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SEPTEMBER 1992

VOLUME 5 NO. 9

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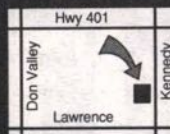
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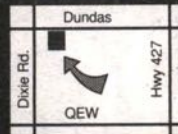
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# From the Editor



One of the interesting theories put forward by Robert X. Cringely in his book *Accidental Empires* is that the death of the mainframe computer will occur on December 31, 1999. According to Cringely, much of the original software code which was written for these mammoth computers in the '60s and '70s has been lost, and no one ever imagined that they would be running into the year 2000. Hence, many of these software programs are "hard-wired" with date and time structures that will fail—or worse, be incorrect—in the next century.

Whether this is true or not, many large organizations are downsizing and they are looking for the right operating system and hardware to run their mission-critical applications on.

This downward pressure is combining with a growing sophistication from personal computer users looking for reliable multitasking, multi-user computing. The battle over the next few years boils down to OS/2 versus Windows (NT) versus all the Unix variants.

### Intel or RISC?

Competitors have been lining up to the challenge. The options fall into two main categories: 1) all the operating systems that will run on fast Intel-based 486 and 586 (or P5) chips, and 2) those that will run on proprietary RISC-chip based systems. Offering high-volume, low-cost Intel hardware are Windows NT, OS/2, NeXTstep, Sunsoft, SCO Unix, DesqView X. At the other end of the spectrum fall faster, more expensive RISC-based hardware boxes running, usually Unix, on proprietary boxes by Sun, NeXT, HP, DEC among others. What these systems offer is comparable pricing to Intel boxes in the low end, but a much higher high end, both in performance and price.

### Who Wins?

OS/2 is out already and is finding reasonable success. Microsoft is shipping the developer version of Windows NT and will probably deliver the real thing early in 1993. SCO has a new version of their Open Desktop, but one wonders if they are seriously competing when the operating system costs \$1,000 and up compared with the \$100-range that IBM and Microsoft are targeting. Sunsoft and NeXT have both delayed their products until early next year.

### Whither Unix?

Unix has been hailed in the last few years as the solution, because it supposedly offers Open Systems and has many of the industrial-strength features needed for corporate computing. Unfortunately, the Holy Grail of a large base of "shrink-wrapped" Unix application software remains elusive. You still can go down to your neighborhood software store and buy a copy of Word, Lotus 1-2-3 or dBASE that will run on SCO Unix, Sun Unix and NeXT Unix. The "window" of opportunity is rapidly closing on Unix. OS/2 is here now and offers many of the features of Unix in a format that is not as formidable to the end user as Unix. Windows NT, which promises to have a similar robustness, will emerge early next year and will be a logical upgrade path to millions of Windows users. Is it already too late for Unix?

Enjoy the issue.

Kirtan Singh Khalsa  
Publisher/Editor

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**Re: 'The Pirate's Sting'**  
 As an Amiga user, the main reason I pick up *The Computer Paper* is because it's free and I seldom pass up a freebie. However, I did take the time to read the August issue (which I picked up on July 20—wow, you folks put it out quickly) and I thought that "The Pirate's Sting" was an incredible story. Too bad you couldn't mention the "Man's" name. His actions were truly reprehensible, and it bothers me that he could be allowed to open another business. I also enjoyed the MIDI article (and its brief mention of the Amiga). While I'd like to see more about my particular machine of choice, I understand that market forces dictate your coverage. Besides, there's enough Amiga magazines out there to satisfy me. Of course, none of them are free. A small comment about your classifieds: it might help if you included a form for would-be advertisers to fill out, much like a certain Toronto-based competitor of yours. In fact, you did have such a form a few issues back. Why did you get rid of it? You have a good paper here, and I hope that the Toronto version gets as big as the B.C. counterpart soon!  
 Angelo Furlan  
 via Canada Remote Systems

*The classified ad form should run again in our September edition. We had planned to run it, but pulled it for another item at the last minute. Good point, though, and we appreciate the feedback.*

**Re: last month's Letter from the Editor**  
 Windows may or may not be a Juggernaut (I don't think it is) but whichever it may be, it certainly isn't an Argonaut. Malaprop strikes again!  
 Richard Anstruther  
 via Canada Remote Systems

*You caught that one, eh? An argument could be made that it was intentional. An Argonaut is someone who went with Jason on his quest for the Golden Fleece. Some (though not I) might say that Windows users are being fleeced royally. Another interpretation could be that it was referring to a certain professional sports team in Toronto. The final interpretation, and the correct one, is that you are right. It rolled off my fingertips and right past the (now red-faced) proofreader.*

**Accounting Scam**  
 I read with some interest and amusement your editorial about NewViews. I've met Phil Quackenbush and am certainly familiar with the product from my Bedford days. We used to get "The Cheque Question" a lot, too. Even though Bedford may have been tighter in places than NewViews, it was possible to print an unposted cheque. The question really is, "Will this software keep my people from stealing?" Of course it won't!

One of the cute answers we sometimes used was, "lock up your cheques in your safe when you leave, the same way you secure other valuable papers." Another was, "sure this can be done, but you can do it with a manual bookkeeping system, too."  
 Congratulations on your expanding paper.  
 Tom O'Flaherty  
 Richmond Technologies and Software Inc., Burnaby, BC

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- Seagate 40MB 15ms IDE...\$227. | FUJITSU 105MB 14ms SCSI...\$379.
- Seagate 130MB 15ms IDE...\$399. | FUJITSU 330MB 12ms SCSI/E...\$1192.
- FUJITSU 670MB 16ms SCSI/E...\$1436. | MAXTOR 130MB 14ms IDE...\$429.
- WDC 60MB 16ms 32Kc,IDE, 2.5"...\$259. | Quantum 105MB 12ms IDE...\$399.
- Quantum 105MB 12ms SCSI...\$439. | Quantum 52MB 12ms IDE...\$269.
- ALWAYS IN2000 SCSI H/F...\$239. | ULTRASTOR 12F ESDI H/F...\$229.

### CASES & POWER SUPPLIES & KEYBOARDS

- Mini Tower/Desktop w 200W CSA...\$99. | Full Tower w 300W, 10 Bay, 2Fan...\$239.
- Keytronics 101 Enhanced...\$59. | ED120 Ext HD Case HH 45W SCSI...\$129.

### MEMORY UPGRADES - COMPUTERS & HP LASERS

- 4 MB x 9 SIMM 60ns...\$189. | 1 MB x 9 SIMM 60ns...\$55.
- 1 MB MEMORY UPGRADE HP...\$99. | 2 MB MEMORY UPGRADE HP...\$159.
- 4 MB MEMORY UPGRADE HP...\$269. | POSTSCRIPT UPGRADE HP...\$389.

### MATH COPROCESSORS Intel~Cyrix~ULSI~ALL

- Cyrix 387/SX/20...\$89. | Cyrix 387/SX/25...\$99.
- ALL SX Upgrade 286 to 386SX...\$199. | Intel 387/DX/33...\$119.

### MULTIMEDIA/CD ROM & REMOVABLE HARD DISKS

- PC Powered 90MB 18ms Ext Drive...\$669. | PC Powered Pro 90MB Ext Drive...\$789.
- SONY CD ROM w Intf/SW Internal...\$449. | Bemoulli 90 MB Cartridge...\$179.
- Syquest 88MB 20ms Int Drive...\$499. | Syquest 44MB Cartridge...\$99.
- Syquest 44MB 20ms Int Drive...\$379. | NEC CD ROM GALLERY Bundle 37...\$689.

### MODEMS/FAX & VOICE CARDS

- Complete Communicator 9600 FAX/2400 Modem V.42 bis MNP5/Voice...\$399.
- US Robotics HST 16.8 External Modem ASL, V.42 bis/MNP5, 57,600bps...\$639.
- US Robotics HST Dual Standard 16.8 Modem External v.32bis/v.42bis MNP5...\$899.
- GVC Send/Receive 9600 FAX w WINFAX/2400 Modem Internal 5yr Warranty...\$99.

### TAPE DRIVES Archive~Tallgrass~Irwin~Colorado

- SUMMIT 120MB Int Tape Drive...\$259. | JUMBO 250MB Int Tape Drive...\$339.

### VIDEO CARDS / MOUSE

- DIAMOND STEALTH SVGA, 1024x768, 16 bit, 72Hz, 1MB, 32K Colors...\$329.00
- ATI Wonder XL VGA, 1024x768, 1 MB, NI, 72Hz, Mouse, 256K Colors, 8/16bit...\$149.00
- ATI VGA Stereo-F/X, 1024x768, 1MB, NI, 72Hz, Mouse, MIDI, w Speakers...\$259.00
- ATI Graphics Vantage VGA, 1024x768, 1 MB, NI, 72Hz, Mouse, 256K Colors...\$269.00
- ATI Graphics ULTRA VGA, 1024x768, 1MB, NI, 72Hz, Mouse, 256K Colors...\$379.00
- VGA PREM V VGA 16 bit, 1024x768, 256 Colors, 1MB, SW...\$89.00
- JM-S8 Serial Mouse, 3 Button, 9/25 Pin, 400dpi, Holder, Paint/Image SW...\$21.00

### POS SOLUTIONS - BAR CODING, SCANNERS, SOFTWARE

- KeyBoard Wedge WAND Scanner...\$349.00 | POS CASH DRAWER w Dual LOCK...\$189.00
- STAR 4.5" SERIAL POS PRINTER...\$475.00 | UTILITY 1 BAR CODE Software...\$179.00
- CCD HAND LASER SCANNER...\$1095.00 | POS ACCOUNTING Software...\$495.00

### MULTI I/O, RAM, CONTROLLER CARDS

- BOCARAM/2 PLUS PS/2 MC RAM Board, Exp to 8MB, SIMMS, EMS 4.0...\$159.00
- BOCARAM AT PLUS RAM Board OK->8MB, SIMMS, EMS 4.0, 286/386...\$139.00
- ST11M/R XT RLL or MFM Hard Disk Adapter...\$69.00
- KT-AT10-V8 AT I/O, 2 Serial, Parallel, Game w Cables...\$19.70
- ECS CI 91 AT I/O, 2 Serial, Parallel, FDD, Game, HD IDE, w Cables...\$39.99
- EXP 1101 AT 16 Bit IDE HD/FDD Adapter w Cables...\$25.00

### MAINBOARDS SX/DX 386 & 486 (ISA & EISA)

- HM386SX/25 386SX, 25MHz, OK, Exp>9MB, Intel, OPTI, AMI, SIMM, 8Slot...\$133.00
- HM386SX/33 386SX, 33MHz, OK, Exp>16MB, AMD, OPTI, AMI, SIMM, 6Slot...\$201.00
- 386L/25 386DX, 25MHz, OK, Exp>32MB, TOPCAT, AMI, SIMM, 8Slot...\$235.00
- UM386DX/33 386DX, 33MHz, 128K Cache, OK, Exp>32MB, UMC, SIMM, 8Slot...\$249.00
- 386DX/33/WB 386DX, 33MHz, 64K Cache, OK, Exp>32MB, WriteBack, SIMM...\$219.00
- 386/DX/40 386DX, 40MHz, OK Cache, OK, Exp>32MB, AMD, OPTI, AMI, SIMM, 8Slot...\$225.00
- UM386/40 386DX, 40MHz, 128K Cache, OK, Exp>32MB, UMC, SIMM, 8Slot...\$270.00
- ET486DX/33 486DX, 33MHz, 64K Cache, OK, Exp>32MB, Intel, OPTI, AMI, SIMM, 8Slot...\$632.00
- UM486/33 486DX, 33MHz, 128K Cache, OK, Exp>32MB, Intel, UMC, AMI, SIMM, 8Slot...\$652.00
- ET486DX/33 486DX, 33MHz, 256K Cache, OK, Exp>32MB, Intel, OPTI, AMI, SIMM, 8Slot...\$672.00
- UM486II/50 486DX, 50MHz, OK, 128K Cache, Exp>32MB, UMC, SIMM, 8Slot...\$897.00
- UM486/50 486DX, 50MHz, OK, 256K Cache, Exp>32MB, UMC, SIMM, 8Slot...\$1029.00
- EM486/33 486DX, 33MHz, OK, 256K Cache, Exp>32MB, UMC, SIMM (EISA)...\$1329.00
- EM486/50 486DX, 50MHz, OK, 256K Cache, Exp>32MB, UMC, SIMM (EISA)...\$1659.00

### MONITORS/PANELS SAMSUNG~SONY~NEC~HYUNDAI~MAG

- NEC Monitors 3FGx, 4FG, 5FG, 6FG...\$CALL.
- MM-1488X 14" Monochrome TTL A/W...\$126.
- MM-1488AX 14" VGA Paper White...\$145.
- CVL4955 14" VGA .39 640x480 I...\$259.
- TVM LR3A 14" SVGA .28 1024x768 I...\$347.
- TVM MS4A+ 14" SVGA .28 1024x768 72Hz NI...\$454.
- SAMSUNG 17" CCB7571 .31 1280x1024 90Hz NI...\$1049.
- SONY 17" MultiScan .25 1024x768 87Hz NI...\$1179.
- SONY 20" MultiScan .30 1280x1024 120Hz NI...\$2449.

### PRINTERS Star~Epson~Panasonic~IBM~HP

- StarScript Laser Printer 4 w Postscript/Risc...\$1499.
- HP DeskJet 500 / HP DeskJet 500 Color...\$CALL.
- CANON BJ-20 INK JET Printer, 4lb, w SF & SW...\$459.
- IBM LaserPrinter 10 ppm, 600 dpi...\$CALL.
- HP Laser Printers - IIP+, III, IIII, IIII, IIII...\$CALL.
- NEC Model 95 2MB PostScript 6ppm Laser...\$1749.
- OKIDATA OL400 Laser 4ppm...\$749.
- STAR NX2420 Rainbow 24 Pin Color, Wide...\$377.
- PANASONIC 1180i, 1123, 1124i, 2123, ETC...\$CALL.

### SOFTWARE SALE

- LOTUS 123 Win 1.1...\$199.
- QEMM-386 v6.0...\$69.
- PAGEMAKER 4.0...\$279.
- MS/DR DOS 5/6...\$49.
- MS EXCEL 4.0 Win...\$149.
- WordPerfect Win...\$89.
- Windows 3.1/Mouse...\$129.
- MS Project 3.0 Win...\$99.
- WORD 2.0 for Win...\$149.
- WINDOWS 3.1...\$59.
- VENTURA 4.01 Win...\$259.
- Norton Util 6.01...\$89.
- Q & A 4.0...\$99.
- OS/2 2.0...\$79.
- PARADOX 3.5...\$249.
- COREL DRAW 3.0...\$179.
- Adobe Illustrator 4.0...\$169.

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## WHAT'S NEW

### Epson goes after home printer market

After more than a decade as leader of the dot matrix printer market and a significant player in the laser-printer sector, Epson has produced a printer for the home market which could offer the best of both worlds.

Although it is a dot-matrix printer of the 24-pin variety, the new Epson ActionPrinter 3250 looks and operates more like a laser or inkjet printer. According to Epson, design work for this printer has been underway since late 1990 and is the result of extensive research to identify users' product preferences.

So what's different about it? To start with, it accepts paper from a 50-sheet paper cassette just like the ones used in laser printers and photocopiers. If you feel a desperate need for a tractor feed for continuous paper, that is available as an optional extra.

It is light (12 pounds), less than 15 inches wide, able to operate either horizontally or vertically and—using an optional desk-side printer stand—can be hung from the side of a desk. The ActionPrinter 3250 uses Epson's latest ESC/P2 printer language, includes built-in scalable fonts (both roman and sans-serif) in sizes from eight to 32 points.

The language also has an enhanced graphics mode that operates at 360 dots per inch for printing graphics. Epson claims a print speed of 200 characters per second in draft mode and 72 characters per second in letter-quality mode.

Price for the printer is \$399, and it will be sold through mass retail outlets, computer superstores and mail order.

Contact: Epson at 1-800-GO-EPSON.

### MacWorld Expo Canada promises to be bigger, better this year



If you use an Apple Macintosh and can arrange to be in Toronto for September 15, 16 and 17, one of the world's biggest Mac expositions awaits you. MacWorld Expo/Canada 1992 at Toronto's Metro Toronto Convention Centre will play host to more than 200 exhibitors covering some 120,000 square feet of space.

Among the Mac applications being showcased are networking, spreadsheet analysis, databases, education, research, word-processing, accounting, law, CAD/CAM, forecasting, design, publishing, illustration, animation, music, programming, entertainment and multimedia.

Contact: MacWorld Expo at (416) 620-5412.

### VARDEX '93 plans well underway

Anyone who makes a living from "adding value" to computer systems may be interested in the VARDEX '93 Value Added Reseller Dealer Exposition. It will take place in Toronto next May 5 and 6, and organizers expect more than 200 exhibitors to take part and in excess of 4000 visitors to attend.

ence at the show, wooing VARs to develop products to use under its new OS/2 2.0 operating system. This follows IBM's big push at last month's VARDEX '92, where it offered many VARs their first chance to really get a close look at OS/2 2.0.



IBM is expected to have a major pres-

Contact Reed-Macgregor Exhibitions Limited at (416) 479-3939.

### A few seconds of speech could be worth 1000 words

Adding speech input and playback to software is one of the fastest-growing areas of computer development right now. Even conservative PC clone-maker Compaq unveiled systems this summer that include a microphone and support for speech input and playback in Microsoft Windows 3.1.

count on speaking the contents of the new Canadian constitutional package into your PC, however, as some 4K of disk space are required per second of speech. A modest four-minute dissertation would thus take up almost a megabyte of space!

For the tens of millions of PC users whose machines don't include such facilities, an Ontario-based company has developed an add-on system that easily allows speech to be entered and played back in documents. For \$300, Sidus Systems of Thornhill, Ontario will sell you the Sidus IVP, which consists of an eight-bit IBM PC half-size expansion card, a microphone, speaker and software. Don't



The idea instead is to attach short, punchy comments to word-processed documents, parts of a spreadsheet or a database. It could also be helpful to users of e-mail systems who aren't great with the keyboard—a detailed voicenote could be attached to an e-mail message.

Contact: Sidus Systems at (416) 882-1600.

## You'll learn faster because we've done our homework.

We know that PC Learning Labs books are the fastest and easiest way to learn because we've spent years perfecting them. Beginners will find practice sessions that are easy to follow and reference material that is easy to find. The techniques contained in these books have been tested on thousands of first-time computer users in the classrooms of PC Learning Labs. We listened to their feedback and made numerous refinements until we found the most effective way to learn. The result is a carefully tailored book/disk learning system featuring a "reader-friendly design".

The time we spent designing this series translates into time saved for you. You can feel confident that the information is accurate and presented in a way that allows you to learn quickly and effectively. We did our homework so you don't have to.

PC Learning Labs book/disk packages are currently available for WordPerfect 5.1 for DOS (28.95), Excel 3.0 (28.95), 1-2-3 Release 2.3 (28.95), DOS 5.0 (29.95), and Word for Windows 2.0 (29.95). Many more to follow.

PC Learning Labs by Ziff-Davis Press  
Distributed in Canada by Copp Clark Pitman



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### 386SX-33C

Desktop 386SX 33MHz  
33MHz i80386SX Processor  
16K Cache  
1 x 3.5" 1.44MB Floppy Drive  
100MB Hard Disk Drive  
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2xRS232 Serial Ports  
0.28 Dot Pitch SuperVGA  
Colour Monitor  
1MB SuperVGA Video Card  
101 Key Keyboard  
MSDOS 5.x  
Mouse

Magnum (Taiwan) \$1,365

### 386DX-33C

Desktop 386DX 33MHz  
33MHz i80386DX Processor  
64K Cache  
1 x 3.5" 1.44MB Floppy Drive  
1 x 5.25" 1.44MB Floppy Drive  
120MB Hard Disk Drive  
4MB RAM Expandable to 32 MB  
6 Free Expansion Slots  
1 Parallel Printer Port  
2xRS232 Serial Ports

0.28 Dot Pitch SuperVGA  
Colour Monitor  
1MB SuperVGA Video Card  
101 Key Keyboard  
MSDOS 5.x  
Mouse

Magnum (Taiwan) \$1,550  
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### 486DX-33C

Desktop 486DX 33 MHz  
33MHz i80486DX Processor  
64K Cache  
1 x 3.5" 1.44MB Floppy Drive  
1 x 5.25" 1.44MB Floppy Drive  
213MB Hard Disk Drive  
8MB RAM Expandable to 32MB  
6 Free Expansion Slots  
1 Parallel Printer Port  
2xRS232 Serial Ports

0.28 Dot Pitch SuperVGA  
Colour Monitor  
1MB SuperVGA Video Card  
101 Key Keyboard  
MSDOS 5.x  
Mouse

Magnum (Taiwan) \$2,250  
Magnum Canadian \$2,360  
Magnum American \$2,400

### 486DX-50C

Desktop 486DX 50MHz, 50MHz i80486DX Processor,  
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RAM Expandable to 32MB, 6 Free Expansion Slots,  
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Pitch SuperVGA Colour Monitor, 1MB SuperVGA Video  
Card, 101 Key Keyboard, MSDOS 5.x, Mouse

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Magnum American \$3,400

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386SX-20 Notebook  
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NEW Print Shop  
Wing Commander II  
Where in World C. San Diego  
Reader Rabbit  
Civilization  
SimCity  
Typing Tutor  
Microsoft Learning DOS  
Falcon

#### Hot List\* COMMUNICATIONS AND UTILITIES

Stacker  
Procomm Plus  
Norton Utilities  
Norton Desktop  
Norton pcANYWHERE  
PC Tools  
After Dark  
Norton Anti-Virus  
PC-Tools with Anti-Virus  
Laplank Pro  
SAM

#### Hot List\* BUSINESS APPLICATIONS

Quicken  
WordPerfect  
Microsoft Word  
Microsoft EXCEL  
Microsoft Office  
Microsoft Works  
Harvard Graphics  
Adobe Type Manager  
Calendar Creator Plus  
Grammatik  
Pagemaker  
Microsoft Money for  
Windows  
Quattro Pro  
Paradox  
Packrat by Polaris  
Microsoft Project  
Labels Unlimited  
Professional Write  
Q&A  
Facelift for Windows  
Willmaker  
CorelDraw

#### Hot List\* ACCESSORIES

Microsoft Mouse  
Logitech Fotoman  
Logitech Scanman with OCR  
AAMAZING Mouse  
Panamax Surge Suppressor  
American Power Conversion UPS

#### Hot List\* BOARDS AND INTERFACES

Sound Blaster PRO  
ATI Stereo FX  
Sound Blaster  
ATI Wonder XL 1MB  
ATI ULTRA VGA 1MB  
Bocaram AT Plus Memory

#### Hot List\* PRINTERS

Canon LBP4 + Laser Printer  
Canon BJ-10E / Sheetfeeder  
Epson LQ570 24 Pin  
NEC Model 95 Postscript Laser  
Okidata OL400  
Brother HL8V (HP III Compatible)

### AST

386SX-25 Notebook  
4MB RAM  
60MB Hard Disk  
\$1,850

#### Hot List\* MONITORS

NEC 3FGx 15"  
Darius 1424 70Hz Non-Interlaced  
AAMAZING 1024 x 768 SuperVGA  
IDEK YAMA 17"  
Sony CPD-1304 Multiscan

#### Hot List\* MODEMS

ZYXEL 14400 FAX/MODEM  
Zoltrix 2400/9600 Fax/Modem  
GVC 9600 Internal Modem  
US Robotics Dual Standard  
ATI 2400I Internal w/Sendfax  
INEL Satisfaction

#### Hot List\* CD-ROM BUNDLES

Sony 340ms + 5 CD Pack  
NEC Gallery + 7 CD Pack  
Pinnacle Internal + 1 CD  
Hitachi 1700S  
Pioneer 6 Pack

#### Hot List\* NOTEBOOKS

Texas Instruments WINSX 3000 60MB  
AST Executive Notebook 386SX 20MHZ  
AST Executive Notebook 386SX 25MHZ  
EVEREX TEMPO LX  
Choice 2000 386-33DX, 100MB  
Choice 2000 486-33DX, 100MB

#### Hot List\* LANGUAGES AND SYSTEMS

Microsoft Windows  
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DR DOS  
DesqView  
Borland C++  
Application Fwork  
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386MAX  
QEMM

\* Call for prices.

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Hours: Mon-Fri 8-6

## WHAT'S NEW

**Check the warehouse without leaving your desk**

Hartronix Computer Solutions of Concord, Ontario has developed new extensions to its Accounting accounting system that will allow users to actually see full-color pictures of what's on their shelves when they ask for an inventory-statement on-screen.

Using what Hartronix calls "inventory imaging," Hartronix Accountware Version 5.3 will allow users to append images from

a camera, video camcorder or PC scanner to the inventory control module. It might also be used to add pictures of employees to payroll records, pictures of parts to order-entry records or with bill of materials entries to see how sub-assemblies fit together or break apart.

Contact: Hartronix at (416) 738-4508.

**GENie now available on Canada's Datapac**

General Electric's GENie online information service can now be accessed through the national Canadian Datapac packet switching system. It means that GENie can now be dialled into directly as a local telephone call in more than 200 Canadian cities—including Toronto, Calgary, Edmonton, Vancouver and Winnipeg. These are, of course, in addition to

GENie's fourteen existing Canadian nodes. To use the Datapac access, dial the local Datapac number in your city and enter 95700517 as a network user address if you live in Eastern Canada, and 84400312 if you live in Western Canada.

Contact: GENie 1-800-638-9636

**Toronto company develops improved color PostScript print controller**

Outputting color images to PostScript printers has never been a simple task. Getting accurate, properly registered color work often poses a challenge for desktop publishing bureaus.

Developments in 24-bit color technology have made this challenge all the more acute—particularly given the size of 24-bit color files. The huge size of these files means that they can tie up output devices for extended periods of time while they are printed out.

Graphic Links of Toronto is selling a new series of PostScript-compatible print controller developed by Canadian software experts Questar. It improves speed by taking the image from the PC to the output

devices more quickly and by using the software built into what Graphic Links calls the "Starburst" PostScript controller to process the image more quickly and get it ready to print.

Graphic Links says that with the Starburst print controller, dedicated Raster Image Processors (RIPs) are not needed, and non-PostScript printers can be used to print PostScript files. Starburst will operate with a wide range of color and b/w laser printers, dye sublimation printers, plotters, film recorders, Canon color copiers (both the CLC500 and the BJA1), inkjet and dot matrix printers.

Contact: Graphic Links at (416) 322-6727.

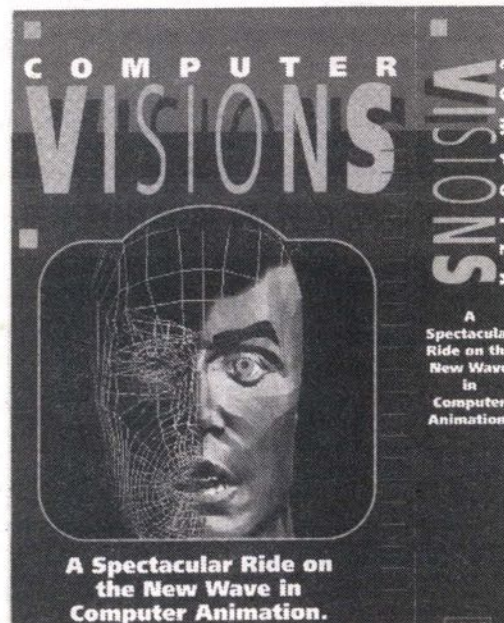
**Industry leaders help plan 1992 Canadian Computer Show & Conference**

Organizers of the 23rd annual Canadian Computer Show and Conference, to be held at Toronto's International Centre November 23-26, are boasting the use of a top-flight "advisory council" to plan the show.

Members of this advisory council include representatives from IBM, Microsoft, Compaq, Canon, Hitachi, Computer Associates, Dell, Lotus, Borland,

Fujitsu, the SMS Group and Sharp Electronics. A few changes have already been announced: the show will run three days (rather than the usual four) and each day will concentrate on different types of customers (e.g., CEOs, technical experts and distribution specialists).

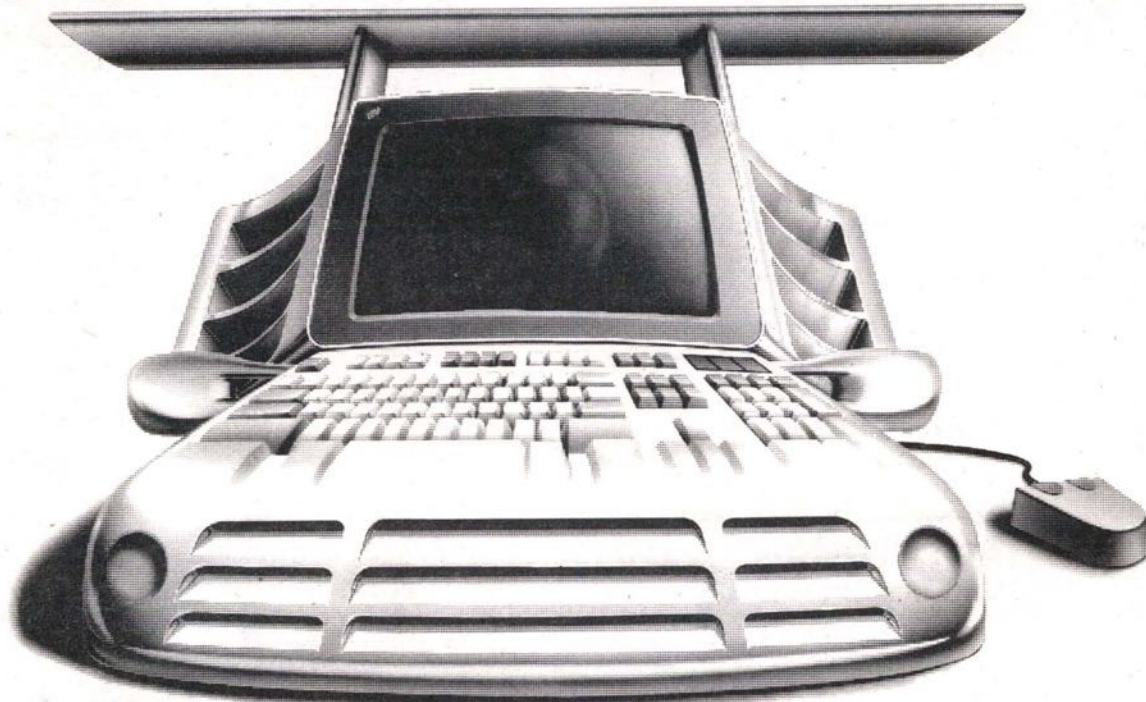
Contact show publicist Gail Godel at (416) 422-1414.

**Computer Visions Videotape**

Computer Visions is a new videotape of computer animation that goes behind the scenes and follows this new technological art form through its recent rapid development. The video showcases computer animation being used in such diverse fields as astronomy, surgery, auto design, advertising, environmental studies, medical research and modern art.

The 60-minute video careens through a wide range of styles and forms to educate and entertain the viewer. It is produced by Pacific Arts of California, and is distributed in Canada by Sounds of NOOR for \$29.95 + \$5 shipping.

Contact: 1-800-567-1849

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386 or 486? If you're facing that choice for your end users, here's an offer that'll make your decision simpler. Buy an IBM PS/2 386 SLC (Model 56 or 57) before September 15th, and we'll rev it

up to 486 performance with an SLC2 TurboChip for only \$299.\* The 486 SLC2 TurboChip doubles the clockspeed of your 386 (20 MHz to 20/40 MHz).\*\* It'll let you run Lotus 1-2-3, for example, four times faster than you could with a 386 SX-20.\*\*

So if you want 486 performance without paying 486 prices, buy an IBM PS/2 at your IBM Authorized Dealer. Or call IBM Direct at 1-800-465-7999 to locate the dealer nearest you.



\*Order through IBM Direct at 1-800-465-7999 with proof of purchase or see your IBM Authorized Dealer. Chip availability: 4th quarter, 1992.\*\* IBM measurements using NSTL benchmarks. IBM and PS/2 are registered trademarks of International Business Machines Corporation. IBM Canada Ltd., a related company, is a registered user. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

## WHAT'S NEW

### Purely Canadian clip art offered by TechnoPrint

TechnoPrint Software of Victoria, B.C. recently spotted a gaping hole in the North American market for pre-drawn, computer-created "clip art"—no-one was selling images of Canada. Responding to this observation, the company created a clip-art package simply known as "Art O'Canada." It consists of some 70 Canadian-specific images, including provincial maps and flags, maple leaves, a fishing boat and the

fleur-de-lis of the Quebec flag available in EPS format for both Apple Macintosh and PC systems.

Users of the package apparently already include the Royal Canadian Mint, Apple Canada, Microsoft Canada and the Office of the Governor General of Canada. The package sells for \$77.50 (excluding taxes).

Contact: TechnoPrint at (604) 380-0744.

### Toshiba offers cut-price promotion on T4400SX 486 notebook systems

Until September 30 of this year, you can buy a 486SX-based Toshiba T4400SX/80 sidelit LCD or gas plasma notebook computer bundled with an internal fax/modem and a Logitech Trackman portable at no extra cost. The system with



LCD screen will cost \$4699 while the same bundle with gas plasma display will run you \$5099.

Contact: Toshiba of Canada at (416) 470-3478.

### Toronto desktop service bureau pioneers multimedia, silver plate printing

Toronto-based Campus Copy and Publishing Services—which has been providing desktop publishing output services since 1988—is planning to branch out into assisting users with multimedia applications and in speeding up PC-based professional printing.

Partner Paul Varghese says the company is taking the same attitude to these services as it did to providing business cards, rubber stamps and faxes. "We're looking into

Mitsubishi silver plate output," he says. "It will let companies go directly from the computer screen to a standard quick-printing plate. That will really put the quick in quick printing—and at great savings, too. Color scanning and color laser output are already here."

Contact: Campus Copy and Publishing Services in Toronto at (416) 925-2277.

### Financial planning with your PC

RAM Technologies of Milton, Ontario has developed a completely rewritten version of its financial planning software. Known as The Wealth Creator Version 4.0, it promises to allow users to consider how much money they will need to retire financially

independent, what kind of savings plan will be needed to put children through college and what kind of financial returns different investments will yield.

Contact: RAM Technologies at (416) 876-4246.

### CRS offers EasyLink, Expands Coverage to Barrie

Canada Remote Systems, (CRS) the Mississauga-based electronic Bulletin Board System, has released a new program designed to ease the trauma of negotiating through vast megabytes of on-line data and messages. EasyLink, is a custom-programmed front-end software package for users of IBM-compatible computers. It is not a full-fledged "GUI" (Graphical User Interface), but instead offers menu-driven help screens and options for users to choose. The menu items can be selected by keyboard, or with a mouse. The program includes a context-sensitive help system. The setup will automatically configure your modem and setup the correct phone num-

ber for dial ins. According to Neil Flemming, President of CRS, EasyLink software is designed to help first time users navigate the system.

CRS was also recently chosen as the most popular bulleting board by over 10,000 regular BBS-user in a poll sponsored by Caller's Digest magazine. CRS also now claims to be the largest BBS in North America surpassing Exec-PC BBS who reduced the number of lines while CRS increased theirs.

Computer users in the Barrie area can now access CRS's on-line services through a local phone call.

Contact: CRS (416) 620-1439.

### Plusware Keypad adds Numbers and Function Keys to Mac Powerbook

Markham-based Plusware Inc., a Canadian manufacturer and developer of Macintosh ADB peripheral devices for the Macintosh has just released its 23-key numeric keypad. This product has the honor of being primarily "made in Canada". According to Softcode (Plusware's parent company) president Julian Lee, the development, the molding, circuit board and the assembly were all done in Ontario. The keys themselves came from Germany, and the



additional software Quickkeys Lite came from the U.S.

The product was designed primarily with Mac Powerbook owners in mind. It is flat, light-weight and slim line for portability. Plusware hopes to have an IBM-compatible version available shortly. Suggested Canadian retail price is \$159. Softcode plans to distribute the product in

Canada, the U.S., France and Germany.  
Contact: Softcode Distributors & Consultants Ltd., (416) 477-5474.



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# PC Canada/ LAN Expo

SHOW REPORT

BY KIRTAN SINGH KHALSA

120 vendors and 8-10,000 people showed up July 28-30 at the Metro Toronto Convention Centre for The Interface Group's PC Canada/LAN Expo trade show and conference. According to The Interface Group, "Canada is North America's fourth-largest technology market." (*The Computer Paper* was still trying to locate the fourth country in North America at press time.) The show was a success, and many dealers and distributors plan to be in next year's show, when it will be called Comdex Canada.

Big-name exhibitors included Microsoft, IBM, DEC, Quarterdeck, Symantec, Artisoft, Hayes, Honeywell, Ingram Micro and Intel.

#### Microsoft Mail

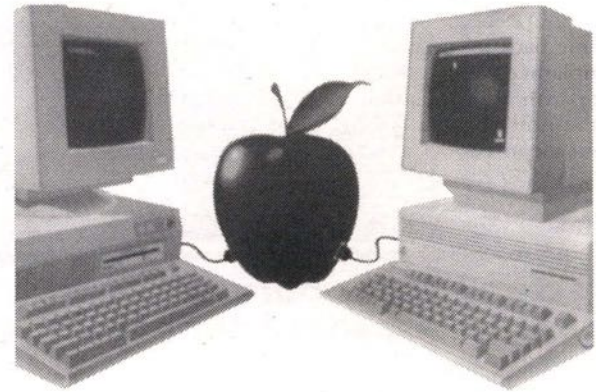
I wandered the aisles for a few hours and saw a number of interesting things. Microsoft had the new version of its Mail product for Windows. According to a representative in the booth, the product has a number of significant new features, but ultimately the company plans to go to a client-server architecture with the former Network Courier (purchased recently from Vancouver's Consumers Software) product as it currently has on its Macintosh product. Another interesting new product is Microsoft's scheduling software. This is a separate product that integrates with Mail 3.0. It allows users on a network to call up their co-workers' calendars and choose a best fit for scheduling meetings. Very slick. Contact: Microsoft Canada (416) 568-0434.

#### OS/2

IBM was out in force again, as they have been at most recent computer shows—big and small—pumping the OS/2 operating system. This product, which competes directly with Windows 3.1, has recently been hailed by noted computer columnist John Dvorak as the way of the future. IBM had a large OS/2 lab right on the show floor to let users have a first-hand crack at OS/2. In the center of the lab was the plaster-of-paris man, familiar from *Time* magazine's early '80s choice for "Man of the Year" cover. Contact: IBM Canada (800) 465-7999.

#### LANDA Lab

The LAN Expo portion of the show featured an elaborate lab of networked Unix, OS/2, DesqView/X, R/6000, ALR, Everex and other high-end computers. It was a little vague what was being demonstrated in some cases, but if you waded in and asked



Artisoft had a big booth to demonstrate its new LANtastic Windows front end for setting up and administering LANtastic networks.

questions, there were some very knowledgeable "techie" on hand. Contact: LANDA Toronto (416) 480-0248.

#### LANtastic

Artisoft had a big booth to demonstrate its new LANtastic Windows front end for setting up and administering LANtastic networks. The company also

has a telephone and sound board combo so that the boss can actually yell at his workers over the computer network. The display had a lonely Macintosh, but it wasn't plugged into the network while I was there. Artisoft claims to be able to share files and printers both ways between an Appleshare and LANtastic network. Contact: Artisoft, Inc., 691 East River Rd., Tucson, AZ, USA 85704.

#### Screen Convergence

IIS Technologies, a Bell Canada company, was on hand to demonstrate a multipoint conferencing system. This \$800 software package allows users to share screens over ISDN phone lines. If you add a bit of hardware (still-video capture, pen digitizers, scanners, etc.) a complete system can be shaped for corporate users, education and other creative one-to-one solutions. Contact: IIS Technologies (800) 263-9673.

#### Wrist Wrelier

Forminco, a Montreal-based furniture manufacturer, was showing a variety of high-tech black melamine and metal computer furniture. One add-on that caught my eye was the "Mouse Arena," a circular table for mousing around with a little leather upholstered palm support pad to rest one's wrist on. It sells for \$39.95 and is available from Crowntek. Contact: Crowntek (800) 567-5000.

#### Low-cost Voice Mail

KISS Communication, based in North York, had its TAVIS Talk multiline voicemail system on display. This system is said to offer all the snazzy features of high-end voicemail (auto attendant, call transfer, call screening, call forwarding, call holding, remote access, etc.) at about half the price of the competition. It is PC-based and a four-port system can be purchased in kit form for \$1995, or \$4995 as a turnkey system. Contact: KISS Communications (416) 633-0351.

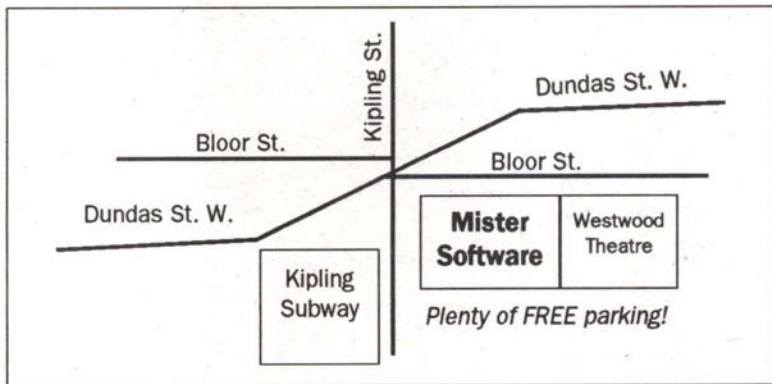
#### Back Relief

The folks at NADA-Chair had an idea for people with backaches from working at a computer. They sell an adjustable padded sling that slips around your back and knees

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while you are sitting in a chair. You snug up the adjustable straps and use your knees to take some of the pressure off your back. It sells for \$45. I saw a number of back-pain sufferers queue up to try it out. One guy put money down untested, saying "I'll try anything."  
Contact NADA-Chair (514) 849-3543.

#### Color Notebooks

Ultinet Computers is fast off the mark with new 386 and 486 color notebooks. These are the first color notebooks I have seen from second-tier clone makers. Dell, Compaq, Sharp and Toshiba have been out with them for a while, but I think Ultinet is the quickest on the draw in assembling these units in Canada. They use the Sharp TFT screens and offer quite reasonable color for \$3375 on the 386SX version and \$4875 on the 486DX-33 unit. One dealer, who dragged me back to the booth to see the units, complained that his only problem with dealing with Ultinet is that they keep lowering the unit price without telling him—a pleasant surprise.  
Contact: Ultinet Computers (416) 256-6000.

#### Fax on Demand

IBEX Technologies Inc., was demonstrating its FactsLine system. This \$7,000 system allows telephone service bureaus and other companies to set up a multiline telephone system that gives users fax on demand. You dial in, wander through a touch-tone maze, select your required forms by number and then key in your own fax number, and hang up. The system will call you back and fax you the selection of stored documents you requested. To try it out first-hand, call (416) 629-8880. *PC Week*, said it was the best of five systems tested back in February of 1991. Contact: IBEX Technology (916) 621-4342 or City-Com Communications (416) 629-2612.

Other networking products of note included SuperTime, a DOS-based office productivity package from Willowdale-based SuperTime Inc. ((416) 499-3288), and Imara Research Corp's ((416) 581-1740) Windows-based Imara document imaging and filing software.

#### DacEasy Instant Accounting

DacEasy Canada was there showing off its new low-end Instant Accounting product. The \$69.95 package is unique in offering both Windows and DOS versions in the same box. The files remain compatible in both directions. Apparently DacEasy felt that its original product, DacEasy Accounting, had matured beyond being an entry-level product, so it intends to edge the pricing up towards the midrange over the next few upgrades.  
Contact: DacEasy Canada (416) 940-3314.

#### Log on to your Bank

The TD Bank was on hand to demonstrate its Business Window product. This software package allows TD account holders to check on the status of their business accounts by modem. Users can monitor up to three accounts with up to 35 days of history for about \$45 a month. The best feature of this system is the ability to see month-end statements immediately at the month end, and not have to wait for a statement to be printed and mailed. There are a variety of value-added features including more history, special reporting and transfers between accounts.  
Contact: your local Toronto Dominion bank.

#### Financial Forecasts for your Business

Pendock Mallorn Ltd. was happily showing off its new version of Pro-Forma Plus software. This financial forecasting model runs in Quattro Pro or Lotus, and allows users to prepare complete financial forecasts in a very short time. The developer says that Pro-forma Plus can calculate bank credit lines and predict collateral shortfalls. It even takes off the taxes for you. \$179.95

with a free 30-day trial period.  
Contact: Pendock Mallorn Ltd. (416) 264-2126.

#### What will that Mortgage Really Cost?

Business Logic Corp. has launched a new version of its financial calculator. The new version, The Financial Calculator—Professional, adds flexibility to any time-value money calculations. Imagine you and the bank own a house together. The bank is

charging you 11.75% interest. It was a good deal when you got into it, but the rates have gone down. For one year you can get 7.25% now. The only problem is the bank wants to charge you a surcharge to change rates. Is it worth it to switch now or wait till December '93 for your original term to end? The Financial Calculator will tell you the answer. Contact: Business Logic Corporation (519) 763-2097.

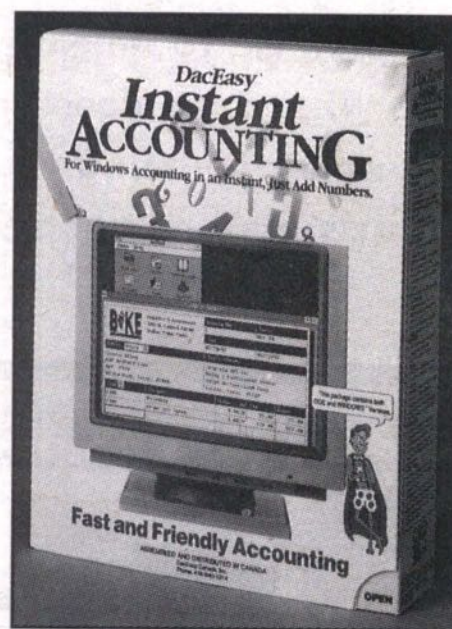
Next year, Comdex/Canada '93 will take place July 13-15 at the Metro Convention Centre and will be made up of three shows: Windows World, Corporate Computing and LAN Expo. ■

Contact: The Interface Group (617) 449-6600.

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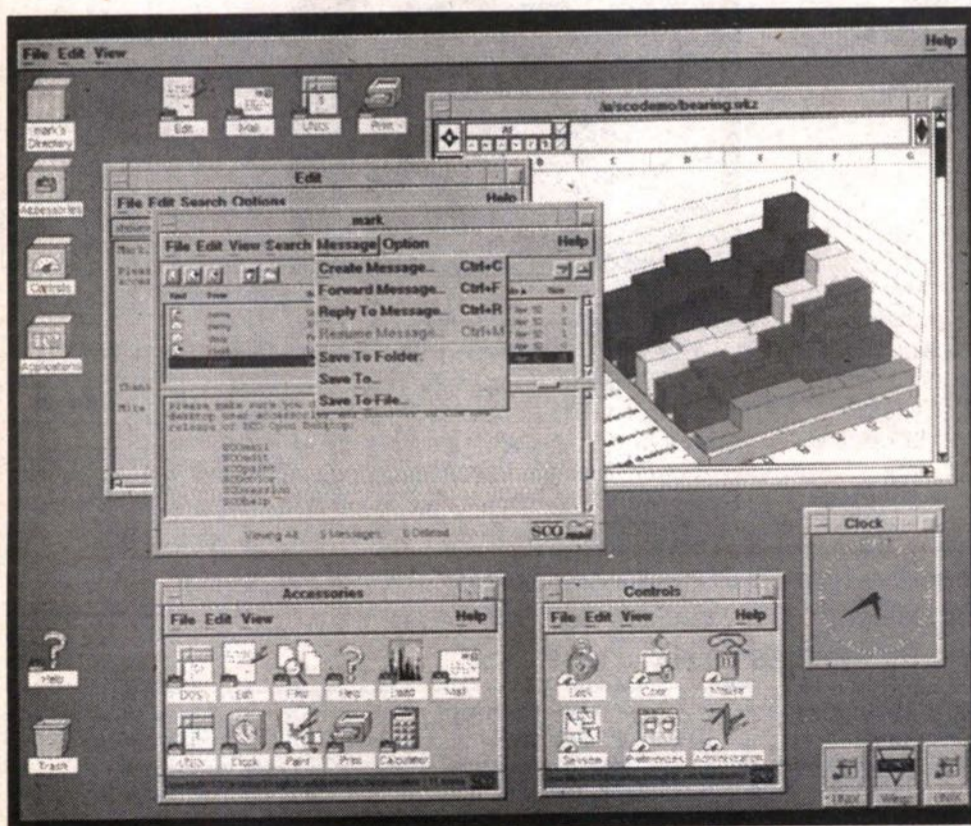
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# Running UNIX on your PC

BY KENNETH CLARK

Running Unix on your PC will take full advantage of the 32-bit architecture of Intel's 386/486 processor, and can turn your personal computer into a workstation-class machine. Of course, IBM's OS/2 and Microsoft's yet-to-be released Windows NT also promise to unleash the power of your 32-bit PC. What then does Unix have to offer over these new operating systems? The answer lies in Unix's maturity and widespread acceptance.



The SCO Open Desktop Personal System

## What is Unix?

The Unix operating system found its humble beginnings on a DEC PDP-7 at Bell Laboratories in 1969. Since then, it has become by far the most popular operating system in the workstation market, used by such names as Hewlett-Packard, Sun Microsystems, NeXT, Digital Equipment (DEC), Silicon Graphics, and even IBM.

Unix possess true multiuser/multitasking capability, which means it can allow you to format a floppy disk, print out a 500-page thesis report, and play chess with someone in another city, all without breaking a sweat. Unix also has a built-in networking system, and runs a powerful graphical interface called the X Window System.

If you are a software developer, Unix includes powerful development tools, and can be used as a cross-development platform for other architectures and operating systems (even DOS!).

Many programs written for Unix on a Sun or DEC workstation can be made to run with little or no modification on your 386 Unix. Through the efforts of standardization committees such as ANSI and POSIX, software written for Unix today will be able to run on a wide range of hardware well into the future. As the differences between the workstation and PC worlds shrink, such portability considerations will become all the more important.

It is fair to ask why IBM chooses to use Unix on its RISC System/6000 graphical workstations rather than OS/2. It is also unlikely that Microsoft's Windows NT will ever gain widespread acceptance on non-Intel 80x86 hardware. Ironically, according to Microsoft chairman Bill Gates, NT pretty much is Unix, and will have POSIX standard compliance.

If you are already in the market for a workstation, it is worth your while to look into running Unix on a 386/486 as opposed to purchasing a system from DEC, Sun, or IBM. The intense competition in the PC market has driven down the price of computer hardware to the point where you can buy performance equivalent to a \$16,000 workstation for under \$8,000!

## Which Unix?

Okay, so you've decided you want to run Unix on your new 386 or 486. Unfortunately, buying Unix for your PC is not quite as easy as walking down to your local computer retailer and pulling a box off the shelf.

Over 20 years, the Unix operating system has had a long and complicated evolution, and as a result Unix can be found in a number of different flavors, most notably System V (SYSV) and Berkeley Unix (BSD). System V was developed at AT&T, and is now in the hands of Unix Systems Laboratories (USL), an AT&T spin-off. BSD was developed at the University of California (Berkeley), and most of this software is now public domain.

In what follows I offer a brief outline of some of the SYSV Unix products available for the 386/486. Most of these are based on System V release 4 (SYSVr4) from USL, and hence are very similar in terms of their code (that is, the source code that makes up the operating system) and features. When shopping for Unix, the things to watch for are compatibility, support, and of course, price.

All the System Unix implementations reviewed claim they are "SCO binary compatible." This is really just a byproduct of the fact that they are all based on the same AT&T code, but is important because most software written specifically for SYSV/386 Unix was written for SCO Unix. Ask your dealer to make sure the software you want will run on the system you buy. All of these Unix implementations also claim POSIX compliance so porting source code from a workstation or mainframe should be fairly painless as long as the code conforms to the standard.

Pricing Unix can be quite confusing. Vendors complicate matters by charging differently depending on whether you plan on using their product as a personal system or a multi-user system. To make things worse, vendors often charge extra for complete development systems, networking, and X Windows.

**Unfortunately,  
buying Unix for  
your PC is not  
quite as easy as  
walking down to  
your local  
computer retailer  
and pulling a box  
off the shelf.**

If you are unfamiliar with Unix, it is a good idea to buy an introductory Unix book to help you decide what features you are interested in, and then find out from the vendor or your dealer exactly what that system will cost. If you are fortunate enough that you can afford the big bucks, you will save yourself some headaches if you just buy their "complete" system. Upgrading later can often cost as much as a whole new system.

## Consensys Unix Version 1.3

Consensys Corp., Universal City, TX.  
(800) 387-8951

Consensys is one of the least expensive proprietary SYSVr4 Unix implementations on the market and arguably the best bang for the buck. They have basically licensed stock AT&T code from USL, with very few modifications. However, their system includes an impressive array of features: a development system, full networking, real time kernel extensions, and X Windows (X11r5 including Motif).

You get free phone support until installation, for a maximum of 90 days, after which they charge by the half hour of phone time. They also have a support BBS at (416) 752-2084. Their support is reported to be on the skimpy side but if you can convince your dealer to handle the support, Consensys, along with Micro Station Technology (MST), are good inexpensive alternatives to SCO.

## Dell Unix System V Release 4 Issue 2.1

Dell Computer, Austin, TX.  
(800) BUY-DELL

Dell has invested some effort to improve upon USL's licensed code. Thus, they have managed to iron out a number of annoying bugs and simplified the installation process. With its modifications, their system is said to run significantly faster than stock AT&T code.

They also include a few add-ons with their base system, including a DOS bridge and lots of nifty freeware. Dell would be more than happy to sell you hardware with their Unix preinstalled, and this may not be a bad idea if you don't mind paying a \$1000 premium over bargain-basement clones. Buying Dell's hardware can reduce many a headache over hardware incompatibility.

They offer 90 days free phone support and yearly service contracts are available at US\$500 for an unlimited system. Dell does support their Unix on non-Dell hardware but only for software problems, so if you encounter any hardware incompatibilities

on non-Dell hardware you are on your own.

**Esix Revision A**

Esix Computers, Santa Ana, CA. (714) 259-3020  
Esix code is pretty much stock AT&T code licensed from USL. Although Esix is a division of Everex (a clone manufacturer), they haven't yet bundled their Unix with any of their hardware products. Many of the users are pleased with the performance and have not encountered any major hardware incompatibility problems as yet. Esix lacks most in that they have little to differentiate themselves from their competition.

Purchases include unlimited free phone support although the only two engineers assigned to help you are completely swamped with calls. They also have a BBS to better serve you at (714) 259-3013.

**MST Unix**

Micro Station Technology, Cupertino, CA. (408) 253-3898

MST is another vendor that offers cheap stock AT&T code with very few modifications. They have been around longer than Consensus and offer very helpful and timely support. Their X Window libraries are bundled with the networking system which is sold separately, so if you want to run X Windows, you will have to spend a little bit more. MST also offers hardware with Unix at very reasonable prices, from US\$1349 to \$5599.

One general impression of MST is that their support is very good. They offer 30 days free support with purchase and have one year of fax/e-mail support for US\$299 and phone support for US\$599.

**Microport System V/4 Version 4**

Microport Inc., Scotts Valley, CA. (800) 367-8649

Like Dell, Microport has put time into improving the performance of their USL code, and it shows. The base price includes printed manuals, and their system allows you to run X Windows without having to buy the networking package. The only downside to Microport's investment in their product is their price tag, which makes them the most expensive vendor on the market. But if money is no object, here is a good quality product.

They bundle from 30 days to one year free phone support, depending on which system you buy. Their support is reputed to be friendly and knowledgeable and they also have a BBS where you can reach them (408) 438-7270 or 438-7521.

**UHC Version 3.6**

UHC Corp., Houston, TX. (713) 782-2700

UHC offers basically stock USL code, complete with printed manuals. Most notably, their support is said to be head and shoulders above the rest.

Their technical phone contract is very pricey at US\$1195, but it includes 75 per cent off for upgrades. All their technical staff take shifts answering phones and they've devoted two engineers to man the phone lines full time. They seem to make an effort to try and develop a working relationship with their clients, no matter how small they may be.

**SCO System V/386 Rel 3.2 version 4.0**

Santa Cruz Operation, Santa Cruz, CA. (800) 726-8649

Last but far from least, there is Santa Cruz Operation's Open DeskTop (ODT). SCO is the most recognized name in the PC Unix market and has roughly 70 per cent of the market share.

Of all the vendors listed here, SCO is the only Unix based on USL's System V release 3.2 (not release 4). Real System V release 4 contains several improvements and additions to release 3.2, and the "version 4.0" in their product's name is somewhat deceptive. SCO's version 4 contains

many System V release 4 enhancements, but is not based on release 4 code.

SCO also sells Xenix, the Unix-like operating system first released by Microsoft for the 286. You will find that SCO Unix has a lot of Zenix stuff scattered throughout the system, and contains numerous undocumented changes and divergences from standard SYSVr4 code from USL (which can drive developers and hackers alike up the wall). Complete SCO systems are also highly priced, and the number of options and features, all priced differently, are mind boggling. You get 30 days of free phone support with purchase, after which support is \$895 per year.

SCO does, however, have several advantages over their competition. It is nice to know you are in the majority when running SCO, and most night courses for 386 Unix are aimed at SCO users. There are SCO dealers everywhere, so support is usually not too far away either.

SCO comes with documentation that is second to none, and has very extensive "DOS under Unix" options that can be a big help if you are new to Unix. And finally, SCO has a large number of proprietary software titles available, such as WordPerfect and Lotus, and dBASE.

My feelings are that SCO is ideal for the business user who is not too concerned with price and wants to run DOS-like applications, but perhaps should be avoided by the more advanced user or software developers with tighter budgets.

**More Unix**

There are a few other varieties of Unix that deserve to be mentioned, and even more that I have probably missed. These include Solaris, QNX, Coherent, Minix, Mach 386, BSD/386, Linux, and 386BSD.

Solaris is a SunOS Unix for the 386 which is to be released soon (SunOS is the operating system used on Sun workstations). It promises a complete SYSVr4 system with all kinds of Networking, Multimedia, and SunOS goodies. Solaris is made by SunSoft, a division of Sun Microsystems.

Coherent by Mark Williams Company is priced at only US\$99 and is a good way to get your feet wet if you are new to Unix, but does have some major limitations such as lack of networking and X Windows.

Mach 386 (Mt. Xinu) and BSD/386 (Berkeley Software Design) are Berkeley Unix systems available for the 386. BSD/386 is based on the Berkeley Net-2 release, and is POSIX compliant. There is even talk that BSD/386 will soon support SCO binaries. Perhaps most impressive, BSD/386 includes sources for the entire system and an unlimited user license with the base system.

Finally, Linux and 386BSD are available as free Unix systems for the 386. These are both very complete Unix systems, but unless you know what you are doing you will need a lot of help to get them installed on your machine. Don't be fooled by their free availability. At present, these systems lack very little from their commercial counterparts, and are still growing.

If you are on a tight budget, both these systems offer a good alternative route to getting Unix running on your 386. Companies that offer support for these systems are springing up throughout North America.

**Final words**

Be aware that Unix can have some very specific hardware requirements and is sometimes incompatible with certain motherboards, controllers, or video cards. The easiest way to avoid these problems is to buy a complete "turn-key" system from your dealer

If you already have a machine waiting, try to get your dealer to install Unix for you. It can often take an inexperienced user several days to get a new system

installed and configured properly. If you are the do-it-yourself type, I strongly recommend that you buy your Unix system software first, then buy the hardware. Be sure to bring your vendor's hardware compatibility list with you when you are shopping for your new 386 or 486.

Finally, try to get your Unix system from a knowledgeable dealer who will offer support beyond pointing to their vendor's technical support line. Most vendors do not

offer 1-800 support numbers, so it is advantageous to have your support close to home.

Unix systems don't come cheap, and as with any major purchase, it will pay if you shop around before settling on any one vendor's product. ■

Acknowledgment: Many thanks to Eric Raymond and his FAQs for much of this information.

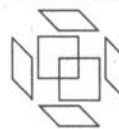
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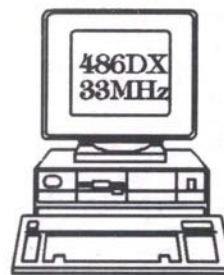
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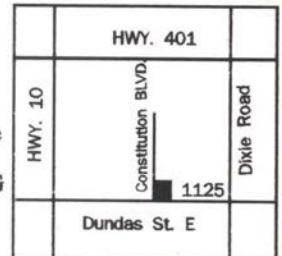


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**If you are using DOS or Windows right now, you might consider moving to IBM's OS/2 or Microsoft's NT in the next few years. You also might consider migrating to some form of Unix, such as SCO Xenix. What could persuade you to jump?**

# Planning For the Future

## Preparing for OS/2 and NT

BY ROEDY GREEN

### Introduction

Nearly always, customers ask me, "How can I buy a machine today that will work in the future with IBM's OS/2 or Microsoft's new operating system, NT?"

I will be looking at this question from three angles:

1. Why would you ever want to move to OS/2 or NT?
2. What sort of machine would you need today to run these new operating systems?
3. How can you buy a machine today with a good chance of being upgraded to work with future operating systems?

### What are the possibilities?

If you are using DOS or Windows right now, you might consider moving to IBM's OS/2 or Microsoft's NT in the next few years. You also might consider migrating to some form of Unix, such as SCO Xenix. You might decide to convert your computer to act as the heart of a LAN — a file server.

What could persuade you to jump?

1. You want the powerful new applications coming along that will need the breathing room of the new operating systems.
2. You need to smoothly run more than one program at a time.
3. You need a stable operating system that does not crash.
4. You have application programs that require huge amounts of RAM and computing power, and want to wring every last drop out of your CPU, RAM and hard disk drives.

### Why stick with DOS?

The main reason to stay put with DOS is to avoid the complexity of setting up a multitasking operating system, although once they are set up, they are almost as easy to operate. Multitasking operating systems require large amounts of RAM and hard disk space. If you don't need to multitask, there is no reason to pay that overhead.

Though, in theory, all DOS and Windows 3.0 programs will continue to work on OS/2, in practice many have glitches. Windows 3.1-specific programs will not run under OS/2, though IBM hopes to have them working by September. You will not reap OS/2's full benefits until you use programs that run in native OS/2 mode. This means buying new software applications.

OS/2 is much pickier about hardware. Many controller cards that work fine under DOS lack appropriate drivers for OS/2.

Don't just move to OS/2 because your friends have. If you want simplicity, stick with DOS.

### What's the matter with DOS?

DOS was a slight modification of the earlier CPM operating system. Microsoft designed

DOS when 640K looked like an impossibly large amount of RAM, and when only main-frame computers had hard disks.

DOS was designed for simplicity. Only one program at a time could run. DOS knew only about the first 640K of RAM.

Since then, we have tacked on fix after fix to improve DOS's functionality while preserving compatibility with older programs. For example, we added hard disks by telling DOS they were giant floppies. This was not very efficient, but it worked.

We tacked on memory past 640K as expanded EMS RAM, but allowed programs only to peek at it 16K at a time, making it almost useless for storing code. We invented memory managers like QEMM and 386MAX to allow little pockets of RAM in the region between 640K and 1 MB to be exploited. We invented XMS drivers so the RAM above 1 MB could be used to store data. There is still no easy way to put programs in the memory above 1 MB. With DOS 5.0, we learned how to shoehorn DOS itself into a special 64K region just above the 1 MB mark called the HMA.

We tried to make DOS run more than one program at a time. The first programs of this type were TSRs (pop-ups). There are no official rules for interactions between TSRs. Only one program at a time can ask DOS to do work on its behalf. Unfortunately, there is no fool-proof way for a program to tell if DOS is busy working for some other task.

We then used multitaskers such as DESQview to run several programs at once. DESQview tries valiantly to keep the various programs from interfering with each other. Because DESQview is kludged on top of single-tasking DOS, this house of cards often comes crashing down when any program fails.

Since DOS can do work for only one program at a time, everything comes to a grinding halt any time any program uses the floppy disks. All must wait until the floppy I/O is complete before DOS can do any other work — such as read a hard disk.

In summary, because Microsoft designed DOS so long ago, it is inefficient handling today's hardware. When you attempt to use DOS to run more than one program at a time, it is unstable.

### What's the matter with Windows?

Windows fixes some of the problems of DOS, but adds new ones of its own. Windows sits on top of DOS, but does some of DOS's work for it, providing a rich environment for programs.

Windows, with its printer and screen drivers, has greatly simplified buying and installing software. You no longer need to find out if each individual program supports your printer or screen. If Windows supports them, then automatically all Windows application programs do too.

Windows allows programs to break the 640K barrier, and use the RAM above 1 MB for code. However, it extracts a penalty for this boon. All programs must be broken into small chunks no bigger than 64K each. In the "bad" old DOS days, a program could fill the 640K region.

Windows works only 16 bits at a time, wasting the full 32-bit power of the 80386 and 80486 chips. Windows only uses half of each 32-bit register.

The biggest problem with Windows is that it throws all programs into one big pot. If any program misbehaves, it can cause another unrelated program to fail. A typical Windows session

is a soup concocted by hundreds of chefs who have never even met. It is a wonder it works at all.

Windows is a GUI (graphical user interface). It treats even text as pictures made of hundreds of thousands of dots. This is much slower than the old DOS pure-text method, so you need a faster CPU, more RAM and special video hardware to get even close to the speeds you enjoyed under pure DOS on creaky old hardware. In return, the GUI offers graphics and fonts in any shape, size and colour you could imagine.

### Why OS/2?

Microsoft and IBM saw all these troubles with DOS and Windows, and decided to rewrite DOS from scratch to solve them. This took much longer than anyone expected. The result was OS/2 2.0.

OS/2 can do many things at once. It can be reading a floppy while it reads two different disk drives, while simultaneously it paints the screen. It can be doing work for several programs at once. In other words, OS/2 was born to multitask. This means faster, smoother multitasking.

OS/2 runs four kinds of programs:

- a) old DOS programs
- b) old Windows 3.0 programs (but not 3.11)
- c) 16-bit OS/2 version 1.3 programs
- d) native 32-bit OS/2 2.0 programs

In native 32-bit mode, we finally use the full power of the 80386 and 80486 chips. Programs can be up to 4 gigabytes long. Programs use all the registers, and all the memory, directly with no kludges such as EMS or XMS. This means OS/2 finally unleashes the raw computing power of the 80486 CPU. Unfortunately, much of OS/2 itself, as distinct from the application programs, continues to run in the old 16-bit mode.

OS/2 keeps each program in an airtight box. Hardware prevents it from meddling with other programs or with the operating system. Normally OS/2 even prevents a program from accidentally destroying its own code. This means you very rarely crash the entire system. At most, only one program will die. These airtight boxes help programmers track down bugs, which means, in theory, there should be fewer of them.

OS/2 completely redesigns the way hard disks work. The new HPFS (High Performance File System) allows you faster access, and long filenames like the Mac. Caching is now safely built-in, rather than tacked on as a utility like the infamous PC-Tools DOS Disk Cache. Under DOS, random access to large files is notoriously inefficient. HPFS fixes that problem.

OS/2 (and NT for that matter) will ease the transition to motherboards with more than one CPU. OS/2 applications would



need no changes at all to allow them to run on machines with a bank of CPU chips working in tandem.

OS/2 uses a more intuitive, Mac-like, object-oriented user interface. This means, for example, you can print a file by dragging to the printer, or delete it by dragging it to the trash.

**Why NT?**

Microsoft and IBM built OS/2 as a joint venture. Then they had a parting of the ways, and Microsoft renamed OS/2 version 3.0 "NT." Inspired marketing is Microsoft's forte, so it is likely NT will eventually prevail over IBM's OS/2. Microsoft's developer conferences are drawing over ten times as many attendees as IBM's. Microsoft is almost giving away development tools to those willing to write applications for NT. This will probably result in a flood of powerful NT programs coming to market within a year.

However, NT is not yet released. Beta NT versions show promise, but are still only half as fast as IBM's OS/2 version 2.0. Meanwhile, IBM won't stand still. If IBM hires the right advertising agency, we all will benefit from the intense competition.

As you might expect from its lineage, NT is very similar to OS/2. Microsoft designed NT so that it would be easy to port to high-speed RISC CPU chips that have nothing in common with the venerable 80x86 architecture. Portability is a mixed blessing. Had Microsoft targeted and tuned NT only for the 80486, it would run faster. However, portability will mean if you outgrow your 80486 or P5, there will likely be even faster chips available to run your NT software.

Not to be outdone, IBM has been working on porting OS/2 to RISC platforms like the SPARC.

**What else?**

There are at least two other possible futures your machine might grow into. You might convert it to a file server, running Novell Netware to service the disk needs of a LAN (Local Area Network). Netware is yet another operating system, something like a cross between DOS and OS/2. Novell certifies only a small fraction of the possible hardware choices as compatible with Netware.

You also might decide to run one of the many flavours of Unix. You could look on NT and to some extent OS/2 as just eccentric Unix implementations designed from scratch, rather than descending from AT&T's Unix.

**Which should I pick?**

If you are happy with DOS, at least experiment with DESQview. I was fairly sure I would not like it, and that I would have no use for multitasking. Now, I don't know how I ever got along without it. I have increased my productivity by 15%. DESQview gives you a low-cost way to experiment with multitasking. It lets you run more than one ordinary DOS program at a time with as little as 2 MB of RAM.

If you find yourself happy with Windows, stick with it. If crashes, slow disk access, slow floppy access, slow access to

large files are driving you round the bend, you might want to try OS/2. You will then trade those problems for a different set of headaches. Don't leap into OS/2 unless under DOS you were competent with writing BAT files and tweaking WIN.INI and SYSTEM.INI.

NT is not yet an option, unless you are a program developer with a CD-ROM drive.

Installing a LAN makes almost no change to the way your machine feels. You still use DOS and Windows. If you install an Ethernet LAN and Novell Netware, you may find access to large files is improved, since Netware fixes some of DOS's problems with disks. The big difference is the ability to share files and printers with other users. If you install Novell Netware on a server, you put it in a closet and let it hum.

In Unix, many users share a single powerful computer, not necessarily even related to the 80x86

series. Exploring that option is beyond the scope of this article.

**Hedging**

We don't know much about NT, but there is a wealth of information on OS/2. Chances are, hardware that works for OS/2 will have a good chance of eventually working with NT as well. For the remainder of

the article I will concentrate on how to buy hardware for OS/2. If you know what will be needed, you might not buy OS/2-capable hardware today, but you might leave your options open to easily upgrade when OS/2 or NT takes off.

There are four keys to buying hardware that will work with OS/2.

1. Check that someone else has already managed to make your proposed combination of hardware work.
2. Stick to the mainstream. Buy only well-known, popular brands.
3. Select hardware that has drivers available from multiple sources.
4. Choose vanilla hardware.

**Check before you buy**

First, ask your vendor about OS/2 compatibility, then also seek confirmation from a disinterested party. You could ask fellow members of your local user group. I did a poll last month and found about a third of the members are now using OS/2.

Mark Sehorne, an IBM employee, tracks which hardware works with OS/2. You can reach him and other OS/2 experts on the global BIX electronic conference.

To subscribe to BIX, use your modem to dial your local Tymnet node (in Vancouver 683-7620), with 2400-N-8-1, either MNP-4 or plain. When you get through, ignore any gibberish and hit an "a". Then type "BIX". When it asks you for your name, type "bix.deal". Once you have registered, type JOIN IBM.OS2/INSTALLING.

In Toronto call Tymnet at 365-7620, in Calgary 232-6653 and in Edmonton 484-4404. If you live outside those areas, to find out the number of the closest Tymnet node, call (800) 628-3497.

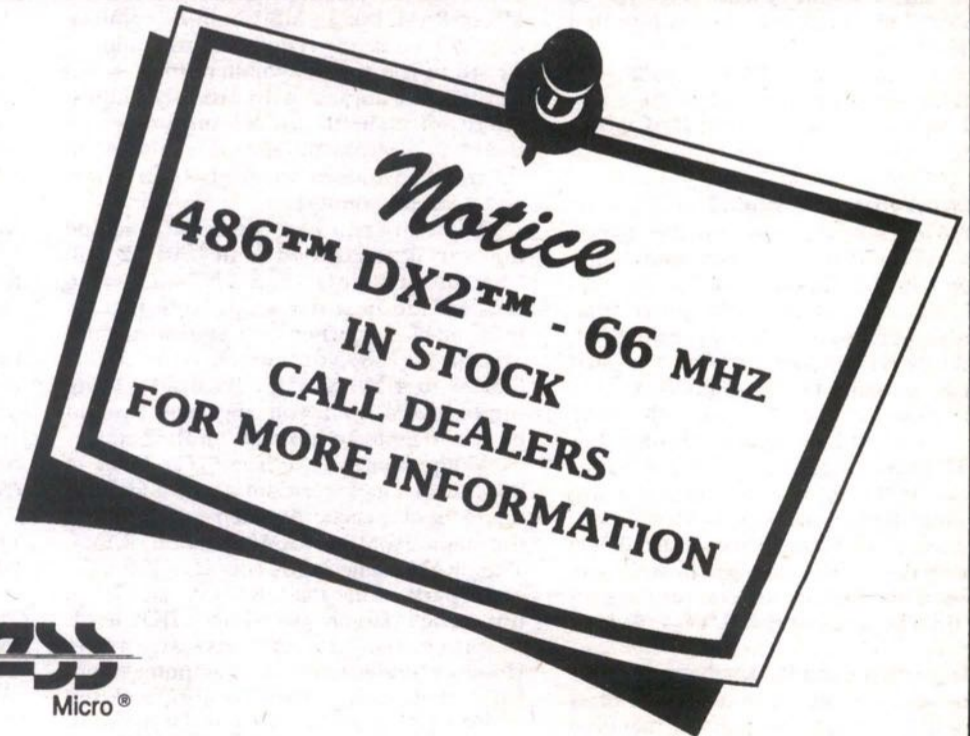
*Continued on page 18*

**Microsoft and IBM saw all these troubles with DOS and Windows, and decided to rewrite DOS from scratch to solve them. The result was OS/2 2.0.**

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### Sticking to the mainstream

In our office, we have two expensive, beautiful, full-page desktop publishing monitors. They are almost useless. The company that made them went bankrupt. There is no one to write the new drivers needed to make them work under Windows 3.1 or OS/2.

Without ongoing new software drivers, any hardware you buy for Windows or OS/2 will be useless. Even if you are wiser than we were and pick a company that stays in business, unless it sells huge volumes of a product, it will likely not bother to continue to keep supporting it in future. Vendors concentrate their driver efforts on the most recent hardware. Check the vendor's history of support for its older cards.

If you pick a popular card, you at least have the hope some third party might provide driver support if the primary vendor drops it.

### Multiple sources for drivers

I hope you are beginning to see the crucial importance of an ongoing supply of updated drivers to keep your hardware functioning. Having two sources of supply doubles your chances of success.

For example, let us say you purchased the ATI Graphics Vantage card. This card will behave as:

1. an ordinary VGA card
2. an IBM 8415 accelerator
3. a Mach-8 super accelerator.

Ideally you want it to run as a Mach-8. However, let us say ATI for some reason in the future failed to provide you with the new driver you needed, or was late providing it. Then you could use the 8514 driver that comes bundled with OS/2. It would run a tiny bit slower, but it would still work. IBM has an excellent track record of supporting its obsolete equipment, so chances are the 8514 drivers will be around forever.

However, what if the 8514 driver did not work? You could then run the card as a plain VGA. This would be very slow in comparison, but it would at least allow you to function. Plain VGA also comes bundled with OS/2.

Other cards besides IBM's emulate the 8514. The vendors of these cards are a possible source of drivers should IBM fail to provide.

### Am I worrying too much?

When Windows 3.1 came out, the drivers for the ATI and the S3 cards such as the Diamond Stealth did not work. Five months later they were still not fully functional. Meanwhile ATI users could run as the 8514. The S3 user had no such fallback. They had to run as the painfully slow plain VGA.

The situation is even worse with OS/2. No drivers at all have appeared for either the ATI or S3 cards. ATI users are happy running as 8514, whereas S3 users are grumbling along as plain VGA.

In theory, the S3 cards should be almost as fast as the ATI cards, but in practice, because of the lack of drivers, they are no better than bottom-of-the-line VGA cards.

### Sticking with vanilla hardware

Imagine you were going to a cocktail party where all the guests carried Uzi machine guns. If any of them did not like you, they would happily shoot you. You might wish for a short guest list. You might avoid wearing a loud tie or expressing unusual opinions. You would not want to be too presumptuous about which seat was yours. You would want to be as vanilla and bland as possible to avoid clashing with any of the other guests.

This is a metaphor for what it is like to be a piece of hardware inside a modern computer.

Every new piece of hardware you add must get along swimmingly with every existing piece. The more stuff you add, the greater the likelihood of clashes. Even if the new piece works now, if it is eccentric, it

may cause problems later when you add new hardware or update the drivers.

What do I mean by this in practice? Go for standards. For example, don't buy an IDE disk unless it complies with the ATA standard. Don't buy SCSI unless it complies with ASPI. Stick with AMI — the McDonald's of BIOSes. Make sure your video card can handle the VESA standard. Make sure your laser printer is either PostScript or HP compatible. Ethernet is the safest choice for a LAN.

While you are at it, make sure your motherboard, case and power supply are a standard shape and size. This will make it easier to get upgrade or replacement parts later. Nonstandard replacement parts can easily cost ten times as much.

### Brass tacks

What do you need to run OS/2? What should you buy now that you could easily upgrade later to run OS/2? I am going to name brands and models that I know will work and that are widely available. This does not mean other equipment would not also work. Most dealers should be able to beat the street prices I will quote in Canadian dollars.

### Motherboard

OS/2 will run a machine as slow as a 386/25 MHz, but practically it requires a 486/33 MHz. As a minimum you need 8 MB of RAM, but 16 MB would be comfortable. NT currently requires a minimum of 12 MB to run the development tools, 8 MB to run most apps, and 16 MB for comfort. Microsoft plans to put NT on a diet and shed 2 to 3 MB by the time it is released to the public. Windows 3.1 needs 4 MB to run and 8 MB for comfort.

Therefore you had best get a machine that can be expanded to at least 32 MB. Guaranteed both OS/2 and NT will get fatter over the next few years. Note that on most machines, when you expand from 8 MB to 16 MB, you switch from 1 MB SIMMS to 4 MB SIMMS. To avoid wasting the old RAM when you upgrade, it would be best to go to 16 MB right off the bat.

Motherboards have from 32 to 256K of fast SRAM (static random access memory) that acts as a cache between the chip and the main 16 MB DRAM (dynamic RAM). The SRAM cache holds copies of the most active parts of the main RAM. Under DOS, this cache is largely wasted since DOS tends to concentrate on one task at a time. However, under OS/2 the computer rapidly flits from task to task. To work well, the SRAM cache must be able to hold the work

in progress of several tasks. Here is where a large 256K SRAM cache pays off.

Do not confuse this SRAM cache with 2 MB DRAM disk caching or the super high speed 8K SRAM cache internal to the 486 chip.

**OS/2 uses a more intuitive, Mac-like, object-oriented user interface. This means, for example, you can print a file by dragging to the printer, or delete it by dragging it to the trash.**

To avoid compatibility hassles, look for an AMI BIOS. A compatible BIOS is not as crucial with OS/2 since OS/2 largely ignores the BIOS after the boot. Lithium batteries or Dallas clock chips are best at holding the CMOS configuration when the power is off.

Make sure you have a full eight slots. Having at least one 8-bit slot will let you fit in an oddly shaped XT-style card.

### ISA or EISA?

An EISA motherboard will cost you about \$1000 more than the equivalent ISA. If you examine

an EISA motherboard, you will see it has fancier connectors. Standard ISA cards fit into them just as on an ISA motherboard. However, EISA cards sit deeper and connect with a second bank of connectors deep inside the sockets. These extra connections allow the EISA cards to communicate 32 bits at a time rather than just 16 bits at a time over the bus. There is no speed advantage, unless you also use special EISA controller cards. EISA controllers are much more expensive than standard ISA controller cards.

If this gets too technical, just skip to the next section. The ISA motherboard has a 16 MB RAM limit. The peripherals on the bus can only see and interact with the first 16 MB of RAM. For example, if the operating system wants to read from a disk into memory above the 16 MB limit, it must first read into a location in the first 16 MB of RAM, then copy to high RAM. With an EISA bus, there is no such limit, and the disk controller can deposit the data directly to the desired location above 16 MB.

Some DOS software is unaware of this problem, and fails in ISA machines with more than 16 MB.

DMA (Direct Memory Access) is a method of having a device such as the disk controller work independently of the CPU, read the disk and directly deposit the data in RAM, all without CPU intervention. There are three types of DMA: third-party DMA where the motherboard DMA chip controls the operation, first-party DMA where the disk controller itself takes over that function, and bus mastering where the disk controller commandeers the entire bus for short bursts to blast the data into RAM.

On the ISA bus, third-party DMA is too

slow to use at all. The best you can hope for is first-party DMA — used only on high-end SCSI host adapters. In contrast, the EISA cards use the extremely fast bus mastering method. Often ISA first-party DMA is erroneously billed as bus mastering.

For years pundits have been predicting that EISA would soon displace ISA. It still has not. EISA does not buy you much speed improvement if you only run DOS. It buys you no speed improvement at all unless you at least buy an EISA disk controller. EISA only begins to strut its stuff when you use a true multitasking operating system.

EISA may catch on as we begin to bang into the 16 MB ISA RAM limit. A year ago EISA boards cost four times what they do now. If EISA prices continue to drop at that rate, it won't be long before ISA goes the way of the XT.

For now, I would recommend most people buy ISA, and wait for EISA prices to drop further. If you want to prepare for EISA, get a SCSI hard disk now with an inexpensive ISA SCSI host adapter. Then when EISA motherboards become affordable, get one and a bus mastering EISA SCSI host adapter.

IBM makes a third type of bus called MCA (Micro Channel Architecture). It is technically superior to both EISA and ISA since IBM started from scratch and did not burden itself with ISA compatibility. MCA motherboards and cards are about twice as expensive as the ISA equivalents, largely because IBM owns all the patents for the bus.

### Case and power supply

OS/2 machines tend to accumulate large hard disks. Make sure your case has plenty of room inside for them, and a powerful fan to keep them cool. A full-size tower would be best both for room and cooling. Modern components don't use that much power, except at start up. However, in practice I have found a 300-watt power supply makes these big machines run more smoothly because of the higher-quality filtering.

### Video

OS/2 runs mostly in GUI mode, either emulating Windows, or running the Workplace shell. There are millions of dots to paint every second on the screen, so it pays to get some specialized help — namely a video accelerator. As I explained earlier, the safest type is 8514 compatible.

ATI is a Canadian company that makes two cards, the Graphics Vantage and the faster still Graphics Ultra that are both 8514 compatible. Even many Americans recommend these as the best OS/2 video cards. If you abandon OS/2, these cards are also great for speeding up Windows. Operating systems don't know or care what kind of monitor you use.

### Hard disk

If you install all of OS/2, it will consume 30 MB of your hard disk. In addition, it will need room for swapfiles, print queues, and expanded directories. Some people have reported these using as much as an additional 30 MB. Using selective install, you can leave out features of OS/2 you do not need, and save disk space. Some people have managed to squeeze OS/2, a few substantial application programs, and some data onto a 60 MB disk. In practice, I would not consider OS/2 for systems smaller than 80 MB.

There are three kinds of disk you could use: IDE, ESDI, and SCSI. Under DOS, the three interfaces operate at about the same speed. Manufacturers use the same mechanicals with a different set of electronics to make the IDE, ESDI and SCSI versions of the same disk drive. There are two numbers that measure the speed: the access time and the sectors per track.

The access time, e.g., 15 ms, is the average time it takes to hop from one part of

## 4 STEPS TO PREPARE FOR OS/2 OR NT

1. **Get a 486 motherboard**, or one that can be upgraded to a 486.
2. **Make sure your motherboard will accept at least 32 MB RAM.** Consider putting in 16 MB right away.
3. **Get an 8514-compatible video accelerator** such as the ATI Graphics Vantage or Graphics Ultra.
4. **Use an Adaptec 1522 or 1542 SCSI host adaptor** for your hard disk.

the disk to another. The smaller the better. The sectors per track, e.g. 53, is the count of 512-character sectors that whip by with each revolution of the disk. The more per track, the more can be read per revolution. Nearly all disks revolve at 3600 RPM. However, under OS/2, SCSI is faster than the other types of interface because OS/2 can do other work while the SCSI host adapter is working.

**The case for IDE**

The three types of disk: IDE, ESDI and SCSI now cost about the same. The three types of host adapter card, however, vary widely in cost. IDE host adapters cost only \$27. This makes the complete IDE package by far the cheapest.

IDE drives usually are non-standard. You cannot necessarily mix and match drives from different manufacturers. Sometimes you can even damage the drives when you try to combine incompatible pairs. Pick drives that follow the ATA standard, such as Maxtor, then you should be able to combine safely.

You can have at most two IDE drives. If you need more space, you must replace the smaller drive.

With IDE, you usually cannot correct damaged formatting information in the field. However, Maxtor, Fujitsu and Western Digital let you redo the low-level format without sending the drive back to the factory.

So far, only Conner lets you disable the onboard cache to test the drive surfaces.

The problem with most IDE drives is they don't follow any standard. This means they may cause trouble now or down the road.

IDE drives are the best choice when you are on a budget.

**The case for ESDI**

ESDI are the most trouble-free type of drive to install. All drives conform to the standard so you can mix and match drives from different manufacturers. All the drivers you need come bundled with OS/2. All ESDI controllers work exactly the same way. A typical good ESDI controller would be the Ultrastor 12F for \$194.

Unfortunately, *PC Magazine* just declared them obsolete. Already, in the USA, ESDI drive prices have started to rise as they become rarer. It will become harder and harder to find upgrade ESDI drives over the next few years.

If you have no time to waste and want to get OS/2 working quickly and smoothly now, ESDI is the way to go.

**The case for SCSI**

SCSI is complicated and the most difficult to get working, either in DOS or OS/2. The SCSI host adapter handles not only hard disks, but also tapes, PostScript printers, mag tape backups, CD-ROMS, scanners, etc. The big advantage of SCSI is you can add these new devices without requiring yet another controller in yet another slot in your motherboard. You could even hang on seven disk drives. With other types of controller, you can hang on at most two.

First-party DMA SCSI host adapters are able to work independently, allowing the CPU to work on other tasks. Under DOS the CPU just spins its wheels waiting for the disk to finish, but under OS/2, the CPU does other useful work. This independence is what makes SCSI so fast under OS/2.

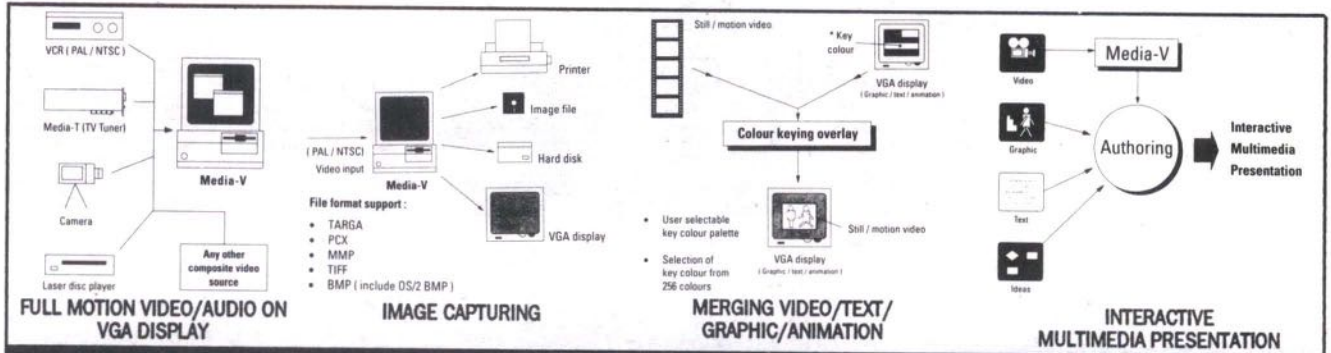
Every SCSI host adapter needs a proprietary software driver to make it work. There is no official standard for how the host adapter looks to the computer, though there are rigid standards for how the host adapter and the devices communicate. The closest we have to an industry standard are the two Adaptec SCSI host adapters. Bustek makes clones of them and Corel writes drivers for them.

*Continued on page 27*



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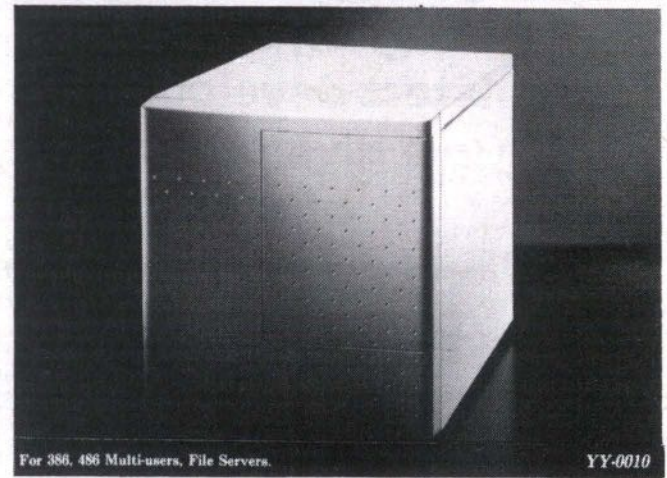
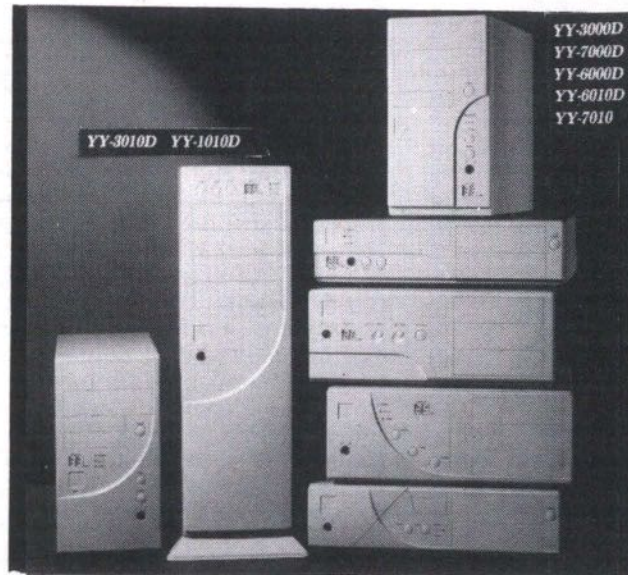


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Many of you have heard that Internet is for university and government types, and is a cryptic monster that only a Unix guru can navigate. While Internet began as a university/government network, it is also for the rest of us. The myth that Internet is this great, unmanageable, cryptic monster comprehensible by only the Unix masters is just that: a myth.

# The Hitchhiker's Guide to the Internet

BY T. D. GUAY

Internet is used productively by many people who do not, even remotely, qualify as Unix masters. Internet users I'm familiar with include an editor of a yachting magazine, a professor of creative writing, historians, freelance writers, secretaries, and regular people like you. Internet is no more difficult to use than most information services and BBSes.

That's fine you say, but what does Internet have to offer, and how do I get on to it? Those are the questions I hope to answer.

## What is Internet

Internet is a global information network with sites in over 30 countries that is not controlled by any one organization or committee. The net is not a commercial service, being funded by the various governments and the organizations which maintain Internet sites. The fact that a network so large can work as an informal cop of the site administrators, group moderators, and users is quite amazing and bodes well for the future of electronic democracy. As one user put it:

I blundered into it, I didn't realize the network was so vast and unregulated....One of the most interesting things about Internet is the co-operative nature. It is real-life anarchy working.

Vast it is, with approximately three million users, over 1800 news groups (forums), over 900 publicly accessible sites containing in excess of a million files totaling a hundred gigabytes. While it is impossible to cover all its offerings in this article, we can gain a feel for each service Internet offers.

## Usenet: The Internet News Groups

Usenet, also known as Netnews, though not strictly an Internet service, is one of the richest services available on the net. Usenet is a distributed bulletin board of over 1800 news groups (forums) on a vast range of topics, with new groups being added almost daily. Usenet sites can be found worldwide, with the largest concentrations to be found in the U.S., Canada, Europe, Australia, and Japan.

These news groups can be either moderated or unmoderated, with unmoderated groups being the norm. The topics range from computer special interest groups, to religious groups, academic topics, hobbies, philosophies, fan clubs, sex, and science. If you're into home brewing your own beer there is a group for you; if you're into the Grateful Dead there is a group for you, if you're Albanian...and so on. Comments from several users are indicative of Usenet's scope and diversity:

Its humungous, you're in a [news] group with people all over the world.

I am constantly amazed at the range and depth of information available on Internet. The news groups allow me to stay on top of the latest developments in a diverse number of areas.

**I am constantly amazed at the range and depth of information available on Internet. The news groups allow me to stay on top of the latest developments in a diverse number of areas.**

So how does Usenet work? The user accesses the various groups using a news reader program that allows the user to read and post to a group. Postings are transmitted throughout Internet, with copies of the posting being stored at each site that carries the specified group. While postings are only kept on a site for a limited amount of time, some of the more popular news groups will archive

all postings at a specific site. Thus sci.virtual-worlds, the virtual reality news group, has an archive of over 5 megabytes compressed, containing every posting made since 1989.

Postings are not just limited to discussions, but can also include binary files, and GIF images. A lot of new public domain software is distributed through the various comp.binaries news groups. The binary files and GIF images are extracted using a decoder program. There are several different news reader and decoder programs available, so you will have to contact the administrator for the site you are using to access Internet for specific instructions on these programs.

## Internet Mail Groups

While Usenet postings are very public, being posted to every site carrying the group, mail groups are more private forums for discussion. In order to join a mail group

you must subscribe to it. Some lists are restricted, with only those users meeting the restrictions being allowed to subscribe or maintain their subscription. An example of this is the fiction writers mailing list, where the members must actively participate by submitting their own work and critiquing other members' work.

There are currently over 300 known mailing lists covering a wide range of topics. There are lists devoted to exchanging bread recipes, discussions on the Arthurian legends, alternate lifestyles, role-playing games, and Broadway musicals, just to name a few. Furthermore, many Internet sites have a bridge to BITNET, giving access to several hundred more mailing lists.

## Anonymous FTP

Anonymous FTP is the term used to describe both the software and the techniques for downloading files from various publicly accessible Internet sites; these sites are often referred to as FTP sites. FTP stands for File Transfer Protocol, and anonymous refers to the procedure of logging into most of these sites using the user ID 'anonymous', with the password being your Internet address. Those few sites not using anonymous as the ID, use "guest." Once you've logged on to the site, you can access the various public directories and download whatever files are publicly accessible.

Many FTP sites contain large archives of public domain software and shareware, many of which are not available anywhere else. Software is available for MS-DOS, Macintoshes, Amigas, Ataris, NeXTs, and for various Unix workstations. Besides software FTP sites carry archived Usenet news group postings, Internet documentation, databases, PICT images, collections of GIF, TIFF, and PICT sets, fonts, essays, and frequently asked question lists (FAQ) for various news groups.

Also accessible on many FTP sites are MUDs. MUD stands for Multi-User Dungeon. They are interactive adventure games, ranging from the traditional dungeon hack games to nonviolent sociologically oriented games. Currently there are over a hundred MUDs and there are both Usenet groups and a mail group for MUD devotees.

## Archie: The Internet File Finder

So how do you find the file you want among a million files spread over 900 FTP sites? You use Archie. Archie is an electronic directory service for locating files on Internet. It tracks the contents of the over 900 FTP sites, updating the information on each site on a monthly basis. The user queries Archie via either e-mail or interactively.

Archie returns the location(s) of the file(s) the user is searching for. The user

can then use anonymous FTP to download the files from the specified sites.

## Internet e-Mail

Besides offering e-mail services among Internet users, Internet also has gateways to other networks, BBSes and information services. These gateways allow users to send and receive e-mail to and from users on other networks. Internet is capable of sending and receiving e-mail from 19 different networks, BBSes, and information services. Numbered among these 19 are CompuServe, MCI, SPRINT, and BIX.

Internet e-mail addresses are expressed as <userid>@<sitename>. For example, my Internet e-mail address is guay@sfu.ca. As an example of how e-mail between networks operates I will use the example of sending messages between Internet and CompuServe. By following the first example CompuServe users will be able to e-mail the Internet information addresses given later in this article.

To send e-mail from CompuServe to Internet, where the Internet user's address is userid@sitename send to:

INTERNET:userid@sitename

To send e-mail from Internet to CompuServe, where the CompuServe ID is 99999.999 send to:

99999.999@compuserve.com

Note the substitution of a period in place of the comma.

## Online Library Catalogues

One can access a wide variety of online library catalogues through Internet. These catalogues include some of North America's most prestigious universities as well as The Library of Congress.

## Accessing Internet

So how do you access Internet if you are not affiliated with a university or a government agency? There are several possible

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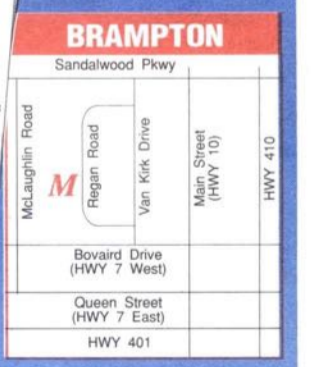
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Continued from page 20  
 routes you can take.

The first route is to see if your local university sells external accounts. An external account is an account on a university's system that is owned by a user who is not affiliated with that university. For example, my university will sell an account giving unlimited access to Internet for \$65 per four-month semester. You can access the account either through the university's dial-up lines or the university's onsite terminals.

The second route is through a commercial BBS. Many large cities have commercial

BBSes that provide complete Internet access. Examples of these would be Canada Remote Systems in Ontario, and Mind Link in British Columbia. The charges will vary between the BBSes, but should be reasonable.

The third, and often the cheapest route, is the public access networks, often referred to as Pubnets. There are hundreds of Pubnets spread throughout many of the Internet countries. A Pubnet can best be described as a noncommercial BBS specializing in providing Internet access. Charges are nominal, and in many cases access is

free. Pubnets grew out of the ideal that Internet access should be available to everyone.

**Further Information**

More detailed information on the various Internet services can be had by contacting the following sources. CompuServe users can e-mail these sources using the syntax outlined in these sources on e-mail. Sprint, MCI, and BIX users should consult their documentation.

- To find out more about Pubnets, and



where your nearest site is, subscribe to the Pubnet mailing list by sending an e-mail message to:  
 pubnet-request@chinacat.unicom.com

• To find out about new and existing mail groups, subscribe to the e-mailing lists mailing list by sending an e-mail message to:  
 info@vml.nodak.edu

• To get a list of all anonymous FTP sites, send an e-mail message to:  
 odin@pilot.njin.net

In the subject line say: listserv-request  
 In the body of the message say: send help

- To get documentation on Archie, send an e-mail message to:  
 archie@archie.mcgill.ca

In the subject line say: help  
 In the body of the message say: help

• To get a copy of the Internet Resource Guide, send an e-mail message to:  
 resource-guide-request@nnsf.nsf.net

Or you call NNSC at (617) 873-3400 and they will sell you a hard copy of the guide for a nominal fee.

• To subscribe to the Internet questions and answers mailing list, send an e-mail message to:  
 quail-request@ftp.com

In the body of the message say:  
 subscribe quail mailing list  
 And give your name and e-mail address.

• Once you've found out how to access Usenet groups, check out the new users Usenet group. It is called:  
 news.announce.newusers

• Another source of Internet information is CompuServe's Unix forum. Just type GO UNIXFORUM. There are a lot of useful files in library 12.

**Conclusion**

I've barely scratched the surface of Internet, but this should be enough information to get started. The sheer size of Internet is enough to hold the most avid explorer's interest for a lifetime, so happy Internet hitchhiking! ■



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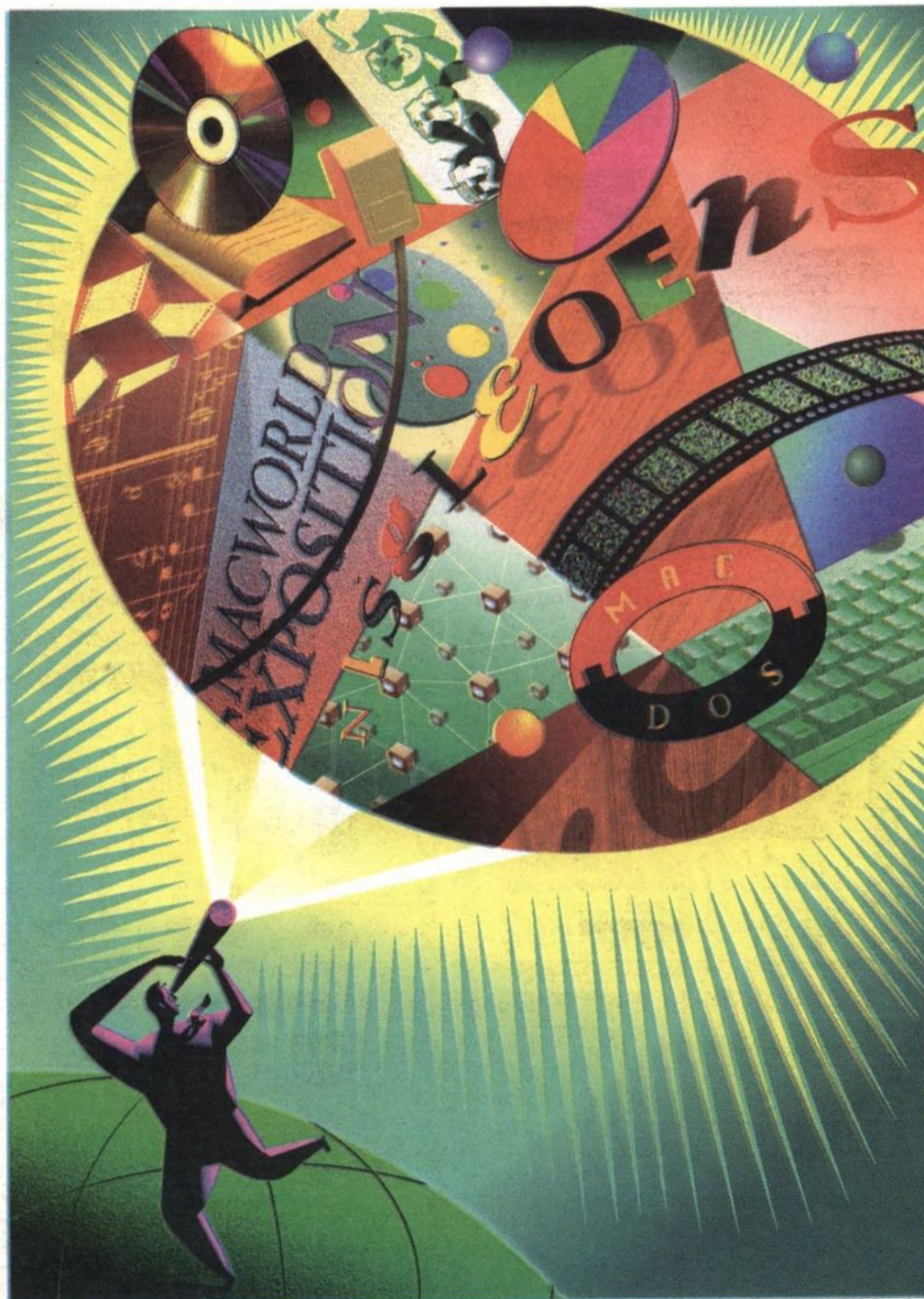
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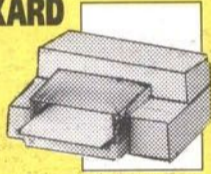
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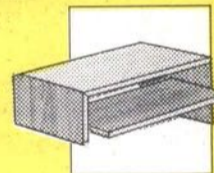
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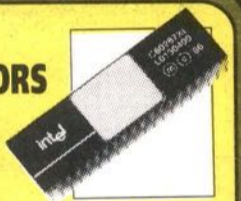
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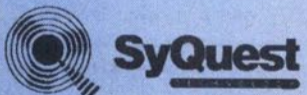
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# NT

## UPDATE

BY GEOFF WHEELWRIGHT

*Now that Microsoft and IBM have finalized their messy divorce and laid out a future for Microsoft Windows and OS/2—one which won't allow IBM any access to Microsoft's code for Windows NT (New Technology)—it's probably a good time to look at what NT is supposed to be all about.*

**N**T has been portrayed in some circles as an alternative to OS/2, while others have whispered that it's basically the software component of the troubled ACE (Advanced Computing Environment) consortium. According to Microsoft, neither description is totally accurate.

A recent visit to Microsoft's Windows NT development at the company's headquarters in Redmond, Washington suggests that the picture is much more complex—with the new high-end operating system having a number of major goals to fulfill.

### ACE not vital to NT

Starting with the question of ACE, Microsoft group product manager for corporate and network systems David J. Thacher says that the company's view of it is evolving. Although Microsoft is by no means abandoning development of Windows NT for non-Intel processors—and, in fact, recently announced plans to port to DEC's new high-speed Alpha chip—Thacher does admit that the computer industry's view of the advantages of running on RISC (Reduced Instruction Set Chip) processors has changed in recent months.

"About five years ago, RISC was just being announced and there were no RISC chips on the market," says Thacher. "Power curves were far steeper for RISC and it came to our attention because we were working on a new foundation for OS technologies and wanted portability across multiple CPU architectures. That was the focus. The world has changed a lot since then."

Thacher says the biggest change has been in the performance of standard CISC (Complex Instruction Set Chip) technologies—led by Intel. "It is nowhere near as clear that people need RISC as it was," he

admits. "People have to have a big performance advantage to give up using Intel architecture. You don't just switch to another system because it will offer you five to ten per cent better performance."

Thacher recalls how the company began its quest for an alternative hardware development platform for the product which would eventually become Windows NT. From the start, Microsoft knew that if it was going to build for RISC, the operating system had to be portable—so that it could go onto one RISC chip and then others. The company also recognized the need to isolate the hardware from the operating system and achieved this in the specification for Windows NT through the use of what it calls an "abstraction layer".

As anyone who has watched the PC market for the last year knows, Microsoft's first choice for a RISC platform for this operating system was the MIPS R4000—which was also being backed by the ACE consortium as part of a common hardware-standard definition for next-generation, high-end PC workstations. With the recent acquisition of MIPS by Silicon Graphics and a fall-off in support from several key ACE members, you might think that ACE was dead.

Not according to Microsoft. Despite the fact that Compaq has backed out of its involvement with ACE—and Digital has announced Alpha as its major chip technology—Thacher says he still sees a place for ACE. "Our viewpoint is we think it's real, that the MIPS-based systems will be delivered and that they meet a need—the manufacturers like the chip and will follow the ACE specification," he says.

"We will, of course, be ready for that. We will continue to develop on that plat-

form and will have widespread developers' release. We also have a strong relationship with Digital and will work to port onto the Alpha chip set as well. It is a good business opportunity. We are not going out looking for dozens and dozens of platforms for Windows NT—it doesn't replace MIPS."

Thacher says he is happy that in Windows NT, Microsoft will be able to offer a high-performance operating system that will run happily on Intel, MIPS and Alpha architectures—and yet will be as extensible as possible through the hardware abstraction layer.

### Myths surround NT

He is also quick to dispel what Microsoft consider "myths" about the differences between OS/2 2.0 and Windows NT—which have been compared closely to one another in the press lately. "The difference between NT and OS/2 is that not everybody will need NT," says Thacher. "IBM has to get out there and say that Windows 3.1 isn't good enough and that you need to spend this extra money to get better performance."

Notwithstanding the company's keenness to knock OS/2 2.0, Thacher admits that it hasn't always gotten across its own message about NT very well—and that this has created some confusion in the minds of users. "At this stage in the cycle, we haven't gone whole hog in trying to get the message out about Windows NT—with developer's software kits available in the summer, we will become more audible about it," he says.

"The most pernicious misconception is that Windows 3.1 will be superseded by Windows NT. There's a lack of understanding of just how sophisticated and how powerful it is. People don't realize this is the guy (Windows NT project founder David Cutler) who did VMS (DEC's popular operating system for its minicomputers) doing this. It is a very serious, high-end system from a guy who is trying to do something as good as—if not better than—something he has done before."

And it is the traditional MIS manager—who has, in the past, used minicomputers (and Cutler's VMS on the DEC Vax range) to develop critical company-wide applications—that Microsoft is hoping will use Windows NT. Thacher also says that Microsoft has learned in this development process that the MIS manager's view of PC applications is very different from that of the average PC user.

"They would never call Word and Excel an application—they are personal productivity tools," admits Thacher. "In that environment, the desire for high-end features is very important—as well as the fact that it is extensible and flexible. There are four areas where we expect people will move to NT—developers who adopt NT for developing windows company-wide applications (where pre-emptive multi-tasking and a graphical environment might be important); power users (users who need to run multiple communications sessions or huge spreadsheets or large modelling programs); LAN administrators who need a sophisticated server environment (where NT can be run on a networked server); or business applications (primarily as a platform for database applications)."

### So what's it for?

Thacher said that in recent "focus group" sessions with corporate MIS managers from large U.S. companies, the potential of being able to run corporate database applications was what really interested them. Despite this, there are developers from a wide cross-section of the U.S. software community talking about the plans to offer NT-specific 32-bit Windows applications—including those in the computer-aided design, computer-aided manufacturing, electronic design automation and computer-aided engineering markets.

U.S. electronic design automation market leader OrCAD, for example, says it is heavily committed to producing applications to run under Windows NT. "Our EDA software tools will be available for Windows NT as part of our strategy to support the most sought-after operating systems and hardware platforms," said OrCAD president and CEO Mike Bosworth in a statement solicited by Microsoft. "Users will get the graphical interface of Windows 3.1 and ultimately the capabilities of new and emerging microprocessor and memory technologies via Windows NT. There is a large contingent of PC-using designers who want to take full advantage of the performance of their 32-bit hardware—especially virtual memory, pre-emptive multi-tasking, threads and 32-bit graphics manipulation."

CAD specialists Intergraph would appear to agree. "With power equivalent to Unix and the ease-of-use of Windows, the Windows NT operating system will unlock the full performance of the 486 processor to MicroStation users," says Intergraph MicroStation marketing director John Hubbard. "CAD places heavy demands on computing power and Unix has long held sway as the preferred operating system for CAD because of its true 32-bit environment and multi-tasking and security features. Microstation will be fully capable of exploiting those capabilities under Windows NT."

### Workgroup computing a key target

Meanwhile, Microsoft itself says that it will be using NT as a way to encourage workgroup computing applications development. Microsoft's David Thacher says the need for an even more powerful platform for workgroup computing is one of the major thrusts behind the company's planned Windows NT operating system.

"The whole idea of a PC as just a personal productivity tool is very much phasing out," he says. "Some 30 per cent of Windows users—a number of whom are now using machines where the hardware needed to connect to a network is provided by chips built right onto the motherboard of their PCs—are already running using networks. Windows NT is being designed for working together even more closely with networks so we can have a lot of services built-in. Workgroup applications will be able to be written so that support, for example, for many electronic mail systems can be built in. We are building on the Windows platform and working with Lotus, IBM, DEC and various other electronic mail vendors—as well as WOSA—to make this happen."

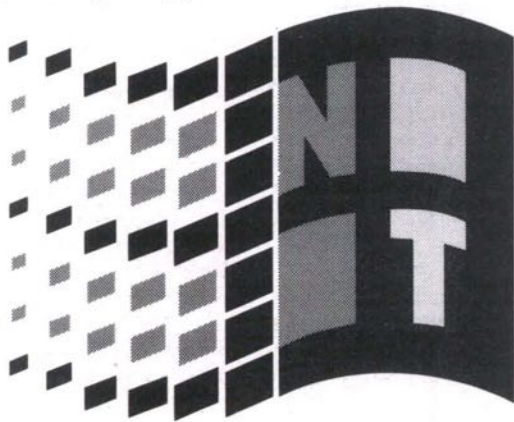
He says that Windows NT will go a long way towards making life easier for workgroup applications developers, with built-in file and print sharing and basic messaging services through MAPI (Messaging Applications Program Interface). "It (support for workgroup applications development) is a critical design element," adds Thacher. "If 20 per cent of all users and 30 per cent of Windows users are already networked, by the time you get to NT users it will be 80 to 90 per cent."

### Making it happen

Microsoft is pouring a lot of money into Windows NT and is banking on it as a way to finally break into the mid-range computer operating system market. It also isn't the first time the company has sought to offer a minicomputer-sized operating system. It first did so in the mid-1980s with a version of Unix called Xenix and subsequently took a large stake in successful PC-based Unix house SCO (Santa Cruz Operation).

Windows NT probably represents its best effort so far at cracking this elusive market. Not only is the Windows NT team led by the man who brought DEC's hugely-

Continued on page 34



MICROSOFT  
WINDOWS NT

# IBM's RISC/6000 Workstation Family

BY GORD TULLOCH

**Introduction**

First released in 1990, IBM's family of RISC-based workstations/servers has proven to be comparable to other alternatives, both as stand-alone power work stations and as commercial servers for business applications running on dumb terminals.

This article is intended to describe what makes RS/6000 systems tick and what they have to offer. The low-end single-chip CPU systems in the line are of particular interest as the basis for the new IBM/Apple/Motorola POWER PCs.

**Inside the RS/6000**

The RS/6000 line is based on IBM's POWER (Performance Optimization With Enhanced RISC) chip set, with binary compatibility extending from the lowest Model 220 to the rack-mounted Model 950. RISC (Reduced Instruction Set Computer) operates through reducing the number of individual instructions in a processor to a bare minimum toolkit—then optimizing that toolkit to do those few operations extremely rapidly!

Rather than create an instruction in the chip that moves a block of memory from one location to another, a RISC chip will create a very fast instruction to move one byte and leave the more complex instructions to the next higher-level tool—possibly a C compiler. CISC-based chips (Complex Instruction Set Computers) such as Intel's 80486 are incorporating some RISC technology to enhance performance. IBM's POWER series of processors are available in 20, 25, 33, 42 and 50 MHz versions.

The RS/6000 family consists of four distinct product levels: the recently introduced 200 series and the more established 300, 500, and 900 series. Each has its own distinct market segment and focus:

**200 Series**—the Model 220 is intended to compete with high-end microcomputers as a high-performance, relatively inexpensive workstation or multi-user server. With base pricing starting under \$10,000, the cost of a 220 for either purpose is comparable to a similarly equipped name-brand microcomputer, but with roughly twice the performance. A high-end microcomputer (such as a 33 MHz 80486) may perform at 10 or so SPECmarks (a very common suite of benchmarks to determine performance of high-end systems) while the Model 220, with its 33 MHz single chip POWER CPU, rates at 25.9 SPECmarks. Physically, Model 220 systems (the only current 200 series entry) are slightly thicker than pizza boxes, with similar proportions.

**300 Series**—Originally the low end of the RS/6000 line with the 320, the 300 series is now the middle of the range and a good choice as a server-based system for medium-sized businesses (which may wish to run up to 30 or so ASCII terminals or other devices from the system) as well as a high-performance workstation for power CAD or engi-

neering work. 300 series RS/6000 computers are the same physical dimensions as desktop PCs. Starting cost is about \$15,000.

**500 Series**—Called deskside units because of their larger dimensions, these computers add more I/O capabilities and, in the higher-end machines, double-wide 128-bit memory buses. These factors have culminated in the Model 560, which with its 50 MHz POWER chip, 128-bit memory bus, 8K of onboard instruction cache, and 64K memory cache peaks out at an astonishing 89.3 SPECmarks. Starting cost is about \$35,000.

**900 Series**—These computers are intended as workhorse multi-user servers, giving companies the capability to add gigabytes in hard disk storage as well as numerous peripherals. While these systems are not the speed demons that some members of the 500 series are, they offer respectable performance. Starting cost is about \$85,000.

Of course, no workstation would be complete without extensive graphics support. IBM offers a variety of display

options for the RS/6000 including 4-bit monochrome adapters at a resolution of 1024 by 768 pixels, through 8-bit and 24-bit high-performance color adapters. One nice feature of these adapters is that a number of non-IBM displays are supported.

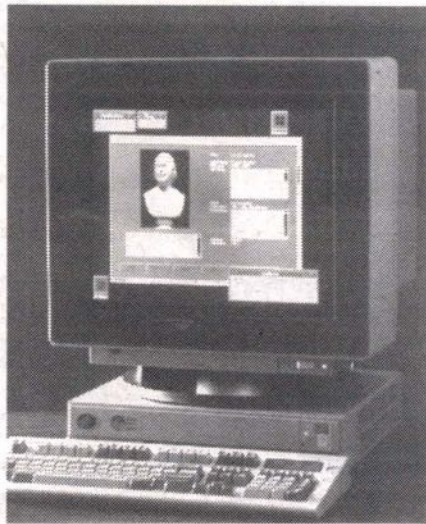
**AIX 3.2**

The glue that binds the RS/6000 series together is its Unix-derived operating system, AIX 3.2. While not fully OSF/1 compliant (OSF/1 is an operating system standard which a consortium of computer vendors, including IBM, is working toward), each new release of AIX moves closer to the standard.

For administrators, AIX features a hypertext-based online reference system named infoExplorer, as well as a sophisticated front end for system administration named SMIT (System Management Interface Tool). Using infoExplorer, getting information on various and sundry system management tasks is as easy as doing online searches for keywords or article titles.

While occasionally cumbersome, SMIT is helpful in allowing the user, once they have completed the screen for the operation they wish to perform, to then get the command line equivalent by pressing a function key. This makes the command line-driven functions easier to learn and use. Many users prefer them because they are faster than wading through 4 levels of menus in SMIT.

Graphical User Interface (GUI) fans using the RS/6000 as a workstation will discover AIX/Windows, an XWindows 11.4, OSF/MOTIF 1.1 windowing system. infoExplorer is also supported as a GUI application.

*Continued on page 32*

# Sun's New SuperSPARC Workstation Family

BY WILLIAM BARR

On May 19, Sun Microsystems staged a worldwide pre-release announcement. Observing a recent industry tradition of announcing products well in advance of ship dates, Sun unveiled its long-awaited SuperSPARC chip.

Sun claims SuperSPARC is able to give 400+ Million Instructions Per Second (MIPS) performance in its four processor model. SuperSPARC is a superscalar version of Sun's SPARC Reduced Instruction Set Computing (RISC) processor. The chips were co-designed and co-developed with Texas Instruments.

Rumored to have been under development for over two years, SuperSPARC has lived under the codename of Viking for some time. Along the way, SuperSPARC development has suffered from production delays and strategic alliance breakdowns with Sun's partners. Industry watchers were predicting a release date of the Viking chip late last year.

Sun states that the new SuperSPARC-based workstations, the SPARCStation 10 series, will be available near the end of 1992. Sun is also offering a number of upgrade programs so customers can have the new products as soon as they are available.

Reactions to the announcement ranged from, "This is what Sun needs to stay in the lead," to, "It's about time." The new products, consisting of both servers and workstations, will give Sun some high-end products capable of competing with RISC offerings from HP, DEC and IBM.

**Response To Pressure**

Sun is the last major workstation vendor to announce a second-generation product in the market. Over the past two years, IBM, Motorola, HP, Mips and DEC have all shipped Unix workstations capable of outperforming Sun's offerings. Most notably, over the past year, HP has taken direct aim at Sun's dominant market share in the workstation market and has been steadily gaining. Both IBM and HP have shown fast product-to-market cycles with products giving customers excellent price/performance value.

Sun appears to be taking this threat to their "power user" market seriously, but the steps it has taken may not be timely enough. Over the past two years, Sun has not been the favored vendor for high-performance computational solutions.

To help create a bigger market for SPARC products, Sun is making available processor modules to equipment manufacturers for use as embedded controllers. While you may not find a Unix workstation CPU in your microwave oven, you may find one in the car you drive. Sun will also provide board-level products through their

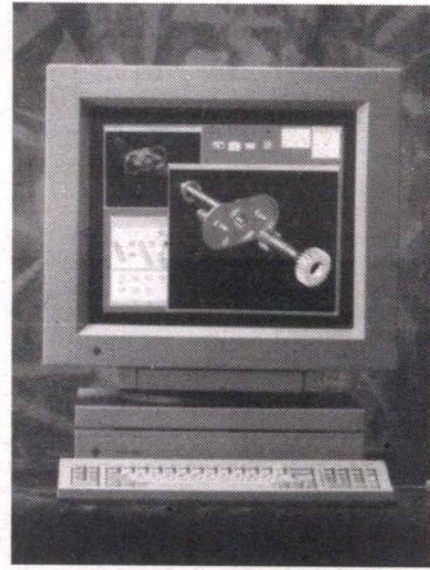
partner, LSI Logic.

**On The Desktop**

At the time of writing, there are no independent benchmark results for the SPARCStation 10 series. The data for the table below has been provided by Sun. Two things to note: there is no overall SPECmark rating nor is there a consolidated MFLOP rating.

Like previous models, the SuperSPARC is a single-chip design. Sun states that the new CPU performs two to four times faster than previous designs. Sun also states that overall system throughput has been doubled. This will help I/O-intensive operations to work faster.

The unit is designed to be easily upgraded. If more performance is required, only the CPU needs to be swapped. To upgrade, the SPARC module gets pulled from the motherboard and is



	Model 30	Model 41	Model 52	Model 54
Processors	1	1	2	4
MHz	36	40	45	45
SPECint	92	44.2	52.6	-
SPECfp	92	52.9	64.7	-
MIPS	86.1	96.2	200+	400+

replaced with a new module. This preserves investment in peripherals and memory.

Sun points out that their multi-processor systems will address user's needs for more computing power. However, it must be noted that to use the multi-processing ability of the new workstations, one must have the next release of the operating system, Solaris 2.0. Sun estimates that Solaris 2.0 will be available in late 1992. Until Solaris 2.0 ships, Sun must compete for the desktop with other vendors' uniprocessor boxes. It must also be noted that other vendors are busy preparing multi-processor boxes of their own.

One novel addition to the SPARCStation 10 is an ISDN chip. Like NeXT, Sun is looking to future global-networked applications for workstations. With built-in ISDN, the SPARCStation 10 will truly be a capable electronic multimedia workplace, able to transmit or receive voice, video, fax and data. This enhancement will add to the allure of a Unix workstation as a professional's PC.

**Summary**

While it is too early to tell what kind of impact Sun's announcement will have on the Unix workstation/server market, it will go a long way in keeping their existing customer base happy. However, it may not be enough to stop customers from looking at other offerings from different vendors for specific needs.

The new products will serve to round out Sun's offering at the high-performance end of the product line, while augmenting existing products. One thing we can all be sure about is that there will be announcements from Sun's competitors in the very near future, which will narrow Sun's window of opportunity. ■

Continued from page 19

The Adaptec 1522 is the simple \$200 SCSI host adapter and the 1542 is the fancier \$360 version with first-party DMA.

Since all the devices you attach to the SCSI host adapter could potentially be working at once, the software to control them must be coordinated. The most successful standard way of doing this is called ASPI. Before you buy any SCSI equipment, make sure it has ASPI drivers for both DOS and OS/2.

Because SCSI is so reliant on up-to-date third-party drivers, it is doubly important you stick to the mainstream vendors. Oddly though, since the interface between the hard disk and the host adapter is so well standardized, you can buy any brand of disk you want quite safely. You only need to be careful with the host adapter and non-disk peripherals.

Pick SCSI when you want the fastest OS/2 performance, and the most future flexibility in adding new devices.

**CD-ROM**

Bill Gates, chairman of Microsoft, figures that CD-ROM will replace floppies as the medium for distributing software. Some packages are already too big for floppy and now come on CD-ROM — e.g., NT SDK (Software Developer Kit), Corel Draw and the Windows SDK. CD-ROM is also becoming important in multimedia — to store music, live action, animation, and enormous computer games.

The fastest CD-ROMs by far are the NEC 350 millisecond drives. NEC also makes some low-cost 1500 ms access time drives. People have also had success under OS/2 with Sony and Toshiba. Your best chance of success is with the Adaptec 1542 host adapter and ASPI drivers. Avoid drives that come with a separate proprietary SCSI host adapter that would likely give trouble with drivers now or in future.

Before you buy, verify the CD-ROM device drivers will co-exist with your SCSI hard disk drivers. IBM publishes a list of officially supported drives, but happily, with a bit of fiddling, almost any drive can be made to work.

**Backup**

A major hurdle for me switching to OS/2 is tape backup. My trusty Colorado DJ-10 software does not work under OS/2. I first need to find a third-party driver. I inquired after one from the Sytron company and found their Sytos software driver costs more than the tape drive!

My little \$275 mag tape drive holds only 60 MB per tape uncompressed. For OS/2, I will need something faster and bigger.

I could use Sytos to run a 4 mm Identica DAT tape, which stores 2 gigabytes (2000 MB) and can find any file in 30 seconds. The catch is it costs about \$2900. Ironically, the cartridge is even smaller than the 60 MB DJ-10s.

There are other choices between those two extremes. Again, compatible driver that works under OS/2 is the prime criterion in selecting hardware. SCSI tape drives in general do not share a SCSI host adapter with the hard disk. This is because during backup, the tape and disk are both going full bore, and would clog a single SCSI host adapter.

OS/2 offers no built-in mag tape drivers. Adaptec told me there are no ASPI SCSI drivers for mag tape under OS/2. For now, we are stuck with proprietary, non-standard tape backup.

**LAN**

The safest choice for a LAN would be one based on Western Digital 8003 Ethernet cards, or IBM's token ring. There are so many of these cards already installed, somehow there will always be a way to use them on future operating systems.

If NT is in your future, look at the list of

LAN cards that Microsoft's Lan Manager 2.1 currently supports under IBM's OS/2. These are the best bets for future NT support.

**Summary**

People have told me they wanted OS/2-ready systems. Then when they added it all up and compared it with the cost of a simple Windows-ready computer, they decided they did not need it after all. As more people start to use OS/2, the prices of the necessary hardware will fall. This will lead to more people buying OS/2 equipment, which in turn will lead to lower prices still.

It was not that long ago that RAM cost over a million dollars a megabyte. Now it runs about \$40.

If you want to prepare for OS/2 or NT, here is what I recommend you do now:

1. Get a 486 motherboard, or one that can be upgraded to a 486.
2. Make sure your motherboard will accept at least 32 MB RAM. Consider putting in 16 MB right away.
3. Get an 8514-compatible video accelerator such as the ATI Graphics Vantage or Graphics Ultra.
4. Use an Adaptec 1522 or 1542 SCSI host adaptor for your hard disk.

**Credits**

As usual, dozens of people on BIX helped me prepare this article. I would particularly like to thank Roland Dobbins, Doug Hamilton, Karen Kenworthy, John Ruley and Cheyenne Wills. ■

**Roedy Green**, president of Canadian Mind Products in Vancouver (604) 684-6529, builds custom computers. He also writes custom computer software, primarily for non-profit organizations and charities, and offers training and consulting.

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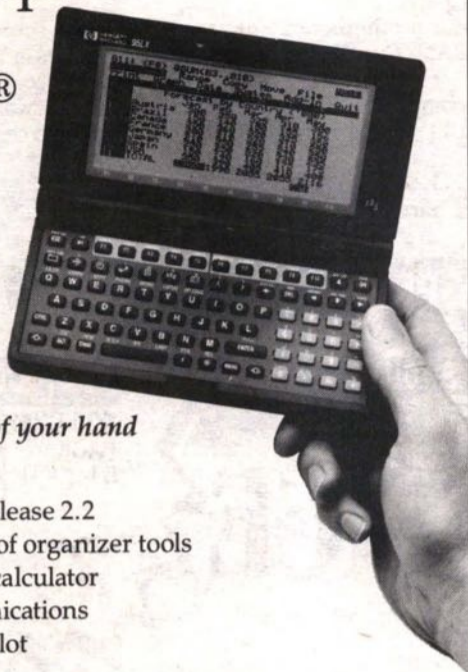
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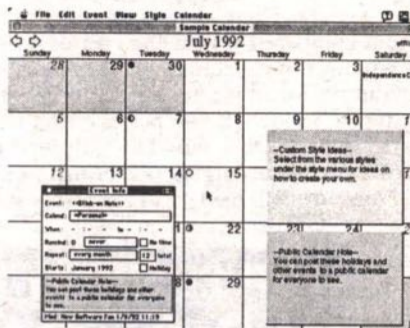
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# Macintosh Event Management Packages Now Up-to-Date, DayMaker



**Product:** Now Up-to-Date Version 1.0  
**Publisher:** Now Software,  
520 S.W. Harrison St. Suite 435,  
Portland OR 97201  
Tel: (503) 274-2800;  
Fax: (503) 274-0670

**System Requirements:** MacPlus or higher with hard disk and at least 1 MB RAM; System 6.05 or higher. Minimum of 2 MB for System 7. Not copy protected but requires that copy be personalized with a serial number.

**Retail Price:** US\$99

- Key Features:**
- System 7.0 compatible
  - Remote access using Appletalk Remote Access or similar program in combination with a modem
  - Reminder alarms
  - Network public calendar makes it possible for associates to coordinate scheduling.
  - Personal organizer format printing

**Overview**

An indication of a maturing Macintosh software market is the appearance of specialized products that appeal to a mass market. DayMaker, and Now Up-to-Date are such products and can be broadly categorized as task-management tools. They are similar in some respects, but have enough major differences to deem whether or not they are suitable for your particular needs.

In this article I will concentrate on their key features to help differentiate them.

**Installation**

Installing these products is a simple, straightforward process that harkens back to the days when you didn't need to use installer programs. Both the products and their associated files come on single 800K disks.

DayMaker also requires that you copy a DayMaker Startup extension and Alarm desk accessory into your System Folder so you can use its reminder alarm feature. In addition, there is a folder containing files that are used for various print formats e.g., Filofax, Dayrunner, etc. DayMaker also requires that you personalize the master floppy.

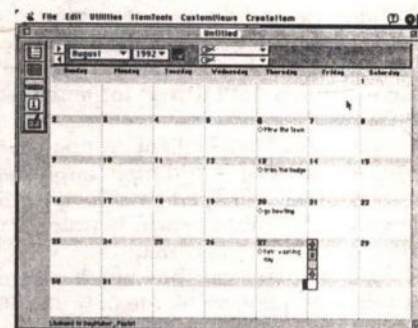
Now Up-to-Date includes an installer but you are not required to use it. There are also two system extensions to be copied into the System Folder if you plan to use the product on a network.

If you want to take advantage of having reminders and printing popular diary formats, Now Up-to-Date and DayMaker require you to copy specific files into the System Folder.

**Performance**

Both programs have lean system requirements and are capable of running in memory partitions of 750K or less. Speed on individual workstations is very good because of compact program sizes that are RAM-based. Now Up-to-Date's performance on a network will depend on your network's size and amount of traffic.

The reminder Control Panel file for Now Up-to-Date conflicted with one of the few extensions that I ran. To avoid this, I would suggest that you use a startup manager that allows you to change the order in



**Product:** DayMaker Version 1.0  
**Publisher:** Pastel Development Corp.,  
113 Spring Street,  
New York, NY 10012  
Tel: (212) 941-7500

**System Requirements:** MacPlus or higher with hard disk and at least 1 MB RAM; System 6.04 or higher. Minimum of 2 MB for System 7. Not copy protected but requires personalization of master disk.

**Retail Price:** US\$99

- Key Features:**
- System 7.0 compatible
  - Powerful categorization and search capabilities
  - Reminder alarms & Auto-dial
  - Gantt charts
  - Personal organizer format printing

which extensions load at startup.

**Documentation**

All three products come with small, easily digestible manuals that are well-organized and contain tutorials. DayMaker also has a QuickStart Tutorial for those who need to get up and running.

The best approach to using this software is to try to figure out as much as you can by yourself, then resort to the manual when you get in a bind. Even if you tend to master programs without using documentation very much, don't be fooled. There are features you will not discover unless you read the manuals.

**Now Up-to-Date**

If you are looking for an electronic replacement for your appointment diary you may find Now Up-to-Date more to your liking. It is similar in most respects to DayMaker with the major difference being that it can also run as a network application. If you need to coordinate your activities and events with work colleagues, or access and update scheduling remotely while on the road then Now Up-to-Date is your only choice.

Like in a conventional appointment diary, you can view your events by the day, week, month or year. You can categorize color-code and even filter out specific events to bring them more into focus. Now Up-to-Date has an alarm reminder feature that is implemented as a Control Panel device. This means that you don't have to be running the program for the alarm to sound and your reminder note to pop up.

If you like to carry a hard copy of your schedule, Now Up-to-Date supports popular appointment diary formats such as Filofax, Franklin Planner, DayRunner and DayTimer so you can print them on Laserwriter.

**DayMaker**

With the exception of networking capability, DayMaker is quite similar to Now Up-to-Date. However, there are some features and enhancements that differentiate this package.

DayMaker offers a far more comprehensive Find command that enables you to do

Continued on page 40

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# Focus on Photo CD

BY GRAEME BENNETT

**O**ne key technology we see contributing to the visibility of CD-ROMs in the marketplace is Kodak's Photo CD, which should be available by the time you read this (the official release date is Sept. 7th), courtesy of your local photofinisher and the Photo CD Imaging Workstations (PIW). Kodak claims it is delivering weekly.

For about \$35 per 24-exposure roll of film per picture, Kodak says it will scan your 35 mm negs or slides (a minimum of 20 images at a time) and put them—in five resolutions per 24-bit image, at resolutions up to 2K x 3K—onto a CD-ROM readable by numerous brands of CD-ROM drives. (For comparison, an electronic scan of a 35 mm slide now costs \$50—Ed.) Each disc can hold up to 100 pictures.

Kodak Photo CD players are due to show up in audio and electronics stores this fall at suggested retail prices of C\$550, \$650 and \$750. These players read Photo CD files in 4 seconds, display the images to a TV and play audio files to boot. Kodak says it is even possible to do simple edits and

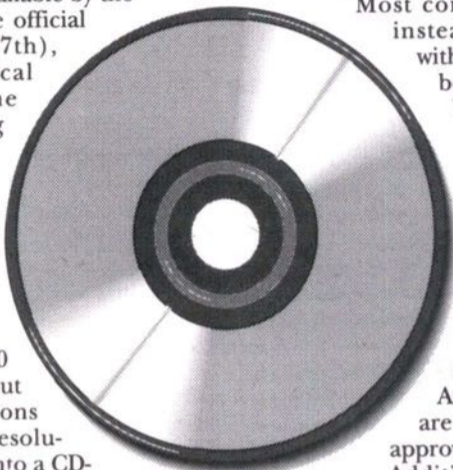
crops on the TV screen using the Photo CD player.

## Computers and Photo CD

Most computer users will opt instead to read Photo CDs with a CD-ROM drive. The best drives for use with Photo CD are those that support its "multisession" feature, where data may be written to the disc several times as images are accumulated. The Pioneer DRM-604X, the Sony CDU-561 and an upgraded version of the Magnavox Audio-ROM CDD 461-BK are all multisession players approved for Photo CD use.

Additionally, there are a few CD-ROM recorders, including the Phillips CDD 521 and Sony CDW-900E, that can write multisession discs. Note that although all of these players and recorders are said to be CD-ROM/XA (extended architecture)-compatible (sometimes called XA-ready), Photo CD doesn't require true XA compatibility—it demands only that a CD-ROM drive be able to mount an XA disc. Further, not all XA drives are multisession-compatible.

Older drives, such as the NEC Model 36



and current Apple CD 150 and CD SC players are able to read "single-session" Photo CD discs; Apple has a forthcoming model slated for release later this year that is expected to support multisession discs.

Kodak says that owners of single-session drives can bring in several rolls of film at once to partially alleviate the problem of having a drive that can only read discs written to in one session. Photo CD photofinishers will also be able to duplicate discs for stock releases or other purposes.

Paul McAfee, Manager of Consumer Imaging News at Kodak says the company can supply a US\$39 Photo CD Access program to read the discs, but when we asked Kodak Canada about this, they were not sure when it would be available or how much it would cost. According to Kodak, both Aldus PhotoStyler and Adobe Photoshop plug-ins are forthcoming.

CorelDRAW directly supports the browsing and conversion of Photo CD images via its Mosaic utility. Images may be converted into .BMP, .EPS, and .TIFF formats. The new version of Mosaic is currently shipping in full kits of CorelDRAW 3.0, and is also available through customer service for all registered users of CorelDRAW who purchased prior to July. Call 1-800-836-DRAW for more details.

Corel Corporation also announced that its CorelSCSI device drivers are now able to read Photo CDs from any XA-compatible CD-ROM drive.

## Image Quality

How's the quality? Well, one user reports that he successfully output a 20 x 13 inch image at a 150 line screen, with results that were "spectacular." Another user reports creating separations of up to 20" from Photo CD images with "great results." *The Computer Paper* has seen images that were, in a word, superb—far better than is possi-

ble with any consumer-level flatbed scanner.

(If you want to check it out for yourself, the June '92 cover of *Outdoor Photography* was from Photo CD—Ed.)

## Technical Data

Photo CD images are saved in five resolutions on the disc: 128 x 192, 256 x 384, 512 x 768, 1024 x 1536 and 2048 x 3072. The file format is known as YCC, but the company says computer users can open the file in RGB directly with one of the aforementioned plug-ins. All images are 24-bit color. According to the company, the compression on Photo CD discs is transparent and lossless. There is no provision for the transfer of previously digitized images.

Currently, all discs have all five resolutions. In the future, the company says it will be possible to store up to 800 512 x 768 images or 72 minutes of stereo sound, or any combination of the two, on Interactive Photo CD discs. Kodak says it will demonstrate how to add audio at Photokina in Germany this month.

The company also plans to offer a commercial-level set of so-called "PCD" services wrapped around Photo CD, although prices are expected to be higher than the consumer Photo CD scans and services.

Kodak also says it will introduce next year a large-format scanner for Photo CD that supports images of up to 4 x 5 inches. That's 8K x 12K!

It remains to be seen whether Photo CD will revolutionize photography the way the audio CD has changed the record business, but for computer users interested in low-cost, high-quality scanned images, it is like a dream come true. For us, that's as good as saying "Cheese!" ■

Call Kodak at 1-800-465-6325 (ask for Kodak Info Centre) to find the lab nearest to you.

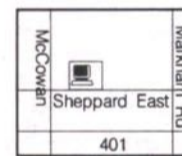
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# Computer Training

## How to get your money's worth

BY ROBERT P. FORD

**W**hether computer technology training is delivered by your own staff, or conducted by outsiders, the evaluation of its effectiveness is usually imprecise.

At budget time, someone in your company will ask what the benefits of the training were. An evaluation process helps to justify the costs.

Training courses offered by private companies can cost from \$150 to \$600 for each student each day. A spreadsheet course will fall into the lower end of the range while advanced technology, such as CASE tools, can run to the higher end. Course fees, the cost of time away from the office and possible travel expenses add up to a significant sum.

### Time Wasters

If you are spending time and money on a course there are several sure-fire ways to waste your resources:

- Send someone on a course because they deserve a course and an out-of-town trip.
- Don't take immediate advantage of the new knowledge from a course.
- Send your staff member on a course because they have ten training days this year that need to be used up.
- Send someone to a course that covers a technical subject of interest but is not in use in the organization.

### Meeting Objectives

Before the course is taken, the employee and the manager should do everything possible to ensure the course enables the employee to meet customer objectives. If the course does not directly help you build or maintain your customers' systems, don't buy it.

Let's assume you are paying for a course to provide skills needed for your business. How do you know you've received what you've paid for?

To make sure the course has done everything correctly, look for quality in the following areas:

- Instruction
- Facilities
- Equipment
- Content
- Reference materials/learning aids

### Rate the Instructor

How do you rate an instructor? It is very likely that the instructor will know more than you, but how well are their knowledge and expertise communicated? When evaluating an instructor, ignore personality and focus on technique, or the lack thereof. An instructor you really enjoy listening to may be teaching you nothing. A person with whom you'd never share a meal may be the best trainer you've ever seen. For instructor

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Lotus 1-2-3 2.2	Intro to Adv.	\$139	24
Lotus 1-2-3 3.1	Intro to Adv.	\$169	30
<b>OPERATING SYSTEMS</b>			
DOS	Intro to Adv.	\$99	15
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Course Name	Coverage	Tuition	Hrs
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Here's a sample evaluation form to use at work. The scale is out of four to eliminate fence-sitting. Neutral is not an option. If four is too restrictive, try six. Keep the number even.

### Sample Course Evaluation Form

Name: \_\_\_\_\_ Instructor: \_\_\_\_\_  
Dept: \_\_\_\_\_ Course Date: \_\_\_\_\_  
Vendor: \_\_\_\_\_  
Course Title: \_\_\_\_\_

What per cent of the course was: \_\_\_\_\_ unnecessary review \_\_\_\_\_ necessary review \_\_\_\_\_ new knowledge

List the most valuable aspects of the course: \_\_\_\_\_

List the topics you feel will be least useful on the job: \_\_\_\_\_

Using the scale below, please rate the following categories:

(4 = Excellent 3 = Very Good 2 = Satisfactory 1 = Poor)

CATEGORY	RATING	COMMENT
Practice sessions reinforced course content	_____	_____
Pace of course	_____	_____
Duration of course appropriate?	_____	_____
Trouble free hardware/software	_____	_____
Quality of material	_____	_____
Quality of instruction	_____	_____
Instructor enthusiastic and positive	_____	_____
Overall Course Rating	_____	_____

Additional Comments: \_\_\_\_\_

### Tips for education departments:

- Send this form to the student on the day they return from the course. This is easy if you have electronic mail.
- If after a week the form is unreturned, send another. Repeat this weekly until you receive a completed form.
- Review the results with the vendors. Make sure to check with the employee that it's OK to show a vendor the completed evaluation form.
- Tell all who take courses exactly what it is a vendor has to do to get four out of four. This will take work. It's best to go to departmental meetings and present the criteria for a good course.

tors to earn full marks on an evaluation they must:

- Keep the pace fast, but not overwhelming.
- Handle the different learning styles of your classmates. You shouldn't notice that people around you are learning at different rates.
- Talk less than 25 per cent of the time.
- Never let an activity (especially a lecture) last longer than twenty minutes.
- Maintain your interest.
- Make standard course content relevant to you.
- Tell you right away the location of the restrooms.

This leads to a consideration of facilities. Many educators still believe a sterile, bland and understated venue is best for training. They're wrong. Learning is most efficient when all senses are active. A dull room creates a dulled mind. Windows, wall hangings and music (no heavy metal) all add to the learning experience.

Comfortable clothes keep a person's mind off discomfort and on the class. Casual attire at courses is becoming more common. Providing refreshments for students is nice, but too much sugar and caffeine lead to a quick "high" followed by a longer "low."

There is only one way for a vendor to receive top marks for equipment in a classroom. All hardware and software should work perfectly with no fumbles. You should never have the impression that the classroom is under-equipped.

The more customized and relevant the course content, the higher the marks for the course. A vendor charges more to customize course materials for your working environment. This investment may lead to a system being put into place faster and with fewer problems.

How many times have you returned from a course with heaps of manuals whose fate is to lie on a shelf ignored? This happens too frequently. Highest marks go to the course that provides materials you will use later. The hand-outs should be dog-eared within a month of the class. Above all, the hand-outs should have an index.

Most vendors or instructors will provide an evaluation form at the end of the class. This is a blunt instrument. The employee's company rarely sees these forms. Evaluation forms have been nicknamed "happy sheets" because the vendor derives a vague idea of how happy the student was with the training. They provide neither the vendor nor the customer with a measure of effectiveness.

**Set Objectives**

For students and their managers to fully gauge the effectiveness of a course:

- The student and manager must meet before the course and set objectives for the training. They must answer the question: "How does this training help our customer?" Choices of measures might be reduction in the number of customer complaints, faster development of error-free code or decrease of the delivery time of customer objectives.
- After the course, the student completes a company standard course evaluation form.
- With form in hand, the student and manager review the results of the course and compare them with the original objectives.
- The manager checks regularly with the employee to see if the new training is being applied and determines if the objectives are being met.

**Evaluation**

The company standard evaluation form should be filed in a central location so that other employees can:

- Choose courses more easily
- Avoid bad vendors and instructors
- Pick up travel tips or deals regarding hotels and flights

If your company has an education department, it is the logical choice for administering the evaluations. The education staff members can also act as the company's consumer advocates. If there were serious problems with a specific class, they can help deliver feedback in a manner that the vendor will understand and appreciate.

Filling out an evaluation form some time after completion of the course is advantageous because the student has had

time to reflect on the class. Five minutes to five on the last day is probably the worst time to do an evaluation. The student is tired, the instructor wants to leave and, besides, who wants to critique someone who is nearby? The information collected under such conditions is limited.

In summary, to get the most value from a course:

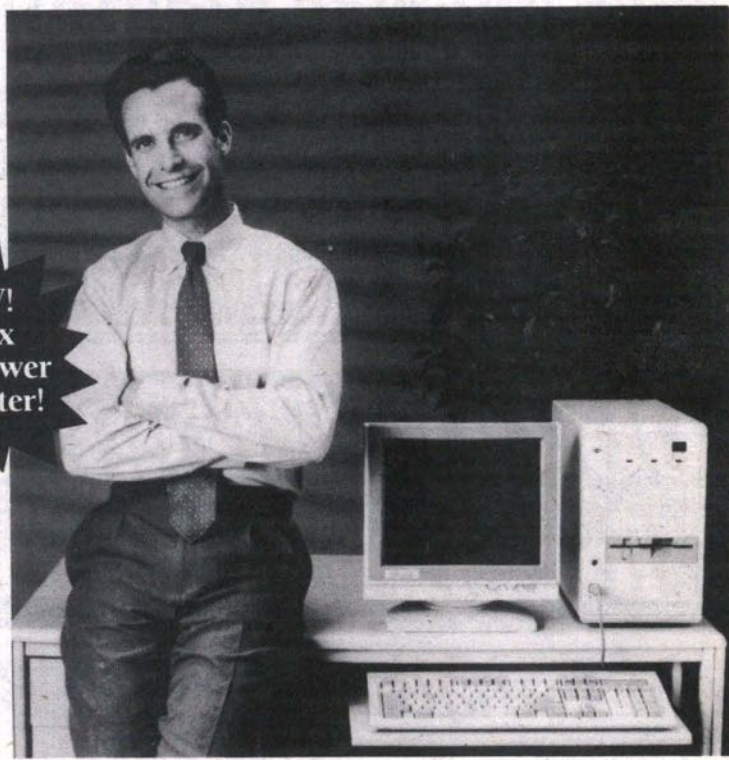
- The manager and employee must pick a course that helps meet customer requirements.
- The manager and employee must set objectives for the later use of the course information.

- The vendor must provide a high quality course.
- Evaluation is done after returning to the office.
- The employee and manager must review the results of the training.

Like learning any new task, undertaking such an evaluation process is easier once you get started. ■

**Robert Ford** is a freelance writer and Education Specialist with Canadian Airlines' Technology Services department. Questions? Contact him at 604-279-6240.

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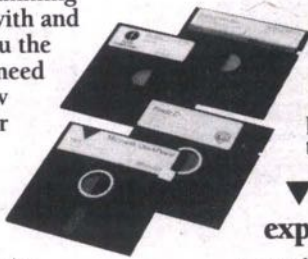
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EXCLUSIVE NEWS

# Newsbytes

## New For Macintosh: Adobe Premiere 2.0

MOUNTAIN VIEW, CALIFORNIA (NB)—Adobe Premiere version 2.0, the enhanced version of the Adobe software geared toward the production of QuickTime movies on the Macintosh, has been announced by Adobe Systems. Adobe says the product is geared toward making it easy for any user to start working with moving images.

Adobe Premiere is geared toward combining video footage, audio, animation, still images, and graphics to create QuickTime digital movies. Adobe says digital transitions can be inserted between video clips, still images, animation and audio including dissolves, wipes, page turns, funnels, and more. Premiere also offers plug-in filters which can be used to create tints, distortions, replications, and

other special effects. QuickTime movies produced with Premiere may be viewed at variable sizes up to full screen, using any QuickTime compressors, Adobe added.

Adobe says the new version offers users professional features such as software communication with high-end editing systems and video devices. PostScript rasterizing technology and an expanded user interface are



other new features, Adobe added.

The new version of Premiere supports Society of Motion Picture and Television Engineers (SMPTE) time code for professional on-line and off-line editing, the company added.

Contact: Adobe Systems, 415-962-2100.

Continued from page 26

### Conclusions

Although IBM has been under considerable fire for its new version of AIX 3.2 due to poorly documented changes and some compatibility problems, its hardware is top

notch and a very high performer. While IBM may not realize that its machines are excellent multi-user systems, the market seems to. Overall, RS/6000 is a reasonably good, open system with considerable expandability and excellent performance. ■

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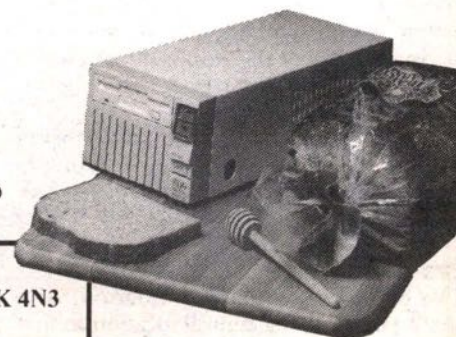
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Dealers Welcome

## U of T Students Design Futuristic Portable Computers

CUPERTINO, CALIFORNIA (NB)—Apple is soliciting ideas on what computers of the future will look like and hopes to get them from the first Interface Design Project for university students. The company offered each of seven universities \$10,000 worth of Apple equipment and all-expenses-paid trips for selected members of each university's team to Apple's Cupertino, California, headquarters for their ideas about future computers.

S. Joy Mountford, manager of the Human Interface Group, Advanced Technology Group at Apple Computer, said: "There is value in sponsoring such an open-ended effort because their (the students') ideas are so innovative. Some of these designs could, in fact, find their ways into our homes and offices in the years to come."

Mountford said portable computers and image-capture devices were often the basis for the student designs. Some students even developed realistic industrial design prototypes of their computers, Apple said. The biggest difference in the designs was the departure from angular and hard surfaces "Overall, the designs were softer forms than

most products on the market today," Mountford said.

Apple requested each design team be made up of students from a variety of disciplines, such as graphic design, psychology, and computer science. Each team was to create interfaces of a family of three related computers and a 10-minute presentation using either a Macintosh computer, video, and/or slides.

One team came up with three computers that are also a camera, hat, earrings, and watch that they call the "Portable and Wearable Computers." Another team designed a computer to translate sign language into voice display and recognize speech.

A special computer for landscape architects designed by another team uses the satellite-based global positioning system (GPS) for accurate site information.

The universities involved were the University of Toronto, Georgia Institute of Technology, Carnegie Mellon University, Rhode Island School of Design, Cranbrook School of Design, Royal College of Art, and New York University, Apple said.

## New For Macintosh: Logitech Fotoman Digital Camera Ships

FREMONT, CALIFORNIA (NB)—Logitech says it is now shipping the FotoMan digital camera for the Macintosh.

FotoMan allows users to take snapshots and download them directly into their computer system. As reported by Newsbytes, a Windows-based version of FotoMan was introduced earlier this year. The FotoMan camera has a built-in flash, and uses a fixed-length camcorder lens.

Once the image has been transferred from the camera to the Mac through a proprietary cable and software furnished with the camera, thumbnail pictures of each image are displayed for selection. The image can be edited with the bundled Aldus Digital Darkroom software. The process requires no frame grabbers, digitizers, or additional boards.

FotoMan can store up to 32 images in its internal memory, or RAM (random access memory). The images can be stored and manipulated in any of several popular formats, including TIFF and PICT. The camera has been used by real estate agents

to capture pictures of properties for sale, for police ID photos, and personnel file employee photos. It has an f4.5 lens the company says is the equivalent of a 55 mm lens on a 35 mm camera. A charger and a neutral-density filter is also provided.

FotoMan's image resolution is 376 x 284 pixels (picture elements—the little dots that make up a picture).

Fotoman has a suggested list price of US\$799, including the Aldus Digital Darkroom software. To view the images, you need a Macintosh Plus or greater, and operating system 6.04 or higher. The system also works with Apple's PowerBook and Quadra computers.

Logitech offers a lifetime limited warranty on FotoMan, as well as a seven-day-a-week technical support hotline. The company also maintains an electronic bulletin board where support is available.

Contact: Logitech (510) 713-4756 or (800)231-7717.

## New For Macintosh: Microsoft Works 3.0

REDMOND, WASHINGTON (NB)—Microsoft has announced Works 3.0, which company officials describe as a major upgrade to Microsoft Works, an integrated application that runs on the Macintosh computer.

Works includes word processing, database, spreadsheet, charting, drawing, and communications modules, and was introduced in 1986. Microsoft says it is one of the five best-selling Macintosh applications of all time.

Microsoft told Newsbytes that Works for Mac 3.0 supports System 7 with Balloon Help, the Macintosh Communications Toolbox, TrueType fonts, 32-bit addressing, and Apple Events.

There's also a floating tool palette that provides one-click access to most of the common commands. Multi-line headers and footers, with automatic date-time-page numbering, are supported, as is Microsoft Mail, character formatting, stationary document preview, workspaces to group commonly used documents, and recorder macros. There's also a built-in MacLink Plus Library of converters that allows files from other programs to be used with Works.

Endnotes are now supported in the word processing module, and a larger spelling checker with custom user dictionaries has been added. Word count, a new thesaurus, and improvements in the mail merge functions are also new, Microsoft officers told Newsbytes.

The company said that users can now design 16 different forms per database. That feature would allow the same database to supply the data to invoices, business envelopes, mailing labels, and other forms. Database records can contain up to 254 individually formatted multiline fields, including calculated fields.

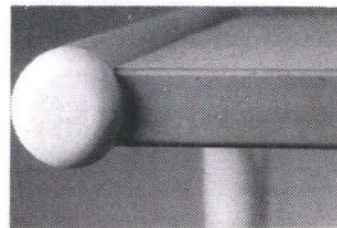
Other new features in the database module include filters, which allow users to extract the records which meet very specific criteria. The database module also includes report writing capabilities.

Microsoft spokesperson Karen Frey told Newsbytes that the new version of Works for the Mac has a suggested retail price of US\$249. Present owners of release 1.0 or 2.0 can upgrade for \$79, said Frey. Canadian prices were not available at press time.

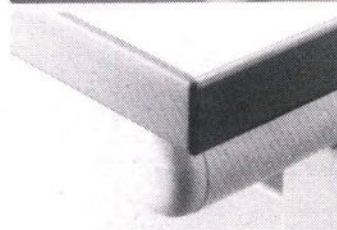
Contact: Microsoft, 416-568-0434.

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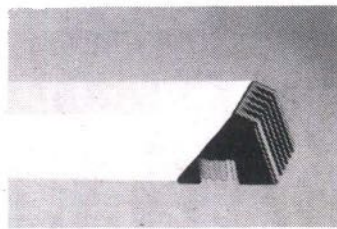
## Detailed Finish



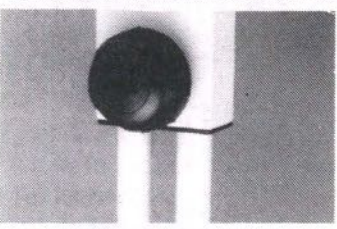
Fine and unique joints



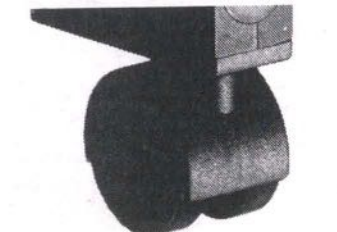
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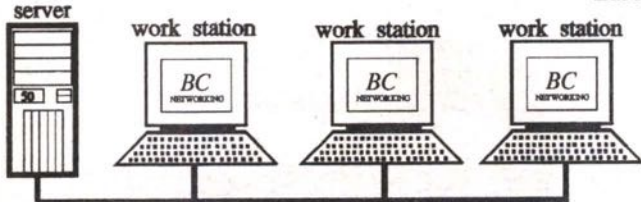
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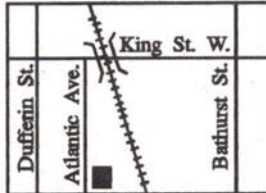
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## New For Macintosh: 3-D Desktop Planetarium

SAN LUIS OBISPO, CALIFORNIA (NB)—Virtual Reality Laboratories has released a Macintosh version of Distant Suns, a "virtual reality desktop planetarium."

The program is an on-screen presentation, not the virtual reality involving headsets and gloves. But its creators say the virtual reality comes into play with its 3-D realistic effect.

Distant Suns allows the user to set up a "virtual reality observatory" anywhere on earth, then set the "time machine" to transport back as far as 4713 B.C. or as far forward at 10,000 A.D., the company says. The program displays up to 10,000 stars (expandable to 250,000), 2,000 galaxies, nebulas and star clusters. The viewpoint can be moved from Earth to other points in the solar system for better views of the

planets and other solar-system objects. Clicking on any object in the sky will open windows that will identify them, including the name, distance from earth, type of object, and, for some objects, a color photograph.

Distant Suns can also print star charts and timetables for star-gazing sessions. Distant Suns for the Macintosh also allows the user to add new objects, such as recently discovered nebulas, galaxies and black holes, to the database.

Recommended hardware requirements: 2MB RAM, hard drive, II series, 68020 processor, math coprocessor. The program is also available for Windows and Amiga users.

Contact: Virtual Reality Laboratories, 805-545-8515.

## CANADIAN NEWS

### Zeos Opens Canadian Offices

ST PAUL, MINNESOTA (NB)—IBM-compatible PC maker Zeos International has announced the opening of a Canadian sales and service office in Richmond Hill, Ontario.

Zeos President Greg Herrick said that the office, under the direction of national sales manager for Canada Mark Wyndlow, will be responsible for increasing sales and raising the level of service for Zeos's Canadian customers. Wyndlow will also act as the contact person for Canadian industry publications and the press.

Zeos said that through the new office it will be able to provide Canadian customers same-day shipment on the most popular

configurations, 30-day money-back guarantee, 24-hour year-round toll-free sales and technical support, and optional on-site service through PC Services Partners.

Wyndlow told Newsbytes that Zeos selected Ontario as its Canadian base because about 65 percent of the company's \$3.5 million Canadian revenue originated in that province.

Wyndlow, formerly a sales representative for Beamscope, said that the office is initially staffed with three people. He said the company would have ads in the *Financial Post* starting immediately.

Contact: 416-731-5214 or 800-423-5891.

### Zeos Intros Notebook With Tilt & Swivel Display

ST PAUL, MINNESOTA (NB)—Zeos International has introduced a new notebook computer with a unique "floating" screen. The display on the Intel 386SL-based 25 megahertz (MHz) system uses a special mount for the video screen which allows the display to tilt and swivel.

Zeos said the device weighs 5.6 pounds, with a standard configuration that includes a 60 megabyte (MB) hard drive and two MB of RAM. According to Zeos spokesperson Rick Apple, the system, dubbed "Freestyle/SL" will retail for \$1,895.

Other features include a digitally controlled monochrome VGA liquid crystal display, made for Zeos by Sharp, a 3.5-inch high-density floppy drive, and a 64-kilobyte (KB) internal processor cache.

Zeos said the power-management system will allow the user to extend battery life several hours.

Greg Herrick, president of Zeos International, said Zeos worked with input from its customer base to design the Freestyle. Herrick said that other note-

books resembled "cigar boxes" compared to the Freestyle.

The LCD display has a 9.5-inch viewing area with VGA (640 by 480) resolution. A separate external video connection provides for simultaneous display on the notebook's screen and on an external VGA monitor. The unit has an 82-key keyboard with the usual T-shaped cursor control keys, as well as "End," "Home," "PageUp," and "PageDown" keys. There's also a built-in pointing key which replaces the mouse.

Power-management features include Manual Suspend and Resume mode, as well as Auto Suspend. A backup feature allows users to exchange batteries without turning the system off. One parallel and one serial port are accessible behind a sliding door. There's also an auto-detecting PS/2 connector port for an external keyboard, mouse, or dedicated 10-key pad. A carrying handle is built in. Zeos said the Freestyle is built in the U.S.

Contact: Zeos, 416-731-5214 or 800-423-5891.

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*Continued from page 25*

successful VMS minicomputer operating system to the world, but the operating system itself is being constructed in such a way that it is fully compatible with both DOS and Windows 3.1.

In many ways, this should address the traditional criticism of PC companies entering the minicomputer market—that they attempt to tackle minicomputer problems with microcomputer operating systems. Microsoft is doing its best to tackle this nagging doubt—particularly amongst developers—by hosting a huge three-day developer conference at San Francisco's Moscone Center, where hundreds of key corporate developers will be told that Windows NT should be the development platform of choice for their "enterprise-wide" applications.

Microsoft will also make its preliminary Windows NT developers' kit available at the conference, in the hope that it can encourage developers to start moving their high-end applications to Windows as quickly as possible. The company's strongest argument in favor of this is the success Windows has already enjoyed—more than nine million copies of Windows 3.0 sold and another three million of Windows 3.1 (a significant number of which will undoubtedly have been upgrades from Windows 3.0).

That size of installed user base brings with it a huge developer momentum—and Microsoft will need every ounce of it to combat the huge effort IBM is now putting into encouraging that same developer base to move to OS/2. ■

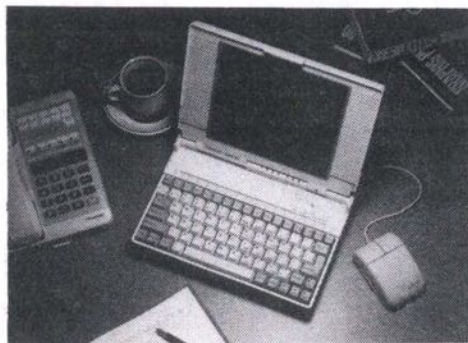
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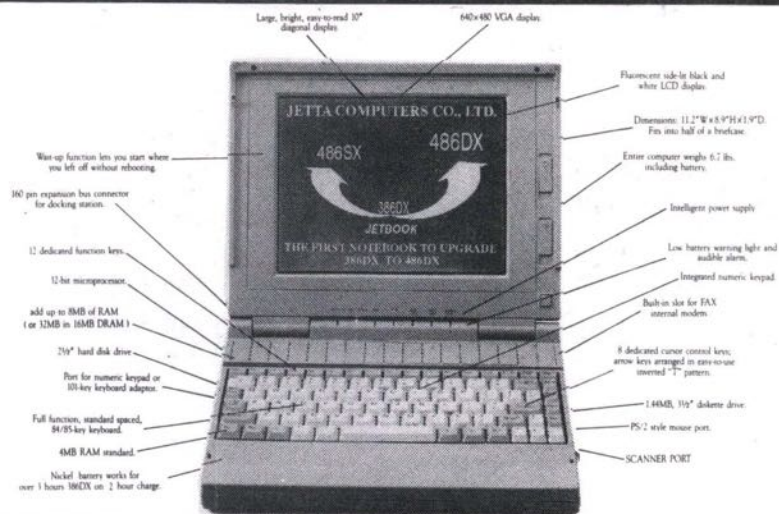
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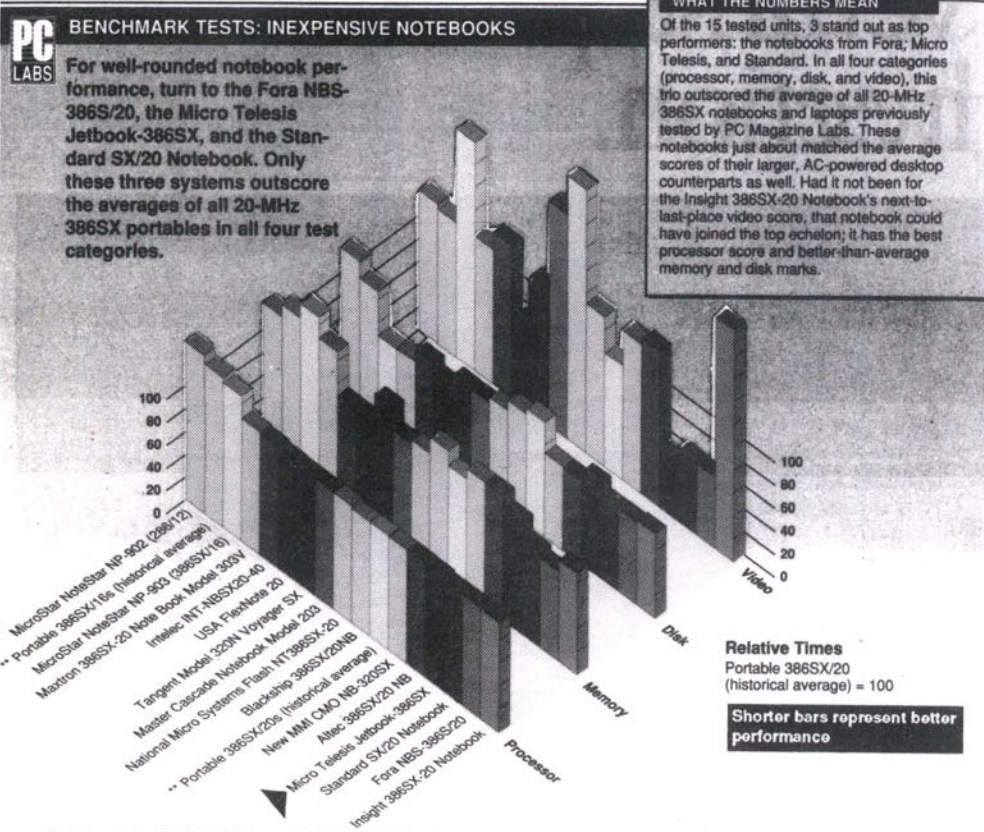
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**PORTABLE COMPUTERS**

## AT&T & Go Corp Ally To Take On Apple's Newton

BURLINGAME, CALIFORNIA (NB)— AT&T wants to hit Apple's Newton on the head with its own line of products, called Hobbits.

AT&T formally announced a joint-venture with Go, creator of the PenPoint operating system, to jointly develop what AT&T calls "personal communicators." The company called its personal digital assistants (PDAs) the new "Hobbit" line of products. The company had disclosed its plans in an interview with Newsbytes on July 9.

As part of the deal, PenPoint is being ported for use with the an AT&T processor previously code-named "Hobbit." Hobbit is a RISC-based chip which was reported last week to be at the heart of the company's new line of products, which will compete with the Apple Newton in the nascent PDA market. Go and AT&T Microelectronics said they will work with hardware vendors, software developers and other communications companies to establish an open platform for personal communicators around Go's PenPoint mobile operating system and the AT&T chip. The product line will be formally introduced later this year.

mally introduced later this year.

In order to focus its efforts, AT&T Microelectronics has formed a new Personal Communication Systems business unit in Sunnyvale, California. One of its tasks is to establish strategic alliances with other companies, in addition to Go, to offer complete systems for the personal communicator market. The unit will also develop chips, development tools and software based on the Hobbit micro-processor. Hobbit employs an architecture created by AT&T Bell Laboratories called CRISP, for C-Language Rational Instruction Set



Processor.

The new group is headed by Senior Director Ahmed Nawaz. It also has operations in Japan, Europe and Allentown, Pennsylvania. Nawaz joined AT&T in January after 17 years with Philips, Harris, and Texas Instruments. He most recently was product line director for the PC Systems Logic Business in Texas Instruments' Semiconductor Group.

Contact: AT&T Microelectronics, 408-522-4099; GO, 415-345-7400.

**ABOUT THE COVER**

# Techniques

BY BILL FRYMIRE

This cover, which I call "Rex," was the Best of Show winner in the 1992 Corel Draw World Design Competition.

The graphic was done entirely with Corel Draw and is 100% vector graphics (no bitmaps).

The piece took approximately 150 hours of work over a 3-month period and was created on a 486-33 IBM compatible with 8 megs of RAM, a 120 meg hard drive and an ATI Graphics Ultra video card.

Inspiration for the image came from "Rex," my 10-month-old pet iguana, who posed patiently for the portrait. He was drawn directly on-screen using the mouse, a lot of patience and a live model.

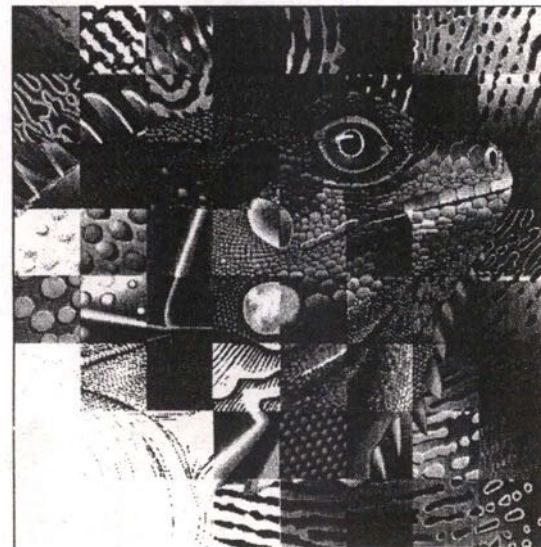
No photographs were used in this process. The portrait is actually a combination of Rex's left and right profiles, as from time to time he would change positions.

"Rex" was much too large after a certain point to work on all at once. Therefore, I broke up the image into sections of a more manageable size. I wanted the overall look to convey a progression of rendering techniques from bottom left to upper right, so I gave each section of a 64-piece grid a different look.

The other element that is used as a backdrop for Rex is my thumbprint, which I scanned in with a hand scanner and traced with Corel Trace. Each individual square was then manually edited, broken to

fit the appropriate square and given a different rendering technique.

The final graphic was broken into 55 pieces, exported to scodl format (due to color limitations of scodl) and imaged on a Dicommed D-148 Digital camera in four



hours as a 55 in-camera merge at 4,000 lines.

The resulting image was not exactly what I expected (since I never saw the image on screen at one time) but nevertheless caught the attention of the competition judges.

Bill Frymire is the Creative Director at ShowMakers Productions and can be reached at 604-875-9880.

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## Learn Photography With Camera Simulation Software

ROCHESTER, NEW YORK (NB)—Expensive college classes, or a lot of trial and error, are how most people learn about photography. But Eastman Kodak has come up with a better, faster way.

The company best known for its familiar gold film boxes has announced a software package for PCs that simulates a 35mm single-lens reflex camera to help master photographic skills.

PCphotographer uses the keyboard or a mouse to select a still or animated scene, choose the appropriate film speed and film type, position the camera, and adjust camera settings including flash.

Once the "shutter release" is pressed, a simulated photograph is exposed, developed, and displayed in an on-screen photo album. Lens aperture, shutter speed and film choices are also reviewed.

Kodak says the software can lead users

through basic photographic techniques, and will challenge more advanced amateurs to improve their skills. The user can select a basic camera or a more advanced model with extra capabilities. Using the software, you can practice metering, bracketing, controlling depth of field, and working with both fixed and zoom lenses. Bracketing is the practice of exposing one picture with several different lens openings and/or shutter speeds.

The neat thing about software like PCphotographer is that you can experiment with various camera settings without having to burn up a lot of film. The screen image in the program shows the effects of over- and under-exposure, subject motion, or focus problems caused by improper technique. When you ask for a review of your technique, the program keeps the "photo" on the left side of the screen and

displays comments about your exposure, lens and shutter speed on the right side.

PCphotographer comes with a workbook that includes 15 exercises, or you can experiment on your own. The workbook includes lessons designed to explain shutter speeds and explain how light affects exposure settings.

To run PCphotographer, you need an IBM-compatible PC, 640K of system memory, and an EGA or VGA color graphics or Hercules monochrome graphics display, 1.5 MB (megabytes) of free space, and a 286 or better. The program has a list price of US\$59.95, and comes on both 5.25- and 3.5-inch high-density disks. For users with older computers, you can exchange the high-density disks for a set of 5.25-inch 360K floppies.

Contact: Eastman Kodak, 1-800-465-6325.

## New Oxford English Dictionary Now On CD-ROM

WASHINGTON, DC (NB)—Look out, English majors, there is a new Oxford English Dictionary finally replacing the one which brought the English language up only to the 1930s. OED2 is a 20-volume production (first released nearly three years ago) which proved intimidating to any potential user, but there is an alternative, a CD-ROM version for MS-DOS computers (Macintosh version due next year) that not only trims 136.95 pounds from the weight of the paper version but also costs substantially less.

The CD-ROM version of OED2 is playable on CD-ROM drives that have recently dropped in price to as low as \$200 (DAK Industries, Canoga Park, Calif.) so even adding the \$550 cost of a quality CD-ROM drive to the \$895 disc, any purchaser who chooses the electronic version of the

dictionary can realize a substantial savings over the \$2,750 price of the print version.

CD-ROMs are the computer equivalent of the popular CD-audio discs, differing only in the fact that they carry data, images, and sound instead of only sound. A CD-ROM disc, which can hold as much as 550 megabytes of data, costs as little as \$2 to duplicate in quantity but for some publications the cost of preparing and indexing the data can be quite high.

Lexicographers and sesquipedalians alike have been awaiting the CD-ROM version of the second edition of the OED ever since the print version was published in 1989 because searches are far easier when the text is fully indexed and digitized.

The CD-ROM version allows logical searches for words, phrases, or even quotations anywhere in the text, not the key-

words.

Oxford University Press said at the announcement of the CD-ROM disc that the new OED2 contains 60 million words, 16 million more than the 12-volume 1933 version, but that the CD-ROM version of OED2 is much faster than the CD-ROM version of OED1; as well it is able to conduct more complex searches. An example given was the ability of the OED2 CD-ROM to search for suffixes.

There are 616,500 words and terms defined in the OED2, the last being "zyxt"—something which you are only likely to find in a *Times* crossword puzzle. (Note: The *Times* is the one published in London; the other one is called *The New York Times*.)

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**Dataware Offers CD-Recordable Drive With Software**

WASHINGTON, DC (NB)—The latest advance in optical publishing is the desktop CD-ROM recorder. Dataware Technology has brought the company's ReferenceSet CD-ROM authoring software to the recordable arena with the introduction of a package which includes pre-mastering and author software as well as a Philips CD-ROM Recorder.

CD-ROMs, a computer storage/publishing medium, are traditionally made in large-scale production plants right alongside the identical CD audio discs which so rapidly replaced the vinyl LP. The need for large pressing facilities has, until recently, made it difficult and expensive for companies to produce a limited number of CD-ROMs carrying custom data sets.

The recent development by Sony and Philips of under-\$10,000 recording stations along with a CD-ROM compatible record-

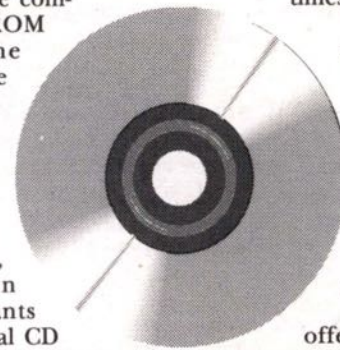
ing disc, has made it possible for even small companies to produce individual CD-ROMs right in their offices, with production times under one hour.

Dataware is selling its CD-recordable hardware/software bundle for \$19,500, including ReferenceSet which normally has a price tag of \$18,000. The same recordable technology, which creates fully compatible CD-ROM discs, formerly cost \$30,000 for the hardware alone.

A Philips drive is currently offered, but Sony drives will be available in the near future.

Dataware Technology, Cambridge, MA, which has produced more than 350 CD-ROM titles, is offering a free 25-page "white paper" explaining CD-recordable technology. To obtain a copy phone 800-229-2222.

Contact: Dataware Technologies, 617-621-0820.



**WORKSTATION NEWS**

**Sun Offers CDs And On-line Support Products**

MOUNTAIN VIEW, CALIFORNIA (NB)—One of the problems in marketing hardware or software is how to offer users support. Sun Microsystems Computer Corporation (SMCC), makers of Sun workstation products, is offering its support for sale in the form of software products called Sunsolve and Sun/Helpdesk.

SMCC offers Sunsolve, an on-line database for Sun SPARCstation users to get access to technical bulletins and problem/resolution.

Sun/Helpdesk is geared toward Sun's resellers and offers them assistance in setting up their own help desks so that they can support their clients.

Sunsolve comes on compact disc read-only memory (CD-ROM). SMCC says the disc contains troubleshooting help from the most commonly asked questions of SMCC technical support in the form of symptoms and resolutions as well as bug/patch descriptions. Key word searches are used to find the needed information. The Sunsolve is based on the Open Look graphical user interface that Sun users are

already familiar with, the company said. SMCC said the discs will be updated quarterly.

Sunsolve is also available on-line as a dial-up information service updated daily, the company said.

Sun/Helpdesk offers resellers all the support of Sunsolve, in addition to tools, support, and documentation, so they can set up their own in-house support for their users.

One Helpdesk tool is Techescalator, which allows resellers to access Sun's support engineering staff directly over electronic mail to get answers when the information is absent from the Sunsolve information databases, SMCC said.

SMCC says the two help products are available immediately. Sun is not the first company to begin offering its technical support database to users. Microsoft is offering a CD-ROM of commonly asked support questions for its products as well.

Contact: Sun Microsystems, 416-477-6745.

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# Trend Watch

## CPU TRENDS

The next generation of microprocessor chip from Intel may not be named the 586, as everyone has expected. Because the courts have allowed its competitors to use the 386 moniker, and may allow the use of 486, Intel is searching for a new name that it could copyright. However, the new name must convey its compatibility with the 386 and 486.

Because Intel was the victor in a recent lawsuit against AMD, it has postponed some competition for the 486 chip market for approximately six months. This should allow Intel some delay in price cuts for the 486 market. However, demand for the high-end systems is still weak when compared to the venerable 386 market. This is most likely due to a lack of software which demands the 486 system. Virtually any program which runs on the 486, can also run more slowly on a 386.

It was actually software demands which put the 386 into its dominant position, not just its speed advantage over the 286. Windows 3.0 and numerous applications made excellent use of 386 features which the 286 could not match. The 486 chip possesses none of these feature advantages over the 386. Its principle benefit is speed.

While a small percentage of users will pay any price for speed enhancement, the majority will not. Hence, the 386 market will continue to be vibrant until the 486 prices fall further.

Since AMD is the largest producer of 386 chips today, the loss of the lawsuit may not be as damaging as many first suspected. Given its penchant for innovation, the delayed 486 AMD unveils next year may be the improved version needed to move the market. In the interim, prices of used 386's are not expected to fall as rapidly as previously expected.

## NOTEBOOK TRENDS

While IBM will introduce a record number of notebook computers this year, most of them will not be IBM originals. The first one due this month is manufactured by Zenith. The color notebook due this fall will be true IBM, but the pen-based notebook due by then will be another Zenith. The most inexpensive IBM notebook, also due in the fall, will be made by AST.

Following portables, laptops, notebooks, subnotebooks, and palmtops, the smallest computers of all may not be computers but tiny, removable hard drives. Once the removable hard drive interface is standardized, the need for transporting the computer is lessened. A business person can use a home system with greater continuity by bringing the hard drive home. In addition, inexpensive computers without hard drives will be made available by airlines and hotels for the traveler. Software savings is significant due to the single copy on a single drive.

## MARKET TRENDS

The price-cut massacre of the summer of '92 appears to be slowing down. The only announced cuts this week were from Digital Equipment Corp., which is lopping 42% off some of its computer models, and Dell, which announced a 5% pay cut to its top executives.

DEC said it was a long planned cut, not a reaction, and Dell said pay cuts will keep the company lean and mean.

The rash of sales of 486 computers has killed the market for math coprocessors.

Experts predict the 350-million-dollar math coprocessor market will shrink to \$50 million dollars by 1995.

## MARKETING TRENDS

What does Microsoft Windows have in common with Pepsi and Nike sneakers? They all made it to Ad Age Magazine's Marketing 100 list. That's like the best dressed list for product packaging. Microsoft's use of a colorful logo, television advertising and 10 million copies sold put the software product up there with regular consumer items. Doesn't that sound like Window Dressing?

## SOFTWARE TRENDS

Microsoft fired the next salvo in the desktop operating systems war following their divorce agreement with IBM. They changed directions and announced that the next version of DOS (which they must give to IBM) will be watered down, and the valuable goodies, like advanced multitasking, are going to be released in the upcoming version of Windows NT.

If you can't get your Windows to come clean, the new Skylight program from Renasance Group may help. Skylight is a window on Windows that lets a user monitor system resources like memory, drives, ports, interrupts, and task assignments when a program is launched in Windows. The program editor will help modify the system bottlenecks, particularly helpful on systems with loads of multimedia hardware and software.

## LEGAL TRENDS

The gig is up for software pirates. A U.S. court has decided that you can't escape the costs of software piracy by declaring bankruptcy. In a case between Novell and MedPerfect Sytems, MedPerfect acknowledged that they violated Novell's copyright, then tried to duck the bill by declaring they were bankrupt. The judge said pay up. The Software Publisher's Association estimates software piracy costs 2.4 billion annually in lost US domestic sales.

## TECHNOLOGY TRENDS

The Japanese have finished their ten year effort to develop the fifth generation computer. While the ICOT project yielded no major new computer it did develop 75 different software and hardware products, all of which are being made available to the public without cost.

## TELECOM TRENDS

Sprint is launching another project "just like" AT&T. Now, Sprint will be using a third-party translation service to let phone users perform on-phone language translations. Drawing on the services of WorldNet, Sprint will allow callers to have either spoken or written messages translated into any one of 11 languages.

## AMI Hardware Distributor

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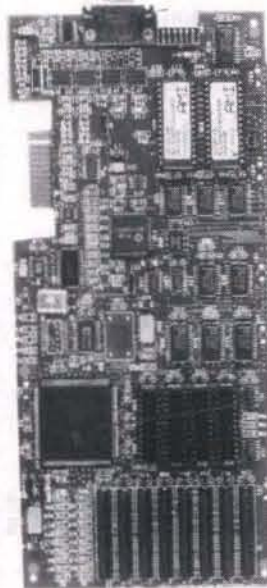
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**K.R.D. 1995** (The Kidstuff Reunion Drive Group For 1995) At 144 Gillard Ave., Riverdale. Tel. 461-1343. Call for meeting dates 11AM Saturdays. Group's focus is to collect 1975-6 Canadian pennies in order to reassert interest by signing a petition to rein-

state the 1975-6 CTV Show "Kidstuff." Komputer Kidstuff 1995?? 2005?? Ask for Jeffrey Leitner.

**LOGIC** Apple II & Mac, meets 1st & 3rd Tuesday, North York City Centre, 5110 Yonge St. (Concourse level, Burgundy Room A), North York, 7:30 p.m., all meetings open to general public, non-profit & self-help, messages 323-0828, BBS 487-9771.

**NEXT USERS GROUP,** NeXT computer support, 2nd Thursday, McLennan Physics Lab (University of Toronto), 60 St. George St., Room 118, 7 pm, 416-365-1899.

**NETWORK/BUSINESS COUNCIL.** Etobicoke lead exchange meets second Thursday every month for light, informal breakfast and networking. 255-0217 x463.

**PCCT (PERSONAL COMPUTER CLUB OF TORONTO)** PC users, 3rd Tuesday, St. Gabriel's Community Centre, 672 Sheppard Ave. E. (2 blocks east of Bayview, north side), North York, 7 p.m., membership includes shareware, BBS, special interest groups (SIGs) & workshops, information 244-6786.

**TAF (TORONTO ATARI FEDERATION)** Atari users, 3rd Thursday, North York City Centre Library, 5110 Yonge St. (at Park Home), public domain library, regular demonstrations & guest speakers, Infoline 416-425-5357, BBS 235-0318. Non-member admission \$2, membership \$30 (incl. newsletters).

**TPUG (TORONTO PET USERS GROUP, INC.)** Commodore users (PET, 64/128, Amiga, CDTV, MS-DOS, etc.), meets Tuesdays (1st, 128; 2nd, Amiga; 3rd, GEOS; 4th, 64), York Public Library, main branch, 1745 Eglinton Ave. W. (near Dufferin), 7:30 p.m.; 3rd Thursday, Alderwood United Church, 44 Delma Drive, Etobicoke, 7:30 p.m.; software library, newsletter & BBS, Information 416-253-9637.

**TORONTO PARADOX GROUP,** meets 2nd Friday of month, Free BBS (416) 271-9795. Call BBS for next meeting Loc. & list of presentations. Learn about 'PAL' (Paradox Application Language), add-in products, Paradox tips and traps. For membership info., contact Doug Campbell (416) 496-0061.

**TORONTO TIMEX-SINCLAIR USERS CLUB.** All Timex and Sinclair computers. 1st Wednesday, Forest Hills Collegiate Inst., 732 Eglinton Ave. W., 7 p.m., demonstrations, bi-monthly newsletter. Voice Information (416) 751-7559.

**TRACE**—Toronto Regional AutoCad Exchange Presents Factorium—3D Goes Solid "with stereo Lithography", on July 28th at Malton Community Centre, 3540 Morningstar Drive. For details call Tim Lucas at 750-9765.

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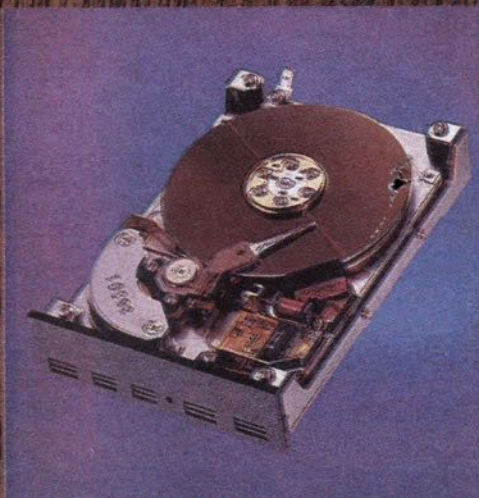
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