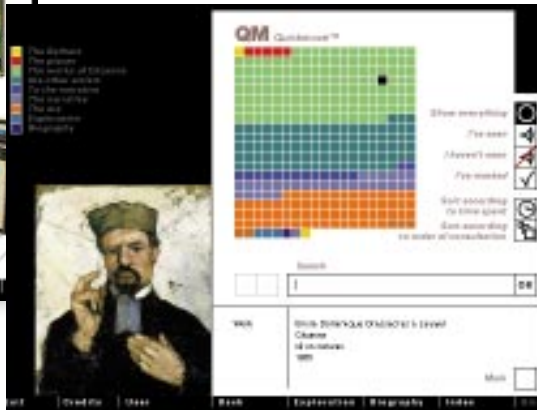
exhibition. Technically, it is highly accomplished. You move around virtual environments sketched in pencil, such as the artist's studio or the Louvre, where he copied many of the works, and through this you find out more about his art and his theories. The "video" sections are stylish animations with "Cézanne" speaking over the top, his words quoted from letters.

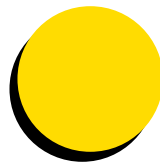
On an educational level, the content is good, if safe. Any suggestion of Cézanne as a disturbed character is side-stepped and his more troubling works, such as *The Rape*, are omitted. He is portrayed more as a harmless old man pottering about his studio. Ultimately, however, the visuals and the insight in his theories make up for any bland interpretation of the art itself.

The other titles take a documentary approach. *Volcanoes* is based around the photographs of Russ Ressmeyer, who originally shot them as an assignment for National Geographic. And they are stunning. Those taken of Mount Etna as it



Walk around Cézanne's studio and listen to the cicadas chirping. Finding the works is made very easy with this chart





CUTTING EDGE

erupts are truly amazing, as Ressmeyer has got dangerously close to flowing, molten lava.

The CD looks back at the history and culture, mythology even, that has grown up around volcanoes. Helen Mirren provides the voiceover, but the CD is interesting mainly for the Ressmeyer photographs.

Finally, Critical Mass is a documentary on the development of the atom bomb and is actually one of the most inventive CDs. You can choose the medium you prefer for most of the disk — for example, in the sections on the most prominent Los Alamos scientists, you can choose either a video presentation or a text-based summary. The whole package is extremely slick, from the newsreel-style introduction to the virtual reality tour of the Los Alamos site.

However, as in the Cézanne, the approach taken is somewhat facile. There is no discussion of the repercussions of the Los Alamos project or even of the Hiroshima and Nagasaki explosions. Corbis claims not to have made a CD which is purely pro, but in side-stepping the moral danger areas they have



abnegated all responsibility.

All three Corbis CDs are well made and visually splendid, but they all suffer a little from superficiality. There is plenty to hold your attention, but little to get you really excited.

**Adele Dyer**

**Paul Cézanne: Portrait of my World**

Contact Corbis UK 0171 278 1387

Price £39.99

●●○○○

**Volcanoes: Life on the Edge**

Contact Corbis UK 0171 278 1387

Price £49.99

●●○○○



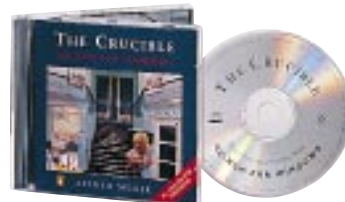
He's on the ROM, Daddy. Get out your black beret, slip on the turtle-neck and lay some jazz on the turntable. Without this, you don't know Jack

**Critical Mass: America's Race to Build the Atomic Bomb**

Contact Corbis UK 0171 278 1387

Price £49.99

●●○○○



● **A Jack Kerouac ROMnibus**

● **The Crucible**

If you're looking for a CD full of bongo-beating, black beret-wearing beatniks, you won't find it in A Jack Kerouac ROMnibus. But if you want some serious, historical Kerouac edification then yes, Daddy, it's here.

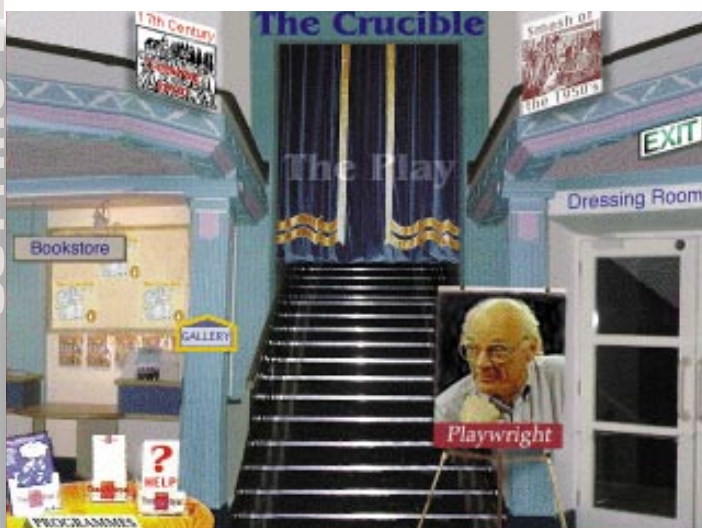
The Kerouac ROMnibus is really meant to educate rather than entertain and it's been done impressively. It opens with a video shot of a young and hip-looking Kerouac reciting passages from one of his books. This sequence then brings you to a point-and-click interface that navigates you through his life.

There's plenty to learn about



A newsreel presentation gives an excellent introduction to the circumstances surrounding the development of the bomb, while there is a plethora of information on the Los Alamos project





Penguin's CD provides an excellent introduction to one of the 20th century's greatest playwrights

Kerouac, and Penguin has done a good job of distilling it. You can find out about his life and relationships with other key Beat figures such as Neal Cassady and William S Burroughs. Or, if you're feeling voyeuristic, you can browse through his letters and diaries, all of which are scanned in from original material. There are also recorded recitations of his work, photos, interviews with his contemporaries and, for the ambitious, 448 pages of *The Dharma Bums* to read.

Just as informative but a little less slick is *The Crucible* CD-

ROM for Windows. It's perfect for theatre buffs or teachers wanting their students to delve deeper into the meaning of Arthur Miller's play. The whole CD is focused on the elements of the work, starting with its origins right through to its present-day relevance.

Using the CD is like going out to the theatre. You first enter the foyer where you can pick up a programme, venture backstage, meet the playwright, and view (er, actually read) the play.

One of the most fascinating and educational aspects of this CD are the video clips of Miller

himself talking about the genesis of the play and what it meant to many during the MacCarthyite era in the US during the 1950s. There are comments from actors — Dustin Hoffman, for instance — about their views of Miller and The

*Crucible*. The whole CD-ROM is simple to interact with and clear in its presentation of the background material.

Both CD-ROMs provide an overflow of detailed information and are a good buy for the serious reader of literature. The only real complaint that can be raised is that Penguin hasn't released any titles from UK authors, so the classroom relevance of these titles may be diminished. That being said, both these CDs are excellent teaching tools and Penguin offers teacher's guides for both.

**Dylan Armbrust**

#### A Jack Kerouac ROMnibus

Contact Penguin Electronic  
0171 416 3000

CD-ROM for PC and Macintosh

Price (incl VAT) £49.99

Rating ●●●●○

#### The Crucible

Contact Penguin Electronic  
0171 416 3000

CD-ROM for PC

Price (incl VAT) £49.99

Rating ●●●●○



#### ● MTV Unplugged

It was inevitable that a spin-off CD-ROM would appear based around the successful MTV series of acoustic concerts featuring leading rock artists such as Nirvana, REM and, er, Tony Bennett.

You are promised over 70 unplugged artists, but if you were expecting 70 video clips you are going to be disappointed. Only a selected number of the featured artists





EDGE

More unplugged than most, Kurt Cobain features heavily in MTV's new CD



unplugged. This is not a poor CD-ROM, however. Far from it. The quality of production and design is high and the design is in keeping with the whole MTV look. All the video clips run smoothly and the sound is above average. If you are lucky enough to own an

section, which accesses info about all 70 bands, uses a rotary control which is very difficult to control. A simple slider would have been better. This disc is memory-intensive and you will need at least 8Mb to run, although I had problems with video drop-out on a 16Mb Pentium 120.

The info sections are interesting, using video, sound and text well to give an insight into how Unplugged shows are put together. Having done this once, watched all the video clips and listened to the music, you are still left with a feeling of wanting more. So this, like all my other CD-ROMs, is likely to remain unplugged from my PC.

**PJ Fisher**

**MTV Unplugged**  
**Contact** CIC 0181 846 9433  
**Price** £24.99  
**Rating** ●●●○○

get the video treatment; even fewer are allowed to perform whole songs. The rest either get a music clip or just a track listing, even big names like Neil Young and Pearl Jam. Very

of production and design is high and the design is in keeping with the whole MTV look. All the video clips run smoothly and the sound is above average. If you are lucky enough to own an

MPEG-equipped PC you can enjoy full-screen, high-resolution video clips of Nirvana, Paul McCartney and 10,000 Maniacs. Even without MPEG you can get a passable image from a couple of feet at full screen, although poor old Paul McCartney seemed to have a few lip-synch problems. Must be his age. Interactivity mostly involves clicking although the central

● **Microsoft World of Flight**

The box of this CD does not augur well. It features a huge picture of the front of what, to an inexperienced eye, looks like a World War 2 bomber. You assume it is going to be some kind of aero-techie's dream — planespotting for anoraks. But Microsoft has cunningly avoided that trap and produced something which should interest most people.

Throughout the CD you have various narrators to accompany your every mood. In the "guides" section you can choose from around ten different guides, all of them quite jolly, who explain certain fields associated with aeronautics. So, among others, there is a flying instructor, a fighter pilot and an airline stewardess. The voices feature both British and American accents. As each guide talks, a series of pages appear with links to other pages. You can navigate quite easily as each of the links appear over the original page, and you can click back on to the original page to clear the link. Other sections focus on military and commercial flying and individual types of plane, but the technology is dealt with superficially.

The amount of sound and video on this CD is positively overwhelming; in fact, it can get a little annoying after a while. You can get incredibly lazy in front of a disk like this, as your attention is immediately attracted by whatever is happening. Little videos start up automatically when you open many of the pages — great the first time through, but it can be a bit tiresome second time around, especially when you are looking for links.

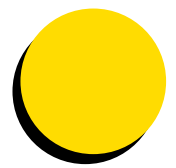
The only downside was a problem I had with the graphics drivers. It can run under either Windows 95 or Windows 3.1 and the recommended resolution is 640 x 480, but when I loaded it on my machine, the screen was reduced to a narrow



strip in the centre of the monitor and could not be altered. The read-me file suggests you check your drivers if this happens, but it could be a source of annoyance.

**Adele Dyer**  
**Contact** Microsoft Connection 0345 002000  
**Price** £29.99 inc VAT (RRP)  
**Rating** ●●●○○





# Screenplay

## NEWS

### Game for a movie...

Rumours abound that the next box office hit from Stanley Kubrick could be based on the war combat game, Steel Panthers.

Snoop, the "in-store detective" at VNU Business Publication's Computer Retail News, has reported that the film director was recently spied buying a copy of the new release from a Mindscape retailer. Kubrick, the man behind 2001: A Space Odyssey, The Shining, and the self-banned A Clockwork Orange, could be "looking to the interactive game industry for inspiration," reported Snoop. Meanwhile, the retailer has been inundated with enquiries and has commented: "We're wondering if it's going to be made into a film."

Could this be the result of David Brake's review of the hit strategy game in our March issue?

Mindscape 01444 246333



### ...Movie for a game

Viacom New Media, the people who brought Beavis and Butthead to your PC (reviewed last month in PCW), is set to release a 3D action adventure based on the movie, Congo.

Players pick up where the movie left off and face a new mission in the impenetrable African jungle, involving industrial espionage, jungle death-traps, active volcanoes and treacherous rivers. However, in your search for the flawless diamond hidden in the Lost City of Zinj you'll find your main adversaries are the fierce, mutant "Grey Gorillas". Along with over 400 photorealistic 3D scenes, there are cinematic special effects and a lively musical accompaniment.

Congo: The Movie — Descent into Zinj will cost £39.99.

### Power VR powers in.

Graphics on PC games are set to improve dramatically with the launch of PowerVR, the latest 3D chipset from NEC and VideoLogic.

PowerVR promises scaleable, arcade-quality, graphics performance without the price; a claim backed by top coin-op developer Namco. It is currently converting two of its hit titles, Rave Racer and Tekken, to run on the system and the results



so far have been stunning.

There's even the possibility that the former will run at an even higher resolution and bit depth than the original.

PowerVR's key features include texture mapping, Gouraud shading, automatic shadow casting, perspective correction and pixel-perfect hidden surface removal.

VideoLogic 01924 268969

### Charts



1	Command & Conquer: Covert Ops (CD)	Virgin
2	Command & Conquer (CD)	Virgin
3	Terminator: Future Shock (CD)	Virgin
4	7th Guest — White Label (CD)	Virgin
5	Worms (CD)	Ocean
6	Day of the Tentacle — White Label (CD)	US Gold
7	Wing Commander 4 (CD)	EA
8	Gabriel Knight 2: Beast Within (CD)	Sierra
9	Rebel Assault — White Label (CD)	EA
10	FIFA 96 (CD)	EA
11	Top Gun: Fire At Will (CD)	Microprose
12	Screamer (CD)	Virgin
13	Star Wars Trilogy (CD)	Acclaim
14	Indiana Jones and the Fate of Atlantis (CD)	Kixx
15	Tie-Fighter Collectors CD	Virgin
16	Encarta 96 (CD)	Microsoft
17	The Dig (CD)	Virgin
18	TFX (CD)	Ocean
19	Star Trek 25th: White Label (CD)	Virgin
20	Championship Manager: Italia (CD)	Domark

### dolphin friendly

Following the release of the PC version of Virtua Fighter Edge 3D card, Sega has announced a further three games for Windows users. Unlike VF Remix they will run without special hardware, but Sega has set a 60MHz Pentium as the minimum specification.

First up is a conversion of the Megadrive hit, Ecco The Dolphin, an underwater swimming and shooting affair

with frenzied sharks, killer jellyfish and deadly rip tides. The new version boasts CD-quality sound, high-resolution graphics, up to 800 x 600 pixels with Windows 95, and more video footage than the original.

The other two titles, also taken from Sega's 16-bit library, are Tom Cat Alley, an aircraft combat simulator, and the high-speed combat classic, Comix Zone.

Each game will retail at £29.99.

Sega 0171 373 3000



Do you lie in bed at night, unable to sleep because all that's buzzing around your head is how to zap those nasty, huge, mosquitoes? No? — bet you will once you start playing Rayman.

Rayman is our hero. The Electroons' world has been totally destroyed by the evil Mr. Dark and it is Rayman's job to restore harmony and balance. There are Electroons everywhere; locked away and sobbing in

cages — only Rayman can help, with a little guidance and power distribution from Betilla, the fairy.

Originally designed for consoles, the game has made an unusually good transition to the PC. The format is a long, multi-levelled action and adventure game, packed full of our hero's

acrobatic or aerodynamic feats, demonstrating his superhuman powers.

Despite being a familiar format, don't disregard Rayman until

you've had a closer look. The graphics in this package are brilliant. The scenery is multi-layered and gives a wonderful 3D effect; the colours are beautiful and the animation is superb, with those little extra details that make such a difference. Rayman himself doesn't have any arms or legs — hands and feet, yes — but this can make for some very interesting manoeuvres.

This certainly isn't an all-action, no-thinking game: getting around and steering clear of trouble isn't that straightforward as some things aren't at all obvi-

ous, initially; for instance, giant purple grapes are, in fact, boats. And that's all I'm giving away — the rest is up to you to work out.

With six different worlds and around ten levels in each, you should be kept busy for awhile. To get the best out of Rayman, you should ideally have 8Mb of RAM and a Pentium but you can switch off the



background if running on a less powerful combo. I urge you to go out and buy Rayman. It's totally addictive and truly magical, which reminds me... back to those little mozzies.

**Janice Murray**

**System requirements** 486DX2 33MHz or higher, 4Mb RAM (8Mb recommended), Sound Blaster compatible, double-speed CD-ROM, Win95 compatible.

**Price** £30 (street)

**Contact** Ubisoft 0181 941 4004



# W I N G COMMANDER IV - THE PRICE OF FREEDOM

**A six-pack full of action and state-of-the-art presentation.**

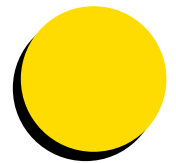
Supplied on six, packed, CD-ROMs The Price of Freedom is the latest instalment in the hugely successful Wing Commander series.

Each episode has greatly improved on its predecessor, and Origin hasn't let us down with number four.

Set two years after the war

between humans and the cat-like Kilrathi, Wing IV casts you once again as Colonel Christopher Blair. Blair's job this time is to investigate mysterious attacks on Confederation ships; a task which sees him reunited with several old faces. Among these are the cocky pilot, Maniac (aka Tom Wilson) and the white-haired Admiral Towlyn (played by Malcolm McDowell). All the characters are well thought out and the casting is superb; especially Mark Hamill in the role of Blair.

Wing IV's gameplay follows the same formula as the others, mixing fast-paced dogfighting missions in space, with generous helpings of video. Most of the movie sequences are linear but you do get the chance to step in and alter the storyline from time to time. While this limits gameplay, Origin has a way of pulling you into the action so that you always want to see what's coming next. The video is some of the best ever seen on a PC, with SVGA resolutions and support for



# Duke Nukem 3D

BOUNTING EDGE

Duke nukes the competition with its all-new game engine.

Duke Nukem 3D is the latest title from Apogee, the company that kick-started the PC 3D games revolution. Id's Doom may have become the benchmark by which others are judged, but Apogee's Wolfenstein was first and had just as many fans. Duke Nukem 3D follows in the same baddie-blasting footsteps, but thanks to an all new game engine, blows the competition away.

The plot behind Duke Nukem is as predictable as ever — destroy the alien invaders before they take over the world and enslave all humanity. The game starts in a rundown part of Hollywood, complete with seedy cinema, and you know what you have to do as soon as you fire your first round. The idea is to explore your surroundings, investigate every nook and cranny, and shoot seven shades out of anything that isn't human.

No self-respecting hero would be satisfied with a mere hand gun and hard-bitten soldier of fortune, Duke Nukem, is no exception. Other weapons at



your disposal, if you can find them, include a rather satisfying rocket launcher, a shotgun and impressive looking pipe bombs. You don't have to look too hard for most goodies, but there are others more difficult to locate. Among these are a highly useful pair of night vision goggles, and a jet pack for when you need to rise to the occasion.

Other parts of the game have you exploring a red light district, a night club, the local space station and another world. Each level becomes harder and there are four difficulty settings to test your skill.

So far, Duke Nukem 3D sounds the same as any other blast-em, but its presentation far exceeds that of its predecessors. If your machine can handle it, the game can be played with SVGA graphics, at resolutions up to 800 x 600 pixels in 256 colours. Most players will probably opt for the slightly faster 640 x 480 pixels but even this offers four times the detail of Doom. Couple this with excellent stereo sound effects and a gravely voice-over and you've got all the ingredients for a highly enjoyable action adventure. Some parental guidance is advised due to the sheer

number of flying limbs and occasional (pixelated) nudity, but there's nothing too bad in there.

Duke Nukem 3D won't win any prizes for originality, but it clearly shows the way forward for out-and-out PC action games. What's more, in the Apogee tradition, the first six levels are available for you to try as shareware. If you like it, you register to receive the whole game.

**Chris "Dook" Cain**

● Try the shareware version on this month's free, cover-mounted CD-ROM.

**System requirements**

486DX2 66 or higher, 8Mb RAM, SoundBlaster, double speed CD-ROM

**Price** £39.95 (CD-ROM only)

**Contact** US Gold 0121 625 3366



thousands of colours.

The dogfighting and other interactive sequences are better than before, with new ships to fly, improved missions and impressively devious enemies. A joystick is still the best way to handle yourself in the cockpit but the keyboard makes a good substitute. The sensation of flying through space is as bad as ever, but hey, this isn't supposed to be a flight simulator.

With a gripping storyline and state of the art presentation, Wing Commander IV — The Price of Freedom is further proof that you can make a good interactive movie. You

can easily get lost in it for a couple of hours and it would make a great introduction to the genre for those who've never tried it before.

**Chris "Wingco" Cain**

**System Requirements**

486DX 75MHz or higher, MS-DOS 5.0 or higher, 8Mb RAM, 30Mb free hard disk space, SoundBlaster, double-speed CD-ROM drive, MSCDEX 2.23 or higher, VESA Local Bus or PCI SVGA graphics card, keyboard and joystick or mouse.

**Price** £59.99 (CD-ROM only)

**Contact** Electronic Arts 01753 549442

# TOPGUN

## FIRE AT WILL

CUTTING EDGE

“The Navy demands a lot from a pilot: strength, courage, resilience and above all else, cool under fire.”

For millions of people, Top Gun is an unforgettable film. Now, thanks to Microprose and Spectrum Holobyte, you can star in it. Top Gun — Fire At Will puts you in the cockpit of a Grumman F14 Tomcat and brings all the thrills of air-to-air combat without all that tedious training beforehand.

You take over from Tom Cruise as hot shot pilot, Maverick, and everyone is relying on you to successfully complete a number of missions. It's not going to be easy though, as piloting takes great skill and manoeuvring ability, while targeting using the numerous head-up displays (HUDs) demands more than a quick trigger finger.

Microprose is famous for its simulations and while the game is fundamentally a shoot-em-up, if you don't watch your flying



and pull too many Gs while banking, you could be temporarily blinded and shot down by a nasty Mig-29 or Su-27.

It pays to thoroughly master the plane's controls: to practice your skills, try landing on the aircraft carrier after an exhausting mission. But remember, these planes cost an absolute fortune to replace!

Top Gun is graphically excellent, displaying in either 256 or thousands of colours at either 320 x 200 or 640 x 480 resolutions. Sound is first class, with good use of sound effects,



voice-over comments and music — even the Top Gun theme tune is in there.

To make everything run smoothly you really need a Pentium 90MHz and upwards, but the minimum spec is a 486DX2/66. The game's setup utility is quite thorough, providing suggestions for problems such as freeing-up more base memory. Most joysticks are supported, and are a must for this type of game.

An excellent blend of a realistic flight simulator and a combat "fire at will" blaster.

**Nicola Kingsley**

**System requirements** 486DX2/66 8Mb, 30Mb hard drive space, VESA or PCI SVGA video card, DOS 5.0, double speed CD-ROM, joystick and mouse.

**Price** £44.99

**Contact** Spectrum HoloByte / Microprose 01454 893893

### Leisure Lines

#### Brainteasers courtesy of JJ Clessa.

##### Quickie

We often read about people who sail around the world, either single-handed or in yacht races. Big deal. I happen to know that at no time during their trip are they more than 7 miles from the nearest land. Why is this?

##### This month's Prize Puzzle

A moderately difficult problem, this month. Those familiar with check digit methods will find similarities, but for the benefit of all, we'll explain the problem as follows:

There are nine 7-digit numbers, shown right. If I choose a weighting number of **4972853**, containing seven different non-zero digits, and calculate for the first of the nine numbers (**1234568**):

**a.** The sums of the products of corresponding digits

i.e.  $4 \times 1 + 9 \times 2 + 7 \times 3 + 2 \times 4 + 8 \times 5 + 5 \times 6 + 3 \times 8 = 145$

**b.** The remainder when this sum (**145**) is divided by **11** = 2 (i.e.)  $145 \text{ modulo } 11 = 2$

Repeat the calculation for the other values in the list, and the same remainder (**2**) will always be obtained. This is only true if the weighting number is 4972853.

However, it is possible to find a weighting number which gives a remainder of 7 for every one of the nine values, and also one which

1. 1234568
2. 7652134
3. 2578349
4. 6427891
5. 3946785
6. 4891276
7. 4783952
8. 3615827
9. 8169453

gives a remainder of 9. What are these two weighting numbers? Both answers are required to qualify for the prize.

Just to make the conditions clear:

1. No two digits of the weighting number may be the same.
2. A zero may not be used.
3. In every case, the sum of the products of corresponding digits must be divided by 11 to get the required remainder.

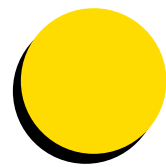
Answers on postcards or backs of sealed envelopes — no letters and no floppy disks — to: PCW Prize Puzzle - May 1996, P.O. Box 99, Harrogate, N. Yorks HG2 0XJ, to arrive not later than the 20th May 1996. Good Luck!

##### Winner of February 1996 Prize Puzzle

A good response — 166 entries in all, despite the problem being fairly difficult. Alas, quite a few entrants misunderstood the problem requirements and assumed, wrongly, that the solution had to be within the range 1-999. In fact, we said that the problem was about the summation of consecutive positive integers within the range 1-999, and the required answers (two were requested) were **45045** and **51975**, both of which could be obtained in 26 different ways.

The winning card, chosen at random as usual, came from Mr Phil Richmond of Daventry in Northants. Congratulations, Phil, your prize is on its way.

Meanwhile, to all the near misses, keep trying — it could be your turn next!



# Win a Microtek PageWiz



**F**or a paperless office there is only one sensible solution: a document scanner. And for that you can't do much better than the **Microtek PageWiz**, which we reviewed in our March issue.

It is tiny, robust and fast, and comes bundled with OmniPage OCR software and an easy-to-operate file management package.

Installation is easy, via the parallel port, and you can be up and scanning within minutes.

**Q1.** To win one of the five scanners we have on offer, just tell us what OCR stands for. Is it:

- a) Optical character reconnaissance
- b) Optical character recognition
- c) Open copy replace

**Multimedia bundles**

We have a whole host of multimedia software and hardware bits and pieces to give away, all donated by BIT UK.

One lucky winner will get a **Multimedia Super Bundle**, which includes a video capture

card, MPEG conversion software and a software video editing package.

Four, second-prize winners will each get **Media StudioPro**, the video editing package. Five other runners-up will each get a morphing package, **MorphStudio**.

**Q 2.** To win one of these prizes, just tell us what MPEG stands for. Is it:

- a) Moving pictures experts group
- b) Moving pictures evolution graphics

c) Moving picture expert graphics

**Personalised Microsoft mice**

We've got something a bit different to give away this month. We are offering individual, one-off, personalised mice, designed to your own specification.

Microsoft is giving us the mice. We had a PCW mouse spraypainted specially for us, but you can choose whatever you like to put on yours — for instance, your local football team's strip. We have 15 mice to be painted and given away.

**Q3.** Just give us a very good reason why we should choose your design idea. Send us no more than 20 words on a postcard or the back of a sealed envelope.

**Rules of entry**

This competition is open to all readers of Personal Computer World except for employees, and their families, of VNU Business Publications, Microtek, BIT UK and Microsoft. Entries to arrive by 17th May 1996.

The Editor of PCW is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

**How to enter**

To enter the competition, just write your answers on a postcard, or the back of a sealed envelope, along with your name, address and daytime telephone number, and send to: May Competition, Personal Computer World Editorial, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG.



Multimedia bundles

# Hands On Contents

## OPERATING SYSTEMS



### Windows 95 254

Don't desert good-old DOS just yet: you might need it, says Tim Nott.



### Windows 3.1 258

DDE wins out over OLE in more ways than one. Tim Nott explains.



### OS/2 280

Want to get switched on to OS/2? Then get online. Terence Green is your guide.



### 32-Bit 264

Warp's Internet Access Kit lets itself — and Chris Bidmead — down. And if you were wondering what happened to Taligent...

## APPLICATIONS



### 3D Graphics 295

Liven up your net pages with 3D graphics, courtesy of VRML. With Benjamin Woolley.



### Word Processing 268

Get smart, get SmartBoard to enhance your document editing. With Tim Phillips.



### Spreadsheets 272

Billing facilities and button boxes, with Stephen Wells.



### Databases 276

Mark Whitehorn plucks pearls of wisdom from a meter-reading problem.



### Graphics & DTP 298

There's more to making selections than meets the eye, as Gordon Laing points out.



### Multimedia 302

CD-ROM making on a budget, with Panicos Georghiades and Gabriel Jacobs.



### Sound 306

Steven Helstrip paints a musical picture of subtle contrasts.

## PROGRAMMING



### Numbers Count 287

Spring into Mike Mudge's mathematical miscellany.

*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.ccmil.compuserve.com](mailto:editor@pcw.ccmil.compuserve.com)



### Visual Programming 310

Class Assist helps VB 4.0 with its inheritance, and Borland's Zack Urlocker gives us the lowdown on Delphi.

## AND THE REST...



### NEW! Hardware 288

Our new column has a handle on all things hardware. This month, fitting a sound card. With Roger Gann.



### Networks 314

Stephen Rodda trips the light fantastic with the Samba suite.



### Macintosh 318

System 7.5 Version 2.0 brings all current Macs into line. Chris Cain checks it out.



### Computer Answers 323

Frank Leonhardt pulverises problems and quashes queries. Then it's straight in to his Bargain Basement for a rummage around.



### Beginners 325

Get on a winning streak with Windows 95. Eleanor Turton-Hill works wonders.



## Brahms & List

**There are some things for which we still need good-old DOS. Tim Nott shares some tips for saving and printing file lists, and indulges in an icon-fest involving tubas and footballs. It takes all sorts...**

Some things never change. Under Windows 3.1 it is impossible to save or print a directory listing without either running a DOS session or using a rather awkward kludge involving the back-up utility. In Windows 95 there's still no built-in way of saving or printing a list of the contents of a folder — believe me, I've tried. The Find File utility looked like a promising start, as you can save a Find together with its results — you end up with a \*.FND file on your desktop. Alas, this is only usable by Find itself: if you try to open it with Notepad, for instance, you'll see mainly gibberish.

Having played around with File Find for a while, I can tell you one thing *not* to do. It must have been one of those “bad brain” days, as in a moment of absent mindedness I highlighted all the results of a search for \*.TXT files, right-clicked and selected Print, in a misguided attempt to print the list.

Oh dear. The first file loaded into Notepad, and started printing. Though in hindsight this seemed perfectly reason-

able, it was not what I wanted. While it was doing so, the second opened into a new instance of Notepad, and that started printing. At this stage, I came to my senses and switched off the printer. This had the interesting result that Notepads kept on loading, but each also produced an error message. Trying to hit the Cancel button on the error messages and the Close button on the Notepads was rather like one of those arcade games where you have to move the mouse around very quickly and accurately, shooting things before they take over the world. It must have taken about 20 minutes to get everything under control, and I wasn't even invited to add my name to the “high score” table.

### Doing it the easy way

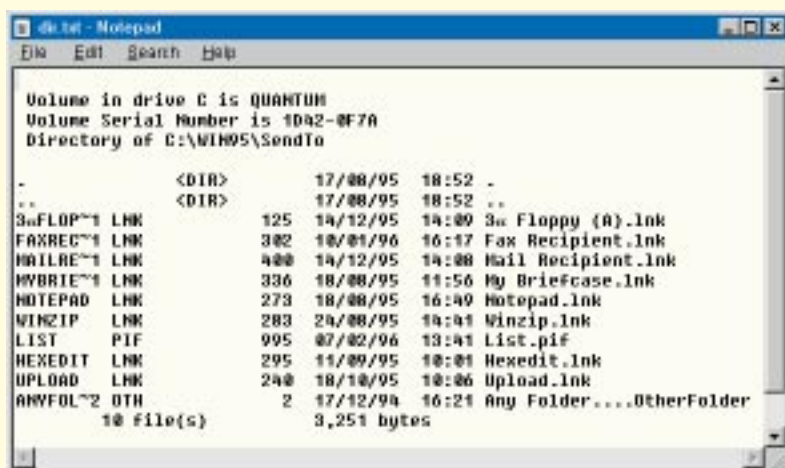
So, back to DOS, where it's easy, if a little primitive. Open a DOS session, change to the folder of your choice with the CD command, and type: DIR > DIR.TXT, omitting, as always, the single quotes. Lo and behold, the > sign redirects the output to a file rather than the screen, and you end up

with a text file, DIR.TXT, located in the current folder, containing a list of all the files and folders therein. By default, each line will contain the MSDOS filename (truncated to 8 + 3 characters), the size, creation time and date, and the long filename. You can change this using “switches”. Typing DIR /V >DIR.TXT, for example, gives a “verbose listing” with the attributes, last date accessed and allocation size added.

Just to go on a brief tangent, this last tells you how much actual disk space the file is taking up. This is a factor of “cluster size” — the minimum chunk of hard disk that the operating system can allocate to a file which depends on the size of the disk (or partition). If you've got a 500Mb partition it's 8192 bytes, so each of those little shortcuts of a few hundred bytes waste over 7Kb of disk. Going up it gets worse — 16Kb over 512Mb and 32Kb over 1024Mb.

### Switch glitch

There's a whole load of other switches: /S shows the contents of all sub-folders, /L displays everything in lower-case, and /B



**Left**  
The results of sending the SendTo folder itself to the List shortcut

**Right**  
Changing the properties of the PIF shortcut



## Icon do anything....

And now for something more frivolous.

Tobie Osmond emailed from Devon to say that "For a few months now you have been saying that it is possible to change the icons in Windows 95 through the properties sheet by right-clicking. For some reason, I still can not work out how... I am getting bored with some of the icons I have and would like to change them."

I think we've covered most of this in bits and pieces before, but let's take the opportunity to indulge in a comprehensive icon-fest. The first thing to notice is that all icons are not equal. Taking the easiest first, shortcuts initially assume the icon of the target. If that is a folder, you get the default folder icon. With a program, you normally get the icon built in to the .EXE file, and if the target is a data file then you get the program icon associated with that kind of file. In all cases, you get a small arrow added to the bottom left of the icon. Changing a shortcut's icon is simple — right-click, choose Properties, click the Shortcut tab and you'll see a button labelled Change icon. This opens another dialogue box showing the icons available in the current file. If this is a program file, you'll usually only get one icon to choose from, though some applications — Notepad, for example — have more. If the shortcut is to a folder you'll probably get a choice of all the icons in WINDOWS\SYSTEM32.DLL, which contains all the system-wide icons such as folders and the Help book, as well as a few others such as a rather fine tree. If none of those turn you on, you can use the Browse button to explore any file on your system. Icons can be embedded in .EXE or .DLL files, in standalone .ICO file or in third-party "libraries". Check out PIFMGR.DLL in WINDOWS\SYSTEM for some nifty examples.

No matter which icon you choose, you'll still have the little arrow in the corner. Personally, I find this a great help — I like to know if I'm about to delete a shortcut or an

actual file; but some people take a strong dislike to it. TweakUI (February's *Hands On* and *CD-ROMs*) will remove these, but beware — there are bugs (see the readme file) that can land you in trouble.

Program (.EXE) icons can't be changed, unless you want to use a programmer's resource editor to hack them. In which case, what are you doing reading this column? Data files can, however. Let's say, for instance, you want all Text files to have a football icon rather than the rather dull Notepad one. Go to the View menu of any folder or Explorer window, select Options and click the File Types tab. Scroll down to Text Document (hint — type T to save a lot of scrolling) and highlight it. You'll see the icons for both the file type and the application it opens with below. Click the Edit button, and at the top of the next dialogue box you'll see Change Icon. The procedure is then exactly the same as for shortcuts, so browse to WINDOWS\SYSTEM\PIFMGR.DLL and scroll through the icons until you find the football. Personally, I prefer the tuba, but it takes all sorts. Close your way back through the dialogues and all your .TXT files will now be represented as footballs, as will all future shortcuts to .TXT files.

Although there are file types — at least on my system — for File Folders and Folders, both of which let you change the icon, this doesn't actually seem to do anything apart from change the icon in the file type list. If anyone has found a way to change the default folder icon, please let me know.

The system desktop icons can't be changed by mortal means — right-click on My Computer or Recycle bin and the Properties dialogue doesn't offer an option for changing the icon. To do this you either have to edit the Registry (see the Tips panel in February's column) or use something, such as TweakUI or MS Plus! that will do this for you.

gives a "bare" listing with just the file and folder names. You can combine switches — /V /L will give a verbose lower-case listing, and if you want the full switch list, type DIR /?. Avoid using the /P (pause) switch if you're redirecting output to a file: this is for screen use only and stops the output after each screenfull.

To move around folders you use the CD (Change Directory) command. Normally, CD STUFF takes you from the current folder to the folder STUFF one level

below. If you want to go elsewhere, CD C:\OTHER\THINGS takes you there. If you want to change drives, just type the drive letter and a colon — e.g. D:. If you want to go up a level, type CD.. — three dots takes you up two levels, and so on. I don't know if there's a limit to this, but my current record is five levels (six dots). With Windows 95 long folder names, there is a problem. You probably have a folder called Program Files in your C: drive. But if





you type CD Program Files you'll get an error message, as DOS doesn't like the space. The way round this is to either type the MSDOS name, which in my case is PROGRA~1, or enclose the folder name in double quotes — CD "Program Files".

### On the right path

At this point you may be thinking: "Stop! I only wanted a file list, not a dissertation." Fair enough — here comes the clever bit. Start up Notepad, and type in, on the first line:

```
DIR%1%> C:\WINDOWS\DESKTOP\DIR.TXT'
```

then press the Enter key. If that isn't the path to your desktop, or you want to save the list elsewhere, modify accordingly. Save this wherever you like as DIRLIST.BAT.

Open the folder where you've just saved DIRLIST.BAT, and open also the SendTo folder which should be in your main Windows folder. Right-drag DIRLIST.BAT into SendTo and choose Create Shortcut. The shortcut you have is not a normal .LNK file, it's a DOS Program Information File, or PIF. Right-click it, select Properties and go to the Program tab. Clear the box labelled Working and tick the Close On Exit box. Leave Run as Normal Window — it won't work minimised. You can rename the shortcut to something more elegant than Shortcut to dirlist.bat if you like — mine's just called List.

### It only takes a second

And that's it. Right click on a folder, select Send To and click on the new shortcut. In a second or so you'll have a Notepad file on your desktop entitled DIR.TXT with a listing of the contents of the selected folder. Pretty cool, or what? Note that any existing DIR.TXT will get overwritten with each Send To... You can change this so the file gets added to, rather than replaced by, replacing the > sign with >>. If you want to save DIR.TXT in the folder you are listing, rather than the desktop, then change DIRLIST.BAT to read:

```
cd %1%
dir %1% >dir.txt
```

The %1%, by the way, instructs DOS to take the folder name as the target of the CD and DIR commands. You can of course incorporate any of the switches mentioned earlier.

Finally, you can send a list straight to the printer by putting LPT1: (or whatever your printer's connected to) to the right of the > sign. If for some reason it's not working, go back to the shortcut: Properties and clear the Close On Exit box — you'll then be able to see any error messages that occur.

**Fig 1 DDE speed test macro**

```
Sub MAIN
channel = DDEInitiate("Excel", "rob.xls")
If channel = 0 Then
    MsgBox "Failed to initiate conversation"
Else
    start$ = Time$()
    For count = 1 To 5000
        cell$ = "R" + Mid$(Str$(count), 2) + "C1"
        DDEPoke channel, cell$, "123"
    Next count
    DDETerminate channel
    end$ = Time$()
    MsgBox "Started at " + start$ + " finished at " + end$
End If
End Sub
```

### Strange goings-on in the Office

There's something strange about Microsoft Office 95, as reader Rob Thompson points out, and that is Dynamic Data Exchange. Now I know we're all supposed to be using OLE these days, but there are certain things that OLE just won't do. Perhaps when Word eventually gets equipped with Visual Basic for Applications this will change, but at the moment, if you want, say, Word and Excel to communicate automatically you still need to use DDE.

If you haven't a clue what I'm talking about, turn to this month's Windows 3.1 column (page 258) for a brief explanation and tutorial. Everything there applies to Windows 95 too, and the macros work under Word 7/Excel 7.

Anyway, Rob sent in the short Word macro listed in Fig 1 (page 254). All this does is make a note of the time, then fill 5000 successive cells in Excel with the value 123, then take a second time check. You need to run this from any open Word document, and have an empty spreadsheet called ROB.XLS open in Excel. I've changed Rob's original macro slightly to show the seconds. As it happens, seconds aren't terribly important in Windows 95, as the total time taken was over 9 minutes. Under Windows 3.1 it was around 30 seconds, and 40 seconds under Windows NT.

Rob did his tests on a different Pentium machine, so I thought I'd try on my humble dual-booting 486/50. Though the contrast wasn't quite as spectacular, the job was completed in 1 minute 12 seconds under Windows 3.1/Word 6/Excel 5 as against 8 minutes 38 seconds in Windows95/Word 7/Excel 7. Being a sucker for punishment, I tried once more under Windows95, this time using Word 6/Excel 5. One minute 28 seconds, this time. According to the

Microsoft Office Support person Rob spoke to, this is a "32-bit problem" and DDE was "an outgoing function". However, he had no suggestions for achieving the same end with OLE and couldn't explain why the "32-bit" problem didn't arise under NT.

### Roll-your-own-icon update

Should you want to roll your own icons then the news at present is not encouraging. The only icon utilities I've managed to track down for Windows 95 are the Microsoft Imagedit utility that came with some Beta versions of Windows 95, and a program called Ezicons by Paul Traver. The former is an icon editor; it will import and export .ICO and .BMP files but can't extract icons from .EXE or .DLL files. It also carries an extremely forthright copyright message, so we can't include it on the cover CD. The second is an icon management utility — it will extract icons from any file, and save them as .ICO files, .BMPs or in its own libraries. It doesn't, however, have any built-in icon editing facilities, though there is a rather awkward way round this using Windows Paint. It's also still in a Beta version and the author forbids inclusion on CD-ROM without express permission, so I'm afraid you're out of luck on this one too. If you want to contact him, however, his email address is 72144.422@compuserve.com. I'll dig further into icon editors in a future column, but meanwhile, if you've written or know of one please let me know.

### PCW Contacts

Tim Nott can be contacted by post via PCW or by email at [timn@cix.compulink.co.uk](mailto:timn@cix.compulink.co.uk)



## There's life in the old dog yet

**Tim Nott highlights areas in which dynamic data exchange still wins out over OLE.**

Those of you with long memories, or long bookshelves, may recall that some time ago I wrote that "DDE will be covered comprehensively in a future *Hands On* session." I can't remember whether I really meant "comprehensively" but I think I'll try and stick with making it comprehensible for now — sorry about the wait.

Dynamic Data Exchange (DDE) dates back to pre-Windows 3.0 days and provides a way of transferring information or commands between applications without using the clipboard. To a large extent, it's been superseded by Object Linking and Embedding (OLE) but there are things DDE can do that OLE can't, at least not in its present incarnation.

One example of DDE at work is the way installation routines add icons to Program Manager, automatically. For end-user access, the applications involved must either have routines built in to the menus, or a macro language with which to construct them.

Let's look first, however, at a very simple example of one application, Word for

Windows, controlling another, Cardfile, without using DDE proper.

The object of the exercise is to prompt the user to enter a word, then start Cardfile with a data file loaded and look for an entry whose title contains that word. An obvious example would be to look up an address when writing a letter. It assumes you have a Cardfile data file named ADDRESS.CRD in the directory C:\LETTERS and that CARDFILE.EXE is on your path.

The macro in *Fig 1* works with version 2.0 of Word for Windows and later. If you use a different word processor, then I'm sorry, but it shouldn't be too hard to translate. Anything preceded by an apostrophe is a comment — Word ignores these statements which are simply there to explain to the reader what's

*Look, no hands — Cardfile fills in its own Goto box via a Word macro*

going on. There's all sorts of room for improvement, but I've deliberately kept it simple and you should see Cardfile leap into action and fill in its own Go To... box when you run it.

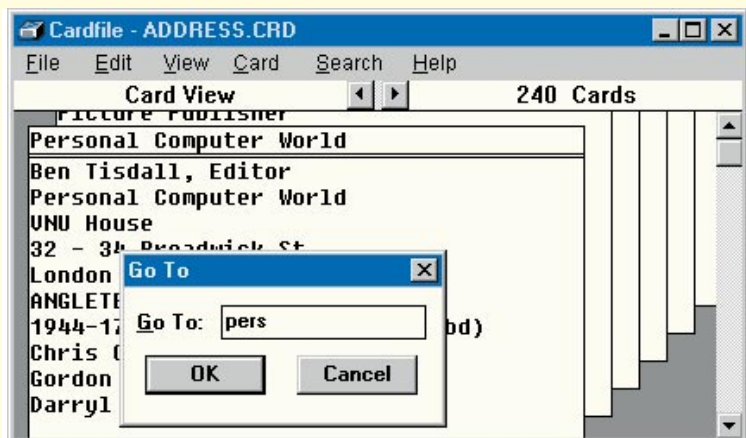
● *Hint: click the OK button rather than press Enter after typing the name.*

### Swimming the channel

Proper DDE is far more functional — it uses "channels" to communicate rather

**Fig 1 Word Cardfile macro**

```
Sub MAIN
name$ = InputBox$("Type in a name")
    'prompts for a name
restore$ = "%(" + "r"
SendKeys restore$
    'stores keystrokes to restore
    'cardfile if minimised
find$ = "{f4}" + name$ + "{enter}"
SendKeys find$
    'stores the go to command
On Error Goto whoops
    'if the cardfile isn't open
    'we can't activate it
    'so macro jumps to whoops label
AppActivate "cardfile - address.crd", 0
    'activate cardfile
    'and carry out the keystrokes
Goto skip
    'we don't need the rest if
    'cardfile was running so
    'jump to the skip label
whoops:
Shell "cardfile.exe c:\letters\address.crd", 1
    'address.crd wasn't loaded, so load it
    'and send the stored keystrokes
Err = 0
    'resets the error handler
skip:
End Sub
```



**Fig 2 Word-to-Excel DDE macro**

```

Sub MAIN
Dim data$(5)
channel = DDEInitiate("Excel", "list.xls")
    'opens channel 1 for DDE
StartOfDocument
lastinv$ = DDERequest$(channel, "R2C7")
thisinv$ = Str$(Val(lastinv$) + 1)
    'gets the last invoice number stored in G2
    'and adds one to create a new invoice number
firstinv$ = DDERequest$(channel, "R2C1")
currentrow = 2 + Val(thisinv$) - Val(firstinv$)
currow$ = Mid$(Str$(currentrow), 2)
    'gets the first invoice number
    'and works out which row to go to
data$(1) = thisinv$
EditGoTo "date"
data$(2) = Selection$()
EditGoTo "number"
data$(3) = Selection$()
EditGoTo "item"
data$(4) = Selection$()
EditGoTo "cost"
data$(5) = Selection$()
'reads the current invoice number and
'bookmark contents into the array data$()
For count = 1 To 5
    cell$ = "R" + currow$ + "C" + Mid$(Str$(count), 2)
    DDEPoke channel, cell$, data$(count)
Next count
    'fills in the spreadsheet row
cell$ = "R" + currow$ + "C6"
total$ = DDERequest$(channel, cell$)
    'gets the total in col F from Excel
EditGoTo "invoice"
Insert thisinv$
EditGoTo "total"
Insert total$
    'inserts Excel data into empty bookmarks
DDEPoke channel, "R2C7", thisinv$
    'updates last invoice number
DDEExecute channel, "[SAVE()]"
DDETerminate channel
    'saves spreadsheet and hangs up
End Sub

```

than depend on the Sendkeys function.

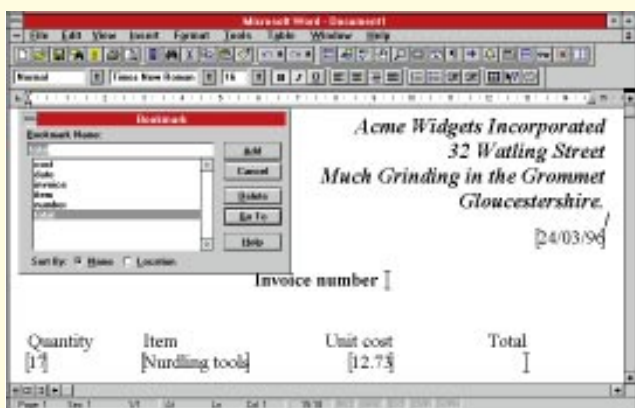
There are only five basic DDE commands in Word Basic: DDEInitiate and DDETerminate are used to open and

close a connection; DDERequest fetches data from the remote application; and DDEPoke sends data to it. Finally, DDEExecute runs a command or a macro in the remote application.

So, let's get our anoraks really muddy with the example in Fig 2. This takes data from an invoice created in Word, puts it in an Excel spreadsheet, picks up other items from there, places those back in

*A sample Word document showing the bookmarks used in the DDE exercise*

continued on page 262



### A quick tip from Reg

In March's column I looked at reader Dejan Stojnic's strange case of the disappearing associations — double-clicking a data file in File Manager would no longer launch the relevant application as the Registry was corrupt.

My suggestion of moving REG.DAT and letting Windows re-create it didn't quite go far enough. You can usually save yourself the trouble of redefining associations or re-installing applications by using the File Manager Search... command to find all \*.REG files — these contain third-party registration information. Double-click on each of these and the information contained will be added to the registry. If you get an error message saying there's "no association", you'll have to re-associate .REG files with REGEDIT.EXE.

the Word document and then saves the spreadsheet. I've kept it very simple and it works with Word 2.0 and Excel 4.0 upwards.

Before you run the macro, you need to do a little groundwork. First do the easy bit — start a new worksheet in Excel and enter the headings shown here in columns A-G in the first row:

Invoice number	Date	Quantity	Description	Unit Cost	Total	Last invoice
----------------	------	----------	-------------	-----------	-------	--------------

In row 2, enter any integer under "Invoice number" and the formula

```
"=C2*E2"
```

under "Total". Use the Fill command to replicate this formula down column F a dozen or so cells. Under "Last invoice" enter the same number that you put under "Invoice number". Save this as LIST.XLS.

Keep LIST.XLS open and start a new document in Word. Type in a letterhead and an address if you like, then on a new line the date, say 24/3/96. Highlight the date and create a "bookmark" (Edit menu in Word 6, Insert menu in Word 2) named "date".

On a new line, type "Invoice number", space, then insert another empty bookmark at the cursor position and name it "invoice".

On another new line type "20", select it and bookmark it as "number". Tab and type "Universal grommets", select that and bookmark as "item"; tab again and type "1.50", select and bookmark as "cost", tab again and insert another empty bookmark named "total". Save the document as BILL.DOC.

If all this seems too much like hard work, then all the files and macros can be found in DDESTUFF.ZIP on our free, cover-mounted CD-ROM.

#### See how they run

Still in Word, run the macro listed in Fig 2 (page 259). If all has gone well, the date, quantity, item description and unit price will be inserted into the third row of the spreadsheet and the document will itself be updated with an invoice number and the total. The new invoice number will replace the original "Last Invoice" in Excel.

DDErequest expects an absolute cell

reference; it can't find the end of the spreadsheet on its own. So this method means the macro always knows where to look for the last invoice number, and by comparing it with the first knows where to poke the next lot of data. It's quick and dirty but means we don't need any Excel macros. And note that the DDE commands

identify a cell by row number/column number, so "A4" in Excel becomes "R4C1".

Try changing the contents of the bookmarks and running the macro again — you'll get a new row in the spreadsheet. Take care not to delete the bookmarks themselves.

● *Hint: type in the new text before deleting the old.*

In Word 6 you can view bookmarks (Tools/Options/View) as square brackets. In Word 2 you can't, and you're also limited to 20 characters.

This is a simple example, and not a particularly robust or sophisticated piece of programming, so please don't use it for any real work.

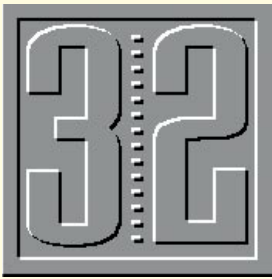
However, DDE can be an extremely powerful tool. There's an example bundled with Autocad that takes an Excel spreadsheet containing the calculations on a shaft, taking into account load, material properties, RPM and so on, to calculate the minimum dimensions. This is linked to an Autocad drawing of the same shaft and as you alter the figures in the spreadsheet — increasing the load, for example — the dimensions in the drawing change to suit and vice-versa. This needs a custom DLL as well as hefty Autocad and Excel macros, but shows just what can be done.

### Dealing with DOS

DOS users please note: In future issues, Tim Nott will be covering DOS topics in this column on an occasional basis.

### PCW Contacts

Tim Nott can be contacted either by post c/o PCW or by email at [timn@cix.compulink.co.uk](mailto:timn@cix.compulink.co.uk)



# NeXT stop, the Web

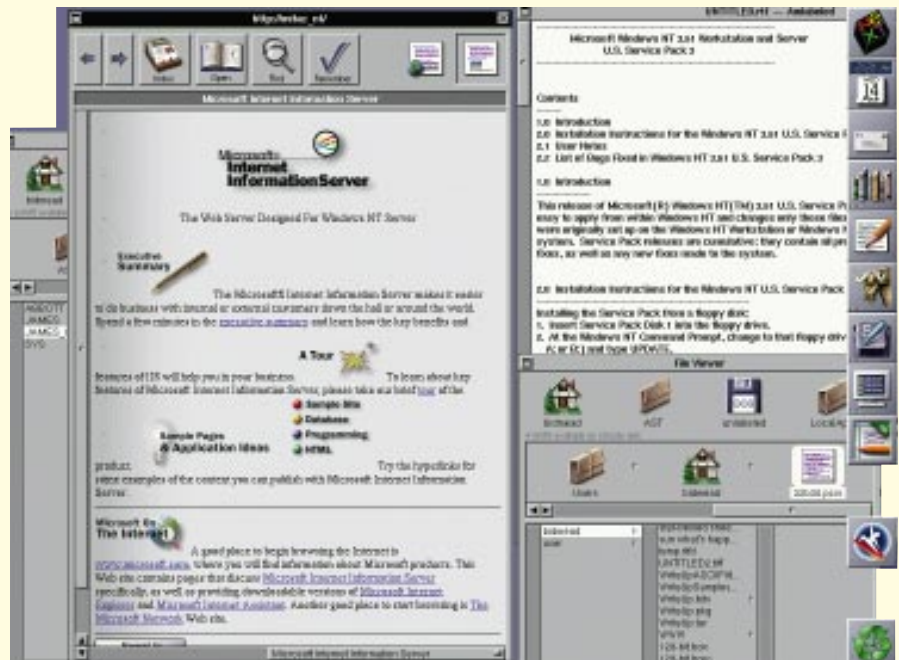
**Chris Bidmead on the shortcomings of Warp's Internet Access Kit, the demise of Taligent, and why .rtfd is the way forward.**

Last month I was whingeing about some of the shortcomings of IBM's Web Explorer. My opinion of the Warp Internet Access Kit has gone down a couple more notches since then, although the blame for this lies not with IBM, but with NeXT and the new PEP machine I told you about. Messing around with Internet-connected NeXTStep has opened my eyes to how this World Wide Web stuff ought to work in a properly designed 32-bit computing environment.

As I said last month, there are several browsers on the NeXT machine. The one I've been using mostly is Netsurfer. It has some very important features that you won't find with WebExplorer, which up to now, despite my criticisms, has been my favourite way of getting onto the World Wide Web. I've already mentioned the pain of not being able to highlight a selection of text from the browsers and copy it across to some other application. There are other annoyances:

1. You have to wait for a page to fill (or explicitly stop it filling) before you can spring off from one of its links on to the next. Given that at least 50 percent of the pages you visit are only stepping-stones, you waste a lot of mouse clicks aborting pages in mid-fill by clicking on the animated icon at the top left-hand corner, then clicking again on the link you want to jump off. Just clicking on a link should be enough to tell the browser that it's time to move on.

2. When you move on to a new link, you don't necessarily want it to overwrite the old one. The page you're about to step off from might have several links you want to explore. Why won't WebExplorer let you



click-click-click on three different links and spawn pages for each of those links, retaining the original page? OS/2 is a multi-tasking, multithreaded operating system underneath, so why can't we see some of this carried through into the application?

3. How do you save a page that you want to refer to again? Yes, WebExplorer lets you file it, but when you bring it back offline all you get is the raw HTML-formatted text. The graphics have all fallen off. For months now, I've just been printing pages that I wanted to keep intact. But not everybody has a colour printer to hand, and those who do may not want to print pages that may only be read once and then binned.

None of this is a problem on the PEP NeXT box with Netsurfer. For a start, clicking on a link jumps you to the target page whether the current page has finished filling or not. Simple — NetScape does this too. But look how Netsurfer behaves when you click on a link and hold down the NeXT

*Netsurfer on the Next machine reads the Windows NT Web server across my "intranet". Sharp-eyed readers will notice the word "Microsoftfi", which should read "Microsoft®". The "fi" is a single-ligatured character in the NeXTStep character set where Microsoft puts ®, one of the minor problems of multi-platform computing*

Command key (usually Alt-Left, but mappable). It holds on to your current page (and goes on filling it if it's in mid-fill), and spawns a new page for the link you're springing off to.

Copying and pasting a section of text from the surface of Netsurfer works the way it does in NetScape and Microsoft Explorer. A little disappointingly, the NeXTStep interface shows its age here. By modern lights you ought to be able to highlight a section of text and drag it across to an editor; instead you have to copy and paste explicitly with the standard Command-c Command-v keystrokes or by

pulling down the Netsurfer menu and selecting Edit/Copy. A very similar menu appears in all NeXTStep applications, by default at the top left of the screen, but power users arrange the application menu to be invisible, only popping up when you click the right-hand button.

So that's copy and paste — don't forget that this NeXT stuff was designed ten years ago. That's why it came as a real surprise when I used one of the NeXT standard mechanisms to save my first Netsurfer page. Needless to say, I hadn't bothered reading the online help, but I knew from messing around with NeXTStep that when you see an icon in a "well", you can usually expect to do some drag and drop with it. An icon well is a square frame, shadowed to look like a shallow indentation in the surface. If you look at my screenshot of Netsurfer (opposite), you'll notice that while the main icons running from left of screen are on raised buttons, the icon at the far right is sitting in a well. The icon shows a page with text and a picture, and represents the whole document you're looking at — technically it's called a "proxy". So one way of saving a page is simply to drag the proxy into a folder shown by the viewer.


And here's the surprise. NeXT works with three basic text types: plain ASCII, Rich Text Format and PostScript, respectively named .txt, .rtf and .ps. Maybe I hadn't been paying attention, but the drag-and-drop save from the icon well turned out to produce a file type that was new to me, an .rtfd file. When I recalled one of these files into NeXT's standard editor, Edit, I was amazed to see that it came back complete, with the text, pictures and diagrams all perfectly in place.

The amazement, of course, was a function of my previous experience with other Web browsers. Any ordinary Joe sitting

down at a computer would expect no less. But how does the decade-old NeXTStep interface do this? If it were Microsoft, it would be using OLE 2.0 Structured Storage. OpenDoc — supposedly arriving this year — will have a similar compound file storage mechanism called Bento, named after the multiple-compartment dishes used to serve up Japanese food. Was NeXT really this much ahead of the game?

### The joy of .rtfd

Forget OLE 2.0 Structured Storage. An .rtfd file is so simple it makes me weep (with joy that people still remember how to keep it simple). There's a neat trick that NeXTStep uses to shape its applications. An application tends to be a whole mess of different executables, resource and data files, so to keep them all neatly together, NeXTStep stores them all under a single directory, then makes that directory behave as through it were the sole executable. All you see from the NeXTStep desktop is a single icon, on which you click to launch the app. The icon actually belongs to the directory, but you never get to see the underlying files unless you explicitly use the Workspace menu's File/Open As Folder command.

This is something you can also do with OS/2, as we discussed in this column once. And it's the same way that the Netsurfer saved pages retain their pictures. The .rtfd file is in fact a directory (hence the d), iconised to handle like a file. Inside the directory is the main rich text file, and this holds pointers to the picture files, which are also contained in the directory. Drag the page from the browser into a folder, and the .rtfd file is created on the spot. Double-click on the .rtfd file and it loads into the Edit app, NeXTStep's standard editor, and is displayed like the original browser page. 



*Borland's WWW versions of its press releases are far more attractive than the drab typed pages that arrive through the post. NeXTStep saves them as .rtfd "files", but as the Viewer shows here, they're really directories that hold the pictures and text necessary to rebuild the original page. Digital Librarian, NeXTStep's standard text retrieval system, works fine with this .rtfd construction. It just ignores the pictures and indexes on the main TXT.RTF file*

## Windows NT on the Web

In mid-February, Microsoft released the final version of its Web server package, called the Internet Information Server (IIS). It's downloadable over the Internet, and so is the seven-disk Service Pack 3 upgrade you need to run it on your Windows NT 3.15 server. If, however, you have a slow link, it could take you the best part of a day. This column was already overdue by this time, so I'm very grateful to Barry Richards at Product Support Services, Microsoft UK, for biking over the Service Pack and the newly minted IIS on a CD-ROM they cut specially for me.

The service pack is commendably easy to apply, and the IIS install off the CD-ROM was even easier. The only executive decisions you're asked to make during the install is whether you want to allow anonymous ftp, and whether you want extra features such as a gopher server. I just said yes to everything, and within minutes I had a working Web server.

By default you start with a set of ready-made Web pages that give you an executive summary of the new software and a tour of the features. The moment I pointed browsers from the Windows NT Workstation, the NeXT machine and the Warp connect box at [http://mitac\\_nt](http://mitac_nt), the hostname I'd given to the Windows NT server, each picked up the home page across my network (which somewhat grandly gets to be called an "intranet" once you start doing this Web stuff on it). Having gone through a similar exercise last year with Linux-FT, which comes ready equipped with a built-in Web server, I didn't get quite the same initial thrill at making the connection, but I still find it amazing that three or four quite different operating systems can share the same world view so harmoniously.

More about this next month, I hope, when I get properly stuck in.

on your network, you'll need to rename them to <something>.tif, without the extra f. The DOS command to do this on an entire directory is simple:

```
ren *.tiff *.tif
```

The equivalent command in Unix is mv (it stands for move), but unfortunately if you try

```
mv *.tiff *.tif
```

inside an xterm window on the NeXT machine, you get a syntax error. (My copy of Linux-FT is more helpful. It throws up the error message "When moving multiple files, last argument must be a directory".)

In other words the Unix command is more flexible, because it moves files as well as renames them. But because it moves them, it can't handle renaming in batches.

Here's the neatest way I've found of doing a batch rename under Unix. The NeXT machine's shell by default is csh, not the most handy of shells, but you can get away with this, entered directly onto the command line:

```
> foreach f ( *.tiff )  
? mv $f $f:r.tif  
? end
```

The closest equivalent in DOS to the foreach command is FOR, but notice here that although foreach is entered at the command line, it's actually a multi-line command, setting up a loop that is terminated by end. When you hit Enter at the end of the first line, instead of executing the command, the tsh shell evaluates it (it will complain if it's garbage) and then gives you a continuation prompt in the form of the question mark. Now you enter the command line or lines to go inside the loop. The end line completes the loop, so when you hit the next Enter, the loop executes.

The foreach line expands the wildcard filename inside the brackets and feeds the results one at a time into the arbitrary variable f. Any name will do here. The line inside the loop simply passes each filename through the f variable to the mv command. The NAME of the variable is f, so in Unix \$f represents the VALUE of the variable. We use this twice, once in full (\$f) and once truncating the filename down to its root (cutting off the .tiff — that's what the :r does) and adding the new suffix .tif.

## Taligent tails off into the distance

A couple of years ago at Comdex, round about the time I started this column, I was shut in a room with Joe Guglielmi, CEO of Taligent. For those of you not familiar with Taligent, it is the spin-off company that Apple and IBM spawned back in 1991 and Hewlett-Packard bought into a year later. Guglielmi was telling me that NeXT had been great in its day, but of course it was all over now. Microsoft's OLE and Cairo would be a distraction, OpenDoc would be the stepping stone, and Taligent would be the true culmination of modern, 32-bit, truly object-oriented computing technology.

Since the Apple connection was severed at the end of last year and the company was rolled back into IBM, Taligent is widely believed to be pining for the fjords. What was initially trumpeted as a revolutionary operating system discreetly evolved into a "multiplatform development environment", and is now lying quietly on its back at the bottom of its cage posing no trouble to anybody. Guglielmi left the company last September, and the Taligent Web page at <http://www.taligent.com>, under Latest News (last updated November 27, 1995) says: "No current job opportunities".

Meanwhile, NeXT hasn't taken over the

world, but it's certainly continuing to deliver, and its own Web page at <http://www.next.com> is on fire with founder Steve Jobs' latest preoccupation, WebObjects. The NeXTStep operating system, having evolved onto the major processor platforms (Intel, Sparc, HP-PA) is now positioning itself under the new name of OpenStep to become that "multiplatform development environment" (including DEC Alpha and PowerPC) that Taligent aspired to be. It's not 100 percent clear how this is all going to pan out, but from where I'm sitting the whole operation looks pretty buoyant.

Coincidentally, unless you believe in fate, Jobs himself has bounced back into the industry as a major player. Round about the time Taligent was posting "No current job opportunities" on its Web page, he made a public offering of another company of his, Pixar, and walked away from the deal with an estimated billion dollars in his pocket. I was talking to one analyst last week who seriously believes there's an outside chance he might get together with some friends and buy back Apple. Borland, thinks my analyst, is another possibility. Borland's Delphi development system certainly seems to owe a lot of its inspiration from NeXTStep's InterfaceBuilders

## PCW Contacts

Chris Bidmead is a consultant and commentator on advanced technology. He can be contacted on [bidmead@cix.compulink.co.uk](mailto:bidmead@cix.compulink.co.uk)



## All ABoard

**Tim Phillips** finds a smart clipboard enhancement. There's a WordPerfect macro, and help formatting between WordPerfect and Word, too.

I'm not one for changing my software very often. Underwear yes, software no. Look at my computer desktop now and give or take a few macros, it's the same as ever. However, for all you Windows 3.1 and Windows 95 users, I have an excellent recommendation that will help your document editing no end. It's only a clipboard enhancement but it's one of those that you wish Microsoft would come up with instead of adding 17 new chart types to Excel.

I'm referring to SmartBoard, which you can get from Oakley Data Services for £15, and I believe it is £15 well spent. SmartBoard runs in the background, only popping up when you right-click on the control menu button or type ctrl-0. It simply stores the last few pieces of data you cut or copied to the clipboard — you set the exact number. This data is shown in four views, presented as tabs: text, bitmaps, metafiles and other

formats, in thumbnail views. To see the data full size, you right-click over a thumbnail and up it pops in a box.

Pasting can be achieved by just pressing enter, or by clicking one of the buttons on the toolbar; you can assign a hotkey to an item that will paste in when the SmartBoard dialogue is hidden.

There's a simple text editor for clipboard items, which includes a macro for stripping out unwanted carriage returns. And that, with a few refinements, is it.

What I love about SmartBoard is that it isn't bloated like most software, or over-complicated like the ClipBook equivalent that Windows for Workgroups supplies. It's a great argument in favour of this sort

of component-based software because it takes Windows cutting and pasting and marries it with the way we really work. If you are filleting a document for the most interesting bits, you can just go through it picking them out, then paste them into a new document later, or even merge them on the clipboard. If you copied something to the clipboard an hour ago and need it again, it won't have been written over.

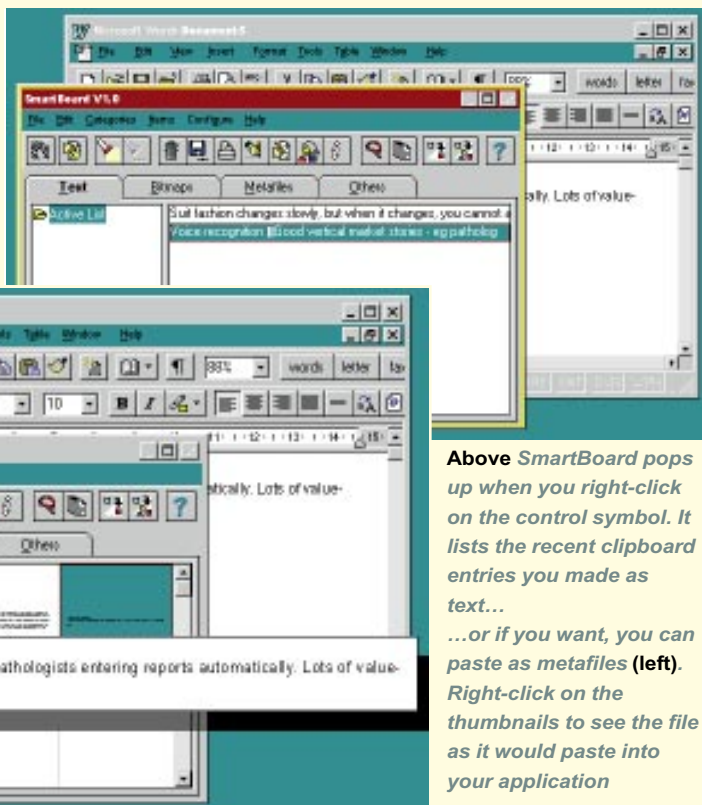
I get so many requests for solutions to problems that SmartBoard would solve. For example, it short-circuits the long debate about HTML generators because you can use it as a palette of codes and links to paste into an HTML document. It takes care of difficult names by allowing you to store half a dozen at once and then paste, using hotkeys.

### WordPerfect makes its sale

Congratulations Corel, you bought WordPerfect. And Novell made its 31st January deadline for selling its applications.

Buying WordPerfect must go down as one of the most spectacularly bad decisions in software history, being sold for a cool \$700m loss, but no-one could have predicted how Microsoft would clean Novell's clock (unless, that is, they took an objective look at the first Windows versions of WordPerfect).

Although the rebirth of WordPerfect is, initially, good news for users, I'm advising that you make plans immediately to dig an escape tunnel to Word Pro or Word, or even Works. I have nothing against Corel, which has been very successful, but I have little confidence that the necessary



*Above SmartBoard pops up when you right-click on the control symbol. It lists the recent clipboard entries you made as text...*

*...or if you want, you can paste as metafiles (left). Right-click on the thumbnails to see the file as it would paste into your application*



## Tim's Macro Club

● To celebrate the continuing existence of WordPerfect, there's a prize for a WordPerfect 5.1 macro from Peter Kahrel in the Netherlands.

It removes duplicate entries from a list, although in this case, the list must be sorted. Revisions, improvements and of course versions for other word processors are requested for this macro:

```
SAVSTATE
WP51CursorMovement(On!)
DISPLAY(Off!)
NOTFOUND(Off!)

SearchCaseSensitive(No!)
ReplaceLimitNumberOfMatches(No!)
ReplaceConfirm(No!)
CheckHrt()
WHILE(NOT Eof())
    SearchString(GetLine())
    ReplaceString("")
    ReplaceForward
    DISPLAY(On!) DISPLAY(Off!)
ENDWHILE

FUNCTION GetLine()
BlockOn(CharMode!)
PosLineDown
RETURN(?BlockedText)
ENDFUNC

FUNCTION Eof()
RETURN(?RightChar="" AND ?RightCode=0)
ENDFUNC

PROCEDURE CheckHrt()
PosDocVeryBottom
IF(?LeftCode<>-12284)
    EnterKey
ENDIF
PosDocTop
ENDPROC
```

● It's that invoice-counter macro again, with the latest version of the same-ol' thing coming over the wires from Bob Lauder at the University of Lancaster. I have shown it because I like its work-in-progress feel. Again, it writes the invoice number to a specialised .ini file which you create and call invoice.ini. Save it in

your Windows subdirectory. It should contain this (use Notepad to create it):

```
[InvoiceNumber]
NextNumber= 106
The macro
```

Bob explains: "In this macro, the value of the next invoice is NextInvoice\$ and this is inserted into the document by moving to a bookmark, InvoiceNumber. If you want more than one insertion of the number, just use other bookmarks and duplicate the two lines of text for each insertion."

```
EditGoTo .Destination =
"YourBookmarkName"
Insert NextInvoice$
```

● That's the sort of code I'm looking for. Use it as a starting point, because it is sound and compact. Remember, though, that some of your entries for the macro club are too long. I can't print them because they would take up most of the column. The one shown in Fig 1 doesn't.

### This month's problem

This is an easy one, so I'm looking for elegance and presentation.

Ken Gray emailed me with the following simple request:

*"I seem to recall there was a fairly elegant way of printing all installed FONTS in WFW6.0 along with the title of the font.*

*This could then be used as a reference sheet for selecting the font of choice. Please let me know if such a utility does exist, otherwise it could be the basis of a good macro."*

I only know that I can get a list of my printer fonts, but I'm sure you will all flood me with responses on this one.

**Fig 1 Bob Lauder's invoice-counter macro**

```
Sub MAIN

NextInvoice$ = GetPrivateProfileString("InvoiceNumber", "NextNumber",
"invoice.ini")

EditGoTo .Destination = "InvoiceNumber"
Insert NextInvoice$

SetPrivateProfileString "InvoiceNumber", "NextNumber",
Str$(Val(NextInvoice$) + 1), "invoice.ini"

End Sub
```



## Problem solving: When home and work collide

● Julian Wickes, of Northallerton, has a problem using his Word for Windows at home and WordPerfect at work — formatting often gets lost or messed up in the conversion process when he opens a file at home. Is there anything that can be done to improve the filter?

There is one step he can take, which is often overlooked because it's a minor feature of Word for Windows (and not one I knew existed until recently). Under Tools, Options in Word, click on the Compatibility tab. This lets you set a number of "problem" features so when you open the file at home it has more sensible formatting; features such as spacing at the top of a page and hanging indents.

Click on the other file format (WordPerfect is the only non-Microsoft format supported) and it sets these formatting options automatically although you can change them if you wish. There's a custom setting, too, for trial-and-error with your own conversions.

These settings don't affect the formatting when you convert back to the original format so it isn't a "destructive" filter. It just makes them display more sensibly on the page in Word. It's a bit of a kludge, but the few times I have used it, it works.

Note, as well, that the Font Substitution button here checks the document to see if Word has to cope with any non-system fonts and allows you to set the substitutions manually if you prefer.

On the same subject, Word 7 users can edit their conversion filters. In the Macros subdirectory of the Word Directory, find CONVER7.DOT. Then in the macro names list, click on a macro called EditConversionOptions, and click Run. Name the converter you want to change, and it offers you the options to set.

● Janet Gee is an Ami Pro user, but when I found the solution to her

problem it occurred to me this applies to any number of word processors — she can't get small capital letters using the "small caps" formatting option. Looking at her document, I couldn't work out why not until I realised that the words she wanted in small capitals were already typed in capital letters. To get small caps from formatting, you have to format words in lower case.

● We're covering all sorts this month, so Arthur Madsen gets his WordStar query fixed. He's a WordStar user who wants to use long filenames under Windows 95. Unfortunately, this isn't possible.

Firstly, because 2.0 pre-dates Windows 95, it is a 16-bit 3.1 application, and this does not support long filenames.

Secondly, WordStar's way of creating temporary files which change the main body of the filename are going to make a fix difficult to achieve. So it's a question of waiting for a 32-bit version — unless someone out there knows better.

● Finally, this month's grumble — it's WordPad again.

Martyn Bannister wants to use WordPad to add a hard page break in his documents.

No way, dude. It's another stupid omission from a second-rate attempt to make a cut-down word processor. Instead of a simple Ctrl-Enter as in the rest of the world, on the moon applet of Planet Microsoft you cannot do it.

Why not, is the question we really want answered, and the answer might possibly be that if Microsoft gave people too much functionality in WordPad, they might not buy Microsoft Office.



Setting the Compatibility Options in Word gets around some formatting and font substitution problems

development work will be carried out on WordPerfect Office.

This time last year it was probably the most powerful suite available. Now it isn't, and Corel's assertion that WordPerfect will be "profitable from day one" doesn't sound like it will break the bank by pouring in development resources.

Meanwhile, the LotusPhere annual technical conference revealed Lotus and IBM executives being bullish about the prospects for Word Pro, which according to my feedback is causing more than a

little glumness among you Ami Pro users. It is looking for 20 percent of the market in 1996. When number two is looking for one in five sales, you know what a mountain Novell has to climb.

### Breaking the spell

Despite my admiration for the Word spellchecker, not all of you are convinced.

● One reader contacted me to ask how to turn it off and this coincided happily with this quick message from my macro-writing friend, Chris McCarthy: "The automatic spellchecking in Word is very useful but it's a real pain to activate and deactivate. A simple solution is to set up two buttons or hotkeys attached to macros (Fig 2).

"If you don't have the status bar enabled to see if the spellchecker is on, you could put in a message box to tell you that the

macros have run."

● My regular correspondent, Shane Devenshire, points out a feature of Word that I had missed: deleting files from within the application.

We're all good Windows users, but having to iconise Word to delete a file would be one multitask too far. Instead, in Word 2 and 6 you use the File, Find dialogue, find your files, highlight them, hit the Commands button and select delete.

In Word 7, this has been greatly improved — nice one Microsoft. Instead, you use the Open or Save As dialogue boxes, mark the files you want to delete in the same way, hit delete and they're off to the recycle bin.

### Fig 2 Buttons/hotkeys

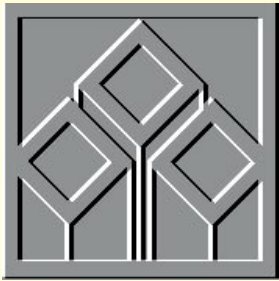
```
Sub MAIN
REM Word Macro to turn automatic spell checking on.
ToolsOptionsSpelling .AutomaticSpellChecking = 1
End Sub

Sub MAIN
REM Word Macro to turn automatic spell checking off.
ToolsOptionsSpelling .AutomaticSpellChecking = 0
End Sub
```

### PCW Contacts

Contact **Tim Phillips** by surface or airmail to PCW, otherwise email him at **wong@cix.compulink.co.uk** and **CompuServe 100436,3616**

**Oakley Data Services** 01270 759739.  
Web — [www.smartcode.com](http://www.smartcode.com)



# Is time money, or what?

**Stephen Wells gives tips on preparing billing facilities in Excel and creates a button box in Office 95.**

“I enjoy reading your articles and cut them out to keep,” emails Bernard Harrison (we hope he similarly saves other pieces in the magazine). “I’m a relative newcomer to Excel but I want to prepare my own billing facility, recording the time a task was started, finished, and the total time spent on a job. There would be a payment rate and the amount to bill the client. However, I can’t get Excel to multiply minutes by £s and give me a sensible answer.”

I’ve previously written about calculating time and formatting of all types but as I receive more questions relating to these two areas than any other subject, I’m confident that you won’t mind my answering Bernard’s question.

The first point to grasp is that Excel looks at what you enter into a cell, intelligently — it tries to figure out what you want. It does this by associating certain punctuation marks with certain formats. A slash (/) or a hyphen (-) makes Excel think of dates. Use a colon (:) and Excel thinks of hours, minutes and seconds.

If you enter a space after a number, then an “a” or a “p”, Excel not only assumes you mean AM or PM but that you want to display the 12-hour clock rather than the 24-hour clock which is its default.

Ctrl+; enters today’s date and Ctrl+: enters the current time. If Excel is confused by your entry it makes it text. To display hours greater than 24, or minutes or seconds greater than 60, place brackets around the left-most part of the time format code. For example, the time code [h]:mm:ss allows the display of hours greater than 24.

I emphasise the word

**Fig 1 Just a minute!**

	A	B	C	D	E	F	G
1	CLIENT	IN	OUT	HRS	MINS.	RATE	INVOICE
2	B Bloggs	9:30 am	11:45 am	2	15:00	£9.50	£21.38
3	J Jones	1:30 pm	3:55 pm	2	25:00	£9.50	£22.96

“display” because dates are not stored as they are shown. They are converted to a number, with the number 1 representing January 1st 1900 as the default in Windows and Lotus 1-2-3; and January 2, 1904 in Microsoft Excel for the Macintosh.

If you open a worksheet, created on a Mac, on a PC Excel recognises the file format and changes dates to the 1900 date system for you. Similarly, if you open a Microsoft Excel for Windows file on a Mac, Excel changes dates to the 1904 date system.

On either platform, you can optionally override the default and use the other system. The times of day (hours, minutes, seconds) are represented as decimal fractions. If we change our entry from 1 to 1.3 then that represents 7.12am on January 1st 1900. Similarly, noon on December 12th 1996 is stored as 35411.5.

If you subtract one date from another, Excel displays the difference as a number. A whole number means the number of days between the two dates. Subtracting a later

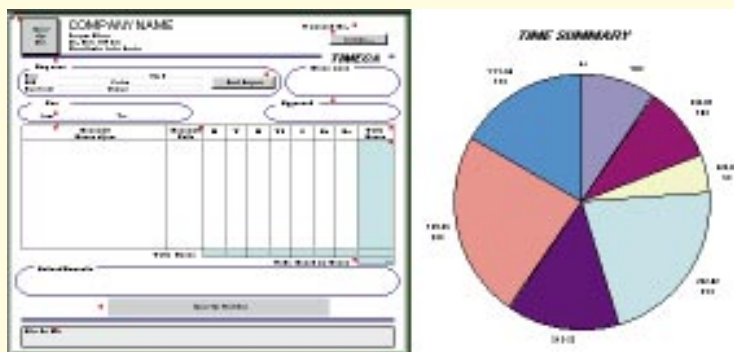
date results in a negative number: so, 30-Jun-96 minus 31-Dec-96 gives the answer -184. With another minus sign and a couple of parentheses in our formula, however, we could produce a positive answer.

Now we’ve covered the basics, we can return to Bernard’s question. There are many ways of producing what he wants but here’s one simple method (see Fig 1). The time his tasks start and finish will be in columns B and C respectively. The hourly rate charged will be entered in column F. Excel calculates the hours and minutes spent, divided between columns C and D. It totals the amount to be billed for the job in column G. The formulas are simple enough and are repeated down their columns.

```
D2=C2-B2
E2=D2-HOUR(D2)
G2=HOUR(D2)*F2+MINUTE(D2)*F2/60
```

The formatting is of critical importance. I’ve used one of the regular time formats for columns B and C, shown in the dialogue box options as 1:30 PM. Column D is the custom format h. Column E is the custom format mm:ss. Columns F and G are the standard currency format using the £ sign and two decimals.

The point to remember is



**Fig 2** An employee Time Card macro is included with Excel 7; it produces a pie chart summary of the week’s productivity

## How to make a button box

If you have the complete Office 95 suite, you can group shortcuts to all your current workbooks and commonly-used applications in a neat little box. The default position of the Microsoft Office Shortcut Bar is at the top of your screen. But drag it down onto the desktop a little and it will turn into a box.

This box can have several sliding doors which can open up with an animated movement and a satisfying little "whoosh" sound. At least, they look like doors to me. Bill Gates likes to say he's got bars on his Windows — I'd better stick to his terminology.

● **To add a bar** right-click the mouse on the background of the Office bar. Choose Customize, Toolbars, Add Toolbar.

Type a name for the new toolbar in the "Create a new blank Toolbar called..." box — in the example below, I've called it

Spreadsheets.

Go to View and select the colour of your choice, whether you want large or small buttons, or sound and animation. Click OK. (You might have to drag this dialogue box up a bit to find the OK button).

● **To add shortcut buttons** to your new toolbar you can choose Customize, Buttons, Add File and pick your documents from an Explorer-type list; or just drag existing shortcuts from the desktop; or press Alt and drag buttons from other toolbars in the Office Shortcut box.

● **To hide a button** on the toolbar, right-click and choose Hide Button.

● **To remove a button** choose Customize, Buttons, and then put a checkmark against the button to remove, and choose Delete.



that although only "2" is displayed here in D2 and D3, Excel is actually carrying a long number which has to be translated. That is why we have to use the HOUR and MINUTE functions in column E and column G.

If your company has a number of employees needing to divide their time between clients or jobs, there is another solution to this: check through the templates offered in your version of Excel. Excel 7 includes a Time Card template consisting of three worksheets.

The first sheet is a typical, fully-formatted, personal weekly time sheet. You just enter the account code and then, in the column for the appropriate day, the number of hours spent on the task (or working for a client).

The second sheet shows a pie chart for this employee with the account codes and total percentage of time spent during the week; on the task or against the client.

The third sheet is a "Customise your Time Card" option macro, where you can insert things like a company logo, and fixed details for the employee. The Time Card and part of the productivity graph page are shown in Fig. 2.

## Array, awry

Roy Small emails: "I have a sheet created in Excel 5 in which I chose the wrong axis for accumulating my data — it grew across the sheet instead of down. I am now using the Office 95 version and can find no way to transpose the columns to rows. The Excel function TRANSPOSE seems to have nothing to do with my requirement. Am I onto a loser or is there a way?"

The TRANSPOSE function can be used on a worksheet or in a macro and it works with arrays. What it does is return the first row of the array as the first column of the new array; the second row of the array as the second column of the new array; and so on.

It has its uses, but a better method is to mark your whole block, including all headings in the columns and rows. Right click your mouse and choose Copy. Go to a blank cell, or a new sheet in your workbook, where you would like to lay the range down again.

Right click on this cell which will become the top left cell of the new block. Choose Paste Special. Check the Transpose box. Click OK. Then your old rows will appear as columns and your old



## Infuriating hang-ups

Sometimes, a spreadsheet can be as stubborn as a mule. Here are some common hang-ups and the solutions in Excel 7.

- If you open a worksheet and the Status Bar reads "Filter Mode" and you want to get out of that, choose Data, Filter and check Show All.

- If some of your columns are missing and you can't get to them with the Scroll Bar, click to the left of a visible column heading and then right-click Unhide. If you can't move fast enough around a large worksheet, hold Shift while you slide either Scroll Bar with the mouse.

- If, for some inexplicable reason, your worksheet tabs aren't visible choose Data, Options, View and check Sheet Tabs. If you enter, say, 101 and the cell insists on displaying only 1 then you probably have two different settings fighting each other.

Under Tools, Options, Edit, the Fixed Decimal setting may be checked and 2 decimal places chosen. Under Format, Cells, the Number Category and zero decimal places may be selected.

- If all your worksheet is visible but the vertical Scroll Bar won't go above say, row 4 and the horizontal Scroll Bar won't go left of say column D, it means you've set the Freeze Panes control in cell D4. Just choose Window, Unfreeze Panes.

columns will become rows — Paul Daniels couldn't do it better.

### How does it RATE?

If there's one thing that drives people bonkers, it's finding that a function name has different meanings in different spreadsheets.

Take the RATE function, for instance. In Lotus 1-2-3 it has the following syntax: @RATE(FV,PV,Nper). In Excel it is RATE(nper,pmt,pv,fv,type,guess). Naturally, the formulas provide different answers.

The @RATE function in 1-2-3 calculates the compound growth rate for an initial investment that grows to a specific future value over a specified number of periods. The RATE function in Excel returns the interest rate for a period for an annuity based on equal periodic payments.

For non-financial types, let me define these terms. An "annuity" is any series of equal payments made at regular intervals of time. The time intervals are called "payment periods". Interest is compounded.

It always helps to use an example, so see Fig 3. Let's say that you invest £2,000. You are promised £8,000 back after 20

Payment	No. of periods	Present value	Future value	Growth rate
£100.00	20	£2,000.00	£8,000.00	7%

Fig 3 Using the @RATE function in Lotus 1-2-3 and the equivalent formula in Excel

years. Assuming that the interest rate is fixed in this instance and that the interest is compounded annually (rather than monthly or quarterly) what interest rate are you being paid?

The 1-2-3 @RATE function uses the future value (FV), or £8,000; the present value (PV), or £2,000; and the total number of periods in the annuity (Nper), or 20. Its @RATE function calculates that you would be earning seven percent (plus a few minor decimal points).

In both spreadsheets, I put the number of periods in column C, the present value in D, the future value in E and the answer in F. With an entry made on row 4, to arrive at the same answer in Excel when provided with the same bits of information, you would use the following formula:

```
= (E4/D4)^(1/C4) - 1
```

So what does Excel tell you with its RATE function? It works just like the IRATE function in 1-2-3. You might start with nothing and then save £100 a year for 20 years. The difference between the £2,000 you eventually put in and the £8,000 you might take out is the interest you've earned and left to compound.

Confusingly, your payment is entered as a negative if it's a savings account and positively if it's a loan payment. (Down at the bank they do it in reverse: loan payments are entered negatively and savings positively. It depends on who's paying out and who's receiving.)

The other elements in the Excel RATE function are "type" and "guess". Type is either 0 or 1 and the default is 0. What is considered here is whether the payment is at the end of the period (0), or at the beginning (1).

An ordinary annuity, sometimes called "payments in arrears", involves payments made at the end of each payment period. Most loans fall into this category. You take out a loan and receive the money now but

don't start paying on it until the end of the first period; typically, a month.

An example of deposits made at the beginning of a period are life assurance premiums, which are called "annuity-due situations". Here, you're making payments in anticipation of services to be received during the coming period.

Excel starts the "guess" at ten percent. You can change that, but ten percent is the default. Then Excel starts an iteration cycle until the actual interest rate is discovered.

Where it sometimes falls down is that if it can't arrive at an answer that works out within 0.0000001 after 20 tries at it (iterations), it unhelpfully throws up a #NUM! error value.

### Not a lottery

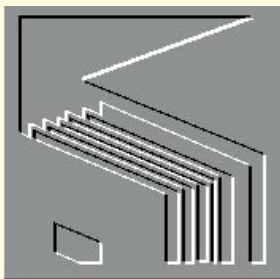
I've received my first lottery solution Excel template on disk from Belgium. Not that I could run it, because when I tried to open it, all I got was an error message that said: "VBA Dutch object library not found." Grateful as I am to any reader who takes the trouble to send me examples of their work, I want to nip further contributions of this application in the bud.

The lottery result is produced at random. No spreadsheet program is going to come up with the answer nor "better your chances" as they always put it — obviously if anyone ever cracked a solution, they'd keep it to themselves.

As to the lottery itself; let's hear no more in this column about this new tax on the poor.

## PCW Contacts

Stephen Wells welcomes comments on spreadsheets and solutions to be shared. Send them to PCW Editorial at the usual address or [Stephen\\_Wells@msn.com](mailto:Stephen_Wells@msn.com). Files can be attached if you are on MSN.



# Can you see the join?

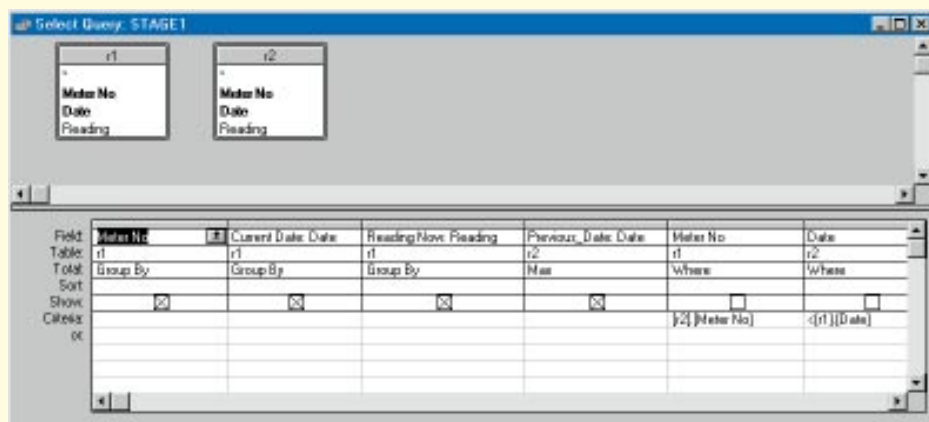
**Mark Whitehorn** has been inundated with answers to a meter reading problem.

The question I posed in the March issue has opened up a huge oyster-full of pearls. To save you having to look it up, it consisted of a table of readings from electricity meters (Table 1). The problem was to generate an answer table consisting of records showing each meter reading, together with the previous reading (if available) from the same meter, and to calculate information such as *units used*. The answer is shown in Table 2.

I concluded by stating that my colleague, Stephen, and I had “cheated” with the solution we presented in March (it works perfectly, but offends the relational model) and we both felt it was inelegant.

Last month I documented the “cheat”, and now we’ll look at the solution. This problem has produced the greatest number of responses I have ever received and

Meter No.	Date	Reading
1	18/05/91	20
1	11/11/91	91
1	12/04/92	175
1	21/05/92	214
1	01/07/92	230
1	21/11/92	270
1	12/12/92	290
1	01/04/93	324
2	18/05/91	619
2	17/09/91	712
2	15/03/92	814
2	21/05/92	913
2	17/09/92	1023
3	19/05/91	20612
3	11/11/91	21112
3	15/03/92	21143
3	21/05/92	21223
3	17/09/92	21456
3	21/03/93	22343



**Fig 1** The Access query builder for Eve Rocks’ first query. Note that the self-join is essentially treating a single table as if it were present twice, and joins it to itself. Eve has used two aliases, one for each occurrence of the table. In the text I have just aliased the second table, but either approach is perfectly acceptable

they are still rolling in.

The responses fell into three main categories:

- Interesting, but ultimately incorrect; or correct in that they functioned but they offended the relational model in some way, just like the solution in the March issue.
- Correct; they solved the problem without

Meter No.	Date	Current Reading	Previous Reading	Units Used
1	11/11/91	91	20	71
1	12/04/92	175	91	84
1	21/05/92	214	175	39
1	01/07/92	230	214	16
1	21/11/92	270	230	40
1	12/12/92	290	270	20
1	01/04/93	324	290	34
2	17/09/91	712	619	93
2	15/03/92	814	712	102
2	21/05/92	913	814	99
2	17/09/92	1023	913	110
3	11/11/91	21112	20612	500
3	15/03/92	21143	21112	31
3	21/05/92	21223	21143	80
3	17/09/92	21456	21223	233
3	21/03/93	22343	21456	887

offending the model.

- Pleas that the sender didn’t understand the problem because he/she didn’t speak SQL and wanted to know more.

In order to try and satisfy everyone (democracy at its best!) I’ll publish some of the solutions, and devote part of this and future columns to a look at the basics of SQL for the benefit of those who want to know more.

Incidentally, several people suggested that Stephen and I actually *knew* what the answer was and had simply set the question as an academic exercise! This wasn’t the case. Although we eventually did come up with our own elegant solution, we hadn’t

**Fig 2 The select command**

```
SELECT Readings.[Meter No], Readings2.date
FROM Readings, Readings AS Readings2
```

**Fig 3 Using the WHERE clause**

```
SELECT Readings.[Meter No], Readings2.date
FROM Readings, Readings AS Readings2
WHERE
Readings.[Meter No] = Readings2.[Meter No]
AND Readings.[Date] < Readings2.[Date]
```

solved the problem at the time of writing, for publication in the March issue.

**The solutions**

SQL is not as standard as many people would like, particularly with regard to the style in which statements are formatted and capitalised. In presenting these solutions I have tried, as far as possible, to leave the SQL in the exact form in which it was sent to me. However, minor modifications have occasionally been necessary in order to make the SQL work with the original table I supplied.

The basis of all the working solutions is a self-join. This is a join in which records from a table are combined with other records from the same table, when there are matching values in the joined fields. The matching values don't have to match

exactly, in the sense of  $A = B$ ; they can match on an expression like  $A > B$ .

The easiest way of picturing a self-join is to imagine that you can duplicate the table and then join it to itself, just as you would if they were actually different tables (*Fig 1, page 276*). In SQL, the syntax for creating a self-join is simple: you just name the table twice in the FROM clause, giving it an alias for the second version of the table (or indeed, an alias for both occurrences); thus, the select command in *Fig 2* is using Readings2 as an alias for the duplicate of the table called Readings. The join conditions can then be described using the WHERE clause as normal (*Fig 3*).

This self-join matches records where the meter numbers are the same and where the date of the second reading is earlier than that of the first.

The solution in *Fig 4* (page 278), sent in by Eve Rocks, uses exactly this type of join, although it is more detailed and uses a GROUP BY clause to group the records. From the original data, this yields the result shown in *Table 3* (page 278).

This output table is named STAGE1 in Eve's solution. It has done most of the work in that it has produced records which

**Tips & Tricks: When is FoxPro like File Manager?**

This bit of FoxPro code comes from Matthew Cook-McQueen: "I wanted my FoxPro for Windows applications to operate like File Manager: you run it once and then when you double-click on the icon, the original instance is merely maximised. So I developed the code, below. It works for FPW and VFP, and maybe for the Mac if that supports DDE (but not for the DOS version):

```
*----- (This goes at the start of the main program in your app)
=ddesetoption("SAFETY",.F.)
ch = ddeinitiate("MyApp","SYSTEM")
IF CH != -1
  =DDETERMINE(CH)
  QUIT
ENDIF
DO DDE_SETUP

PROCEDURE DDE_SETUP
  =DDESETSERVICE("MyApp","DEFINE")
  =DDESETTOPIC("MyApp","SYSTEM","DETECTED")
  RETURN

*----- (This bit can go in your procedure file if you have one)
FUNCTION DETECTED
PARAMETERS A,B,C,D,E,F
  ZOOM WINDOW SCREEN MAX
  RETURN .T.
```

"The theory is that your application is set up as a DDE server. When you run your application, the first thing it does is to see if it can connect to this server. If it can, the function DETECTED is run and the original application is maximised. Control is then returned to the second instance of the application, which quits itself. If the application cannot connect to the server, it 'knows' that it is not already running, so it sets up the server."



**Fig 4 Eve Rocks' solution**

```

STAGE1:
SELECT DISTINCTROW r1.[Meter No], r1.date AS current_date, r1.reading AS reading_now, Max(r2.date) AS previous_date
  FROM readings AS r1, readings AS r2
 WHERE r1.[Meter No] = r2.[Meter No] AND r2.date<r1.date
 GROUP BY r1.[Meter No], r1.date, r1.reading;

```

**Table 3 Data resulting from Eve Rocks' solution**

Meter No.	Current Date	Reading Now	Previous Date
1	11/11/91	91	18/05/91
1	12/04/92	175	11/11/91
1	21/05/92	214	12/04/92
1	01/07/92	230	21/05/92
1	21/11/92	270	01/07/92
1	12/12/92	290	21/11/92
1	01/04/93	324	12/12/92
2	17/09/91	712	18/05/91
2	15/03/92	814	17/09/91
2	21/05/92	913	15/03/92
2	17/09/92	1023	21/05/92
3	11/11/91	21112	19/05/91
3	15/03/92	21143	11/11/91
3	21/05/92	21223	15/03/92
3	17/09/92	21456	21/05/92
3	21/03/93	22343	17/09/92

contain information from two records in the original table. Not only that, it has managed to find the correct records to join together. Note that there are 16 records in this table and 19 in the original; this is because three records (the first one

we want.

This yields the correct answer table (apart from minor differences, such as the field names) as shown at the start of the column in Table 2.

Many people sent in solutions like this

for each meter) do not have a preceding reading.

You may be wondering why Eve hasn't simply pulled the rest of the data we need (such as the Previous reading) into the table at the same time. The answer is that using a GROUP BY clause restricts the fields that you can actually display in the answer table.

However, the bulk of the work is done and the SQL statement (Fig 5) joins this table back to the original one (Readings) and pulls in the missing information that

which used two SQL statements: some were similar to Eve's; others used different means to achieve the same ends. Nothing in the relational model excludes the use of multiple SQL statements; indeed, using two consecutive statements like this makes the solution easier to understand.

### Single file

However, complete solutions can be generated as a single SQL statement, as in this one from Peter Davidson (Fig 6).

As he says: "The use of a self-join in this way is very common. It is perhaps surprising how often data is related to itself in one way or another. The result of a self-join is the Cartesian product of the table with itself and, as with any type of join, it is necessary to restrict the rows only to those that make sense. In my statement, that is achieved in the first part of the WHERE clause which projects only those rows where both meter numbers are the same.

"The second part of the WHERE clause selects only those rows that have a current reading date which is greater than the previous reading date. This is not entirely necessary but it has a use, especially for tables with lots of rows. The advantage is that it cuts down the number of rows presented to the final, processor-intensive part of the WHERE clause."

**Fig 5 SQL statement**

```

STAGE2:
SELECT DISTINCTROW readings.meter, stage1.current_date,
readings.date AS previous_date, stage1.reading_now,
readings.reading AS old_reading,
stage1.reading_now - readings.reading AS units_used
FROM readings INNER JOIN stage1
ON readings.meter = stage1.meter
AND readings.date = stage1.previous_date;

```

**Fig 6 Peter Davidson's solution**

```

SELECT DISTINCTROW Readings.[Meter No], Readings.Date,
Readings.Reading AS [Current Reading],
Readings_1.Reading AS [Previous Reading],
[Readings].[Reading]-[Readings_1].[Reading] AS [Units Used]
FROM Readings, Readings AS Readings_1
WHERE ((Readings.[Meter No]=[Readings_1].[Meter No])
AND (Readings.Reading>[Readings_1].[Reading])
AND (((SELECT count(*) from Readings AS i
WHERE i.[Meter No] = Readings_1.[Meter No]
AND i.[Date] > Readings_1.[Date])-(SELECT count(*) from Readings AS j
WHERE j.[Meter No] = Readings.[Meter No]
AND j.[Date] > Readings.[Date]))=1))
ORDER BY Readings.[Meter No], Readings.Date;

```

### From the Oracle

Peter wasn't the only one to send in a complete solution as one SQL statement, and not all worked in the same way. Fig 7 is in Oracle (ANSII) SQL, which isn't too surprising because it comes from Tony Willis-Culpitt, principal consultant with the Oracle Corporation. Tony provided a detailed description of the working of the statement, which included the following information:

"The function around the date just turns it into a more readable format. The column alias' (in double quotes) just give nice headings to the SQL\*Plus columns.

"In order to add the previous readings to each of the records returned, construct a second set on the same table where, for each of the meter numbers, the read\_date is the next below the one in the current record. Unfortunately, this has to be done as a correlated sub-query but careful indexing should mean that it is still fairly efficient.



**Fig 7 Tony Willis- Culpitt's statement**

```

select  r1.meter_no "Meter No",
        to_char(r1.read_date,'dd-Mon-yyyy') "Reading Date",
        r1.reading "Reading",
        r2.reading "Last Reading",
        r1.reading - r2.reading "Units Used",
        to_char(r2.read_date,'dd-Mon-yyyy') "Last Read"
from    meter_readings r1,
        meter_readings r2
where   r1.meter_no = r2.meter_no
and    r2.read_date = ( select max(r4.read_date)
                       from    meter_readings r4
                       where   r4.meter_no = r1.meter_no
                       and    r4.read_date < r1.read_date)

UNION
select  r5.meter_no,
        min(to_char(r5.read_date,'dd-Mon-yyyy')),
        min(r5.reading),
        0,
        0,
        null
from    meter_readings r5
group by r5.meter_no
order by 1, 2 ;

```

*"The change to the order by clause is because the column names cannot be used explicitly in a union query. 1 and 2 are the relative positions of the sort columns in the select list. The 'min' function on the 'r5.reading' column does not actually do anything positive; it is just there to satisfy the rule that any returned column not in the 'group by' clause must have a group operator applied to it."*

### And thanks to...

It seems grossly unfair to single out only the few who have been mentioned so far. The respondents below each deserve a mention; either for correct answers, or for just plain interesting ones. My solution and the best of the rest are in the magazine directory on this month's free, PCW CD-ROM.

Malcolm Bacchus	Alasdair Macdonald
Paul Bloomfield	Alan Mackechnie
Jose Femenias	Charles Mawdsley
Adrian Fowle	John Meads
David Gould	Brian Riley
Dave Johnson	Geoffrey Snook
Andrew Kaye	

### The speed angle

You may remember that this question first appeared, in the March issue, with reference to speed. The problem *can* be solved with sequential programming in Access Basic, but Stephen and I were keen to find an SQL answer for reasons of speed as well as elegance.

A code solution that we produced for

testing purposes is horribly slow, taking several seconds to produce an answer for a single meter. The SQL answers are essentially instantaneous, producing answers in well under a second. So, that answer is clear — use SQL whenever possible.

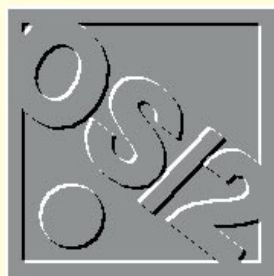
### The quest continues

I am now interested to know whether there is a difference between the single and multiple SQL solutions. I know that the answer is going to depend on the optimiser which Access uses, and that any differences I detect may well reflect differences other than the number of SQL statements. But I'm still going to construct a mega-table of meter readings and do some more speed tests.

Finally, in case this sounds like a diatribe against using an RDBMS's internal programming language (in this case, Access Basic) I am quite happy to use the language to generate the large block of data I need for testing. SQL is not a full programming language; it is a subset of one. It is excellent (and very fast) for querying databases, but useless for other things. Once again, it's a case of horses for courses. ■

### PCW Contacts

**Mark Whitehorn** welcomes readers' correspondence and ideas for the Databases column. He's on [m.whitehorn@dundee.ac.uk](mailto:m.whitehorn@dundee.ac.uk)



# On the line to OS/2

**If you want to know more about all things OS/2, there's just one place to go — online. Terence Green helps you get switched on.**

CompuServe is an excellent source of OS/2 information and official IBM support in the OS2SUPPORT forum. From the emails I've received since starting this column six months ago, it's easy to generalise about the audience as it ranges from home users to corporate programmers. You worry about hardware and applications; and you want more information on OS/2 and related subjects.

This column attempts to keep you up to date on the first two requests, but the only viable answer to the last requirement is to point you towards the wealth of online OS/2 resources. It really doesn't matter which operating system you're using these days — the latest information, the updates that you need to fix bugs in the operating system, and the most recent device drivers, are almost always found online first.

### Get up to Warp speed

If you really don't want to start exploring the online world, send electronic mail to that effect and I'll occasionally note a few other information sources. But the best solution is to get connected with Warp, the first PC operating system to include Internet Access software.

While the Internet, and the World Wide Web especially, are particularly good sources of information, they do require some form of Internet access via a company LAN or dial-up modem to an Internet Service Provider. You also need a bit more expertise to set up an Internet connection, and the information is far more widely-dispersed than on a highly-organised online service such as CompuServe.

If you don't have Internet access or a subscription to an online service but do have a modem, you can use the HyperTerminal utility in the Warp Bonus Pack to access the IBM BBS which is free (apart from your telephone charges) and

relatively up to date.

CompuServe is currently the best organised source of OS/2 information that I'm aware of, and the Warp Bonus Pack includes OS/2 CompuServe Information

Manager which will get you started. CompuServe has been reducing its charges steadily over the last few months in order to remain competitive as the availability of online services expands. The most recent

### A small selection of OS/2 sources

#### BBS

**IBM BBS** 01256 336 655  
— Mainly drivers and updates.

#### Internet sites

**Hobbes** ftp.hobbes.nmsu.edu  
— Everything OS/2 from official and unofficial IBM fixes to shareware.

**Walnut Creek** www.cdrom.com  
— Similar to Hobbes.

**LEO** www.leo.org  
— Link Everything Online: OS/2 drivers and updates via FTP or WWW.

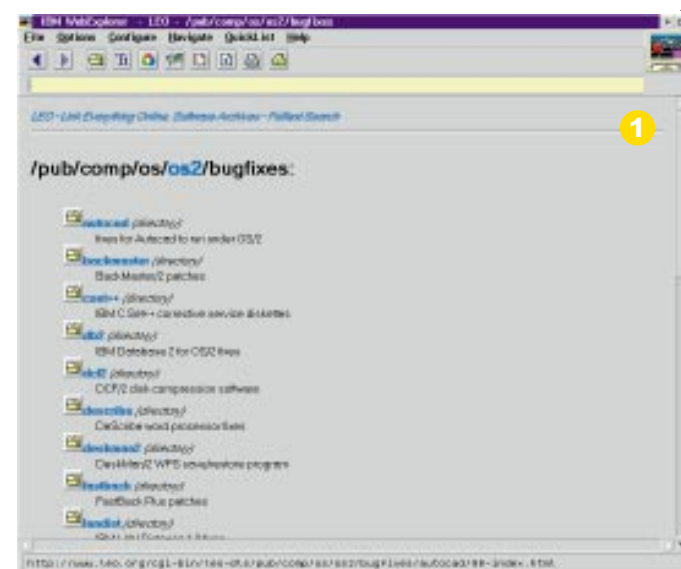
#### AOL

**OS2 OS/2 Forum**  
— CompuServe forums.

**OS2SHARE** OS/2 Shareware library.

**OS2SUPPORT** OS/2 support and updates.

**OS2USER** OS/2 discussion and software.



(1) LEO, the German source of drivers, updates and applications bugfixes for OS/2  
(2) AOL in action showing the OS/2 support forum but having to use Windows software  
(3) CompuServe is an excellent source of OS/2 information and official IBM support in the OS2SUPPORT forum

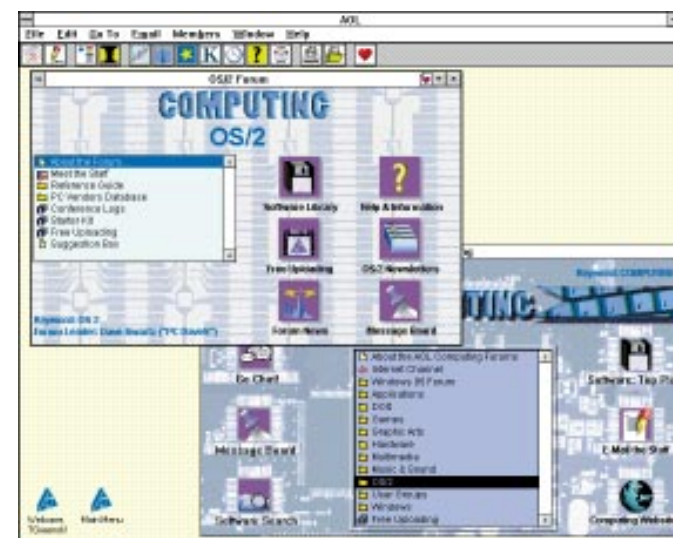
cut coincided with the launch of AOL in the UK. CompuServe's leading competitor in the USA, America Online, where they are neck and neck with over three million subscribers each, uses the AOL acronym as it expands into the world outside the US.

AOL, in common with CompuServe, offers Internet access in tandem with regular conferencing services and, like CompuServe, devotes most of its access software development to Windows. So if you're an OS/2 user and would rather use OS/2 software, the question is whether it is easier, more convenient, or even less expensive to stay with a

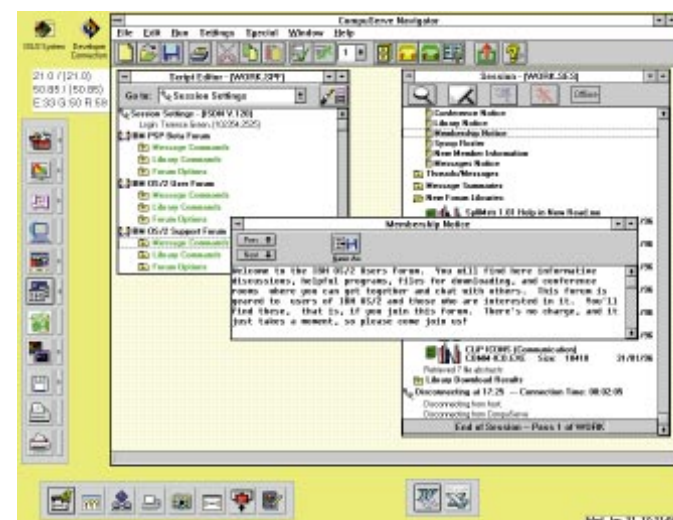
*'While the internet — and especially the World Wide Web — are particularly good sources of information, they do require some form of internet access via a company LAN or dial-up modem to an internet service provider'*

service such as CompuServe or AOL. Might it be better to move over to the Internet entirely? There you can use OS/2 TCP/IP applications, which are plentiful, and increasingly you can find all the support and downloadable software you need.

2



3

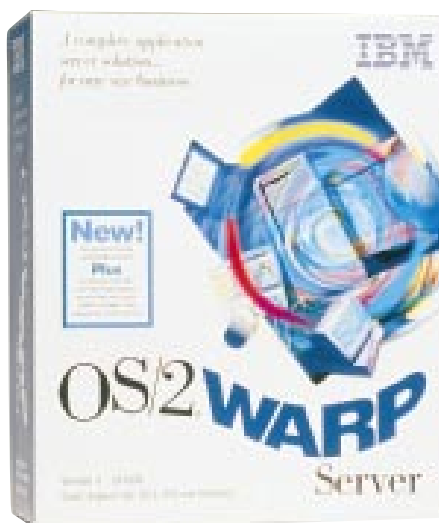


## Fools rush in to FixPacks

In a prior column, I warned against the dangers of picking up OS/2 FixPacks from unauthorised sources. Now I have to warn against picking up authorised FixPacks too soon. The follow-on to FixPack 10 was FixPack 16, which was rushed out before last Christmas. Shortly thereafter it was withdrawn due to "problems". In short, unless you're keen to experiment, don't rush into FixPacks until others have tested them for you. The online OS/2 community sussed this out rapidly, it was quickly withdrawn from service, and FixPack 17 was released at the end of January to replace the ill-fated #16.

Much interest was generated by FixPack #16 because it contained a fix for the Single Input Queue. The SIQ issue means that a program which fails while in the foreground awaiting input can freeze out any other process requiring user input, effectively putting you on the road to the big red switch because you can't get to the task list to shut down the offending program. Windows NT specifically avoids this problem by having multiple asynchronous input queues.

A partial workaround via the Ctrl-Esc handler was introduced with Warp and a more effective fix has now been included in FixPack #17.



The SIQ fix involves an increased queue-size and closer monitoring of applications to determine whether they have hung. When an application doesn't respond to either a mouse click or being selected from the Task List, it is marked accordingly and the system focus is switched to the next running application.

This will enable you to regain control of the system and allow you to kill the offending application if necessary. You may decide to leave the hung program hanging around in case there's a chance it will come to life. If you do, OS/2 will continue to monitor it to see if it begins accepting input again.

(the blue-box version with Windows application support included). Red-box Warp shipped before Full Pack, so it will also need the following fixes in order to recognise ATAPI IDE and NCR SCSI CD-ROM drives.

OS/2 drivers for the NCR are available, complete with instructions as to how to install them on the OS/2 setup diskettes. I've been using older NCR OS/2 drivers, but recently discovered an updated set on LEO ([www.leo.org](http://www.leo.org)), a German site which has a particularly good selection of OS/2-related drivers. Look for NCR810.ZIP in the `pub/comp/os/os2` directory tree.

IDE drivers can be found in the file ATAPI.ZIP, which is widely available on bulletin boards, CompuServe and the internet. This is the second ATAPI.ZIP package (67,776 bytes; file date 13/2/95) and should be used in preference to the first update because it includes support for a number of early IDE CD-ROM drives which don't fully conform to the ATAPI specification.

Read the instructions carefully as you may need to edit the `BASEDEV=IBM1S506.ADD` line in `config.sys` manually, and be sure to check that the `BASEDEV=IBMIDECD.FLT` appears in your `config.sys`.

### ● See all drives in a CD-ROM Changer

If you have a SCSI CD-ROM Changer and Warp only sees the first disc, edit `config.sys` and add the `/ET` parameter to the SCSI device driver (`*.ADD`) which relates to your particular SCSI card, usually an Adpattec or Future Domain.

### ● Discovering a faulty driver

While updating your system drivers can resolve issues, it sometimes goes wrong and you can end up with a system which fails to boot. There a number of recovery options available, some of which have been discussed in earlier columns, but before rushing in, check which driver has failed by rebooting and pressing Alt-F2 when the white square appears in the top left-hand corner of the display. OS/2 will display the name of each driver as it loads. With a bit of luck, you may be able to spot the offending driver as the last to load before it all goes pear-shaped. ■

Until the end of 1995 I paid for all my online access via CIX, Demon Internet Services and CompuServe. I've since received sponsored CompuServe and AOL subscriptions which leaves me with nothing but a huge telephone bill to contemplate. Accordingly, in future columns I plan to compare and contrast these four services and their offerings for the connected OS/2 user, both in terms of access software and for the quality and availability of OS/2 information and support services.

### OS/2 for the PowerPC

OS/2 for the PowerPC slipped out at the end of December 1995, fulfilling the latest in a long line of revised projections. It isn't available to the general public as such, but people who know they need it and can make a case for being supplied, and who know whom to contact within IBM, might be able to pick up a copy.

OS/2 PPC is the microkernel version of

OS/2 Warp Connect, except that it contains a poor shadow of the network support in the Intel-based Warp Connect. The current iteration is mainly of interest to developers who would like to prepare for the day when PowerPC computers come of age, but that probably won't happen in 1996.

Development of OS/2 PPC has been put on the back-burner in order to focus on Intel-based Warp, which IBM will promote as the main competitor to Microsoft Windows 95 and Windows NT in "the connected enterprise".

### Common hardware issues

#### ● CD-ROM drive not recognised

As of Warp Full Pack which shipped this time last year, OS/2 support for SCSI and sound-card attached CD-ROM drives is quite comprehensive, but support for the NCR-embedded SCSI interface found on many motherboards is not included and there's only partial support for IDE-attached ATAPI CD-ROM drives in Warp Full Pack

## PCW Contacts

**Terence Green** can be contacted either by post *c/o PCW* or by email to [tgreen@cix.compulink.co.uk](mailto:tgreen@cix.compulink.co.uk)  
Updates and fixes other than FixPacks are to be found on CompuServe (OS2SUPPO)



## Spring into action

**Mike Mudge presents a spring-time miscellany — hailstones, factorials and points on a graph.**

### HAILSTONES (PCW January 1992) / WONDROUS NUMBERS (PCW December 1995)

#### ... an alternative approach

Nigel Hodges of Cheltenham has studied the above problems extensively and has reduced the special case “ $3n + 1$ ” to the following:

**Problem NH.** Are there any powers of 2, other than  $2^{**3}$ , which satisfy  $6^{**n}$  less than  $2^{**n}$  less than  $6^{**n} + 3^{**n}$ ? More generally, Nigel asks if, given real  $a$  &  $b$  greater than 1 (integers if readers prefer) how many solutions can be found which satisfy  $a^{**n}$  less than  $b^{**n}$  less than  $a^{**n} + d$  where  $d$  can either be a constant value or can increase with  $n$ . (But must be smaller than  $a^{**n}$ .) In particular, are the solution sets finite or infinite?

\*\* Anyone finding a second solution has cracked the “ $3n+1$ ” problem, details of the link from Nigel via M.M., and is assured of instant fame!

### Some Diophantine Equations involving the Factorial Function

Recall that given any positive integer  $n$ , the factorial of  $n$  is defined by  $n! = 1 \times 2 \times 3 \times \dots \times n$ , while  $0! = 1$  for convenience, further Diophantine Equations are those for which solutions are sought in integers only. The following problems supplement those of PCW July 1989 where it was explained that ERDÖS had examined the equation  $n! = 2^a \pm 2^b$  finding solutions for  $n = 1, 2, 3, 4$  & 5 only.

Now, as early as 1937 Erdős and Oblath considered the equations

$$n! = x^p \pm y^p$$

and also

$$n! + m! = x^p$$

for positive integers  $m, n, p, x$  &  $y$ . Their listing appears to consist of (the publication is in German!)

$$2! + 2! = 2^2, 3! + 2! = 2^3, 3! - 2! = 2^2, 5! + 4! = 12^2 \text{ also } 2! = 1^p + 1^p \text{ and } 12^2 + 24^2.$$

**Problem EO.** Investigate the above equations, together with the associated prob-

lem when the two powers in the first equation may not be equal. Obtain empirical data to test my interpretation of “Uber diophantische Gleichungen der Form etc.” (usw.) and, if possible, make some theoretical analysis of the results.

### A Spring Challenge

**Problem MM.** In general  $y = f(x)$  can be represented by a graph on which there may be points with integer, rational (fractional) or irrational co-ordinates, e.g.  $y = 3x + 1$  is represented by a straight line, here (1,4) is an integer point,  $(1/3, 2)$  is partly integer and partly fractional while  $(3^{1/2}, 3^{3/2} + 1)$  is irrational.

Consider the function

$$y^2 = x(x^2 + p)$$

where  $p$  is a PRIME NUMBER. For a given  $p$  determine fractional points on this curve i.e. points with fractional co-ordinates, e.g.  $p=5$  leads to  $x = 1/4$ ,  $y = 9/8$  while  $p = 13$  leads to  $x = 9/4$  and  $y = 51/8$ . Determine a general method for the construction of such points, illustrate graphically. (Consider the result of changing the powers/sign present in the equation above.)

### FEEDBACK

#### Perfect Digital Invariants (PDI's)

These are integers which are equal to the sum of the  $n^{\text{th}}$  powers of their individual digits in a given basis. Following upon the Steinhaus Problem, PCW January 1996, Henry Ibstedt has sent a quotation from Madachy's book *Mathematical Recreations* (Dover, 1979) page 164: “It is a marvel that a tenth-order PDI should have been discovered: 4,679,307,774... There must be many other such digital invariants of higher order, but the numbers get larger and more difficult to work with. Recently the work has been extended to the seventeenth order.”

Henry also refers to an article in the *Journal of Recreational Mathematics* (latest issue) “Variants on Perfect Digital Invariants” but presents his own result — a 21-digit PDI or order 21 128...252.. asking

is this the present record?

#### ● Mersenne Primes

These are primes of the form  $2^n - 1$ . Eric Adler has been beta-testing the new version of Maple (Maple 4 The Power Edition) and has found the 31st and 32nd Mersenne Primes in less than twenty minutes on his 16Mb 100MHz Pentium. These are

$$2^{216091} - 1 \text{ and}$$

$$2^{2756839} - 1 \text{ (227832 digits).}$$

He followed these with

$$M_{33} = 2^{859433} - 1$$

having 258716 decimal digits. This exercise is indicative of the evolution of the Personal Computer, as the final calculation was carried out on a supercomputer — the Cray at Harwell in about January 1994, I believe.

#### ● Some other large primes

**Factorial Primes:**  $3610! - 1$  and  $30507! - 1$  having 11277 & 10912 digits respectively; C. Caldwell 1992/3.

**Primorial Primes:** Define  $n^*$  as the product of all primes less than or equal to  $n$ , then we have  $24029^* + 1$  and  $23801^* + 1$  with 10387 and 10273 decimal digits respectively; C. Caldwell 1993. These are the largest primes of each type published... Unless any reader knows better?

Any investigations of the above problems may be set to Mike Mudge, 22 Gors Fach, Pwll-Trap, St. Clears, Carmarthen, Dyfed SA33 4AQ, tel 01994 231121, to arrive by 1st August 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.

### Smarandache slip-up

The Enigma of Smarandache continues: is it worthwhile? Response to Numbers Count -150- October 1996 did not warrant the award of a prize. First International Conference on Smarandache Type Notions in Number Theory, August 21-24 1997. Information from C Dumitrescu, Mathematics Department, University of Craiova, Romania. Tel (40) 51-125302; Fax (40) 51-413728 (for Dumitrescu); email Research37@aol.com

### 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.



# Slot in some sound

In the first of our new series, Roger Gann gives you a step by step guide to fitting a sound card.

To kick off with, I'm going to show you how to fit a sound card and then go on to examine the thorny problem of resolving hardware clashes — a common problem with sound cards but equally applicable to other peripherals, too.

## Step-by-Step

### How to install a sound card

Just like fitting almost any kind of expansion card or peripheral to your PC, fitting a sound card consists of two distinct phases: fitting the card into the PC and then configuring it and its software.

Although Plug and Play (or PnP) promises an end to configuration nightmares, it has yet to deliver these promises. So far, Plug and Play sound cards have been slow to appear but Creative Labs has released Plug and Play versions of its SoundBlaster 32 and AWE 32 cards. Orchid has done similarly.

**PCW Step by step** Photography by Graham Pearson

Nevertheless, the vast majority of sound cards remain a jumper-fest.

In this step by step guide, I'll assume that you'll be installing an old-style, non-PnP sound card — yes, we're going to do it the hard way!

### Hardware Installation

#### Step 1

- *We don't want to lose you* — so take the usual safety precautions of unplugging your PC from the mains. It's not strictly necessary to disconnect peripherals, like printers or monitors, but it makes it easier if you want to move the system unit about.
- If you've never before removed your PC's lid, make a note of which cable goes where. Be sure to discharge any static you may be carrying; earth yourself by touching a metal pipe, or a tap, say. Static electricity is fatal for chips so try to minimise your handling of the card.

### What our new section has in store for you

Welcome to Hands On Hardware; a new, regular, slot which will deal with all matters relating to PC hardware. Over the next few months, Roger Gann will be showing you how to go about upgrading your PC hardware, step by step: from hard disks, to CD-ROMs; from motherboard upgrades, to fitting a SCSI card. Each month, Hardware will be split into two sections: one will show you an upgrade project, the other will look at a related hardware topic.

#### Step 2

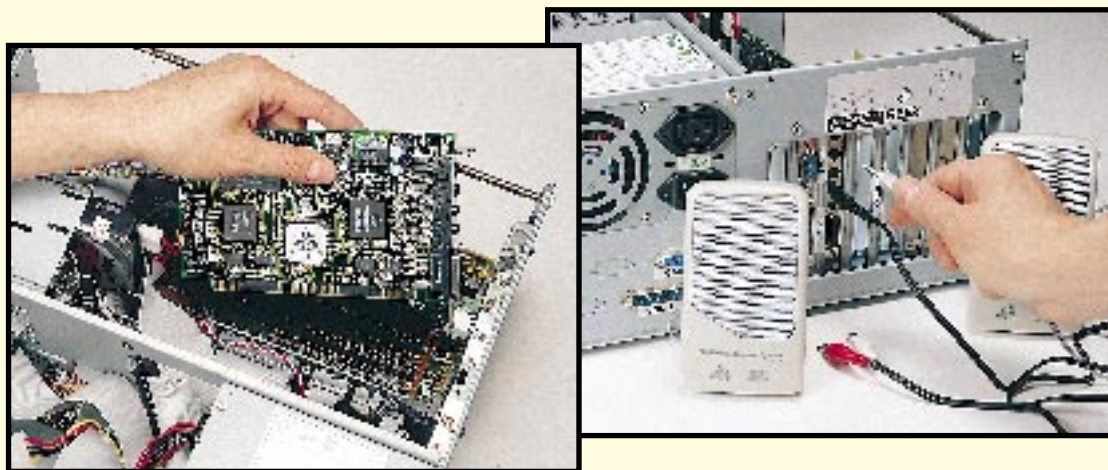
- Remove the cover from your PC — it's probably secured by four self-tapping Phillips screws at the rear.
- You can now see the innards of your PC: at the bottom of the system unit is the motherboard, which will have as many as eight expansion slots along its rear edge.
- Unless you have got a highly-integrated motherboard, several of these slots will already be filled by cards such as your graphics accelerator.

It might be wise at this point to determine exactly what hardware resources (IRQs, DMA channels and I/O ports) are free, so as to avoid a hardware clash.

For the time being, however, let's

Left Slotting a sound card into the expansion slot

Right Plugging in the bits: speakers, line connections and so on



assume that the default settings of the card are OK and that no jumpers need setting.

### Step 3

- Choose a slot — you can find four types of expansion slot in a PC: 8-bit ISA, 16-bit ISA, 32-bit VL-Bus and 32-bit PCI. I've not come across any sound cards that fit the latter two slots; the vast majority of sound cards are 16-bit ISA designs, although some cheap sound cards are 8-bit.
- Pick an appropriate expansion slot for your card: if you do have a 16-bit ISA sound card, try to put it in a 16-bit slot (although it will fit a VL-Bus slot it is a waste of a local bus slot).

If the sound card has an IDE interface for a CD-ROM drive, try to pick a slot close to where the drive is going to go. Sound cards can be susceptible to RF noise generated by other PC hardware and you may have to shuffle your cards around to rid yourself of any annoying buzzes or hums it's picking up.

### Step 4

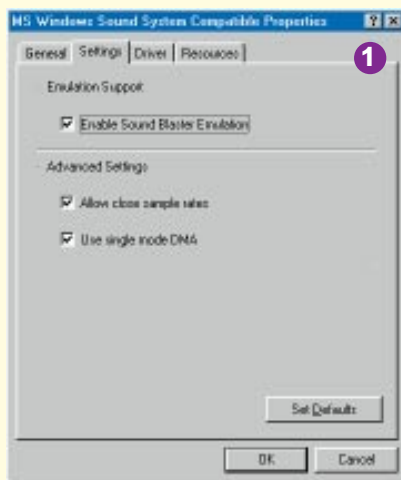
- Undo the bolt securing the blanking plate at the end of the slot and remove the plate.
- Hold the card firmly by its top edge and press its connector edge firmly into the expansion slot — it may be a tight fit and you may have to use a modicum of steady force. Tighten up the bolt to stop the card from flapping around.
- If you have a CD-ROM drive fitted, install the CD audio cable between the drive and the sound card: this will let you play audio CDs through your PC speakers.

### Step 5

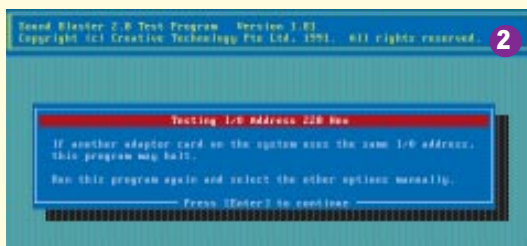
- Put the system unit cover back on, do up the screws and plug everything back in.
- Plug in any speakers to the sound card, plus any microphones or line connections. Some sound cards have a volume control next to the audio connectors, so make sure this is turned up!
- Power up the PC and make sure everything is working as it was before. Check that the sound card is not interfering with anything.
- If you do have a problem, see the section *Resolving Hardware Clashes* (p291).

## Software configuration

- If all is well with your PC, the next step is to install the software for your card. If you have Windows 95 your first stop should be the "Add new hardware" wizard in Control Panel.
- You should let Windows 95 try to



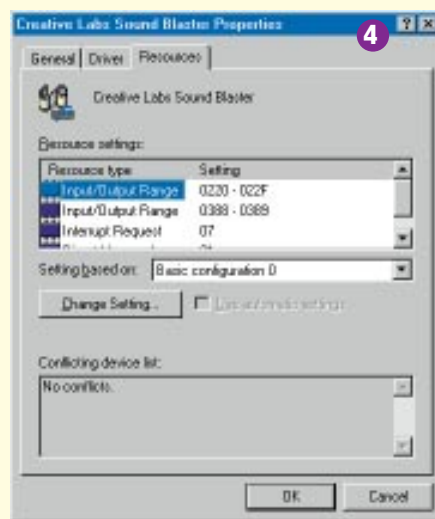
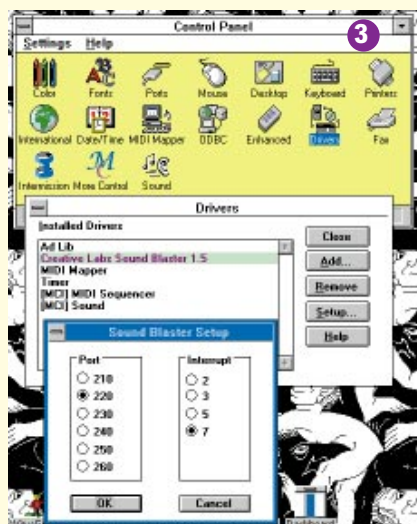
**Fig1** This tabbed dialogue reveals the Settings portion of the Microsoft Windows Sound System sound card properties



**Fig2** The SoundBlaster comes with a simple diagnostics program, TEST-SBC.EXE, which checks for hardware conflicts and plays some sample sounds to make sure that all is well

**Fig3** This Windows 3.1 installation of a SoundBlaster card reveals I'm using the default settings for the card

**Fig4** Under Windows 95, the same information is kept in Device Manager Properties



auto-identify your new sound card. When it does, you'll be prompted for the Windows 95 installation disks or the manufacturer's driver disks. You can then check its correct installation by clicking on the "System" in Control Panel, then on the "Device Manager" tab and selecting the "Sound, video and game controllers" entry on the device tree.

- Finally, click on your sound card and the "Properties" button (see Fig 1).
- If Windows 95 can't detect it, or mis-identifies it, you should then install the Windows 3.1x drivers supplied with the card; Windows 95 comes with a reasonable range of sound card drivers but lacks drivers for Turtle Beach, Orchid and Miro cards, for instance. Often these drivers or more up to date versions can either be pulled down from Internet dial-up services

such as CIX, CompuServe or AOL, or direct from the manufacturer's Web site.

- If you're still running DOS+Windows 3.1x, install the drivers that come with the card. Often it will come with a simple diagnostic/confidence tester utility which will confirm that the sound card is working correctly (see Fig 2).

- Once you've confirmed that the sound card is working under DOS, the next step is to install drivers for Windows 3.1x.

Your sound card will probably have its Windows own install program but it's not difficult to indulge in a spot of D-I-Y and install it manually.

- Load the Control Panel and select Drivers, then Add... and you'll be prompted for the disk with the Windows drivers. Here, I've installed the drivers for an old SoundBlaster card (see Figs 3 & 4).

## Resolving hardware clashes

Until Plug and Play heaven becomes a reality, we have to live with the ever-present problem of hardware clashes. These are caused when two hardware devices try to access the same hardware resource. The end result can be a non-functioning sound card or, at worst, a hung PC. These hardware resources in a PC are strictly limited and it can often take a bit of jockeying around to get all your cards and devices to co-exist peacefully with each other.

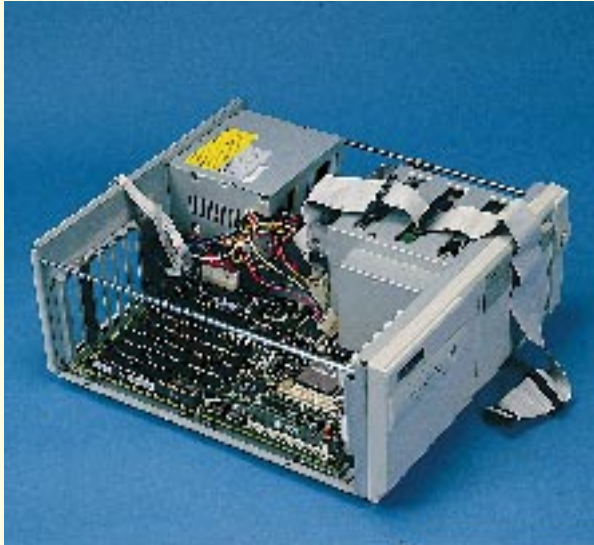
But just what are these hardware resources? They fall into four categories:

### 1. DMA, or Direct Memory Access

This is a method whereby a device can access memory by itself without using the CPU, thus cutting a corner and saving time.

There are only eight DMA channels on machines with 286 processors or better, but five of these will usually be free.

Normally, you'll be able to use DMA channels 1,3,5,6 or 7 for your expansion cards.



### Standard DMA channel assignments

Channel	Used by	Width
DMA 0	System	16-bit
DMA 1	Free	8-bit
DMA 2	Floppy disk controller	8-bit
DMA 3	Free	8-bit
DMA 4	Slave DMA controller input into master	N/A
DMA 5	Free	16-bit
DMA 6	Free	16-bit
DMA 7	Free	16-bit

### 2. I/O port

This is an address in memory. It acts as a gateway, permitting a device to communicate with the processor. There are several hundred of these and are thus not in short supply unless your card can only use a few of them.

### 3. IRQ

IRQ is an "interrupt request" line — a hardware link between a device and the processor. PCs use the equivalent of two 8259 Programmable Interrupt Controller (PIC) chips and each controls eight IRQs. The second, or slave, PIC is co-ordinated via its IRQ 9 and the master PICs, IRQ 2. As a result IRQs 2 and 9 become one and the same.

### This is a list of IRQs and their owners:

Highest priority	Used by?
IRQ 9	Free
IRQ 10	Free
IRQ 11	Free
IRQ 12	Free
IRQ 13	Maths co-processor
IRQ 14	Hard disk
IRQ 15	Free
IRQ 0	Timer tick
IRQ 1	Keyboard
IRQ 2	Cascade to slave PIC
IRQ 3	COM 2
IRQ 4	COM 1
IRQ 5	LPT 2 (free)
IRQ 6	Floppy disk
IRQ 7	LPT1
IRQ 8	Clock
Lowest priority	

Because "high" IRQs receive greater priority than "low" IRQs; if you have a device that makes intensive use of interrupts, it makes sense to allocate it a high IRQ number rather than a low one.

You can't normally share IRQ lines (Windows NT3.51 forbids it) but it is common to share sound cards with the

very lowest priority, IRQ 7, which is normally assigned to the printer port. This is because the printer port is unlikely to be used all the time and is therefore "wasted" most of the time. It's also unlikely that you'll be playing sounds while you're printing, so it's relatively safe to mix both devices on this one IRQ.

For every IRQ line there's a corresponding I/O port address and here's a table showing you typical values:

Device	IRQ	I/O port	MEM
<b>decode</b>			
COM1	4	3F8 - 3FF	N/A
COM2	3	2F8 - 2FF	N/A
LPT1	7	378 - 37F	N/A
LPT2	5	278 - 27F	N/A
AT EIDE	14	1F0 - 1F8	N/A
AT IDE	15	170 - 177	N/A
VGA 2/9	3	COh - 35Ah colour	A000 - BFFF
VGA	3	COh - 3BAh mono	C000 - C7FF

#### 4. ROM address

Some expansion cards will incorporate a ROM, or ROM BIOS, and this has to sit in memory alongside other ROMs in the system: for instance, the boot ROMs and the Video BIOS.

- All ROMs must reside between 640Kb and 1,024Kb and must have a unique address. That is, it cannot share address ranges with anything else.

- All I/O cards will use all or a combination of these hardware resources. For example, a SoundBlaster's default settings are:

DMA Channel:	1
I/O port:	220
IRQ:	7

### Troubleshooting

- You'll know when you've got a hardware clash because something will stop working.

A typical example of this is putting a modem on COM 3, which shares IRQ 4 with COM 1 (your mouse port). The mouse works just fine until you launch a comms program, when it will stop, only to magically reappear when you quit the comms program.

- We've seen that hardware resources are scarce and that it's possible for cards to try and utilise resources already in use. So how do you prevent these clashes occurring?

If you have DOS+Windows 3.1x there really is no substitute for conducting a hardware resource "audit" of your PC, noting which device uses which

resources. Then, when it's time to add a new card you'll know exactly which hardware resources are free and which are spoken for, and thus be able to make the appropriate adjustments to the new card.

OK, it's a *schlepp* but it's nothing compared with making wild stabs in the dark when your PC isn't working properly — forewarned is forearmed! You might have to remove every card to find out its precise settings but sometimes you can use software to do this, such as MSD or WinCheckIt.

- Perhaps the best tool of all for resolving clashes is Windows 95, even if you're using non Plug and Play kit. The Device Manager will flag all hardware clashes and, here's the big advantage, tell you which device it's clashing with.

OK, so you probably won't be able to reconfigure the card via software but at least you will know precisely where the problem lies and that's half the battle.

### Explanation of acronyms and terms used

#### ● Low level

CPU	Central processing unit.
DMA	Direct memory access.
IRQ	Interrupt request lines.

#### ● Hard drive and peripheral interface standards

IDE	Integrated drive electronics.
EIDE	Enhanced integrated drive electronics.
SCSI	Small computer system interface.

#### ● Bus standards

ISA	Industry standard architecture.
PCI	Peripheral component interconnect (a local bus standard; now fairly universal).
VL-BUS	VESA local bus (VESA is the Video Electronics Standards Association; another local bus standard).

#### ● Other terms

RF noise	Radio frequency noise (radio-like signals which are emitted from your PC and which can cause interference).
----------	---

### PCW Contacts

Roger Gann can be contacted either by post c/o PCW, or via email at [rgann@mcgilivray.win-uk.net](mailto:rgann@mcgilivray.win-uk.net)





## Modelling job

**VRML makes it possible to bring 3D graphics to Internet pages. The World Wide Web will never look so good, as Benjamin Woolley explains.**

In 1884 the pseudonymous author "A Square" (his real name was Edwin A Abbott) published a book called *Flatland*, which told the tragic story of two-dimensional creatures trapped in a flat universe. Until 1994, the World Wide Web was like Flatland, totally two dimensional. Then along came VRML or "Virtual Reality Modelling Language", a new standard for a 3D version of HTML.

### Best of both worlds

HTML, the *lingua franca* of the World Wide Web, was interesting and novel because it was, in a sense, both a data file format and a programming language: as well as containing some of the data to be displayed (the text), it included the instructions specifying how that text should be laid out, the source of any pictures that would accompany it, and the behaviour of hypertext links that referenced other data. Among other things, this meant it was easier to make programs that interpreted HTML (browsers such as NetScape Navigator) "platform-independent", capable of running on Unix boxes, PCs and Macs alike.

It was a couple of programmers from Massachusetts, Mark Pesce and Tony Parisi, who came up with the notion of adopting the HTML model for integrating 3D graphics into the World Wide Web. They presented the idea at a special session of the first international WWW conference in Geneva in 1994, and thus VRML was born.

The specification for the VRML 1.0 standard now in use was set after a few months of discussion over the Web among graphics industry enthusiasts. It was decided to base it on an existing file format, the one developed by Silicon Graphics (SGI) for its "Inventor" system. Inventor is a whole set of tools and libraries for creating and manipulating 3D objects on SGI graphics workstations. The bit borrowed for VRML is just the file format, to which extensions have been added to make it more suitable for use over the Web, specifically anchors

and inlines. These are nodes for making objects links to other objects stored anywhere on the World Wide Web. In the case of anchors, when you point at the specified object, the scene to which it is linked replaces the current scene. In the case of inlines, the linked scene is imported into the current scene.

Within months of its introduction, VRML has spawned countless browsers, including SGI's own WebSpace, WebFX from Paper Inc (now Live3D, about which more below) and a plug-in for Microsoft's Internet Explorer.

A VRML file, like an HTML file, is relatively simple: a straight ASCII text file containing instructions and data. The fundamental object (programming object, that is) is the node, which can be a 3D geometry or mesh (a cube, say, or a light), a texture, surface features such as shininess and so on. Nodes are arranged hierarchically to determine how they influence each other.

### Light, camera, action

In the panel below, we have a simple example of VRML which creates a red sphere and a blue cube lit by a directional light and viewed by a camera. There is one overall Separator node for the entire scene, with sub-nodes and sub-separators describing various elements and how they should be rendered. The blue cube, for example, is created using a material node which specifies its colour, a transform node which specifies its position and orientation, and the cube node, which specifies its shape.

You could add another node, Texture2, to give a texture property, which will wrap the cube with a particular image (a picture of a stone surface, for example).

There are 36 different types of nodes in the first version of the VRML standard. Bearing in mind that these nodes are all you have to describe a scene using VRML, this is not that many. There are no nodes for animating objects or giving them any sort of behaviour. There are no nodes for advanced features such

### Simply red and a bit of blue

```
#VRML V1.0 ascii
Separator {
  DirectionalLight {
    direction 0 0 -1 # Light shining from viewer into scene
  }
  PerspectiveCamera {
    position -8.6 2.1 5.6
    orientation -0.1352 -0.9831 -0.1233 1.1417
    focalDistance 10.84
  }
  Separator { # The red sphere
    Material {
      diffuseColor 1 0 0 # Red
    }
    Translation { translation 3 0 1 }
    Sphere { radius 2.3 }
  }
  Separator { # The blue cube
    Material {
      diffuseColor 0 0 1 # Blue
    }
    Transform {
      translation -2.4 .2 1
      rotation 0 1 1 .9
    }
    Cube {}
  }
}
```



as NURBs (for describing complex curved surfaces) or environmental properties (for adding features such as fog). Some of these, however, appear in the specification for VRML 2.0 (see later).

Nevertheless, there are enough nodes to create scenes quite complex enough for most PCs, and VRML has already demonstrated itself capable of creating rich, complex spaces and providing the user with the means to "walk" or "fly" through them.

You can, in theory, create such worlds by hand. All you need is a text editor and a great deal of patience. Most people, however, create their models using one of two methods: a standard 3D modelling package and some form of converter, or a VRML authoring tool.

The former strategy works quite well in the SGI world, since much 3D software that runs on Silicon Graphics systems uses the Inventor tools from which VRML was derived. Converting an Inventor format file into a VRML format file is, theoretically at least, simply a matter of changing the header information and adding WWW Anchor and WWW Inline nodes with a text editor. Of course it is not that easy in practice, as many Inventor nodes are unsupported by VRML. However, if you keep the model simple, you are unlikely to have any problems.

Outside the SGI world, things start to get more difficult. Translators for converting 3D Studio files to VRML emerged soon after the VRML standard was agreed, and Autodesk now supplies one as a plug-in (or "IPAS", in their terminology), complete with facilities for adding anchors and inlines. Unfortunately, the distance in the methods used by 3D Studio and Inventor are so great that conver-

### VRML authoring flows from the Fountain

Truespace from Caligari was the first full-bodied 3D graphics modelling and animation to be developed for Windows and, thanks to its interface, it can be a pleasure to use. That interface now forms the basis of the same company's VRML authoring program, Fountain, which, at the time of writing, was in the final stages of Beta testing.

Fountain provides some neat tools for creating simple geometries and adding properties such as textures and anchors. It also supports such extra facilities as LOD (Level of Detail, which allows for simplified versions of particular objects to be rendered while they are distant) and GZIP file compression.

The Beta 5 version pictured is still very much a Beta release, and it is hard to get consistent results with the VRML files it generates. That said, Fountain is an excellent starting point for VRML authoring on the PC. There is also one feature, introduced with this release, which is particularly attractive: the concept of creating your own neighbourhood. This is the 3D equivalent of a bookmark file. You simply select the neighbourhood icon, point at an object (usually one that links to another world or Web page, though this is not necessary), and it will be copied into a separate VRML file. You can then edit this file to create your "neighbourhood" of favourite places. Neat.



*The Fountain interface, with a VRML scene of the globe in the main window, and a panel showing a separate, non-textured version of the same scene from a different angle. The spear-shaped object pointing at the globes is a pointer put there by Fountain to show that the globe is the currently selected object*



*The Live 3D logo viewed using the Live 3D plug-in for Netscape Navigator*

sion is a hit and miss affair, producing VRML files that some browsers render incorrectly (putting textures on the wrong object, for example) and others are unable even to parse (decode).

A more satisfactory strategy is to use a

VRML authoring tool, something that has the limitations and peculiarities of VRML built into its basic design. There are, as yet, not many on the market. One for the SGI is Ez3d from Radiance (a Windows NT version is due this year), and SGI itself has produced WebSpace Author. For the PC world, there are several in development, but perhaps the best known is Fountain (see panel).

### VRML 2.0

In early February the VRML 2.0 announcement came, though not in the manner we had expected. SGI and NetScape decided they had no time for the drawn-out discussion that usually accompanies the emergence of a new industry standard. They pre-emptively declared that SGI's "Moving Worlds" specification become VRML version 2.0, and got 50 leading Internet and graphics companies to agree with them. NetScape simultaneously announced the Live3D plug-in for its Navigator browser, a VRML browser which supports the Moving Worlds extensions. Two big names, Apple and Microsoft, were missing from the

original announcement. Both had been pushing alternative specifications for VRML 2.0. What Moving Worlds promises to provide is yet another dimension to the World Wide Web — the fourth dimension of time. Objects can now move. They can change shape, precipitate and react to events, be programmed to display certain behaviours. There is a whole layer of extra nodes and features, and I will be grappling with them in future editions of this column.

### PCW Contacts

**Benjamin Woolley**, a writer and broadcaster, can be contacted at [woolley@illumin.co.uk](mailto:woolley@illumin.co.uk). His home page is at [www.illumin.co.uk/woolley/](http://www.illumin.co.uk/woolley/).



## Natural selection

**Photo-retouching of bitmapped images is a tricky business. Gordon Laing takes you through it with one good eye and a steady mouse hand.**

Virtually every process in the world of graphics and DTP consists of making a selection, then doing something to it. This month is not about the wealth of things you can do to a selection, but the process of selection itself.

Selections in the clean-cut world of vector drawing apps are totally straightforward — just point at the desired object and click. Multiple selections can be made by shift clicking each element, or dragging a marquee around them. It's just as easy within DTP.

It's photo-retouching of bitmapped images that often becomes tricky. The human eye can easily spot a person posing in front of a country landscape, but to the computer, it's just a load of coloured dots. There are often occasions when

you'd like to select, say, the foreground object to protect it against any changes, or cut it out and place on a new background altogether. Anyone can do a good physical job with pair of scissors, but digitally it can prove difficult.

The most obvious route is to draw a line around the object by hand with the scissor or freehand selection tool, for which you'll need a good eye and a steady mouse hand. There's also the problem that most applications won't allow you to go back and edit this outline path, unless it was created with vectors. This feeling of better-get-it-right-first-time doesn't half loom over you and induce the wobbles. It is an option however, and sometimes ideal for basic rough selections; see *Fig 1*.

When you've got large regions to

recolour or delete, it can be very satisfying to select huge sections with the rectangular, elliptical or freehand tool and wipe the lot out in seconds. More often than not, you'll probably still have to go in and carefully outline a shape, but all those nerves could be eliminated with a bit of haphazard wiping out.

Before going any further, it's worth briefly taking stock. A selection can be any shape or size, but must be closed without any gaps. Most applications allow multiple selections to be made, such as two separate trees against the same background, and are usually implemented by holding the shift key as you make each additional selection.

A selection is usually indicated on screen by a moving striped line, not at all dissimilar to the flashing lights surrounding a Las Vegas sign and often known as marching ants. The selection is everything contained within this or these outlines. Many apps allow you to make an inverse selection, with everything outside the outlines selected. This is useful if, say, the object you want to select is complex and on a plain background. Select the background, go for inverse, and the complex object becomes the selection; see *Fig 2*.

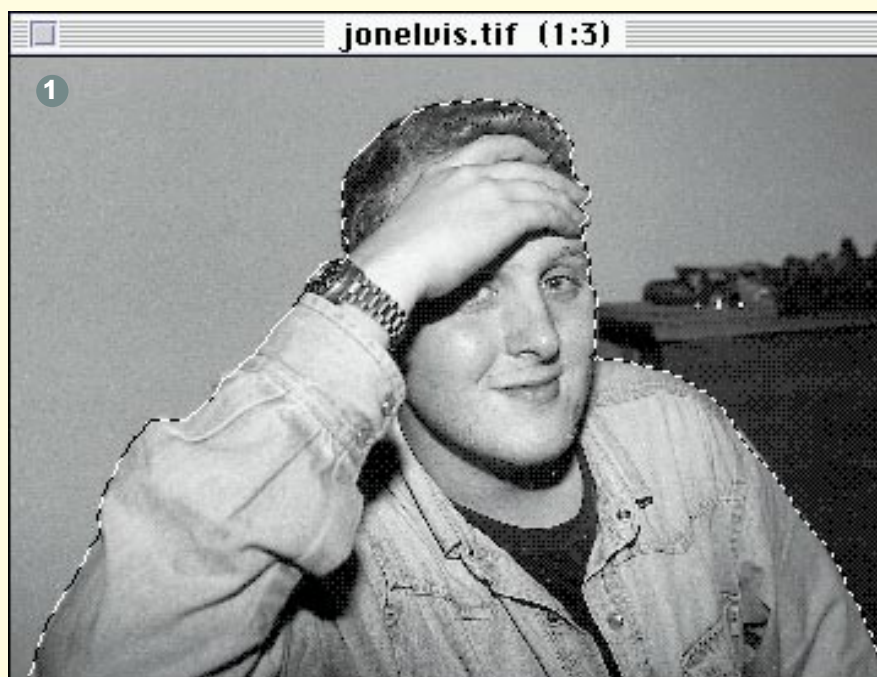
Virtually all paint or photo-retouching apps have at least rectangular and perhaps elliptical selection tools, which you drag out to size with the mouse; these are frequently known as marquees. The freehand tool, where you literally draw out the shape by hand, is often known as a lasso.

### Abracadabra

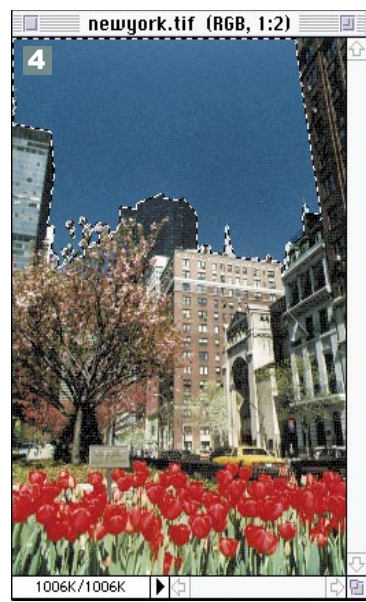
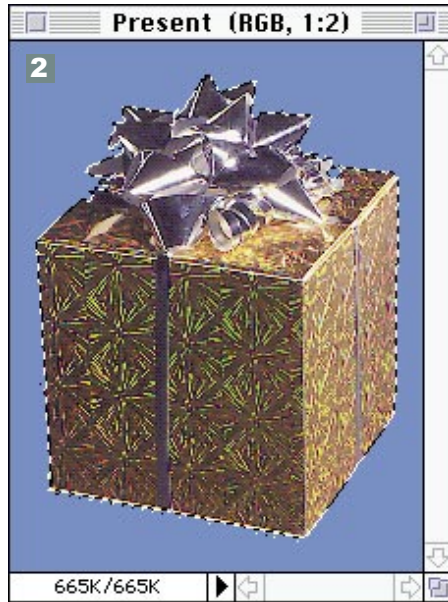
The fun really starts with the temptingly titled Magic Wand tool, found in higher-end retouching applications such as Adobe Photoshop. The magic wand selects portions of an image based on the colour similarities of adjacent pixels. The degree of similarity is set by the user.

In theory you could select an entire object in a single step with the magic wand see (*Fig 3*).

In practice, it helps if the object is made up of similar colours and the background is



**Fig 1** This cheeky chappie surrounded by a dotted line is an example of making a selection by hand. It's quite rough and ready, but this hand-drawn technique is quick and works well in many situations



The rather tempting present, Fig 2 (top left), could prove difficult to select. Instead, select the background then choose Inverse to grab the prezzie Fig 2 (above centre). Part of the CD's surface, in Fig 3, has been selected; choosing Similar has selected all other yellows, leaving the text untouched. Fig 4 (top right) shows the Magic Wand in action, selecting the whole area of sky in one step; now change it to any time of day (Fig 6). The parrot (Fig 5, bottom left) illustrates the perils of pasting a selected bauble; the bauble in Fig 5, bottom right, has been selected with anti-aliasing and had its contrast adjusted to better match the background



## Font of the Month

## Bulmer MT

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
 abcdé fghijklmnöpqrstuvwxyzß&1234567890  
 ¼½¾⅓⅔⅕⅖⅗ ff fi fl ffi ffl 1234567890

completely different. You'll usually have to play around with the tolerance level until the wand accepts the range of colours required, to select the desired region.

Remember that holding shift as you re-click the wand will allow you to select specific similar areas, while apps such as Photoshop additionally offer a similar option, which selects all areas in the image with a similar range of colours (see Fig 4).

Sometimes the wand works perfectly first time, grabbing the desired area without complication, whereas with others it may be virtually useless.

Remember, the inverse function can be really handy. In the case of my famous Christmas Card, which I won't reproduce due to physical threats from colleagues, I began with a photo of myself against a virtually black background. Wanting to select myself for pasting onto a totally different background, the easiest way was to roughly retouch the background until it was completely dark and select the entire thing with one fell swoop of the magic wand. Going for inverse selected everything that wasn't the background (i.e. myself) and bingo, I was off.

So by one means or another, you've selected the desired region. In some instances you'll only do this in order to alter the colour balance or brightness of, say, the sky in the background. However in others, you'll want to physically cut out the object and stick it on another background.

This is where you may run into unexpected difficulties. First of all it will be immediately apparent if you haven't cut out the shape properly: a bit of rogue background here, a chunk missing there all add up to an incredibly unconvincing composite. This somewhat cheesy effect may indeed be what you're looking for, but if you want a convincing, realistic result, there are a few additional tricks up the digital retoucher's sleeve.

Ultimately, the best advice is to blur the outline of the object so that the rough

edges don't stick out so much. So long as the colour balance, contrast, focus and grain match up reasonably, this should do the trick. You could blur the edges of the pasted shape manually, or remove offending pieces of old background, but there are techniques available which may render a great deal of hard work unnecessary.

**Anti-aliasing**

Anti-aliasing already effectively smooths edges by popping dots of intermediate foreground and background colour around coarse outlines. Most magic wand tools offer an anti-aliasing option which immediately smooths the edges, ready for user-friendly pasting onto another background (see Fig 5).

A more advanced blurring option is to feather the outline by a user defined number of pixels. This more sophisticated technique, along with vector-editable clipping paths will be covered in next month's column. Until then, happy selecting.

**Font of the month**

This month's featured font is one of the latest releases from Adobe.

Bulmer, originally designed by William Martin in 1790 and re-penned by M.F. Benton for publishing in its current form between 1927 and 1928, is a smart and classy typeface, ideal for when you want to look good.

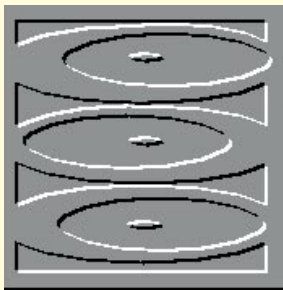
Adobe has released an additional Expert Set, featuring a variety of specialist characters. These include fractions, ligatures, and an entire set of small capitals. Several of these are shown on the bottom line, in the illustration above.

**PCW Contacts**

Any hot selection tips? Write to me at the PCW address on Broadwick Street or email me as [gordon\\_laing@pcw.ccmil.com](mailto:gordon_laing@pcw.ccmil.com)

Faces 01276 38888  
 FontWorks 0171 490 5390





## The raw materials

**Panicos Georghiades and Gabriel Jacobs take you through a basic list of requirements for making a CD-ROM on a budget.**

*‘I have been asked by an administrator at a local hospital for the mentally disabled if I could produce a CD-ROM to help the patients with severe learning difficulties to be a bit more independent. We have concluded that the program will have to include video clips and sound samples, and will therefore need to be authored using a multimedia authoring package.*

*We have access to a video camera and a variety of PCs, ranging from a 386 to a Pentium, and were wondering if you could recommend a reasonably easy-to-use software package.*

*What other hardware would we need? We want to produce about 30 discs and have only limited financial resources. ’*

**Dave Sharples**  
(dave@hudski.demon.co.uk)

Thanks for this letter — we’ve been waiting for the opportunity to answer a focused question like this for a while now. We’ll use the rest of the space in this column to summarise what one needs to develop a “basic” multimedia CD-ROM.

### ● Hardware

You really do need a powerful authoring machine with lots of RAM and hard-disk space. The amount of power and disk space you need depends on the amount of audio, still-image data and video you want to process. As for the processor (Pentium or whatever) — well, the fastest you can afford. You need at least 16Mb RAM, and 32Mb or more can speed up the editing and processing of graphics files.

Your hard disk should be 2Gb or more. A CD holds about 650Mb, but you may find yourself working with 10 to 50 times as much raw material, especially if you’re dealing with video clips. A good, flexible archiving and back-up system, such as a magneto-optical drive or removable hard-disk drives, may be a solution.

The working hard disk should have a

minimum sustained transfer rate of 1.5Mb/second if you wish to grab good video. A higher value is preferable. Accelerator graphics cards, PCI or VL-bus graphics and hard-disk adaptors all help. So at a rough estimate, good basic hardware is going to cost anything between £2,000 and £10,000.

### A testing time

Then there are testing machines, of which you need as many as possible. They should preferably be low-end machines (as low as any user might have) so that you don’t reduce the potential userbase. They should have varying hardware peripherals such as graphics cards, CD-ROM drives and sound cards of different makes. Most problems stem from incompatibilities between drivers of S-VGA cards, CD-ROM drives and sound cards.

To grab stills for backgrounds, main photorealistic material and screen buttons, you’ll need a standard scanner for flat surface reflective material such as photographs and documents, and a film scanner (or transparency adaptor) for photographic negatives or slides.

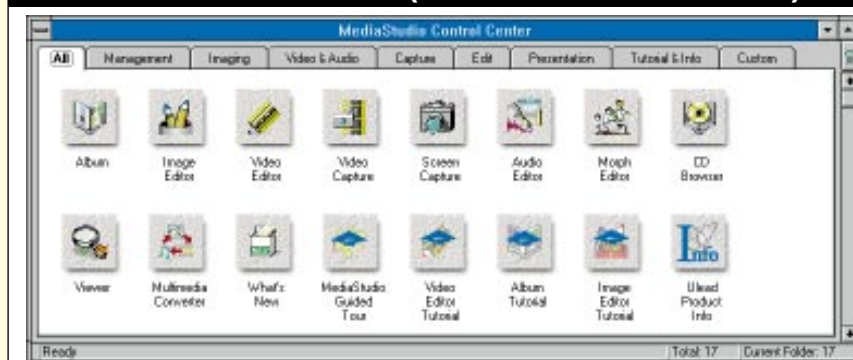
You can also grab stills off video or live material using a video camera and capture board. Or you may wish to use a digital camera. If you want to retouch, or draw original artwork, then a pressure-sensitive tablet instead of a mouse helps a great deal.

Flatbed scanners range between £300 and £10,000 (average just under £1,000). Digital cameras range between £400 and £15,000. Film scanners start at about £700. Drawing tablets start at £150.

### In good voice

To record the human voice for narration or voiceovers you’ll need a good microphone — preferably a studio condenser microphone plugged into a microphone pre-amplifier — and a compressor which eliminates variations in the voice signal. Heavy compression can help with sound to be digitised at 8 bits (if you’re short of space). Good microphones range from £200 to £1,000. Compressors and microphone pre-amplifiers start at £200. You also need a 16-bit sound card to record and playback sound with the PC. Sound cards cost between £25 and £1,000.

### Ulead Media Studio (demo and free software)



*On this month’s CD there’s a demo of Ulead’s Media Studio 2.0 software, which we covered in these pages last December. The demo includes the video editing module in its entirety, with examples for you to play with. You can even save files, though the demo program places an X over them so you won’t be able to distribute them. Have a look at the competition section too — some copies will be given away free to readers*

If recordings need to be made away from the computer, you need a tape recorder, and preferably a DAT (Digital Audio Tape) machine which can record high-quality digital audio. Or you may choose to record the sound in a professional studio. If you do, make sure that a DAT machine is used: you can then import the sound into a PC using a sound card with digital inputs (such as the Digital Audio Labs CardD). This will ensure the best possible quality. It can also be useful if you're grabbing sound effects or music from CDs. DAT recorders start at £500.

### Get it on video

To record video, you obviously need a video camera, but preferably one with an S-Video output. Video can be recorded directly from the camera into a video capture card and onto the hard disk — there's no need for it to be recorded to tape first unless your subject/material is away from the computer.

If you do need to record to tape, then a Digital, Hi-8 or S-VHS or S-VHS-C capable recorder will yield better results. Three-CCD cameras give better quality than single CCD. Video camcorders start at £500. A three-CCD model can cost over £2,000. New digital camcorders start at about £3000.

### Throw some light on it

Lighting is a major factor in video quality. Diffused natural (day)light can give very good results even with cheap camcorders. But if you're using artificial light, you need lots of it and it has to be white. Ordinary tungsten light bulbs emit an orange/yellow tint, and your video clips will resemble those from a certain Jeremy Beadle TV programme. Studio lighting equipment starts at £50. If you are to record sound with the video, you need either to record the sound separately or use an external microphone with the camcorder.

To grab video from a camcorder or VCR into a computer, you need a video capture card. We recommend any capture card that uses M-JPEG compression. The video can then be edited and recompressed using any other compression method suitable for distribution, even MPEG. M-JPEG video capture cards start at £350, average £700, and professional models cost £2,000 plus.

### ● Software

All the above is hardware-related. Now to softer matters. You'll probably need image scanning, retouching and editing software, and high-end paint software if you're drawing original material. You

may need to employ the services of a scanning bureau, or use Kodak PhotoCD. And you may need to employ a graphic designer/artist, the cost of which will obviously depend on how good she/he is — but it won't be cheap.

Digitised sound will almost certainly need to be edited (cut and pasted), its amplitude (signal strength) adjusted, and (almost certainly) cleaned of pops, clicks and other background noises. You may need to mix music, sound effects and voice in a single soundtrack, in which case sound levels of the individual tracks have to be adjusted. You'll need a professional sound-editing program, and this will cost you between £100 and £300.

A great deal of video editing can be done using Video for Windows accessories, but if you need to mix and combine video clips or create effects, a more sophisticated video editing package will be needed. This would set you back between £150 and £400.

### Going out in style

If you want your multimedia application to have its own style, you may need to get hold of fonts other than those distributed with Windows or other packages. Remember that if you want to distribute these fonts with the application, as opposed to using them on a bitmapped image, you have to get permission from the owners.

You'll also need a word processor, but its power is not that critical. You should save files in RTF (Rich Text Format) or as TXT (text) — most multimedia authoring packages accept both these formats.

### Author, author!

Then, of course, there's multimedia authoring software. Depending on the type of application you'll be developing, and your own expertise, you'll decide on either a standard multimedia authoring package or a computer language (such as Visual Basic or Delphi).

For authoring software, you can say that the cost will be between £200 and £1,000 — or more than £3,000 if you go for top of the range.

### Mastering the art

When you've completed the development, you have to consider mastering. A CD writer will be a good investment if you'll be developing a number of multimedia applications, not just one.

But in any case, you'll need one-off CDs for testing purposes. They cost between £25 and £150 each at a bureau service. A CD writer and software can cost anything between £900 and £5,000,



## Question time: MPG video, multimedia authoring

Could you briefly answer the following — probably naive — question? To view an MPG file, do I need special software, special hardware, or both? I run everything under DOS/Windows (Word for Windows 3.11) on a Gateway P75, 16Mb RAM, an ATI Mach 64 graphics card with 2 meg of VRAM and an Ensoniq sound card.

I can view the movies that come free on the cover disk okay.

**Nick Mahoney (nm@nmahoney.demon.co.uk)**

You can view MPG video files under DOS or Windows as follows:

1. You can use a special software player program that uses either software decompression (such as XingCD) or works in conjunction with decompression hardware (such as the Media Station accessory that comes with the Showtime MPEG playback card).
2. You can play MPG files using the Windows Media Player:
  - a) if you have special decompression hardware that is installed with an MPEG MCI driver; or
  - b) if you have a virtual MPEG MCI driver, such as one supplied with a number of the latest faster graphics cards (e.g. the Matrox Millennium card).

Here's some other useful related information:

Software-only playback methods usually require a Pentium 90 or above to deliver full-screen (640 x 480) full frame-rate playback. Some software requires lots of free memory — under the DOS 640Kb limit — even if it's running under Windows, and even if you do have masses of extended RAM.

Finally, some CD-ROM drives don't provide a sufficient sustained data-transfer rate to give smooth MPEG playback. Problems also exist with some CD-ROM drives (or CD-ROM drivers) not being able to play MPG files from Video-CDs. Sometimes a later driver may be all you need.

*I've read your articles in PCW and I need some advice on multimedia authoring. I want to write a dissertation on the impact of multimedia, and I want the document to be interactive (like a cover CD-ROM from a computer mag). For example, a front menu, text, references, video and audio.*

*I have access to Director 4.0, Toolbook 3.0 and possibly Authorware. I want to use the package which is easiest, without coding etc, and which can easily include hypertext, AVIs, TIFFs and so on.*

*Also, do you know of any good research material on the subject?*  
Asif Lakhnopal (allens@allens.demon.co.uk)

You'll be interested to know that PCW's cover disk is done using Macro-media Director. Very briefly — without going into full product reviews of the three programs you mention — the fastest and easiest is Authorware.

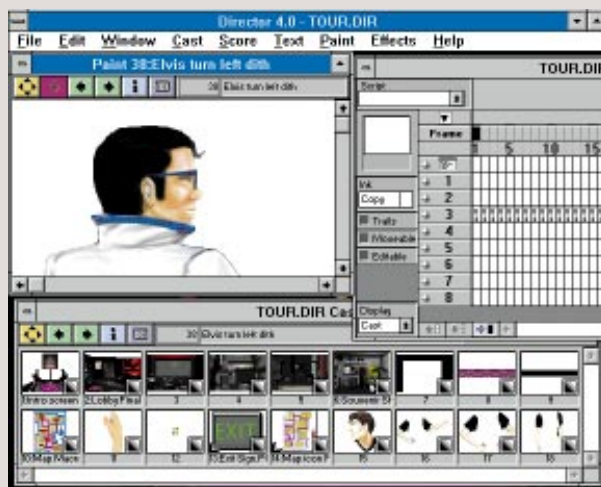
Coding is required for the other two, at least for anything decent.

Director is better for applications which have media that need to be placed on a timeline and synchronised so that they happen at a



specific time. Toolbook works more like a book. It is easier than Director when it comes to handling hotwords inside text boxes, though they are both equally easy in handling hotspots on images. For straightforward applications, it really makes no difference which one you use. What you prefer to work with, and feel most comfortable with, may be more important.

As for research material on multimedia authoring, there's bags and bags of it. A starting point would be to look at some abstracts on the World Wide Web. Use a robotic search engine (any one will do — Lycos, Infotext, Web Crawler ... whatever) and search for, say, "multimedia authoring research" (remembering to AND these, i.e. look for all three keywords in the same document). After that, expect to spend a few hours downloading and reading the masses of stuff you'll get.



and blank CDs cost about £5 each if you buy in bulk (50 plus).

To press a CD in large numbers, you need to pay a mastering charge (about £500), then it depends on how many you press — typical prices are £1.20p each for 250, 60p for 500, 50p for 1,000, and 40p for 10,000. The break-even point (between using a pressing plant or writing your own) is at about 150 to 200 CDs, excluding the cost of the CD writer. Of course, prices are changing all the time. Finally, you also need to consider the cost of packaging,

which may be considerable in relation to the cost of pressing a CD. So, in terms of cost, multimedia could easily stand for multi-spending. However, as with film and music productions, some can cost thousands and others can cost millions — and unless you're involved in the business you can't tell the difference.

It is possible, with the use of imagination, talent and professionalism, to overcome the limitations imposed by a low budget. Keeping things simple always helps in these circumstances.

### PCW Contact

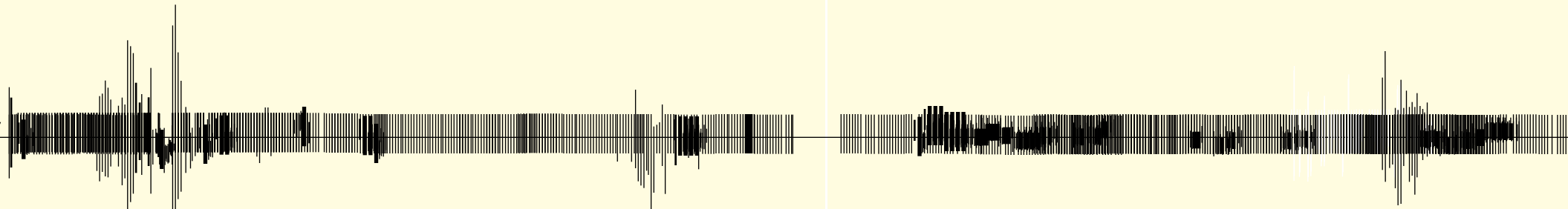
If you have any multimedia-related problems or queries, email us at [g.c.jacobs@swansea.ac.uk](mailto:g.c.jacobs@swansea.ac.uk). We're sorry, but we can't answer queries by personal reply — we'd be at it all day! But we're glad to publish queries, with our answers, which we think will interest PCW readers generally.

**Asymetrix** products from ICS  
Solutions **01256 469460**  
**Illuminatus 3.0** from Digital WorkShop  
**01295 258335**





## Mix-ability



**It's important to create interesting contrasts in your production. Steven Helstrip paints a musical picture.**

Let's take a further look at production and mixing techniques, having covered the basics of the approach and structure of commercial music in last month's *Hands On*. I've included plenty of ideas for adding those little extra details in recordings, too.

### It's the little things that count

When you listen to a song for the first time it's often quite difficult to see (or should that be hear?) the overall picture. This is probably because you are concentrating on listening to the vocal. But how many times have you heard a song and said to yourself "Eh? I've never noticed that bit before"? Whether it's a subtle piano chord, a distant vocal harmony or a weird analogue sound, these are the makings of a great production.

Last month, we briefly covered pre-

production. At this stage, the most important item on the agenda should be to lay down a rough "Lego" mix of the song. The demo should capture the overall feel of the track, though, and have a solid structure.

When you're happy with the demo, have a rest from it for a few days. If there are any problems when you listen back to it with a fresh pair of ears, they will stand out like a sore thumb — the outro chorus needs to lift more, for example. At this point write down any ideas you have; it's amazing how quickly you'll forget.

### Planning ahead

Whether you're recording a song in a friend's bedroom with a four-track recorder, or booked into Sarm West for three days, it's important to plan ahead. I've always found that writing down ideas helps because it's easy to go off on a

tangent when you have access to new gear. If you want the track to sound similar to another song, take along the CD.

Probably the most important, and often the most difficult, aspect of the production is creating interesting contrast. If the track is all on one level, the listener will get bored. Contrast covers many areas of the production, not just its dynamic range. Here are some ideas which can help create interest.

### 1. Increasing and decreasing the dynamic range

Building up to the chorus means it will have more effect. Then at the second verse, drop down to a lower level. As part of the building process, double up sounds: for example, layer four string pads and gradually increase the level of each part. With pianos, copy parts over three octaves, leaving the middle octave

## Creative Essentials: Trance Formation



The latest CD from Creative Essentials — warm, sweeping and, yes... trancy

Trance Formation is the sixth CD in the Creative Essentials library. It contains over 200 professional samples in both audio and Windows .wav format. If you've had the chance to audition the Korg Prophecy synth and liked what you heard, you will love this CD. Warm, analogue-sounding synth sweeps, dreamy LFOs, trancy sequences and filtered film scores can be found on each and every track.

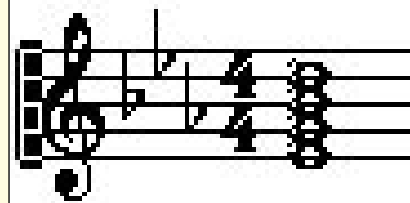
Most of the samples have been recorded with stereo effects giving them a spacious and deep quality. Like many CDs in this genre, many of the sounds are impossible to describe. Names the producers have come up with include Haunting, Prayer Wheel and Fairy Dust — great names, equally fantastic sounds.

Wherever possible, the inlay card describes each track by way of tempo and key. There are however no loop points given.

Among the trancy timbres you'll also find a limited selection of bass and percussion sounds. Every sample in the Creative Essentials range is 100 percent original and safe to use. As usual, you can find a selection of samples on this month's free, cover-mounted CD-ROM in *Hands\Sound*.

## Chord of the Month

This month's gem is E flat with a major seventh. The notes in this chord are E flat, G, B flat, D. Cole Porter's favourite key must have been E flat, as most of his songs are in this key and this chord pops up regularly.



more prominent.

**2. Introducing and dropping instruments**  
This can also help the build up to the chorus.

**3. Changing the instrumentation**  
In a middle eight, for example, you may lose the bass line and compensate with a pedalled, or sustained, note using a strings timbre.

Changing the instruments that play melodies can have a great effect, too.

### 4. Key changes

Key changes are great for adding contrast. There are several possibilities, the

## Super Sonic forges ahead

Sonic Foundry has released version 3.0 of its digital audio editor, Sound Forge. I recently installed a copy and was more than surprised at what it had to offer.

If, like me, you spend loads of time editing and generally messing about with digital audio, chances are you resort to "alt-tabbing" between a handful of editing packages to get simple jobs done. Sound Forge, however, appears to have all the features you'll ever need for mainstream two-track editing.

In addition to the standard features you would expect (cut, paste, fade, insert silence) Sound Forge offers time stretching, normalising and resampling, and a range of effects that include flange, distortion, reverb and noise gates. There's also a 10-band graphic equaliser and a wave generator.

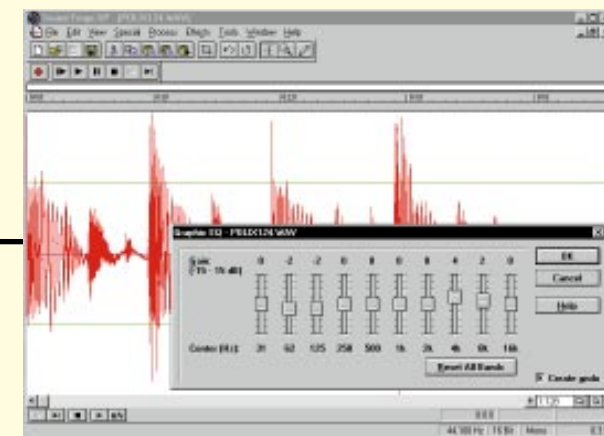
Just as important as the feature set is ease of use, and Sound Forge has it. You shouldn't need to open the manual, since everything is so straightforward.

Version 3.0 uses native 32-bit code for Windows 95 and NT and there are definite performance gains.

Alternatively, there's Steinberg's new 32-bit editor, WaveLabs.

Although I haven't yet seen the program, Steinberg claims it's the fastest editor to date.

Version 3.0 of Sound Forge has an impressive array of features, including this 10-band graphic equaliser



most obvious being to shift the whole song up one or two semi-tones for the outro chorus. You can try a more dramatic key change at the middle eight section; a four tone shift, for instance. This will grab the listener's attention.

#### 5. Inverting chords

This is a subtle way to change contrast. You may also like to try splitting up the chord and playing each note on a different instrument to form new textures.

#### 6. Effects

Effects can be used greatly to create contrast. Here are some examples. Try alter-

nating between a dry (untreated) vocal and one with reverb and a short delay. Single-line harmonies can be treated with over-the-top effects to introduce new textures. Try movement between mono and stereo reverbs and delays.

#### 7. Treating effects

There are many ways to use effects processing units. The most obvious is to patch them into the auxiliary buses, which enables you to send an output from any channel to the effect. If you are low on effect units it is possible to pre-process your sounds before going to tape. This often produces excellent result and frees up your valuable effects processor for another instrument. The down side is that you cannot change the effect at a later stage.

If, on the other hand, you have several units to play with, try combining the effects. For example, send the signal to a compressor, then take the output from the compressor to a reverb, then to a delay or chorus. Different effects can be produced by experimenting with the order in which you chain the effects.

### Voyage of Discovery

Discovering Music is a new CD-ROM from Voyetra. It's like a musical rendition of Microsoft Works, only instead of a word processor, spreadsheet and database you get a MIDI sequencer, a score writer and an electronic band to jam along with. There's also a multimedia exploration of music history and theory.

The package is aimed at 10-year-olds and above and introduces just about every

genre of music from Baroque through to modern-day sequencing. Within the Music Conservatory you can learn the difference between musical consonance and dissonance, what a canon is and how counterpoint works.

There are also video clips and musical examples of 75 instruments, and courses in music theory.

Whether you're studying music at GCSE or A-level and need a valuable reference, or you simply want to have a bit of fun with MIDI, Discovering Music has it all. And it's a bargain at £79.95.



Above  
*Discovering Music from Voyetra provides an entire musical education*

Left *Jam along with a virtual band*

### 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.ccmil.com](mailto:steven_helstrip@pcw.ccmil.com).  
[compuserve.com](http://compuserve.com)

Sound Forge **£149**. Voyetra's Discovering Music **£79.95**. WaveLabs **£299**. All from **Arbiter** 0171 379 5148.  
Trance Formation **£19.95** from **Time + Space** 01442 870681





## A touch of Class

**Visual Basic 4.0 gets inheritance, thanks to Class Assist. And where now for Delphi? Tim Anderson gets the lowdown from Borland's Zack Urlocker.**

Sheridan's Class Assist is an ambitious, intriguing Visual Basic 4.0 add-on. It overcomes a key VB weakness — implementing inheritance, and supplies an easy way to tap the power of the Windows API, too. It requires Windows 95 or NT 3.51 to run, although code generated with Class Assist and 16-bit VB 4.0 runs

under Windows 3.1.

Class Assist installs itself as a VB add-in. There is an executable file which runs the Class Assist integrated development environment and which opens automatically with VB, plus several supporting OCX controls and DLLs.

The Class Assist IDE is a browser and editor for classes stored in Access .MDB library files. Source control is built in since classes are generally checked out to a work area for editing. A Team Development Manager controls user access privileges but there is no integration with SourceSafe.

Initial impressions are good. When you open or create a library, Class Assist shows classes in a hierarchical list.

To create a new base class, right-click on the top level and choose New class. To inherit from an existing class, right-click on the class name and this time the new class will be based on the existing one. In the ensuing dialogue, you can add new properties and methods, and override methods from the parent class as required. You can then move classes into the current VB project by drag-and-drop or from a pop-up menu

option. You can also import existing class modules, in order to inherit from previous designs or to avoid writing code in Class Assist's primitive editor.

Under the bonnet, it is less appealing. The best way to see how Class Assist works is via a small example: imagine you have a CAboutBox class with just one method, Show. We are keeping things simple, so here is the code (Fig 1).

However, for some applications you require an about box that beeps when you close it. In ClassAssist you create a new class, CBeepAbout, derived from CAboutBox. Choose the option to override the Show method, and the code shown in Fig 2 is displayed.

### Inheriting from ancestors

In this case, the new method inherits the functionality of its ancestor, as well as adding its own code. To effect a total replacement, delete the call to CAboutBox\_Show.

For this to work, the generated .CLS file which is pasted into your VB project has to include the code from any ancestor files. In this example, ClassAssist generated the following methods in the CBeepAbout class in addition to the standard Initialize and Terminate:

```
CAboutBox_Init()
CAboutBox_Term()
CAboutBox_Show()
CBeepAbout_Show()
Show()
```

The point to grasp is that when you call an ancestor method, you are not really calling the method in the ancestor class but a copy of that method which Class Assist has pasted into the derived class.

If Class Assist is used correctly, the two should be the same, but it is all rather clunky. In cases where an extensive class hierarchy is designed, with several generations of

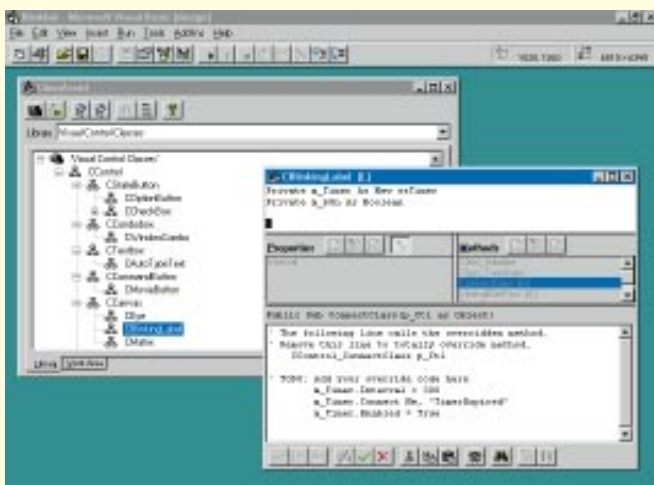
**Fig 1**

```
Public Sub Show()
MsgBox "MyApp " & Chr$(169) & " 1996 by Me"
End Sub
```

**Fig 2**

```
' The following line calls the overridden method.
' Remove this line to totally override method.
CAboutBox_Show
' TODO: Add your override code here
Beep
```

*The Class Assist IDE shows classes in a hierarchical list. Double-click a class to edit its properties and methods, or to create new ones*



## Where next for Delphi?

We talked to Zack Urlocker, Borland's director of Delphi product management, about future plans. Will there be a version 2.0 of 16-bit Delphi? For Zack, it's an ironic question: Delphi 2.0 was originally meant to be a straight port to 32-bits, but according to Urlocker "It developed into something better. There's no decision yet about a revised 16-bit product."

Asked about other platforms, like OS/2 or the Macintosh, Zack commented that "Windows has won on the client side. We might license the Visual Component Library (VCL) for another platform." Even so, Zack claims the compiler has the potential to target other platforms and could, for instance, compile for PowerPC, Alpha or MIPS.

Delphi 2.0 has a problem with OCX controls. "You can write OCXs in Delphi but it's a lot of work," Zack agreed. "By later this year we will make it easy."

Delphi 2.0 already contains components for creating OLE automation servers. What is envisaged includes an Expert for making OCXs and a means of



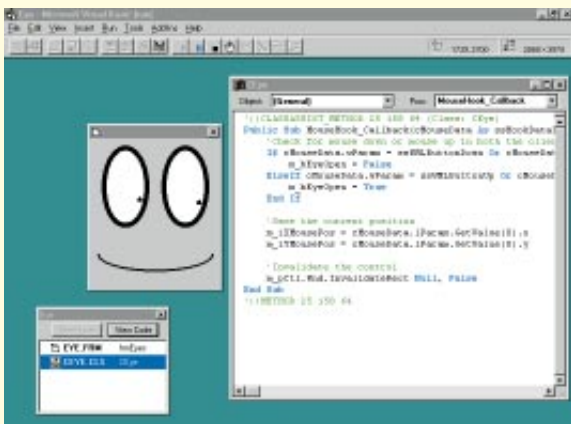
*Urlocker: "We typically win any technical evaluation."*

converting a Delphi visual component into an OCX. But despite the prevalence of OCX as a Windows-universal component, it is not yet a firm standard. OLE lacks support for inheritance and has a long way to go in its evolution.

Will Delphi also support OpenDoc and CORBA-compliance? "We have cautious support for OpenDoc. But we've never had a customer ask for it," says Urlocker. Some developers

dream of a Delphi C++ version; but there are no plans for such a thing. "C++ developers find the Object Pascal language is up to strength and we want it to be easy to learn. We couldn't achieve the same ease of use in C++."

Another problem is that the great complexity of C++ means more work for the compiler, so Delphi's near-instant compilation would be impossible. "But Java has a similar object model to Delphi. There's no multiple inheritance, or pointer problems. We've licensed Java and our goal is to encompass the same tools as in Delphi, but with the Java language," says Urlocker.



*The eyes in this VB application follow the mouse pointer, even when it is over another application. It's done using WinAPI hook objects, along with Class Assist and a couple of Visual Base controls*

At runtime, and before it is drawn on the form, the visual control calls methods in the associated OLE server. This means that VB code can modify the visual

control at a lower level than is normally possible; for example, drawing a different style of button or listbox. You can also intercept and respond to any Windows message sent to that control. In effect, Visual Base Controls enable you to create your own custom controls with VB code.

derived classes, there will be a huge proliferation of duplicated methods in your project. Even so, it delivers what it promises: inheritance for Visual Basic.

If that's what it takes to get inheritance, you might decide to do without it. But Class Assist has two other tricks up its sleeve. One is Visual Base Controls, a set of basic OCX controls which can be linked to VB classes in order to modify their behaviour. When you drag a Visual Class onto a VB form, Class Assist places the control and also creates a new OLE server class module. For this reason you need the Professional, or Enterprise, versions of VB 4.0 to use visual classes.

### Introducing oblets

Visual Base Controls make extensive use of WinAPI oblets, the third key element in the Class Assist package.

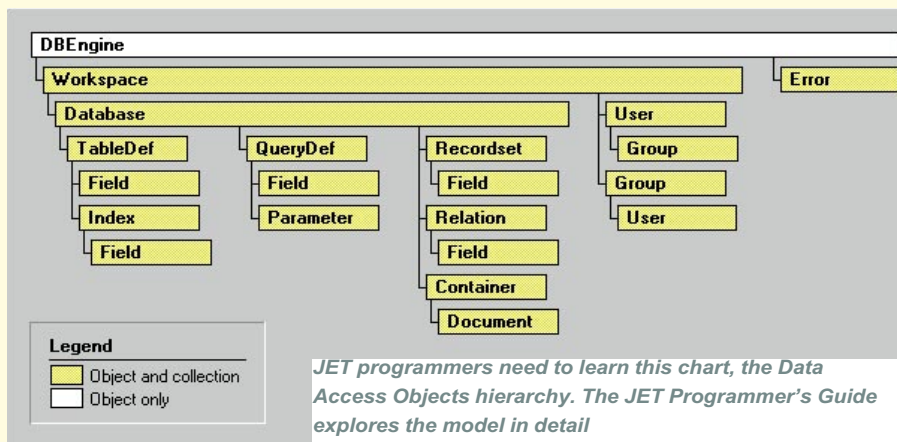
Oblets are in-process OLE automation objects which encapsulate the Windows API. As an example, *Fig 3* (page 313) shows how to set a form to be always on top, using oblets. Note that this is the



## Books for Visual Programming

Not before time Microsoft has published the *Jet Database Programmer's Guide*, by Dan Haught and Jim Ferguson.

Eagle-eyed readers will spot some overlap with the Data Access Objects (DAO) SDK included with Visual Basic and Visual C++. A poster insert displays the DAO hierarchy in more detail than any of the online charts. There's a good chapter on security, and plenty of tips for optimising performance with both local and remote data access. Although spoilt by a weak chapter specific to C++, this title is recommended for any database developer using JET, the database engine behind Visual Basic and Access.



● Visual C++ developers will welcome *Inside Visual C++ 4.0*, a major update of Kruglinski's standard tutorial. It has grown by 300 pages, of which over 100 are devoted to OLE in all its incarnations: OLE automation, OLE structured storage, and the OLE Component Object Model.

Kruglinski does not aim to be a comprehensive reference but to give a clear introduction, with examples, using the Microsoft Foundation Classes throughout. In particular, this is an excellent guide to the document/view architecture espoused by MFC and the VC++ AppWizard.

● *Doing Objects in Visual Basic 4.0* will help VB developers make use of version 4.0's new OO features. There's a common-sense introduction to object-orientated programming and masses of advice on subjects like coding standards and user-interface design. One section describes how to fake inheritance in VB; another explains how to build a VB AppWizard add-in. Along the way, a relational contact management system is developed, using the techniques described and storing the data in a JET .MDB. There is useful technical material here but the book's strength is in the theoretical framework it provides, especially for those already familiar with VB 3.0.

**Fig 3**

```
Dim MyWnd As New ssWnd ' declare the oblet
MyWnd.Attach Form1.hWnd ' attach it to the form
MyWnd.SetWindowPos ssSWPwndtopmost, 0, 0, 0, 0, ssSWPNomove Or ssSWPNosize ' call the SetWindowPos API function
MyWnd.Detach ' clean up
```

entire code. There is no need for declarations or constant definitions: all that is needed is a reference to the WinAPI oblets.

There are 24 oblets which encapsulate most of the Windows API, including areas traditionally difficult for VB, such as callbacks and hook procedures. Working with the API becomes a matter of interacting with the properties and methods of these oblets, using familiar dot notation. Another advantage is that oblets are non-visual, so you can use an ssTimer oblet in a procedure without needing a timer control on a form.

This is cool stuff, but there's a price to pay. Oblets are OLE servers, and instantiating an OLE object takes significant time. Once the object is created, performance is good, although slower than direct API calls. For example, we wrote a routine using ssDC, ssRect and ssWnd oblets, making repeated calls to FillRect. The inner loop took about 50ms for oblets, as opposed to 20ms for direct calls. At those speeds it may not matter. But the whole routine, including oblet creation, took 450ms with no equivalent overhead for the direct approach. That is 20 times slower. Careful application design is needed to avoid creating oblets, or any other OLE

objects, at time-critical moments.

Class Assist is a superb extension to Visual Basic 4.0 and demonstrates what can be done with OLE. If you're happy with VB's performance and want more power, look no further. On the other hand, if you like the idea of inheritance, custom controls and an object-orientated approach to the Windows API, maybe Delphi is worth another look.

### Secret Rich Text Format

M. Hodges writes: "I write DOS programs which create text files intended for import into Word 6. I would find it a great advantage to incorporate RTF formatting control codes but Microsoft has not been helpful: its technical support people do not seem to have heard of RTF. You refer to a 'Developer Network CD'; I'm not familiar with this. Is there any other way I could get hold of RTF documentation?"

The document is called "Rich Text Format specification" and is Microsoft Product Support Services Application Note 1/95 — GC0165. It should be obtainable from the Word product support team.

The Developer Network CD is a quarter-

ly subscription service (call 0800 96 02 79 for details). It contains documentation for most Microsoft products along with bug lists, books and a host of further documentation and examples. It is excellent value for Windows developers, but is not much use for DOS work.

## PCW Contacts

**Tim Anderson** welcomes your Visual Programming comments and tips. He can be contacted at the usual PCW address, or on [freer@cix.compulink.co.uk](mailto:freer@cix.compulink.co.uk)

**Class Assist** £175 from Contemporary Software 01727 811999.

### Books

All books available from **Computer Manuals** 0121 706 6000 (prices shown include VAT).

**Jet Database Engine Programmer's Guide** Book and CD £37.49; Microsoft Press.

**Inside Visual C++ 4.0** Book and CD £41.99; Microsoft Press.

**Doing Objects in Visual Basic 4.0**, by Deborah Kurata. Book and disk £37.49; Ziff-Davis Press.



## Let's samba!

Join Stephen Rodda as he hoofs it through the Samba suite to Linux.

As promised last month I've been playing with Samba, which I finally managed to make work with my version of Linux. I've been looking at SuperPrint for Windows 95 and Windows NT, too, but more of that later.

To explain, for those who may not have read last month's column: Samba isn't a dance (well, not in this case). Samba is a suite of programs which allows connectivity between Unix and Windows for Workgroups machines. The easier part is to attach a Windows for Workgroups share to the Linux machine. The harder task is attaching a Windows for Workgroups machine (or Windows 95 machine, to be precise). The reason this is harder is that we have to "advertise" as a Windows for Workgroups file server and do the sharing over the wire, too.

### How does he do that?

How did I do it? With a great deal of sweat and tears. I first upgraded my version of GNU C++ to version 2.7.2 as 2.7.0 was quite buggy. Then I upgraded from Linux 1.3.20 through all the patches available to 1.3.63. The latter version is quite impressive compared with the former and even the installation routine has been changed.

The new "make config" operation is much smarter, allowing IPX, Samba and AppleTalk support to be built-in (these

come with the kernel). It includes the VFAT file system, which is useful since it supports Windows 95 and NT's long file names — the original Samba package was an add-on.

Once the computer had finished compiling and linking the kernel, I modified the loader batch file (I use LOADLIN rather than LILO, the boot manager) and rebooted. All went well; the machine booted into Linux and soon asked me for my login and password. I ran the "smbmount" program, which came with the Samba package, and mounted the file system on the Windows 95 machine onto the Linux one. The smbmount program (as long as the machine is visible on the network to "ping", say) requires just the name of the share and the mount point (rather like the MS NET program) so I mounted the share called "C" from the machine named "Sanders" onto a directory located in "/sanders/c", following the

command with "-n", which told smbmount not to send the server machine a password as it was configured to allow attachment without passwords.

The reverse, however, was less easy. I had already configured the machine called "sanders" (my business partner Jeff's machine with the login name of "Jeff"), to allow it to access the Novell network and our NT server. Now, since his machine was already logged in to the network with his user name, I had to create that name on the Linux system too, because all attachments to the system use the user name and password.

How did I create a new user under Linux? I'd forgotten. But then I remembered that I had to edit the /etc/passwd file. I added a new line to this, cribbing most of the information from the "operator" account and then, as root, ran the passwd utility to allocate Jeff a password on the Linux system. Once this had been done, I only had to run the daemons, which allow access to the Linux machine as a Windows for Workgroups share; see the extract from the rc.inet2 file (Fig 1).

Then I added the two lines which would auto-mount any drives available on Jeff's machine to the Linux file system at boot time. But before this would work through the MS browser on the '95 machine, I had to change the Samba configuration file so that it would work with my system (Fig 2). Happy Unixing!

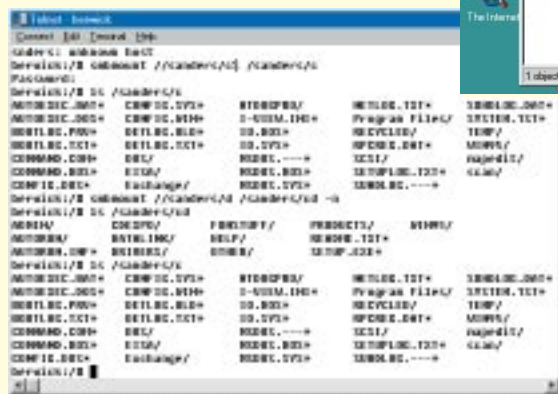
### Durable budget network needed

Stuart Davies writes: "I am the IT co-ordinator of a 500-pupil secondary school and have been given the go-ahead to lease a network for the IT room. At present we have 24 stand-alones of assorted parentage and varying ages, so the prospect of a roomful of Pentiums is an exciting one.

We have limited experience with a small Novell network in our offices but essentially it's a clean sheet of paper.

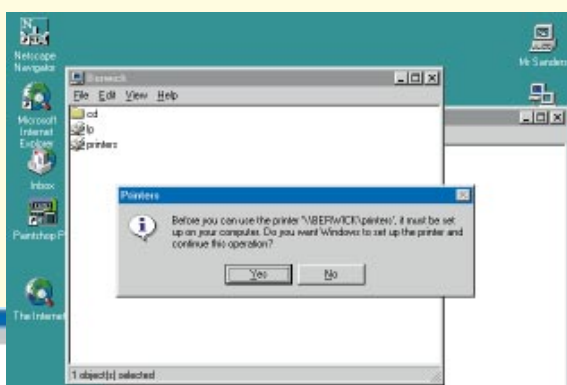
A visit to the recent BETT exhibition gained some information from suppliers such as Research Machines (RM) and ICL. Both were emphasising the benefits of

Windows NT as a network platform, running a Windows 95 front-end on the workstations. RM has even developed an education-orientated management utility



Above The Windows 95 machine browsing the Linux shares before setting a password for the 95 machine's user

Left The Linux machine, showing the Windows 95 machine's drives mounted



**Fig 1 Share and share alike**

```

echo "sharing drives through Samba"
/usr/lib/samba/bin/nmbd
echo "MS NETBEUI service started"
/usr/lib/samba/bin/smbd
echo "Samba shares started"
echo
echo "Mounting remote file systems..."
/sbin/smbmount //sanders/c /sanders/c -n

echo "//sanders/c "
/sbin/smbmount //sanders/d /sanders/cd -n
echo -n "//sanders/d "

```

1. Whatever we get will have to last for five years.

2. Our budget is finite, and tying it up on a five-year lease will not allow for any serious upgrades in that period.

3. Numbers are important; if it's a case of twenty-four 486s or 12 P120s, I'll take the 486s and live with it.

*NT and 95 may be a nice option, but perhaps we should be considering a Novell-based system as well?"*

which would make my job a lot easier.

My problem concerns the hardware requirements. Both suppliers were recommending P75s with 8Mb as workstations and a faster Pentium, with 16Mb, for the server. Quotes from two other sources came up with basically the same set-up.

My knowledge of NT is sketchy and I wonder whether the RAM is enough to do the job? In deciding what to get, I have to bear in mind that:

### How to go about it

Firstly, five years is a long time in computing. Secondly, unless you pay income tax and other taxes which are levied on a limited company, leasing becomes a far less attractive prospect, financially speaking.

In this situation it's worth remembering that the "legacy" machines you already have may be capable of being "souped-up". No matter what operating system you install, it is likely that the file server will bear the brunt of the file and program storage.

Since you already have 24 machines, it may be possible to replace the motherboards in half of them (assuming they are not of a proprietary design) — remember, I am making a generalised guess. Assuming their RAM is unusable, a motherboard with an AMD or Cyrix 486DX100 and 8Mb of RAM should not set you back more than about £350. Add to this price around £20 for a network card and you've got a workstation for somewhere in the region of £370.

Remember, too, that not all Pentiums are better than all 486s. A 486DX100 will perform better on today's software than a Pentium 75. The other thing to look at is to make sure that these motherboards are capable of accepting a true Pentium as an upgrade (as are most motherboards on the market nowadays), so if in the future you found the machines to be sluggish you could always upgrade the processors to Pentium chips, on-site — and for a lot less money than you would now pay.

Be aware, too, that the 686 is only around the corner and it won't be long before clone

**Fig 2 All change for the Samba**

```

[global]
printing = bsd
printcap name = /etc/printcap
load printers = yes
guest account = guest
; This next option sets a separate
; log file for each client. Remove
; it if you want a combined log file.
; log file = /usr/local/samba/log.%m
; You will need a world readable lock
; directory and "share modes=yes" if
; you want to support the file sharing
; modes for multiple users of the same
; files
lock directory = /usr/local/samba/var/locks
share modes = yes
[root]
comment = the whole Linux filesystem
browseable = yes
read only = no
create mode = 0750
path = /
[CD]
comment = CD ROM
browseable = yes
read only = no
create mode = 0750
path = /cdrom
[printers]
comment = All Printers
browseable = yes
printable = yes
public = no
writable = no
create mode = 0700
postscript = yes

```



## SuperPrint, I'm blue for you...

Zenographics' SuperPrint 4.0 for Windows 95 and Windows NT came in a pretty blue box with clouds all over the outside, proclaiming "Advanced Printing Tools for Windows" and decorated with the Microsoft Windows, Windows NT and Windows 95 compatibility logos. Inside, the box was just so much empty space: I pulled out a piece of cardboard, folded to take up the space of the box... and there was nothing more. But then I turned the cardboard over — neatly shrink-wrapped onto it were three pieces of card and a CD. I installed it under Windows 95, removing the PostScript SIMM from the HP LaserJet 4 on my desk, since on the pretty box was printed: "Not for use with PostScript-only printers". I also attempted to install an HP DeskJet 500C because one of those is on the network, too, in the guise of a DeskWriter C. The installation seemed not to be too

happy with accessing the network printers — it didn't even seem to give me the chance to access a printer through a network port. Nevertheless I thought, "I'll unplug the LaserJet 4 from the server and pop it into LPT1. It must work..."

One reboot later... in order to initialise the software (I was running Windows 95) but this time without the old printing services on the LaserJet and the DeskJet — and unfortunately, I had *no printing services at all*. Windows 95 has been on my machine, beta and release version, for about a year. In that time I've had to reinstall the beta version, but never the release version.

SuperPrint 4, despite its uninstall routine, has made me reinstall Windows 95; a feat of which no other program has been capable. You can imagine why I haven't tried SuperPrint under Windows NT.

another SCSI controller card for the tape drive, or replace the aforementioned Adaptec AHA 2940 with the AHA 3940 (a dual-channel version of the former). Now, if I don't qualify this, people are going to be howling for my blood, saying that you can have up to seven devices on a SCSI card. Yes, that's true, although in the greater number of cases you find that errors inexplicably creep in when running a tape drive from the same physical PC SCSI interface, whether under NT, NetWare, or whatever.

The backup medium should be DAT; prices are

pretty low now and about £500 should get you a good DAT drive.

NT provides its own backup program which, for a simple backup such as you would require, should prove to be more than adequate.

I've left your choice of operating system until last. I've already come down heavily on the side of NT Server since I believe this is the way that operating systems are going. However, have you considered the possibility of using Windows NT Workstation on the client machines? It'll run respectably in 8Mb and version 3.52 will provide you with the '95 Explorer user interface as well.

The reason I suggest this is that Windows NT Workstation gives you a hitherto undreamed-of level of security against people breaking security on the file server and, indeed, workstations. '95's security measures are easily circumvented but NT's are pretty solid.

You could look at running NT on the workstations as a goal, because it is hungrier for resources than '95, but I foresee '95 being superseded by NT during the life of your project. It is for this and other reasons that I am against the idea of your leasing machines, which within five years could turn out to be as useful in teaching computing as, say, a Sinclair ZX Spectrum would now be.

### At your Service

Microsoft has released Service Pack 1 for Windows 95 and I have put it on this month's free, cover-mounted CD for you.

### PCW Contacts

Stephen Rodda is an independent computer consultant specialising in DTP and networking. He may be contacted as [the\\_bear@cix.compulink.co.uk](mailto:the_bear@cix.compulink.co.uk)

makers are selling 686 clones. It would be advantageous if the motherboards could also accept this chip as an upgrade.

So far I have spent around £4,500 of your budget. Assuming that the other non-upgradable machines work, you should be able to sell these off for a sum in the region of £200 each. This will net you £2,400 — we have now spent £2,100.

As for the other machines, any reputable clone supplier will be able to assemble a reasonable 486DX/100 with 8Mb of RAM, 420Mb hard disk, 14in monitor and VGA card, mouse, keyboard and a case for about £650 — perhaps less if you assemble the machines yourself.

This comes to a sum of about £7,800: a running total of approximately £10,000. I assume that this is the rough figure you would be looking at for leasing the setup you had in mind. Of course it would take only a few minutes' work with a spreadsheet to come to the point where you could perhaps use more legacy machines, phasing them out over a year or two and upgrading with the surplus budget, which ordinarily would have been swallowed up in the leasing charges.

Nowadays, reasonable-quality clone machines are every bit as reliable as their blue-chip cousins. The advantage lies in

### Incorrectly addressed

I must apologise for giving out some un-routable IP addresses in *Hands On Networks* last month. The 192.0.2.X address which I used on our local LAN was wrong. For some reason, my brain kept telling me "192" whereas my memory, once it had reasserted itself, said "10". For the sake of completeness, the correct ones are: 10.X.X.X; 172.16.X.X and 192.168.X.X.

their generic quality of being easily upgradable.

As far as a server is concerned, Windows NT would be far easier to administer than NetWare: NT's own server administration tools would be quite enough for you to administer the LAN without buying a server from a particular supplier, just because of a freebie administration package.

### The safe way

I'd say that although it's a reasonable compromise, 16Mb in an NT server is pushing it a bit; I'd be inclined to use 32Mb. Remember that you can only put in 36-bit SIMMs in pairs with a Pentium, since it has a 64-bit data path and many motherboards don't have any more than four SIMM sockets, so you can either fit 16Mb or 32Mb of RAM. Anyway, for £300-odd, and since RAM prices are falling quite drastically at the moment, it's better to err on the safe side.

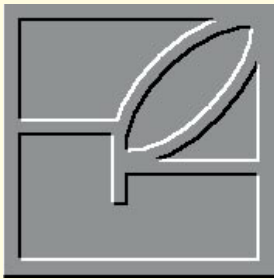
Do check out the availability of 686 clones if you decide to use clone machines — I should really recommend these in an NT server.

Another thing I should point out is, don't settle for anything less than an Adaptec 2940 SCSI controller in your server with, of course, SCSI hard disk(s). NT is a multi-tasking operating system and will make the best use of a proper bus-mastering setup, which IDE and its variants are not. I'd also suggest a 2Gb hard disk drive at the very least. With prices of disk capacity on the same downward slope as RAM prices it's a false economy not to take advantage of this.

### Back DAT up

Don't forget that backup is a necessity, not an option. For your setup I'd either get





# Bringing the System into line

The latest update to the Mac OS sees all current Macs using the same version of system software. Chris Cain checks out the changes.

If all goes according to plan, by the time you read this, Apple will have released the latest update to the Mac OS. System 7.5 Update 2.0 is designed to bring the system software for all current Macs into line, and provide new features and bug-fixes into the bargain.

System 7.5 Update 2.0 is, unsurprisingly, the second major tune-up to the latest version of the Mac OS since its release in November 1994. As with its predecessor, it looks set to be freely downloadable from Apple support sites on eWorld and the World Wide Web.

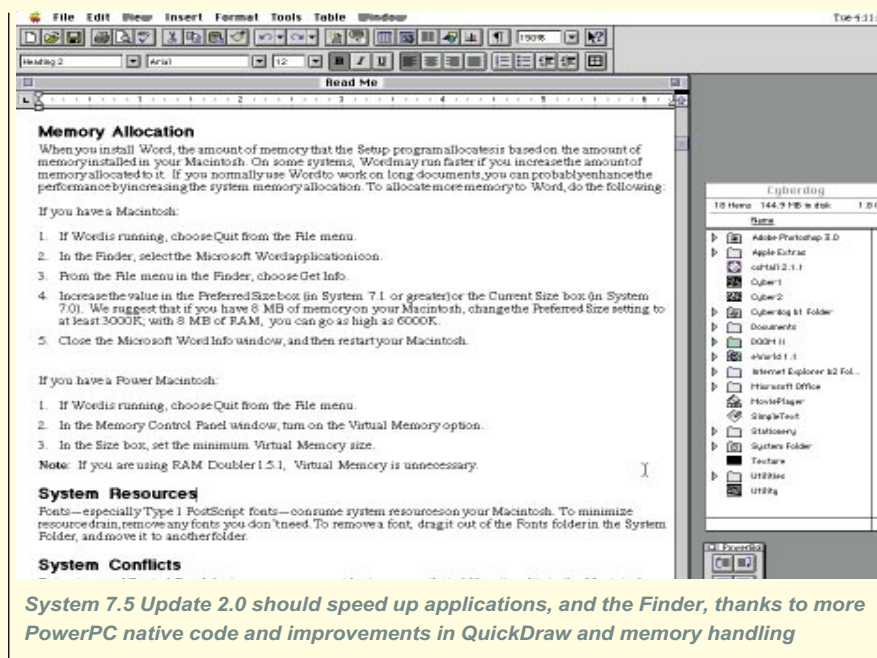
As well as updating all current Macs to the same version of system software, version 7.5.3, sources say that this addition will bring much needed changes for both 68K and PowerPC-based users.

## Transport of delight

For a start, Open Transport will be updated to version 1.1 to fix a number of bugs and it should now run on 68030 and 68040-based machines as well as NuBus and PCI PowerMacs. The revision will support faster networking links and be optimised for server applications.

For those who can't wait until 7.5.3 for improved networking support, Open Transport 1.1b16 can be downloaded from [ftp://ftptoo.support.apple.com/pub/apple\\_sw\\_updates/US/mac/Unsupported/](ftp://ftptoo.support.apple.com/pub/apple_sw_updates/US/mac/Unsupported/). The extension comes either as four disk images or one large network install file. But as hinted at by the address, this is not a final release and will therefore not be supported by Apple. It should work with all applications that currently use Appletalk, and a list of known incompatibilities is supplied with the code.

Finder operations are set to be improved by a number of changes, chief



*System 7.5 Update 2.0 should speed up applications, and the Finder, thanks to more PowerPC native code and improvements in QuickDraw and memory handling*

among which are more efficient flushing of the processor's cache, increased speed on 68040 and PowerPC machines, and longer name fields in list views.

The file copying routines will be updated to work asynchronously, making the CPU available to other applications while these take place, and rebuilding the desktop will no longer delete comments entered in Get Info boxes. Of course, it would be better if Apple could eliminate the need to rebuild altogether.

## Ghost in the machine

If you have a PowerMac, installing the update will give the Finder translucent icons during drag-and-drop operations. Currently when you move an icon from window to window you get an outline underneath the cursor; with 7.5.3 you will get a ghost image à la Windows 95. If you

are dragging more than one icon, only the one under the cursor will be translucent. Nothing stunning, but nice all the same.

Changes to other parts of the OS that will aid both types of Mac include a rewrite of the DMA serial driver for fewer hiccups with communications, and better file sharing. PowerPC users can look forward to better QuickDraw performance thanks to a new fixed point math library, faster application launch times with virtual memory switched on, and native versions of both the Resource and Memory managers. The latter is already native on PCI Macs.

As well as all this, new versions of QuickDraw 3D and OpenDoc are reportedly coming down the line before the summer. As I get either Beta or final copies of these, I will let you know what they're about.

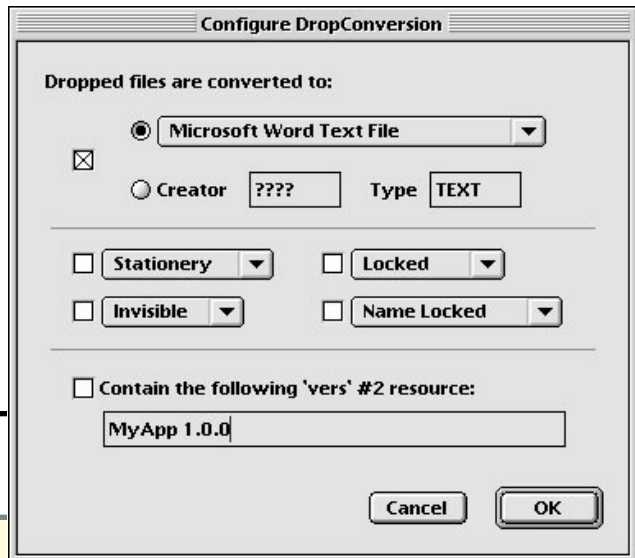
## Utility of the Month — DropConversion

This month's utility has been downloaded from the computer centre at eWorld. It's a neat little program that can be used to convert one type of file to another with ease.

DropConversion doesn't do complex things like convert a TIFF picture to a GIF picture; it simply changes the file-type information. For example, it will change a SimpleText document into a Microsoft Word Text file, as all that needs to be changed is the association and creator information. Even better, you can drop a whole batch of files onto DropConversion and it will handle them all at once.

DropConversion can currently switch between 17 different formats, including Photoshop PICT, CodeWarrior, ResEdit and Think C. It's shareware and costs \$8 to register. Details from <http://grove.ufl.edu:80/~nikolsw>.

*DropConversion easily converts file-type information*



### Woof! Cyberdog goes walkies

Another important Apple software release, and one that I've been trying to get to grips with this month, is the long-awaited Beta version of Cyberdog. This is the codename for a set of OpenDoc components that provide Mac users with "one-click access" to Internet services.

In lay terms, what Cyberdog lets you do is place objects into your OpenDoc documents, mail messages or the Finder, which then provide live links to Internet services. For example, you could create an OpenDoc document containing text and a drawing, then place a Cyberdog link to a relevant URL (or ftp site) into it, too. When you click in this area of the page, Internet tools appear and you're



instantly connected.

In theory, this works with email as well, so you could mail someone else who has Cyberdog, with a document containing a link. You could even have your InTray embedded in the corner of your favourite stationery file.

I haven't had much time to play with Cyberdog, and the Beta isn't exactly stable, but the whole thing looks very promising. I also love the name, although *I just know* that Apple will mess that up by calling the release version something like "OpenNet" or "MacOS Internet Solution". Will they never learn?

*Fetch boy, fetch. With Cyberdog you can add Internet facilities to any OpenDoc document, including a browser and email*

### Double trouble

Actually, I'm a fine one to talk about never learning. For months I've been telling people who have Connectix Speed Doubler to use something like Norton Utilities to check that their hard disks are in tip-top condition before installing the latest update. I've now had to reformat the drive on my own 9500 — almost certainly because I didn't practise what I preached.

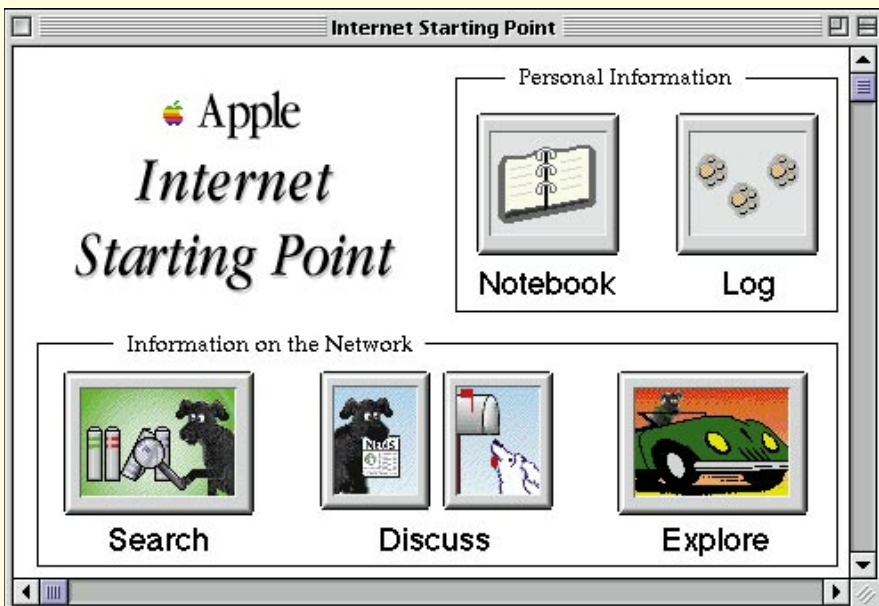
There I was the other day, working away, when the machine suddenly locked up and refused to boot from the internal drive. I booted with a CD-ROM system disk and found the Mac asking me whether it was OK to initialise the unknown internal hard drive. The problem turned out to have something to do with a serious error in the b-tree data, and this is where Speed Doubler experienced problems.

Even if it wasn't Speed Doubler that caused this, if I had run Norton Utilities before I upgraded, I'd probably still have a half-full hard disk. The moral of the story is: don't ever take ReadMe files for granted — they could just save your data.

### Buffer that

As regular readers of this column will know, I occasionally take time out to look at the latest in Mac games. In particular, 3D titles such as Doom II and Dark Forces have been mentioned and the subject of texture tearing is something I've brought up time and again.

Moving graphics "tear" apart on the screen if they aren't properly double-buffered. Every Mac 3D title I've seen suffers from tearing at some point and it annoys me, not only because it's unsightly, but also because it reveals a lack of quality control.



## "An error of type..." aaargh! At last, those system codes explained

One of the most annoying things about the MacOS is its lack of proper error messages. How many times has your Mac crashed with "an error of type X", without telling you exactly what "X" means? To help you out of some of these situations here's a list of the most common error numbers and their official meanings, as listed by Apple in its Technical Info Library. If you have access to the World Wide Web you can get a more complete list from Apple's web site ([www.apple.com](http://www.apple.com)). There are some errors that even the Apple technical documents don't explain, specifically Type 11. If I find out what these mean I'll let you know.

### ● 01 = Bus Error

A type 01 error usually occurs when the computer tries to access memory that doesn't exist: you can get this error on almost any Macintosh. In my experience, assigning extra RAM to an application, using its Get Info dialogue, can help prevent it.

### ● ID=02 Address Error

The Motorola 68000 microprocessor can access memory in increments of one byte (8 bits), or one word (16 bits), or one long word (32 bits). This microprocessor can access a byte of information at either an odd or an even memory address. But *it must* access one word or one long word at an *even* memory address. So, when the microprocessor attempts to read or write a word (or long word) at an *odd* address, you see this error. Since that's a 50/50 proposition when running random code, this one shows up quite often.

### ● ID=03 Illegal Instruction

The computer has a specific vocabulary of machine language instructions it can understand. If it tries to execute an instruction that isn't in its vocabulary, you see this error code. It's less likely than error 02 but is nevertheless common.

### ● ID=04 Zero Divide Error

This error results if the microprocessor divides two numbers, and the divisor is zero. Sometimes a programmer puts these in as debugging aids and forgets to take them out.

For the uninitiated, double-buffering is a technique whereby graphics are drawn into a memory buffer and then "flipped" on to the screen. While the picture is showing, the computer draws the next screen into the buffer ready to be displayed. The result is the kind of smooth animation you see on the PC versions of the games mentioned. The alternative to double-buffering is to just write frames directly to the screen, and this is when tearing can occur.

Originally I had put all this down to bad

programming and the memory restraints put on developers, by publishers. From talking to developers however I have since found out that this depends more on a lack of hardware support for double-buffering graphics on the Mac itself. Worse, recent

*Everything looks fine in this stationary screenshot, but the graphics in Mac 3D titles tear thanks to a lack of double buffering. Find this location (first level, first door on the left) in Doom II and see for yourself*



tests with sample QuickDraw 3D applications have shown that these, too, suffer from the same problem.

If the Mac is to retain its reputation for high-quality graphics, especially with the industry heading in the direction of 3D, Apple must move quickly to sort this out. It will not be taken seriously in the graphics or entertainment industry if its images tear and flicker all over the place.

The next time you see this on a Mac application, do me a favour and tell the developers. Maybe between us we can get it sorted out.

## PowerMac price cuts

Apple has cut its prices across the entire PowerMac range. This is great news for anyone thinking of making the move to Macintosh, or for existing users wanting to move to PCI.

Examples of the new prices are:

- 7200/75 8/500 will cost around £830.
- Bundle of 7200/75 8/500 with Multiscan 1705 display (no keyboard), £1,250.
- 7500/100 8/500/CD has an expected street price of £1,645.

The more powerful 8500 and 9500 systems are also affected by the price cuts. Anyone interested in further details should call the Apple Customer Response Centre.



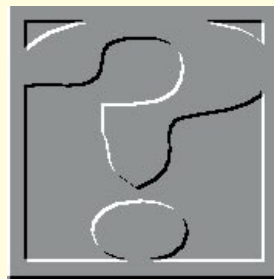
## PCW Contacts

Chris Cain loves to hear from Mac users. He's on [Chris\\_\\_Cain@PCW.CCMAIL.COM](mailto:Chris__Cain@PCW.CCMAIL.COM), [Chris@CIX.COMPULINK.CO.UK](mailto:Chris@CIX.COMPULINK.CO.UK) or as [Cain@eworld.com](mailto:Cain@eworld.com)

Apple Computers 0181 569 1199  
Apple Customer Response Centre  
0990 127753

Apple's home page is [www.apple.com](http://www.apple.com)

## Any questions?

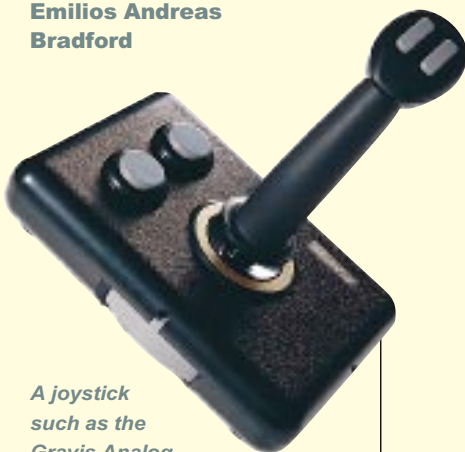


If you have a PC problem or think you could help out other readers, contact **Frank Leonhardt**.

**Q** "I would like to buy a good joystick, for a PC, to use with flight simulators and some arcade-type games.

Reading through PCWI came across three possibilities: the CH Flightstick Pro, the MS Sidewinder Pro with Fury, and the Gravis Professional Analog. I have played around with the Flightstick but know nothing about the latter two. I do not want to spend more than the price of the Flightstick Pro. Please advise me."

**Emilios Andreas Bradford**



A joystick such as the Gravis Analog Pro can be used both for flight simulation and arcade-style games

To make sensible use of a serious flight simulator you need a good analogue joystick, at the very least.

Analogue joysticks are different to the digital type because software is able to read exactly how far the stick has been moved in any direction, rather than simply reading the direction alone.

For proper flight simulation this is critical. You need to be able to make precise and rapid adjustments of the angle of all the virtual aircraft's control surfaces and hold them in place. Using a digital joystick as a substitute would be like dispensing with the steering wheel on a car and replacing it with a pushbutton to turn left and right.

You can switch most flight simulators into easy mode so you can control them from the keyboard or a digital joystick, but where's the fun in that?

While I'm on the subject, you really need rudder pedals to simulate the three-axis control found on most aircraft (pitch, bank and yaw). Without pedals, which

conventionally control the rudder and thus the yaw, you can't perform the more interesting manoeuvres like landing with a cross-wind.

However, analogue characteristics are just what you don't need for arcade games. I have been assured by PCW's resident leap-and-zap merchants that the best joysticks for them are digital; better still are digital game pads such as the Phase 9 Phantom 2 from Euromax.

This explains why I've never got on with arcade games using my Flight Simulator set-up — I had hitherto assumed I was digitally challenged.

This reasoning suggests that you would be far better off with a digital joystick for arcade games and a good-quality analogue one for flight simulators.

There are any number of digital sticks around. The thing to look for is a combination of microswitch construction (meaning durable switches), solid build and a price low enough to make it expendable should you become over-enthusiastic while in battle with the killer rabbits from Hades.

Flight simulator enthusiasts are divided between products from CH and Thrustmaster. The latter has a following in the military simulator camp, where the bias is towards zapping the enemy. Flight simulator fanatics, who look for technical accuracy above all else, prefer the CH product range.

The snag, as ever, is the budget; buying a Flightstick Pro leaves you nothing for a separate arcade stick. However, the Flightstick standard has a more reasonable price tag of around £30. The difference? The Pro version simply has some extra buttons cluttering up the head of the stick to save some use of the keyboard.

### Drive B for CD?

"Having read your answer about CD-ROM and hard-drive letter assignment in the March issue, I wondered whether there was any way of using the commonly redundant drive letter 'B' for the

CD-ROM. As I have only a 3.5in floppy drive, it seems a sensible answer.

I have tried some experiments to see whether it would work but (as expected) it wouldn't, probably due to the drive letters being assigned in hardware or BIOS. I suspect that the manufacturers have already thought of this and that a solution is either possible and coming; possible and not coming; or impossible."

**David Laurie**

Drive letter B has always been a special case, I'm afraid. The original IBM PCs could have a single floppy drive and nothing else, which presented problems copying files from one disk to another, or even keeping your document files on a separate floppy to the word processor.

To make a single-disk machine useful, a little fudge was put low down in the system BIOS. Basically, any application which asked was assured by the system that both drives A: and B: were available for use. Only the BIOS and the user knew the horrible truth — and it was pretty horrible. Whenever the software wanted to use drive B: the user was prompted to swap the current floppy for the one which would have been in drive B: if it had existed. Then, when A: was required, you were asked to swap them back again.

Should you ever want to show your grandchildren how tough life once was you can still activate this feature — just type COPY A:\*.\* B: with a floppy full of files and wait for their arms to start aching and their button-pushing fingers to turn red. (This was even more fun if you had the basic 64Kb machine, of course.)

The BIOS actually stores the true number of floppy drives in bits 6 and 7 of address 40:10 (the equipment list flags). Because this happens at such a low level, whatever drive you are planning to use in place of drive B: had better look very like a floppy disk to the system — and a CD-ROM drive just doesn't.

With clever software it can be done. Iomega managed to map their 1.44/21Mb

## Frank's bargain basement

● Further to discussions about installing several operating systems on one PC, Michael Hohmann wrote to me to sing the praises of System Commander, by V Communications Inc. According to its UK distributor, Ingram Micro Services, it is absolutely wonderful and allows you to keep DOS, Windows 95, Novell, Unix (many flavours), OS/2 and just about anything else, on the same drive.

Considering that some of these systems have different filing formats, this would be quite a feat and some combinations probably aren't as simple in practice. At £59 it's not cheap but nevertheless seems very popular in the US.

● If all you are after is a way to keep Windows NT, Windows 95 and MSDOS on the same disk, then J. David Bryan has helpfully provided instructions on <http://www.bcpl.lib.md.us/~dbryan/directboot.html>. Thanks to James Roberts-Thomson for finding them. Before those without Internet access write in to complain, I'm afraid I can't include the details here because there just isn't room!

*floptical drive as B: and it worked rather well until Windows 95 appeared. Now it doesn't, and Iomega appears unable or unwilling to fix it. In general, however, it is best to leave B: to the BIOS.*

### Best budget buy

"I have £600 to spend on a PC. What is the best I can buy for my money?"

[tmancini@bathhe.ac.uk](mailto:tmancini@bathhe.ac.uk)

*I'm afraid your budget isn't going to get you very much. You should carefully consider what you intend to do with the machine before making your choice.*

*If it is your plan to run the latest PC software, then forget it. You'll need to spend £400 (plus VAT) on 16Mb of RAM alone. You might be able to find a secondhand PC within your price range but don't expect anything that will run more than Windows 3.1 and Word for Windows 2.0.*

*The minimum specification to look for would be: a 386 processor, 120Mb of hard disk, a VGA monitor and 4Mb of RAM. You might be lucky and get slightly better than this — it depends on the mood of the seller.*

*If you work for a large organisation you may find that they are selling off old machines, to staff, at bargain prices. It is often the case that company policy dictates a software upgrade which half its machines are incapable of running. By this stage, the older machines are worthless in part exchange and it is cheaper to flog them to the staff for a nominal sum than attempt to get more for them on the open market. No doubt the possibility of newly-computerised employees taking work home with them plays a part in the reasoning, too!*

*Given that you probably won't find anything to cope with current software, you may be better off considering a non-PC machine for the specific purpose*

*you have in mind. For instance, if your principal interest is in games, then buy a games console instead and keep the change.*

*Many PCs are just used for word processing, which is an expensive way to do it. For the price of a good computer printer you can get a complete word processor. The Amstrad PCW is simple but efficient in this role and can often be found for sale at around the £200 mark. As I write, Morgan Mail Order, a well-established surplus dealer, is advertising "refurbished" PCW 9512 machines at £150 (plus VAT), which includes a daisywheel printer — a very usable word processing system.*

### Dusting down a dead CD

"I have a multimedia PC which I've used for a while with no problems, until recently: my CD decided to die on me. It responds with FAIL ON INT 24 when I type DIR in DOS (and after several 'F' key presses) on the CD 'D:' drive.

There is power to the drive; I can eject the tray, and the busy LED comes on after it has been closed again. But the LED stays on for longer than usual. I can only presume that this means the laser has packed up.

Am I right? I have tried audio CDs using the CD Audio package in DOS and Windows — but again, no response. Can the CD be fixed, or is it worth my upgrading to a quad- or six-speed?

I have one more query: my sound card emits an annoying, high-pitched, continuous tone after about half an hour in Windows. Any ideas?"

**Paul O'Neill**  
[poneill@sleazy.demon.co.uk](mailto:poneill@sleazy.demon.co.uk)

*Like most things, your CD-ROM drive is repairable. But the cost of having it repaired may be more than it's worth. It seems to me like something has caused*

*the laser to misalign sufficiently to stop it reading anything; this could be as simple as dust having built up on the receiver.*

*Before you scrap it, try blowing into it very hard, preferably with compressed air. You could also try one of those audio CD head-cleaning kits that hi-fi shops have been selling since the bottom dropped out of the vinyl and dust-bug market.*

*As for the sound card, it could be picking up stray signals from the rest of the computer and amplifying them, to your annoyance.*

*On your card there will be a mixer which is responsible for adding together the different sound sources before they are amplified and sent to the speakers. These analogue devices have sometimes proven rather sensitive to warming up and it could be that yours is leaking through noise on an unused channel.*

*Most sound boards have an unused mixer input for connection of the PC's internal speaker output. Most of the time this is left disconnected so your machine can still beep without the aid of the sound board and external amplifier.*

*Another common source of noise is an unused microphone input. These are very sensitive inputs and will amplify noise just as well as a microphone.*

*In your case, it might even have been something from your iffy CD-ROM drive's audio output. If you disable and re-enable each of your sound board's channels in turn, using its configuration software, you should be able to isolate the rogue channel. If it was unused, and disabling it in software doesn't work, you can connect a low-noise resistor across the input to shut it up.*

## PCW Contacts

**Frank Leonhardt** is an independent technology consultant who can be contacted on **0181 429 3047** or via email as [frank@dircon.co.uk](mailto:frank@dircon.co.uk) or [leo2@cix.compulink.co.uk](mailto:leo2@cix.compulink.co.uk). There is a web site at <http://www.users.dircon.co.uk/~wombat/answers.htm> which may contain late-breaking news. Letters may be sent to **PCW** at **VNU House, 32-34 Broadwick Street, London W1A 2HG**. Sorry, but due to the high volume of correspondence, individual replies are not normally possible.

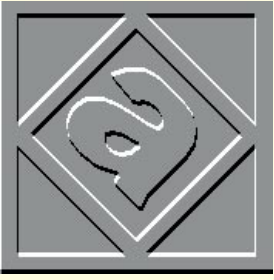
● **Flight simulators** RC Simulations  
**01275 474550**

Strategic Plus Software **0181 977 8088**

● **Joysticks** Simply Computers  
**0181 523 4020**

Ingram Micro Services (System Commander) **0181 905 6969**

● **Used computers** Morgan Mail Order **0121 456 5565**



# Working with Windows 95

**Let's get practical — Eleanor Turton-Hill helps you get to grips with the new operating system.**

Following much hype and a great deal of media debate, people are finally getting to grips with the day-to-day practicalities of Windows 95.

Nevertheless, judging from some of the emails and phone calls I've been getting recently, there are still lots of users out there who could do with a beginner's overview of the new OS (operating system).

Here, I'll be explaining some of the technical terms which are used when talking about operating systems, as well as providing a quick, practical overview of how to get started.

## Installation requirements

Microsoft states that to install Windows 95 you'll need at least a 386 processor with 4Mb of RAM (Random Access Memory)

and 35 to 45Mb of spare hard disk space.

In practice, such a machine chokes at the mere thought of Windows 95 and you can forget running any useful applications. I'd recommend a minimum spec of a DX2/66 processor with at least 8Mb of RAM and 50Mb of spare hard disk space — and by "spare" hard disk space, I mean enough free space to install the operating system.

If you intend to install Microsoft Office, or any other applications built specifically for Windows 95, you'll need a decent amount of spare space in addition to this if you're really going to benefit. Hard disks are pretty cheap these days so it's worth treating your aged PC to some extra breathing space in the form of a new 850Mb (or even a 1Gb) hard disk. The former costs just over £100.

Windows 95 and the 32-bit applications

which go with it are hungry for both hard disk space and memory, so when it comes to the RAM in your system the same rule applies; the more you can get your hands on the better.

Unlike hard disks, however, RAM is expensive, so you'll have to weigh up the pros and cons if your machine is in need of a significant upgrade. You can get hold of Windows 95 itself for as little as £60 but the money you pay out in hardware upgrades can easily run into hundreds of pounds.

## Preparing your system for Windows 95

There are a few clean-up tasks which it will pay you to perform before you start the installation program:

1. First, defragment your hard disk (see last month's *Hands On Beginners*). This will rearrange all the free space on your hard disk into one, uninterrupted area giving the new OS a clean start.
2. Next, check your system for viruses. If there are any lurking around, now is the time to get rid of them.

If anything goes wrong with your Windows 95 installation, you want to be able to eliminate viruses from the list of possible causes. Lots of common viruses can be identified and cleared using MSAV (Microsoft Anti-Virus) which is included in DOS 6.

If you want to be really thorough, use a third party virus tool which has been updated on a regular basis.

3. Make yourself a boot disk so that you can start your PC from the floppy drive if necessary.

Do this by going to the File Manager in Windows 3.1. Insert a clean floppy into the A: drive and go to the Disk menu. Select Make System Disk from the menu and the essential system files will be copied to your floppy.

## The installation program

Installing Windows 95 is a fairly self-explanatory process and you'll find that the documentation is quite clear, should you be unsure of anything.

- If you're upgrading from Windows 3.1, you should start the setup program from within Windows.
- Go to File, and then Run, from the Program Manager and type d:\setup (if you're installing from CD-ROM).

The initial Welcome screen appears and examines your system for the required amount of hard disk space. If you don't have enough, the installation will let you know early on in the process.

- Unless you have vast amounts of spare

## Is Windows 95 a better operating system?

On the whole, the improvements incorporated into Windows 95 make it a more usable, more stable and more fully-featured operating system (OS). Two things from which you will benefit right away 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 the 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 remain 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 does not jeopardise the OS itself: thus, 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. But 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, however, the new OS is generally a good deal more stable than previously.



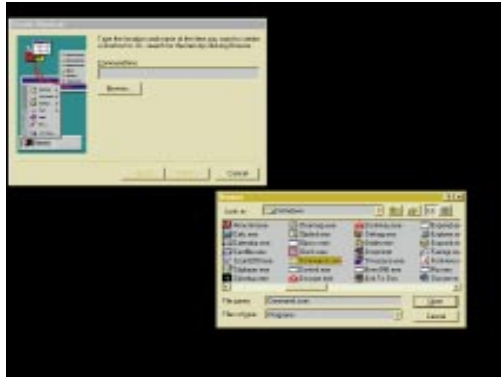
## Setting up your desktop



*Windows 3.1 users like myself will be used to Alt-Tabbing back to the Program Manager to open new applications. Here, I've set up a folder full of shortcuts to all my most commonly-used applications. This can be left open all the time so that you can switch back to it*



*Here, you can see that the files and folders showing in the Start Menu folder in the Windows directory are mirrored on the menu itself; so you can edit the menu directly from Explorer*



*To create a shortcut to the DOS prompt, create a path to command.com*

hard disk space, it's a good idea to install Windows 95 directly over your previous Windows installation. That way, your existing applications will be set up and ready to use from Windows 95 when you've completed the installation.

If you install Windows 95 in a separate directory, you will have to reinstall all your applications before you can get started.

- During the installation you will be asked if you want to save your existing system files. I would strongly recommend that you answer "yes" to this as it allows the whole installation process to be reversible.

Your old system files will take up about 6Mb of valuable space on your hard disk and although this may seem extravagant, it is worth doing. If Windows 95 fails to install correctly, you can get your Windows 3.1 system back. If it installs okay, then

you can delete the 6Mb of system files.

### Interface enhancements

The Windows 95 interface takes some getting used to and feels quite awkward at first. The Program Manager no longer exists and the File Manager has been replaced by the "Windows Explorer".

When you Alt+Tab to move between applications, a box appears in the middle of the screen showing icons for all the applications you have open. But you can't move back to the Program Manager to start up a new program because it's not there anymore.

In Windows 95 everything hinges on the "Start" button on the Taskbar. This gives you access to all the applications and utilities on your system via a series of menus. When you install a new application

it is automatically added to the menu list.

The desktop is less cluttered in Windows 95 than it was in previous versions. The interface design is based on thousands of hours of usability testing and careful analysis of the type of tasks which all kinds of users perform.

When you minimise applications, they sit on the Taskbar at the bottom of the screen so you always know exactly which applications you are running at any time.

### Tips to help you find your way

The combination of the Start button and the Taskbar gives quick access to most common operations. Here are a few tips to help you find your way around:

- Press F1 at any time to go into the Windows 95 Help system. This will display information which is relevant to your location on the desktop. You can also search the help system index for a subject area if you want an explanation or a step by step list of instructions.

- Right-click on everything. The right mouse button is used extensively all around the desktop of Windows 95.

If you're not sure what something does, right-click on it and you should find out by way of a menu or information box. Look out for the Properties option on menus as this allows you to change the appearance of objects on the desktop.

- Experiment with your desktop. The Taskbar can be dragged and dropped to any side of the screen, and you can force it to hide by clicking the Auto-hide check box. Go into the Display option in the Control Panel to control the colours, screen savers and wallpaper.

- Edit the Start menu but don't bother with the Taskbar settings dialogue box. Instead, open up Explorer and take a look in the Start Menu folder in the Windows directory. All files and folders listed here are mirrored on the actual Start Menu. You can add new program icons to the menu simply by dragging and dropping.

- Make use of shortcuts. They provide a way of accessing an application, document or drive from the desktop without having to manually root around for it. All you need to do is drag and drop the executable file on to the desktop, or right-click on the desktop and select New, ShortCut, and then Browse to find the file.

### PCW Contacts

Eleanor Turton-Hill welcomes any feedback and suggestions from readers. She is on [ellie@pcw.ccmil.compuserve.com](mailto:ellie@pcw.ccmil.compuserve.com)



manufacturer offer guaranteed response times?

- Check the technical support. Is it free? Is it easy to get through to?

### PCW Minimum Specification

This is the absolute minimum spec we think you should even consider buying now. It's suitable for general business use: word processing, databases and spreadsheets.

- Windows 3.11
- 486 DX2 66MHz processor
- 8Mb RAM
- Graphics card with 1Mb of memory
- 340Mb hard disk
- 3.5in floppy disk drive
- Double-speed CD-ROM drive
- 14in colour monitor
- PCI local bus

If you're buying the PC for home use, you'll probably want full multimedia capabilities so that you can use CD-ROM games and edutainment products and play video clips. This should include at least a

- 16-bit SoundBlaster-compatible sound card
- Speakers

### PCW Recommended Specification

If you're not completely strapped for cash this is the PC specification we recommend. Certainly no-one who works at PCW would consider buying anything less.

- Windows 95
- Pentium 90MHz or 120MHz processor (a faster processor will make your computer run more quickly and smoothly)
- 256Kb secondary cache (again this makes your computer run faster)
- 16Mb EDO RAM. 16Mb of memory speeds your PC up a lot, particularly if you're multitasking (using more than one application simultaneously)
- Graphics card with 2Mb of memory
- 500Mb hard disk — modern computer software takes up a lot of space
- 3.5in floppy disk drive
- Quad-speed CD-ROM drive (video clips will play more smoothly; you will be able to access files on CD-ROM disks more quickly)
- 15in colour monitor (one inch doesn't sound a lot, but is easier on the eyes)
- 16-bit SoundBlaster-compatible sound card
- Speakers
- PCI local bus

For up-to-date PC reviews, see this month's cover story

## Buying a PC

The one universal rule with PCs is that they get "cheaper, better and faster" over time. This can happen at a bewildering rate, with the result that your state-of-the-art PC becomes outdated and old-fashioned in a couple of years. It may still work perfectly well, but it probably won't run very fast and won't run the latest software. If you're just planning to do simple word processing, this probably won't matter. But we're assuming here that you want to buy a general-purpose multimedia PC that can play games, use CD-ROMs and run a range of modern software.

### Things not to do when buying

- Don't buy a machine with less than 8Mb of memory.
- Avoid older VESA local bus motherboards.
- Avoid cheap 14in monitors.

### Things to do when buying

- You can never have too much disk

space. Spend extra cash on the next hard disk size up.

- Memory is expensive, but upgrading from 8Mb to 16Mb makes a huge difference to performance.
- Look at the bundle. What other software is included — is it worth having?
- Check the warranty. Is it on-site or back to base? If it's on-site, does the

### PCW Best Specification

Our Best Spec is as good a PC as you are likely to need for most software. For some specialist applications, like professional DTP or CAD, you may need to add even more memory, a bigger hard disk, a more powerful graphics card, or a larger monitor.

- Windows 95
- Pentium 133MHz PC
- 512Kb secondary cache
- 32Mb EDO memory
- 1Gb hard disk
- 3.5 in floppy disk drive
- Six-speed CD-ROM drive
- 17in colour monitor
- 2Mb VRAM graphics card (this means your graphics card can display more colours and a higher resolution on your monitor — Sixteen million colours at a resolution of 800 x 600, to be exact)
- 32-bit sound card
- Quality speakers
- PCI local bus

### Other things to consider

PCs have become a lot more similar in the last few years. The days when smallish computer companies designed their own chipsets (the computer chips that assist the computer's main processor) are long gone. Most small box-shifters buy their motherboards from Taiwanese manufacturers. Larger companies either design their motherboards themselves (Apricot, Compaq, IBM) or get motherboards built by other companies to their specifications (Gateway).

## Buying a NOTEBOOK

Notebooks are one area in which it's often safer to stick to brand-names. Not that some of the Far Eastern kit doesn't work perfectly well, but reliability does seem to be a problem and it can be fiendishly difficult to obtain spares. The other useful guideline for notebooks is to try before you buy.

Standard notebook specifications are generally a step or two behind the desktop equivalents. For example, quad-speed CD-ROM drives are still no standard on notebooks, where on desktops the six-speed variety are already well established. The latest generation of colour screens can cope with 800 x 600 resolution, but that's still a step behind the desktop 1024 x 768 standard.

### What to look for in a notebook

#### • Pointing device

There's been a wholesale move from trackballs to trackpads. Some notebooks, notably IBM Thinkpads, use stick technology (a thing which looks like the rubber on top of a pencil and is controlled using one finger).

• **CD-ROM drives** are rapidly becoming standard in notebooks. If your notebook is going to be your only machine, it's worth getting one.

• **Floppy disk drive** Often there's a choice between a CD-ROM drive and a floppy disk drive. Again, if the notebook is to be your only machine, specify both. Otherwise, reinstalling an operating system can mean returning the machine to the manufacturer.

• **PC cards** Modern notebooks all have at least one PC card slot. They take credit-card sized expansion cards which can add a fax-modem, a network interface card or even an extra hard disk to your computer.

• **Battery life** Battery technology keeps improving, but unfortunately the power demands of ever more powerful notebooks tend to keep pace. Battery life varies from as little as 30 minutes over six hours. Lithium Ion and Nickel Metal Hydride batteries have now largely replaced the



older Nicad (Nickel Cadmium) batteries.

• **TFT screens** TFT or active matrix screens are starting to replace the slower dual-scan or passive matrix screens. It means the screen image is refreshed much more quickly.

• **Warranty** Drop a notebook and it may well break. This means it's especially vital to check the

terms of your warranty. How long is it? What level of service is provided.

### PCW Minimum Specification

Notebooks change rapidly. It's often possible to pick up end-of-line machines with 486 processors from brand-name manufacturers such as Toshiba and Compaq at discounted prices of £1,000 or less. These can be a very good buy. Just make sure they can run the software you need to use. They probably aren't up to running Windows 95.

### PCW Recommended Specification

- Windows 95
- Pentium
- 256Kb secondary cache
- 16Mb RAM
- On-board graphics with 1Mb of memory, PCI local bus
- 500Mb hard disk
- 3.5in floppy disk drive and/or dual-speed CD-ROM drive.
- Dual-scan screen.

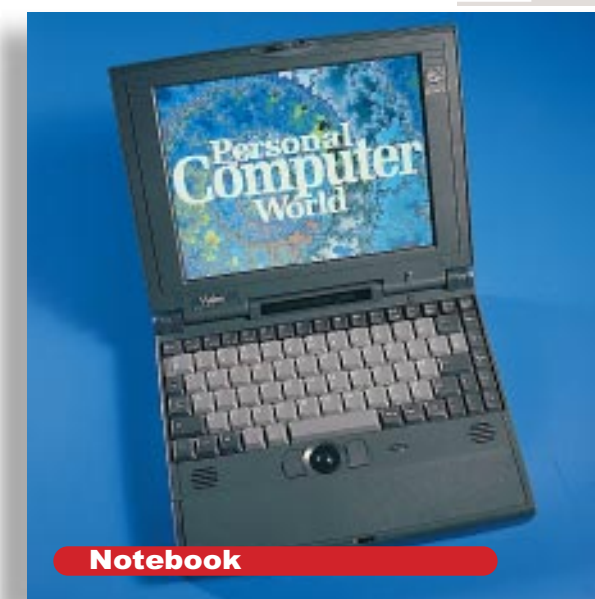
### PCW Best Specification

The state of the notebook art. You're either loaded, or your

company's picking up the tab.

- Windows 95 or Windows 3.11
- Pentium
- 256Kb secondary cache
- 16Mb RAM
- On-board graphics with 2Mb of VRAM memory, PCI local bus
- 1Gb hard disk
- 3.5in floppy disk drive
- Quad-speed CD-ROM drive
- Active matrix TFT screen
- Long battery life

For recent notebook reviews, see PCW March, page 133



Notebook



**A****Access Time**

The time it takes for a device to access data. The access time, quoted in milliseconds (ms) for hard disks and nanoseconds (ns) for memory, is usually an average, as it can vary greatly. Together with the transfer rate, it is used to gauge the performance of hard disks and other devices. The lower the number, the better the performance.

**Acronyms**

These form most of the technobabble which has been refined over many years to confuse you, the user, and keep us, the writers, in business. Try to take as little notice as possible of it: the computer industry is littered with TLAs (Three-Letter Acronyms).

**Applications**

An application, or package, is one or more programs used for a particular task: for example, word processing, invoicing or spreadsheeting.

Applications are bought shrink-wrapped (wrapped in cellophane for general use) or custom-built for more specific uses.

**ASCII (American Standard Code for Information Interchange)**

Usually a synonym for plain text without any formatting (eg italics, bold or hidden text). Since computers naturally use binary rather than Roman characters, text has to be converted into binary for the processor to understand it. ASCII assigns binary values to Roman characters. RTF, a Microsoft standard, adds extra formatting features to plain ASCII.

**B****Backwards compatible**

Compatibility of hardware or software to older versions of the product or standard.

**Baud rate**

The amount of data that can be sent along a communications channel every second. In common usage, it is often confused with bits per second. These days modem speeds are normally measured in bits per second. (See V\* and Bit)

**BIOS**

Basic Input/Output System (pronounced buy-oss). Software routines that let your computer address other devices like the

keyboard, monitor and disk drives.

**Bit**

Binary digit, the basic binary unit for storing data. It can either be 0 or 1. A Kilobit (kbit) is  $2^{10}$ , 1024 bits; and a Megabit is  $2^{20}$ , which is just over a million bits. These units are often used for data transmission. For data storage, Megabytes are more generally used. A Megabyte (Mb) is 1024 kilobytes (Kb) and a Kb is 1024 bytes. A Gigabyte (Gb) is 1024 Mb. A byte (binary digit eight) is composed of eight bits.

**Bug (See Crash)****Boot**

Short for bootstrap. Refers to the process when a computer loads its operating system into memory. Reboot means to restart your computer after a crash, either with a warm reboot (where you press Ctrl Alt Del) or a cold reboot, where you switch the computer off and back on again.

**Bulletin board systems (BBSs)**

A kind of electronic forum now being replaced by the Internet. (See net.newbies, p207)

**Bus**

A "data highway", which transports data from the processor to whatever component it wants to talk to. There are many different kinds of bus, including ISA, EISA, MCA, and local bus (PCI and VL-bus).

**C****Cache (See Memory)****COAST**

Cache On A Stick.

**CD-ROM**

A CD-ROM is the same as a normal audio CD, except it can store data as well as sounds. A CD-ROM player can be attached to your computer to read information from the CD-ROM into the computer's memory in the same way that a domestic CD player reads information from the CD into your hi-fi. The advantage of distributing information on CD-ROM rather than other media is that each one can hold up to 680Mb of data — equivalent to some 485 high-density 3.5in floppy disks. The disadvantage, however, is that you can only write once on CD-ROMs, but this makes them ideal for archiving.

**CISC (See RISC)****CPU**

Central processing unit. Normally



refers to the main processor or chip inside a PC. (See Processor)

**Crash**

Common term for when your computer freezes. Can be caused by a power surge, a bug (which is a fault in software), or a GPF.

**D****DRAM (See Memory)****DOS (Disk Operating System)**

Once the standard operating system for PCs, it is now being replaced by Windows 95 and Windows NT.

**DPI (Dots Per Inch)**

Common measure of the resolution on a printer, a scanner or a display.

**Drive controller card**

An expansion card that interprets commands between the processor and the disk drives.

**Drivers**

Pieces of software that "drive" a peripheral. They interpret between the computer and a device such as a CD-ROM. If you have a SCSI CD-ROM drive connected, you will be able to use it on a PC or a Mac, just by loading up the relevant driver on each machine.

**E****EIDE (See IDE)****EISA (Extended Industry Standard Architecture)**

A bus standard designed to compete with MCA now being replaced by PCI. Its advantage was that it was designed to be backwards compatible with the now-ancient but still dominant ISA interface (as the name implies).

**Electronic mail (E-mail, email)**

(See net.newbies, p207)

**Expansion card**

Circuit boards that fit inside PCs to provide extra functionality. For example, one might be an internal modem, providing the same functions as an external one (which

are more common) but sitting inside the PC. Expansion cards are designed to be fitted and removed by people with little knowledge of PCs.

**F****Floppy disk drive**

Practically all PCs come with a floppy disk drive. 3.5in HD (high density) 1.44Mb floppy disks are now the standard. They come in hard plastic cases and have replaced the older, literally floppy 5.25in disks.

**Fonts**

A font is an alphabet designed in a particular style. Fonts apply to both screen and printed letters. Modern TrueType and Type 1 fonts are stored as shape descriptions, scalable to any size.

**Format**

To wipe a floppy or hard disk in order to prepare it to accept data.

**Graphics Card**

An expansion card that interprets commands from the processor to the monitor. If you want a better, higher-resolution picture or more than your existing setup, you'll need to change your graphics card and/or your monitor.

**GUI (Graphical User Interface)**

(See Windows)

**H****Hard disk**

Sometimes called a fixed disk, hard disks are hermetically-sealed rigid disks able to store data and programs. Disk capacities increase all the time. The standard is now 1Gb, but disks of up to 9Gb are available.

**Hardware**

All electronic components of a computer system, including peripherals, circuit boards and input/output devices.

**HTML (Hypertext mark-up language)**

The standard language used in the creation of World Wide Web pages.



## GLOSSARY OF COMPUTING: IMPORTANT TERMS AND ACRONYMS

**I****IBM-compatible**

Originally meant any PC compatible with DOS. Now tends to mean any PC with an Intel or compatible processor capable of running DOS or Windows.

**Internet**

(See net.newbies, p207)

**IDE**

Integrated drive electronics. A control system designed to allow computer and device to communicate. Once the standard for PC hard disks, now being replaced by EIDE (enhanced IDE) which offers improved performance and extra features. EIDE can support four external devices including hard disks and CD-ROM drives.

**IRDA**

Infra Red Data Association — standard for exchanging data using infra red typically from PDAs or notebooks to a PC or printer.

**ISA (Industry Standard Architecture)**

This was the original bus architecture on 286 PCs. Also known as the AT bus (the 286 was known as the AT), it is still in use today. Slow by modern standards, but so widely accepted that expansion cards are still made for it. (See EISA, PCI)

**ISDN Integrated Services Digital Network**

A digital voice and data telephone network which looks set to replace the current analogue one. ISDN adaptors are already starting to replace modems as a fast way of accessing the Internet and transferring data.

**JPEG (See MPEG)****Kbit (kilobit), Kb (kilobyte) (See Bit)****L****LAN (Local Area Network) (See Network)****Local Bus**

PCI (Peripheral Component Interconnect), developed by Intel, is now the standard for local bus architecture. It is faster than the older VL-Bus (Video Electronic Standards Association local bus) it has now largely replaced.

**M****Macintosh (Mac)**

A kind of personal computer, made

by Apple, that is incompatible with PCs. Developed as a rival standard, its operating system looks like Windows, except that it predates it and (in many people's view) looks and works much better.

**Maths co-processor**

A specialised chip that handles mathematical calculations (floating point operations) for the processor. Modern processors such as the Pentium have a co-processor built into them.

**Mbit (megabit) (See Bit)****Mb (Megabyte) (See Bit)****MCA**

A kind of bus designed by IBM to beat EISA. Although faster, it never became popular because every machine that used it had to pay a royalty to IBM, and because it was not backwards-compatible with ISA.

**MPEG (Moving Picture Expert Group)**

A standard for compressing video available in several flavours: MPEG 1, MPEG 2 and MPEG 4. JPEG (Joint Photographic Expert Group) is a standard for still image compression.

**Memory**

The term normally refers to RAM (Random Access Memory). This is the kind that disappears whenever you turn your computer off and is much faster to access than a hard disk. It acts as a kind of staging post between your computer's hard disk and its main processor.

**DRAM Dynamic Random Access Memory**

This requires its contents to be replaced every 1/1000th of a second and is the most common form of memory in PCs.

**SRAM StaticRAM**

Retains memory until the power is switched off.

**VRAM VideoRAM**

Faster than DRAM, this is used by graphics cards.

**EDO Extended Data Out RAM**

The latest type of memory, offers improved performance.

**Cache memory**

Temporary memory set aside to store the information that is accessed most frequently. The Pentium processor has 8Kb of cache built in. This can be further speeded up by a secondary cache, typically 256Kb. Part of your DRAM is also often used to cache your hard disk.

**ROM Read-Only Memory**

A kind of memory that can only be

read: you can't make changes to it as you can to RAM. It is commonly used for things that will never need to be changed, such as the information the computer requires when you start it up.

**Modem**

The word is a contracted version of "modulator/demodulator", which means that a modem is a box (or, less commonly, an expansion card) that lets your computer talk over phone lines to other computers.

They are commonly used for sending electronic mail and accessing the Internet. (See net.newbies, p207)

**Monitor**

Your computer's screen. Signals are sent to it from the video card.

**Motherboard**

The main printed circuit board which houses the processor, the memory and various other components.

**N****Network**

A network is a group of computers linked together with cable. The most common form is a LAN (Local Area Network), where electronic mail and other files can be exchanged between users without swapping floppy disks. Printers and other resources can be shared. Typically, all the PCs on a LAN are connected to one server, a powerful PC with a large hard disk that can be shared by everyone. There are many other forms of interlinking computers including WANs (Wide Area Networks).

**O****Operating System**

The operating system communicates with the hardware and provides services and utilities to applications while they run, such as saving and retrieving files.

**P****Package (See Application)****PC Card**

Formerly PCMCIA. A standard to allow PCs, particularly notebooks, to be expanded using credit-card sized cards.

**PDA (Personal Digital Assistant)**

Small electronic organisers. The Psion 3a is a typical example.

**PCI (See Local Bus)****PCMCIA (See PC Cards)****Parallel Ports**

Used by your PC to communicate with the outside world, usually via a printer. Information can travel in parallel along a series of lines, making it faster than serial ports which can only handle one piece of information at a time.

**Pixel**

Picture element. The smallest possible addressable dot displayed on a monitor.

**PowerPC**

This family of RISC chips is the result of a collaboration between IBM, Apple and Motorola. It is now used in all Apple Macintosh computers and many IBM workstations.

**Processor**

The chip that does most of a computer's work.

**Programs (See Applications)****Public Domain**

Software that is absolutely free. The author usually retains copyright, but you can make as many copies as you want and pass them to other people. Public domain software often consists of small utilities the author feels might be useful to other people. It is often confused with shareware.

**Q****QWERTY**

The name of a standard English language keyboard, derived from the first six letters on the top row. The French equivalent is AZERTY.

**R****RAM Random Access Memory (See Memory)****Reboot (see Boot)****RISC**

Reduced Instruction Set Computing. These are starting to replace CISC (Complex Instruction Set Computing), as they are generally faster. The PowerPC chip is a typical example.

**ROM (Read Only Memory) (See Memory)****RTF Rich Text Format (See ASCII)****S****SCSI**

Small Computer System Interface is a bus that comes as standard in a Macintosh and is starting to rival EIDE on PCs. It is commonly used for connecting devices such as hard disk drives and CD-ROM drives.

**Serial Port**

GLOSSARY OF COMPUTING: IMPORTANT TERMS AND ACRONYMS

The serial port, of which there are sometimes two (com1 and com2), is used by your PC to communicate with the outside world. They are predominantly used by modems and similar devices, which communicate quite slowly. Some mice also use them. Faster communications are achieved via the parallel port.

**Shareware**  
A way of distributing software which is often used by smaller programmers rather than big software houses. It is freely available, but not free. You are honour-bound to pay a small fee to the software's developer if you continue to use the program after a set period.

**SIMM (Single Inline Memory Module)**  
The standard modules for memory expansion on PCs. Older 30-pin SIMMs have now been replaced by the 72-pin variety available in capacities of up to 16Mb.

**Software**  
A generic word for programs or

applications

**Tape Streamer**  
Magnetic tape recorder designed for backing up data from your hard disk.

**UART (Universal Asynchronous Receiver Transmitter)**  
Pronounced you-art. A chip that allows your PC to cope with high-speed communications.

**V34, V32bis**  
A series of CCITT standards that defines modem operations and error correction. There are over 20, but the key ones are:

- V32.bis — the standard for 14,400bps modems.
- V34, the new standard for 28,800bps modems (see Baud). Don't buy a modem that doesn't comply with one of these standards.

**VESA (See Local Bus)**  
**VGA**  
Video Graphics Array is the name given to a popular display. VGA

graphics have 640 pixels horizontally and 480 vertically, and can display 16 colours. SuperVGA (SVGA) graphics can display 800 x 600 or 1024 x 768 in as many colours as the memory in your graphics card will allow: up to 16.4 million, or true colour.

**VL-Bus (See Local Bus)**  
**VRAM (See Memory)**

**W**

**Windows**  
A GUI (Graphical User Interface) developed by Microsoft. Windows is supposed to make programs easier to use by giving them a standard, mouse-driven interface.

**Windows 3.11**  
16-bit operating system.

**Windows NT**  
Robust, fully 32-bit operating system. Currently has the Windows 3.11 interface, but will soon be available with the Windows 95 interface.

**Windows 95**  
Major improvement to Windows 3.11, with a completely redesigned

interface. Now less prone to crashes and easier to use, but requires more memory.

**WYSIWYG**  
An acronym for What You See Is What You Get, an over-used but useful word to describe much modern software. What you see on the screen is exactly what you see when you print your work out.

**Z**

**ZIF (Zero Insertion Force)**  
Sockets used for large CPUs. Lifting a handle lets you remove the processor.

**ZIP**  
Better known as PKZIP, this is a widely used shareware utility that compresses files — making them smaller, so that they take up less room. You can tell when you have a ZIPped file as its name ends in ZIP. It is widely available from bulletin boards. PKZIP is the most common form of compression of its kind.

Glossary ends

Continued from page 331

## Buying a PRINTER

There are two main types of printer: laser and inkjet.

**Lasers**  
Most office printers are lasers. They work pretty much like photocopiers, and are cheap to run and print quickly. Their disadvantage is higher initial cost and mono output. Laser printers are available in all sizes and at all prices. Small desktop printers cost as little as £400. You can buy colour laser printers but they are still expensive, typically £5,000 or more.

**Types of laser**  
PCs work by sending a description of the page that's being printed down a printer cable. There are three commonly-used page description languages (PDLs):



Laser printers

**PostScript**  
This sends an outline in vector form (see "Drawing Software") to the printer where it is rasterised (converted into dots) and printed to the device's best ability. PostScript is device-independent so that the image looks the same on a monitor (75dpi), a laser printer (300dpi) or a professional image setter (2400dpi).

**PCL**  
This stands for Printer Control Language, and it is Hewlett-Packard's alternative to PostScript, licensed to many clone-printer manufacturers. Printers using this tend

to be cheaper than PostScript ones, but output will vary from one printer to another, making it less suited to professional use.

**GDI (graphical device interface)**  
These printers download the description of your page already used by Windows



Inkjets

straight to your printer. They will only work with Windows, but are cheap and fast. They are also only suitable for a personal printer and will not work across a network.

**Inkjets**  
Inkjets work by spraying ink onto paper. They are cheap to buy but more expensive to run, and slower. Even cheap inkjets can print in good-quality colour.

**Recommended Products**  
**Cheap lasers** Epson EPL-5500: Epson 0800 220546; street price £300 (see PCW February 96)  
**Sub-£750 lasers** Hewlett-Packard 5P: Hewlett-Packard 01344 369222 (see PCW November 96)  
**Network lasers** Hewlett-Packard 5P: Hewlett-Packard 01344 369222 (see PCW February 96)

**Recommended products**  
**Epson Stylus 800 colour:** Epson 01442 61144; street price £350 (see PCW August 95). **Canon BJC-610:** Canon 0500 246246; street price £370 (see PCW, February 96).

**Hybrids**  
For home use and small offices a hybrid could be the answer. These combine a printer, a fax machine and some copying capability in one unit.

**Recommended products**  
Hewlett-Packard OfficeJet LX: HP 01344 369222; street price £499 (see PCW December 95)



Hybrid printer



Document scanners

## Buying a SCANNER

Scanners are used to import text, graphics or pictures into a PC. They vary from low-cost hand scanners not much bigger than a mouse, to drum scanners costing thousands of pounds. The latter are designed to scan photographic transparencies to professional standards.

**Flatbed scanners**  
The most common type of scanner. They range in price from £300 to over £3,000. They're capable of scanning colour pictures to a high standard. Most have transparency adaptors as an optional extra.

**Document scanners**  
This is a new category which aims to combine the reliability of flatbeds with speed and portability. They're intended for OCR and document management. Most will cope with photographs and some with colour, but it's not their forte.



Flatbed scanners

**Recommended Products: Flatbed Scanners**  
**Professional** — Arcus II: Agfa 0181 231 4200; street price £2,600.  
**Intermediate** — Epson GTX 9000: Epson UK 01442 61144; street price £750.  
**Budget** — Umax Vista T-630: IMC 01753 830999; street price £450 (PCW, July 95).

**Recommended Products: Document Scanners**  
**Visioneer PaperPort VX:** Computers Unlimited 0181 200 8282; street price £299. **Logitech PageScan Colour:** Logitech 01344 894300; street price £299.  
**Plustek PageReader 800:** Scan Direct 01292 671676; street price £149 (PCW, March 96).

## Buying a FAX-MODEM

You'll need a modem to connect to the Internet or an online service such as CompuServe or AOL, and to send and receive email. Modems are available in three formats: as PC cards to plug into notebooks, as external boxes, and as expansion cards. PC card modems cost the most and external modems cost slightly more than the expansion card variety.

Apart from the case and the external power supply, there's often little difference between the internal and external versions of a modem. Most modems now have fax capability built in, which means you can receive faxes on your PC to view or print out. If you're strapped for cash, a V32bis 14,400Kbits/sec modem is adequate. However, prices have now fallen so rapidly that a V34 28,800Kbits/sec modem is probably a better bet.

### Recommended Products: Fax-modems

**External — Motorola 3400 Online:**  
Motorola 01923 404343; street price  
£160 (see PCW February 96)



Fax-modem

## Buying a CD-ROM DRIVE

Just about the only things which differ on today's CD-ROM drives are their speed and means of connection. The most common connection is IDE or Enhanced IDE (EIDE). It is possible to connect an IDE CD-ROM drive to most existing IDE hard disk controllers. Older PCs may need a newer EIDE controller. IDE controllers are also found on many sound cards.

The first CD-ROM drives spun the disc at the same speed as an audio CD and were called single-speed, delivering a sustained data transfer rate of 150Kb/s. Double-speed drives spun twice as fast, doubling the data transfer to 300Kb/s, and quad-speeds twice as fast again, raising transfer to 600Kb/s.

Quads are currently the standard, with six-speeds (900Kb/s) becoming increasingly common. Manufacturers are beginning to release eight-speed drives, offering up to 1200Kb/s. All figures are theoretical



CD-ROM Drives

maximums. Buyers should go for quad-speed or higher. There is little to choose between models, but off-the-shelf supplies are frequently short. Internal IDE quads start at around £100 and six-speeds around £130.

#### Recommended Product: CD-ROM Drive

**Teac CD56-E six-speed:** fitted to many new PCs and costing around £170 (PCW January 96)

## Buying a MONITOR

Regardless of your computer application, you'll be looking at your monitor all day — so get a good one.

Some people claim not to see monitor-flicker, but your brain will, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors. Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes.

The resolution refers to the number of dots (pixels) horizontally and vertically on screen. Standard VGA mode runs at 640

x 480 pixels, while other typical modes include 800 x 600 and 1024 x 768. The more pixels, the more you'll be able to fit on screen, but everything will be smaller and may only be suitable on a physically larger screen. Buyers should go for a 15in or 17in monitor capable of running a resolution of 1024 by 768, non-interlaced, at 70Hz or higher. Be aware that the visible area of most monitors (and TVs for that matter) is smaller than the model implies: a 15in may only have 14.5in, and a 17in only 16in.

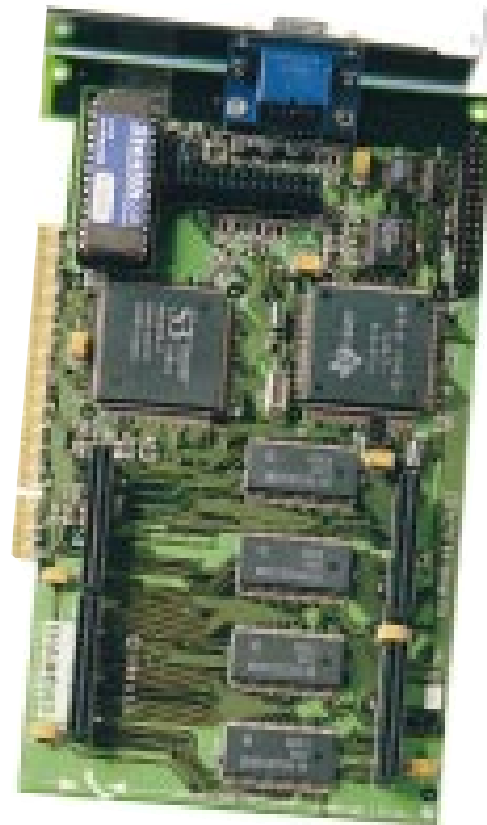
#### Recommended Products: Monitors

**Sony 15sfl** or **NEC XV15 Plus** costing around £300 on the street, or the larger **Sony 17sfl** and **NEC XV17** at around £550.

## Buying a GRAPHICS CARD

The graphics card sits inside the PC and controls the features that the software can display on the monitor.

Check the amount of memory on the card. 2Mb is about standard these days, 1Mb is skimpy and 512Kb is barely usable. Also, check out the performance



capability of the card. Video cards come as 16-bit, 32-bit, 64-bit and even 128-bit — all you need to know is that a large numbers of bits means faster performance and more colours.

The most important aspect of your video card, and the most frequently quoted feature, relates to the resolution which the card supports in Windows. This is measured in terms of the number of pixels that the card displays on the screen. The absolute minimum these days is 1024 x 768 with a refresh rate of 70Hz. The refresh rate is an important figure to look out for, as it relates to the flicker which you will perceive from your monitor.

Finally, find out whether your video card is "local bus" or not. "Local bus" is a type of interface which connects your video card to the motherboard. It allows the memory in the card to be addressed directly by the CPU which makes it a lot faster than the standard ISA (Industry Standard Architecture) interface.

#### Recommended Products: Graphics Cards

**Videologic GraphixStar 700:** VideoLogic 01923 260511; around £200 (PCW November 95)

**Diamond Stealth 64:** Microtonica 01732 592820; from around £125 (PCW November 95)



## Buying a SOUND CARD

As their name suggests, they add sound capability to a PC. Check compatibility with your CD-ROM drive, and remember that 16-bit cards capable of 44kHz provide higher-quality sound than slower 8-bit cards. Better sound cards now include wavetable synthesis which means they have samples of real instruments held in ROM.

The quality of wavetable synthesis still varies widely. Even cheap cards which have the inferior Frequency Modulation synthesis should have a daughterboard connector allowing them to be upgraded to wavetable. The newer cards are also plug'n'play which means, in theory, that you should be able to plug them straight into a PC without any extra configuration. Most cards are bundled with extra software, normally sequencers, wave editors and audio players.

#### Recommended Products: Sound Cards

**Creative Labs AWE-32:** 01245 265265; £199 (PCW April 96)

**Budget:** Aztech SoundGalaxy Waverider Pro: Aztech 01734 814121; £79 (PCW April 96)

● **CONTACT MANAGERS** (see PIMs)

**D** ● **DATABASE** At its simplest, an electronic card index. For just a few hundred names and addresses, an electronic filofax such as Lotus's Organizer may be more appropriate. But for more sophisticated applications like tracking products and customers, the power of a relational database is required. Databases are generally the least user-friendly of the main suite applications. In most office environments you're more likely to use a database application that somebody else has written for you.

**Recommended products:** Lotus Approach, Microsoft Access

● **DRAWING SOFTWARE** Programs for drawing that work using vectors. This means each shape drawn is described using mathematical equations.

**Recommended products:** At the budget end, GSP Designworks 3 stands out. At the professional end of things it's FreeHand 5 which gets our plaudits.

**I** ● **IMAGE EDITING SOFTWARE** A program for editing bitmap files (files made up of pixels). Typically used for converting graphics files, retouching photographs and preparing pictures for printing.

**Recommended product:** For simple image editing the popular shareware program Paintshop Pro is fine. For professionals, Adobe's Photoshop is the industry standard.

● **INTEGRATED PACKAGES** Typically these combine the functionality of a database, word processor and spreadsheet in one application. This makes it easy to move data from one component to another, but integrated packages tend to lack some of the advanced features of individual applications in the Suites.

**Recommended product:** Microsoft Works

● **OCR SOFTWARE** Optical Character Recognition software converts printed text into computer text you can edit. You will also need a scanner or fax card to get the printed text on to your PC. OCR saves re-keying documents and can cut down drastically on paper filing systems.

**Recommended products:** Omnipage is the best product we've found, but TextBridge offers most of the same capabilities for less cash.

● **PERSONAL FINANCE** These help you manage home finances. They're also well suited to some small businesses and tend



Monitors

## Buying SOFTWARE

Just a few years ago there were dozens of different software applications in each category. In the last two years or so, however, there's been rapid product consolidation. Other magazines list large numbers of packages, most of which are out of date and aren't worth considering. We've distilled each category down to just one or two recommended products.

### Software A-Z

**A** ● **ACCOUNTS SOFTWARE** One of the few categories in which there are still masses of packages on the market at a huge range of different prices. Accounts is also one of the last bastions of DOS.

**Recommended products:** Lakeview LMS and Exchequer from SBS Systems.

**C** ● **CAD SOFTWARE** Computer Aided Design covers everything from architectural drawings through office planning to complex engineering drawings.

**Recommended products:** AutoCAD, now at release 13, is still the industry standard. However, it's expensive and complex. For the casual user, Drafix QuickCAD is a cheap and accessible way to try your hand at it.

to be easier to use than full-blown accounts packages.

**Recommended products:** Quicken is the outstanding product in this category and has no serious rivals.

● **REMOTE CONTROL SOFTWARE**

Software which lets you access and control a PC remotely usually using a modem.

**Recommended products:** Reachout, for its simple interface and support for different networks, particularly TCP/IP.

● **SPREADSHEET** An electronic version of an old-fashioned ledger. Ideally suited for balance sheets and sales figures. They now include excellent graphing and charting facilities.

**Recommended products:** Lotus 1-2-3, Microsoft Excel

**S**

● **SUITES** These days, most general business software (word processors, spreadsheets, presentation graphics packages) is sold in Suites. Two suites are widely available: Lotus SmartSuite and Microsoft Office. If you buy them bundled with a new PC, they can cost £100 or less. Bought separately, they cost between £200 and £300. Lotus SmartSuite also contains a

database. For Microsoft Office you pay extra for Office Professional which contains Microsoft's Access database.

**Recommended products:** Microsoft Office is now close to the industry standard. Its high level of integration gives it the edge over the opposition.

**P**

● **PERSONAL INFORMATION MANAGERS (PIMs)**

PIMs are an electronic way of storing names, addresses, phone numbers and appointments. Contact managers take the idea one step further to include business information about dealings with clients.

**Recommended products:** Sidekick 95 and Organizer are excellent PIMs. For contact managers we recommend Goldmine for Windows.

● **PRESENTATION GRAPHICS**

Increasingly the trend is towards doing presentations on a PC and the latest packages tackle this by including sound, sophisticated transitions between slides and support for video clips.

**Recommended products:** Powerpoint and FreeHand are both capable products that are sold with Microsoft Office and

SmartSuite respectively.

● **PROGRAMMING TOOLS** Applications designed for writing software. These range from "low-level" languages which are powerful but difficult to learn and use, to "high-level" languages which are much easier to use but generally sacrifice performance and flexibility in the process.

**Recommended products:** Delphi 2.0 is a great example of scalability, catering for beginners and serious developers working on major projects. Visual C++ is the pick of the high-end Windows development tools.

**V**

**VISUAL PROGRAMMING** (see Programming Tools)

**W**

**WORD PROCESSOR** An application in which you write letters and reports or even produce a simple newsletter. The latest word processors have advanced features such as outliners, table editors and facilities for adding up columns of figures.

**Recommended products:** Microsoft Word is the clear market leader. WordPro (formerly AmiPro) is a capable alternative.



**A-Z of Recommended Software Products**

	Category	Product	Supplier	Contact	Price	Date of PCW review
A	Accounts	Lakeview LM3	Lakeview Computers	0181 303 3329	"£8,750.00"	Jan-96
	Accounts	Exchequer	SBS Financial Systems	01202 298008	"£5,980.00"	Jan-96
C	CAD	AutoCad Release 13	Autodesk UK	01483 303 322	"£3,150.00"	Oct-95
	CAD	Drafix Quick CAD	Roderick Manhattan	0181 875 4400	£69.00	Oct-95
D	Database	Approach	Lotus	01784 455 445	£99.00	Nov-95
	Database	Access	Microsoft	01734 270 001	£220.00	Feb-96
	Drawing	Freehand 5	MacroMedia	01344 761111	£450.00	Apr-96
	Drawing	Designworks 3	GSP	01480 496789	£39.95	Apr-96
I	Image Editing	Photoshop	Adobe	0181 606 4000	£382.00	Apr-95
	Image Editing	Paintshop Pro	Digital Workshop	01295 258335	£49.95	Jun-95
	Integrated Package	Works	Microsoft	01734 270 001	£79.99	Oct-95
O	OCR	Omnipage	Caere	0171 630 5586	£595.00	Nov-95
	OCR	Textbridge	Xerox Imaging Systems	01734 668 421	£349.00	Nov-95
P	Personal Finance	Quicken	Intuit	0800 585058	£49.95	May-96
	PIM/contact manager	Organizer 2.1	Lotus	01784 455 445	£99.00	Mar-96
	PIM/contact manager	Goldmine for Windows	Elan Software	0171 454 1790	£395.00	Mar-96
	PIM/contact manager	Sidekick 95	Starfish UK	0181 875 4400	£39.00	Mar-96
	Presentation graphics	Freelance	Lotus	01784 455 445	£415.00	Sep-94
	Presentation graphics	Powerpoint	Microsoft	01734 270 001	£220.00	Sep-94
	Programming tools	Visual C++	Microsoft	01734 270 001	£379.00	Feb-96
	Programming tools	Delphi 2.0	Borland	01734 320 022	249 (exc. VAT)	Feb-96
R	Remote Control	Reachout	Stac Electronics	01483 740 763	£110.00	Nov-95
S	Spreadsheet	Excel	Microsoft	01734 270 001	£220.00	May-95
	Spreadsheet	1-2-3	Lotus	01784 455 445	£365.00	May-95
	Suite	Office (Standard)	Microsoft	01734 270 001	£360.00	Mar-96
	Suite	Office (Professional)	Microsoft	01734 270 001	£460.00	Mar-96
W	Word Processing	Word	Microsoft	01734 270 001	£220.00	Feb-95
	Word Processing	WordPro (AmiPro)	Lotus	01784 455 445	£99.00	Jun-95

# Buyer's Charter

## MAIL ORDER PROTECTION SCHEME

**H**ello, I'm Anthony George, your Customer Services Manager. My job is to assist you when things go wrong or when you have a complaint about advertisements in *Personal Computer World*. If you encounter a problem, write to me with details of the complaint and I will contact you.



### Ten rules to buy safely

1. Always use a PERSONAL COMPUTER WORLD order form.
2. Keep a copy of the original advert.
3. Keep copies of all correspondence, and if you speak on the phone make a note of who you spoke to.
4. On large orders obtain a written quotation.
5. Wherever possible pay with a personal credit card. All transactions over £100 should be covered by the card company's insurance scheme.
6. Does the price quoted include everything discussed? Is VAT extra?
7. Check how they will deliver and if times are guaranteed.
8. Is telephone support or on-site maintenance included in the price? If a return to base warranty can be extended, how much does it cost?
9. Check that all branded components are genuine.
10. Is the supplier reputable? Do they comply with BS5750 or ISO900? If in doubt, ask to see customer testimonials.



### Personal Computer World Buyer's Charter

When you purchase goods as a private individual reader from an advertisement appearing in this magazine and pay in advance of delivery, and that supplier ceases to trade and subsequently goes into Receivership, Liquidation, and/or Bankruptcy, you may be protected under our "Buyer's Charter" providing you have:

1. Not received the goods for which you have paid or had your money returned.
2. Followed all our guidelines when placing your order.
3. Retained a copy of the magazine's original Order form and the original advertisement, together with comprehensive proof of payment.
4. Submitted a detailed claim in writing to the magazine's customer services manager not earlier than 28 days and not later than three months from the official on-sale date of the magazine from which the goods were ordered. For example, by the end of June for the May issue (which is on sale at the beginning of April).

#### The following limitations apply:

1. Personal Computer World's liability under the Buyer's Charter will not exceed £2,000 in respect of any claim submitted by any one Private Individual Reader or more than £100,000 in respect of claims in any one calendar year. Any additional payments are at the sole discretion of the Publisher.
2. The Buyer's Charter only applies to goods advertised in this magazine. It does not cover goods depicted in classified advertisements, loose inserts, catalogues or any other sales material obtained from any relevant advertiser, or products that have not been advertised even if they are from the same supplier.
3. The "Buyer's Charter" will not safeguard any commercially orientated outlet, neither will it cover goods which are purchased outside Great Britain or any goods which are obtained for resale.

## ORDER FORM

## SUPPLIER'S DETAILS

COMPANY .....

SALESPERSON'S NAME .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / ..... TIME .....

ORDER REFERENCE NUMBER (IF QUOTED) .....

DISPATCH REFERENCE NUMBER .....

## CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / .....

ORDERED BY:  TELEPHONE  FAX  POST

### ADVERT APPEARED IN PCW:

ISSUE DATE ..... PAGE .....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

## METHOD OF PAYMENT

PERSONAL CHEQUE  PURCHASE ORDER  CREDIT CARD

C.O.D  CHARGE CARD  OTHER (SPECIFY) .....

CREDIT CARD COMPANY ..... START DATE ..... / ..... / .....

CHARGE CARD COMPANY ..... START DATE ..... / ..... / .....

CARD NUMBER (below) ..... EXPIRY DATE ..... / ..... / .....

**SUB TOTAL**

**DISCOUNT**

**CARRIAGE**

**SURCHARGES**

**VAT**

**TOTAL**

## DELIVERY DETAILS

DELIVERED TO (ADDRESS)

(IF DIFFERENT FROM ABOVE) .....

.....

..... POSTCODE .....

AGREED DELIVERY DATE ..... / ..... / .....

TERMS OF WARRANTY  MONEY BACK

RETURNS POLICY  COST OF EXTENDED WARRANTY

HELPLINE

Details: .....

.....

SIGNED ..... DATE ..... / ..... / ..... DAYTIME TELEPHONE NUMBER .....



**A**s featured in this month's *Newsprint*, page 19, Planned Sciences has changed the name of its Gentium executive information software after talks with Intel. It appears Intel thought it was a bit too much like Pentium, and so politely "suggested" another moniker might be more appropriate.

But rumour has it there is another, more interesting, story behind this latest move. It is believed that Gentium is the name of a new processor currently under development at Intel's UK labs. Based on low-power Pentium designs as used in notebook PCs, it is being built exclusively for use in new automated public toilets — Superloos.

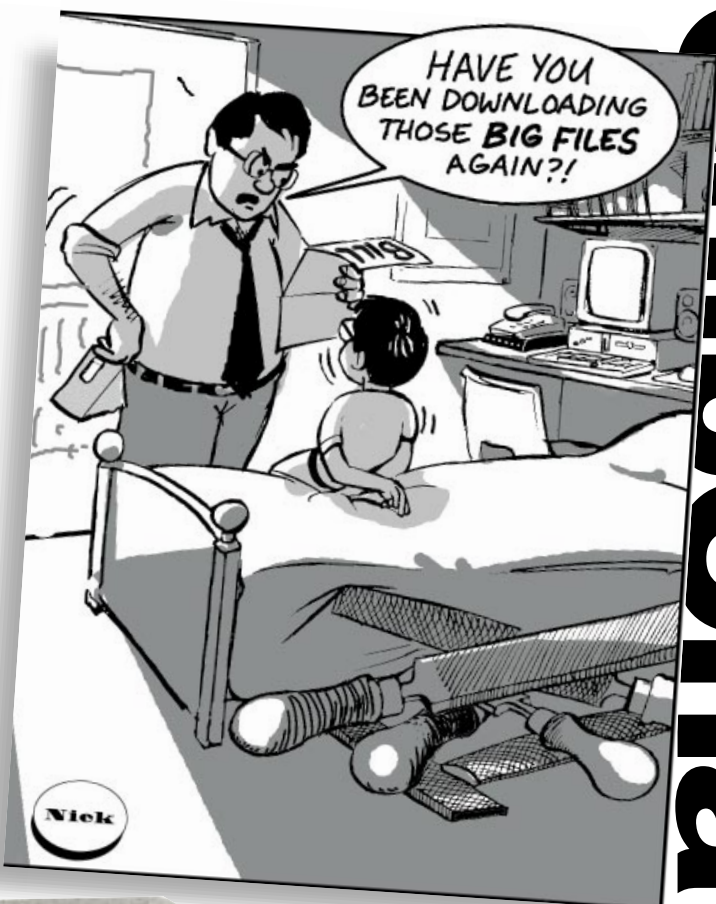
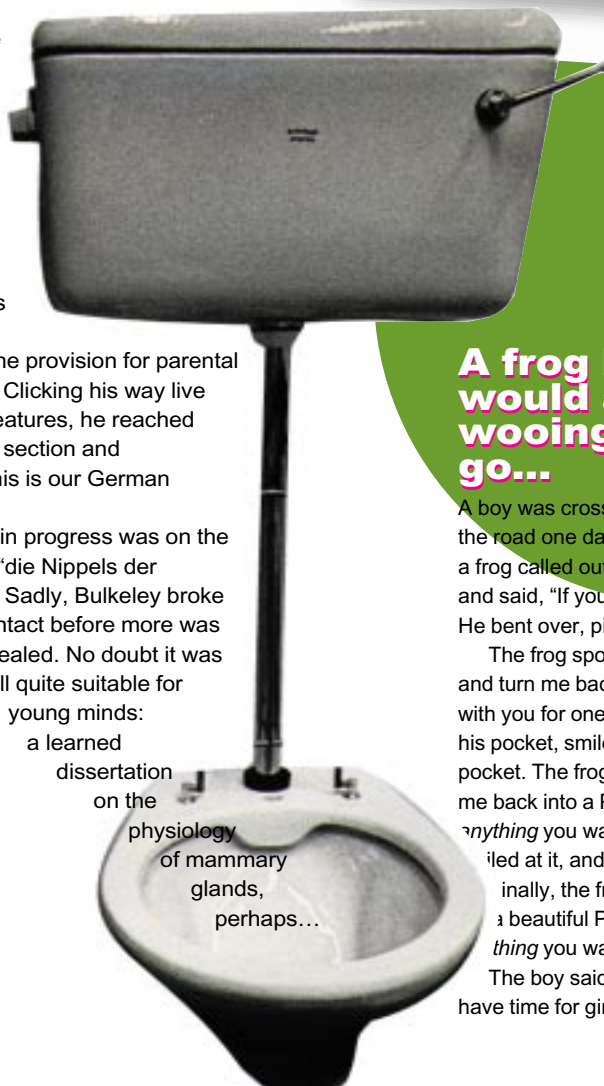
The specifications are sketchy at best, but are rumoured to include advanced cache flushing and multiprocessor support — allowing more than one user at a time. A subset of the MMX multimedia instructions will deliver on-seat entertainment, including Des O'Connor tracks and brief clips from *Nightmare on Elm Street* for those with constipation.

It's still unclear which speeds the processor will be available in at launch, but it is thought a 100MHz unit will be bog standard. Cyrix was apparently readying a challenger, but the project seems to have gone down the pan.

● The problem of linking schools to the Internet is that lads will download smutty pictures instead of buying them from top shelves, thus depriving WH Smith of a tidy slice of income. So AOL's amiable UK head, Jonathan Bulkeley, was duly careful, when he launched his offer of a free account for Britain's 6,000 secondary schools, to stress the provision for parental and school control. Clicking his way live through the other features, he reached the international section and announced: "This is our German chatline."

The chat in progress was on the subject of "die Nippels der Frauen". Sadly, Bulkeley broke off contact before more was revealed. No doubt it was all quite suitable for young minds:

a learned dissertation on the physiology of mammary glands, perhaps...



**Chat**

### A frog he would a-woooing go...

A boy was crossing the road one day when a frog called out to him and said, "If you kiss me, I'll turn into a beautiful Princess." He bent over, picked up the frog and put it in his pocket.

The frog spoke up again and said: "If you kiss me and turn me back into a beautiful Princess, I will stay with you for one week." The boy took the frog out of his pocket, smiled at it, and returned it to the pocket. The frog cried out: "If you kiss me and turn me back into a Princess, I'll stay with you and do anything you want". Again the boy took the frog out, smiled at it, and put it back into his pocket.

Finally, the frog asked: "What is it with you? I've told you I'll turn into a beautiful Princess, that I'll stay with you for a week and do anything you want. Why won't you kiss me?"

The boy said, "Look, I'm a computer programmer, I don't have time for girls. But a talking frog is really cool."

