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ONTARIO (GREATER TORONTO) EDITION NOVEMBER 1994 VOLUME 7 NO. 11

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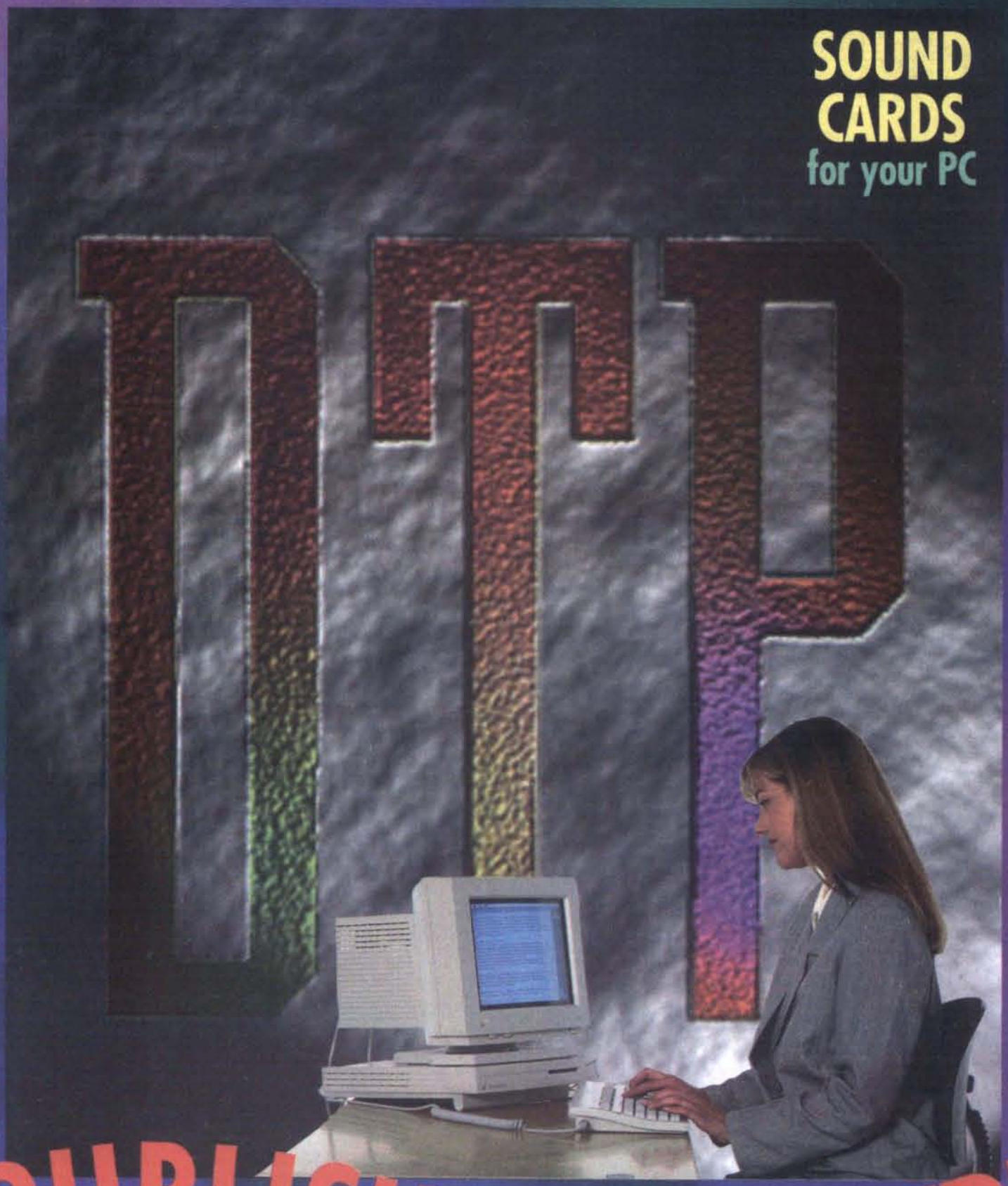
WHAT'S HOT in CAD

OS/2 VERSION 3



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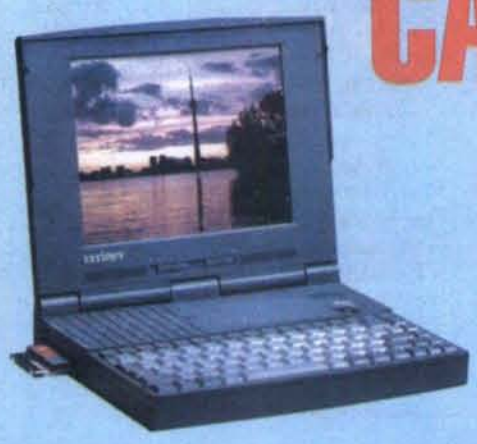
CANADA'S COMPUTER LEADER



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486SX-33	**N/A**	**$1736**	N/A	$1825	N/A	$1918	N/A	$2155	90 MHz
486DX-33	$1758	$1780	**$1846**	**$1869**	$1939	$1962	$2176	$2199	110MHz
486DX/2-66	$1859	$1901	$1948	$1990	**$2041**	**$2082**	$2278	$2319	220MHz
486DX/2-66M	$2059	$2101	$2149	$2190	**$2241**	**$2282**	$2478	$2519	220MHz
486DX/4-110/M	N/A	$2601	**N/A**	**$2720**	N/A	$2782	N/A	$3019	347 MHz
DX-60 with Pentium (TM) processor	N/A		N/A		N/A	$4058	**N/A**	**$4295**	354 MHz
DX-66 with Pentium (TM) processor	N/A		N/A		N/A	$4233	**N/A**	**$4470**	382 MHz

Upgrade PVT mono to dual scan passive matrix colour	$813
Upgrade PVT mono to active matrix colour	$1859
Upgrade DX-60/66 dual scan with Pentium™ processor to active matrix colour	$1625
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- Intel Pentium™ processor 60 & 66 MHz
- VESA LB video: 9.4" or 10.3" dual scan & active matrix displays; simultaneous, external SVGA monitor support
- Extra large, built-in 25 mm trackball
- 8 mb RAM expandable to 16, 24 or 40 mb
- Separate Type II & Type III PCMCIA slots
- VLB 32-bit removable HDD, for maximum software use
- Multimedia capabilities include built-in speaker/microphone, Sound Blaster compatible audio card, an optional docking station with drive bays and expansion slots is also available.

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- Ship 286-12 MHz Notebooks
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- Ship VESA VLB minitowers
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- 3 VESA or 7 ISA slots motherboard
- **Built-in Pentium™ P24T upgrade socket**
- 128k cache on mbd upgradeable to 256k
- **8 mb 70ns RAM expandable to 64 mb**
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- 410 mb HDD, 13ms, 128k cache, fast ATA
- VESA 1 mb Bullet, true colour video card
- VESA local bus hard drive controller
- 2 serial, 1 parallel, 1 game port
- 101 enh. spillproof kybd. & minitower case
- **15" non-interlaced .28 dp SVGA monitor**
- **Built-in deep green power saving features**
- 3-button high resolution 400 dpi mouse

$1976 **$72/MTH**

ULTINET ULTRA PRO PLUS

- Intel™ Pentium™ DX-60 or 66 CPU (+$165)
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- ATI Mach32 VLB or Tseng Lab W32P PCI
- VLB or PCI fast IDE hard disk controller
- 2 serial, 1 parallel, 1 game port
- 101 enh. spillproof kybd. & minitower case
- **15" non-interlaced .28 dp UVGA monitor**
- **Built-in deep green power saving features**
- 3-button high resolution 400 dpi mouse

VLB $2451 **$89/MTH**
PCI $2496 **$92/MTH**

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- Intel™ Pentium™ DX-90 CPU
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- **Built-in Pentium™ Overdrive socket**
- **512k cache on motherboard, 15 ns**
- **8 mb fast 70ns RAM exp. to 128 mb**
- 1.44 mb floppy disk drive
- **720 mb HDD 12 ms, 128k cache, fast ATA**
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- VESA or PCI hard drive IDE controller
- 2 (16550) serial, 1 EPP, 1 game port
- 101 enh. spillproof kybd. & minitower case
- **15" non-interlaced .28 dp UVGA monitor**
- **Built-in deep green power saving features**
- 3-button high resolution 400 dpi mouse

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ULTINET ULTRA PRO

- Genuine **Intel™** or AMD™ CPUs with 128k onboard cache
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- 1.44 mb Japanese brand hi-density FDD
- **Fast 4 mb 32-bit 70 ns RAM onboard**
- **"Bullet" 1 mb, 32-bit, VESA true colour, local bus video card**
- 14" 1024 x 768 SVGA noninterlaced .28dp monitor
- **Ultinet** motherboard features:
  - **Certified Intel™ #3, P24T, Pentium™-upgradable socket**
  - 3 VESA local bus slots & 7 ISA slots
  - **Built-in deep green power saving features**
- Enhanced digital minitower case with 230 watt supply
- Deluxe 101-key spillproof keyboard
- 3-button high resolution 400 dpi mouse

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Model	CPU AMD™	CPU Intel™	LEASE TO OWN	LANDMARK SPEED
486DX/2-66	$1329	$1367	$52/mth	220 MHz
486DX/4-100	N/A	$1825	$69/mth	347 MHz
DX-60 with Pentium™ CPU		$1858	$71/mth	354 MHz
DX-66 with Pentium™ CPU, PCI Version (PCI video card & IDE controller)		$2035	$77/mth	354 MHz
DX-66 with Pentium™ processor		$2028	$77/mth	382 MHz
DX-66 with Pentium™ CPU, PCI Version (PCI video card & IDE controller)		$2180	$83/mth	382 MHz
DX-90 with Pentium™ CPU, PCI Version (PCI video card & IDE controller)		$2650	$101/mth	>400MHz

Upgrade 410 to 540/720 mb, 12ms HDD, 1280 kb/sec	$89/223
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Upgrade to mid/full tower case	$29/62
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Win. 3.1/3.11 OEM	$59/69
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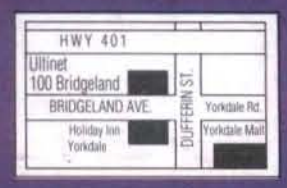

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Monitor sold separately

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- 8 slots (with 2 32-bit VESA)
- 6 drive bays
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- MS-DOS 6.0 & Windows 3.1
- **3-year IBM warranty***

GREAT PRICE!
Ambra i486DX2-66MHz Mini Tower
$2,149
Lease/month $75.32†
Monitor sold separately

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- 1MB video memory
- Local Bus IDE controller
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- 256KB processor cache
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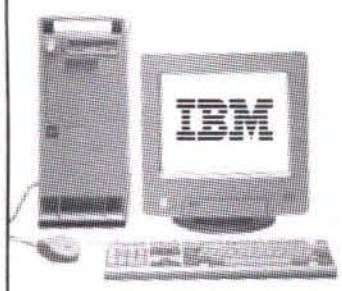
- MS-DOS 6.0 & Windows 3.1
- **3-year IBM warranty***



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- Maximum 256KB L2 cache
- **720MB hard drive**
- 3.5" & 5.25" diskette drives
- 1MB video memory
- Internal Fax/Modem
- **8 slots and 6 drive bays**
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- **3-year IBM warranty***

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while supplies last
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$4,999
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- Integrated Math Co-processor
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- 16KB L1 cache & 256KB L2 cache
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- ISA Plug-n-Play capability on 5 ISA slots
- PCI Local Bus technology with 3 PCI slots
- PCI Local Bus IDE hard drive controller
- MS DOS 6.2 & Windows 3.1
- **3-year IBM warranty***

Real Mobility. Real Notebook Values.

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$3,499
Lease/month $122.64†

- **Our lightest and smallest ThinkPad yet – only 4 lbs.**
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- 200MB hard drive
- 1 PCMCIA Type II slot
- VESA Local Bus video
- Integrated TrackPoint II
- External diskette drive included
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- Memory upgrades & PCMCIA options available
- **1-Year International Warranty Service***

NEW MODEL!

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- **8MB RAM (Maximum 20MB)**
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- 85-key keyboard
- Centred 16mm Trackball
- System Status Panel
- **Integrated audio, including speaker and microphone**
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- AC adapter & carrying case
- **1-Year Executive Exchange Warranty***

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10.3" Dual Scan DSTN Display
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Lease/month $140.16†

NEW LOWER PRICE!
DX4-75MHz/340MB HDD
10.3" Dual Scan DSTN Display
$4,999
Lease/month $175.21†

NEW AMBRA NOTEBOOK!
DX4-100MHz/540MB HDD
9.5" TFT Active Matrix Display
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Lease/month $254.57†

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Mailbox

Editorial Fans

I just wanted to tell you what I think of your editorials in *The Computer Paper*. The intelligent and thoughtful comments you have to offer is very refreshing in this day and age. So typical is the computer magazine editor who is 'gung-ho' on any and every new technology

As well, I like your gentle reminders that computers aren't the only part of life. Thank you for not being the typical 'propeller-head' and having a practical outlook on the new technology!

Dave Bird, Calgary via Internet

Refreshing to see a computer journalist with some perspective on the reality of computer technology.

jdw, via Internet

DA Replies: *Gracious thanks for your positive comments. I owe many of these thoughts to a wife and kids who keep dragging me screaming into the real world.*

OS/2 Flame Never Dies

Graeme Bennett's response to Jack Surveyor's comments (TCP October '94) are truthful in that Windows '95 (AKA Chicago) is a big step compared to its predecessor.

He would also be making a truthful statement if he said it gets dark at night and light during the day.

But that is old news.

Unfortunately, he glosses over the fact that when Windows '95 is released in June 1995 (or later), it will offer much the same functionality as OS/2 2.0 did in Spring 1992.

That, too, is old news.

If I may extend his rationale that products that are 'progressive enough merits further coverage' (TCP September '94), Windows '95 is nothing to crow about. There is nothing new here. OS/2 2.11 already does what Windows95 will do almost a year from now (if we are to believe the Microsoft marketing machine). The impending release of OS/2 3.0 will push the envelope even further.

What Windows '95 will do next year is old news.

The fact that Microsoft is so far behind in desktop OS development *is* (sadly) newsworthy.

John Cathie, Team OS/2 via Internet

DT Replies: *I don't think we've ever questioned the many technical merits of OS/2. Where IBM has missed the boat in previous versions of OS/2, including 2.1, concern usability and marketing issues, not technical ones. I doubt anyone who looked at OS/2 objectively would say that its installation was as simple as the installation procedure for Windows 3.1, for example.*

If OS/2 is being targeted for the masses, then installation has to be a no-brainer — not because average computer users don't have brains, but because they choose to use computers for some end like word processing or data manipulation and not for the challenge of solving OS puzzles.

Judging by what IBM has done with OS/2 Warp V3 — which we are covering in our lead stories, incidentally — IBM has realized that it has to address marketing and usability issues as much as technical ones.

There's an adage in the software industry that says version 3 is the sweet one — the one that finally makes it, commercially. Judging from what IBM has revealed about Warp, this latest OS/2 may, indeed be The One.

A Classical Argument

I would like to take this opportunity to respond to points made by Ross MacDonald in his article "Microsoft Updates Classical Music" (See TCP, Oct '94). First, Mr. MacDonald states that Microsoft is "the undisputed leader in this classic case of computerization," leading one to believe that MS was the first in this endeavor of putting classical music appreciation on CD-ROM. In fact, Voyager Company, put out at least two of these titles for the Mac

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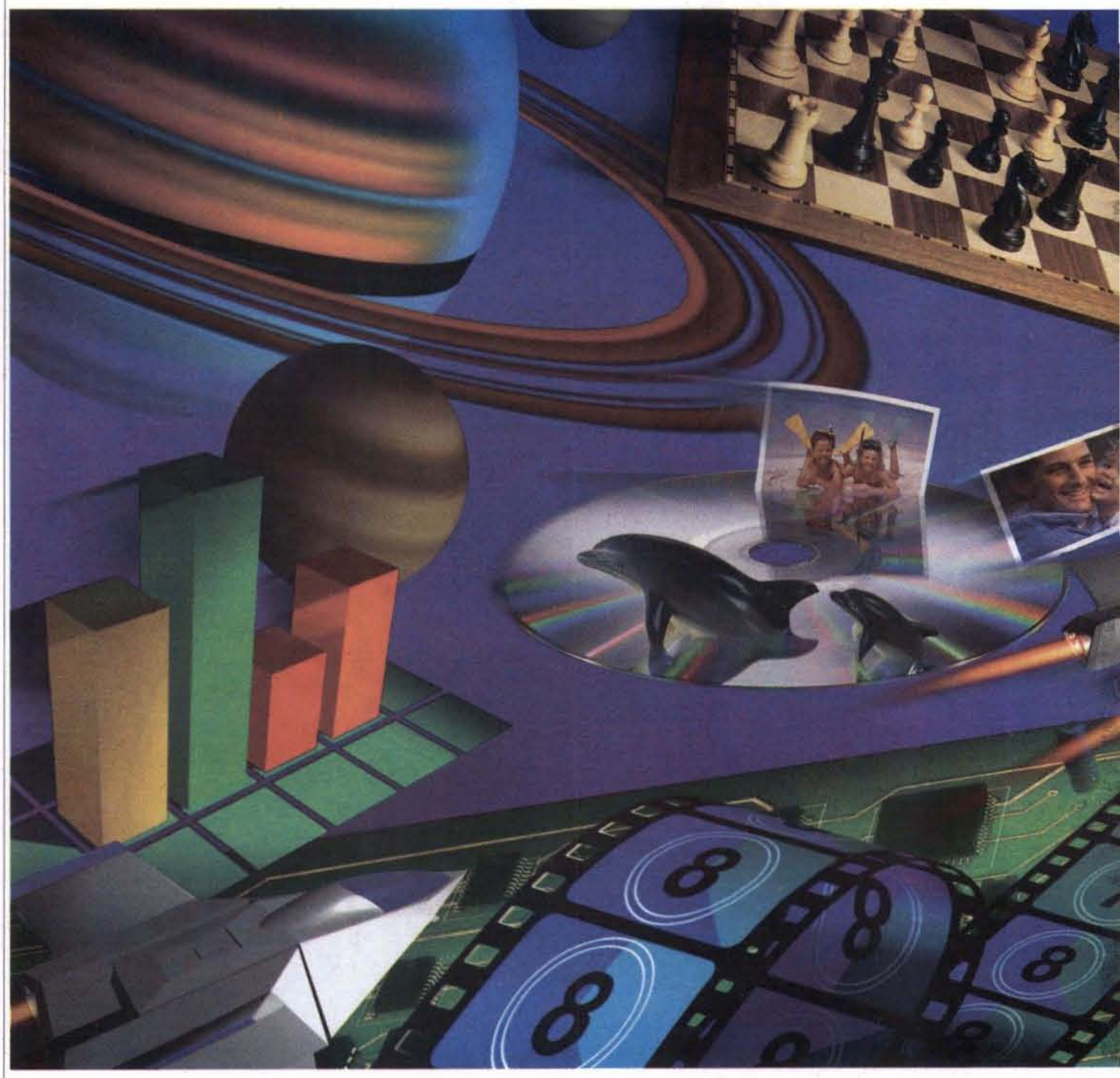

Mailbox

before Microsoft even had the idea. And the two titles, featuring the Mozart "Dissonant" String Quartet and Beethoven's 9th Symphony, were taken by Microsoft and converted into two of their very first "multimedia" CD-ROM offerings.

Then, I find his statement that The Rite of Spring (written in 1913) by Stravinsky is a "cultural cockroach of the Classical world" not accepted until "last Thursday" unbelievable. Come on, Ross, The Rite of Spring is very well accepted and occupies an extremely important place in western art music. It is performed regularly and, to further illustrate its acceptance, it has been imitated and parodied to great length. Anyone who would despise it for the same reasons the first audience did (perceived as too dissonant, brutal, formless, senseless, vulgar, etc.) must have been brought up on a diet of bland, profoundly uninteresting, mono-harmonic music.

Lastly, Mr. MacDonald's complaint that, with the exception of Beethoven, the music and composers offered are "obscure" or "relatively unpopular" is hogwash. All of these composers and pieces are very well known-especially Schubert and his "Trout" Quintet. This piece is one of the very first pieces that many come to know of Schubert. If not directly then at least through its connection with his well known lied, "Die Forelle" (The Trout). Of course, the knowledge one has of these pieces and composers depends on one's musical background.

Barrie Barrington, Ladner BC

RM Responds: *One of the reasons there is so much confrontation in the world today is that people often rage against arguments that are actually self-perceived. "Leader" can mean many things, "ahead," for example, or "one who is followed." In this case, we're looking at five titles all created with the highest production values. "First" simply means first.*

Second, I personally think The Rite of Spring is the bee's knees. I even have a couple of recordings of it. But survey your friends to see how many have even one and you'll get my point. Modern dance occupies an important place in Western art, is performed regularly and is parodied to great length, but I wouldn't say it's very well accepted. Just count the audience. And, the next time you're at the symphony ask 10 people to hum the first four bars from Schubert's "Trout Quintet."

What you missed was my point that CD-ROM is still in its infancy and I was surprised Microsoft went with such sophisticated choices over the more obvious. I don't think many would balk at learning more about "Eine Kleine Nachtmusik" or mabe "Aida" in similar packages, though I fear you might regard them as "bland, profoundly uninteresting and mono-harmonic." just because they're hits. See you at the symphony!

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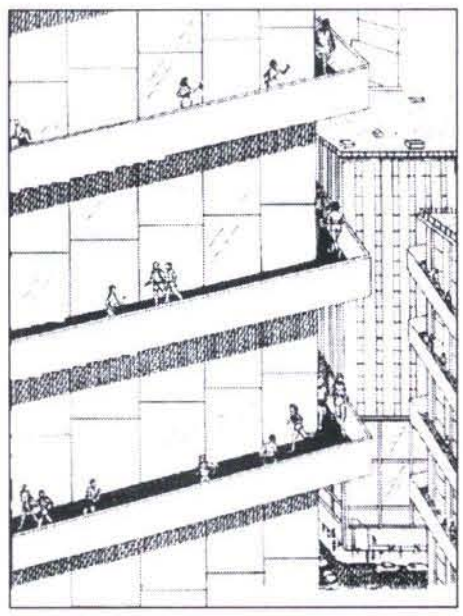

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The Publisher's Apprentice

From the Editor

A pleasant young man made an appointment to see me the other day. He said he had some questions about the publishing business. Always a soft touch for young people on the way up in the world (remembering people who had made time for me when I was starting this publication), I said "yes sure, come on in." (If this article starts a rush on such calls, I promise I will start saying NO.)

This 25-year-old had just spent seven years toiling away in university to get an MA in English. While he may have been having great fun doing it — and I don't begrudge him the opportunity to expand his mind this way — he had failed to do any reality checking on what the working world expected of him, until he actually graduated.

What was missing?

He wanted to know what a potential employer would look for in someone wanting a job in editorial.

He did seem to have some good computer skills with basic word processors and spreadsheets, but nowhere in his resume did I see mention of PageMaker or Quark Xpress. He had spent no time at the student newspapers getting real world deadline experience.

He had no samples of his writing to illustrate ability in the area he was seeking employment. He may have been the best writer/editor in the world, but to find that out, I would have to give him six months of employment to see this first hand. As a profit-minded publisher, I couldn't afford to do that only to find out that he might not be capable of the things he wanted to do.

Supplement your skills

While some professions such as law, medicine and engineering set a more clear course for employment, many others such as generalized arts and science programs don't leave a person with much in the way of desirable job skills at the end of the day. They expand the mind and leave students ripe with potential, but lack the specificity of real world jobs.

Having a goal in mind and supplementing your experience through volunteer labor, part time jobs or practicums really improve the chances of long term employment.

Unhappy grads

According to surveys of recent university graduates, up to a third of them say they would not do it all over again. The implication is that they chose the wrong path. Many graduates require further training upon graduation to get real world employment.

Careers on disk

While at the Seybold Expo, the show for computer products for publishers, in San Francisco recently, I saw a demo of a CD-ROM product designed for school counselors. It was called the Encyclopedia of Careers and Vocational Guidance, a database of information on over 2,000 career options, with description of real world jobs and job requirements.

It contains a four volume, 2,600 text page resource for tracking down the right career. One great feature is a search engine that allows career seekers the ability to enter their interests, hobbies, favorite courses, education level and then come up with the jobs and salary ranges that match those parameters. The product sells for US$199 and comes on a CD-ROM. It seemed like an invaluable aid to schools and even something that some parents might want to invest in to help their children explore options.

Contact: J.G. Ferguson Publishing Company, Chicago, Illinois, Tel 312-580-5480

The wandering path

I can't say that this young man who I started my story with was wrong to follow his interests in getting an Masters Degree. I got a B.A. with nothing much in mind. It was fun and I was interested at the time.

My life followed a twisted path to publishing. I ultimately followed my interests to get to doing something I loved. Life is not always the shortest path from point A to point B. But if you want a job in the real world at the end of all of it, keep in mind some of the things your ideal job will require and see if there is a way to pick up some of those skills along the way.

The end of Liberal Arts?

Unfortunately, Canadians are faced with a massive government deficit. Students are becoming aware that each of those seven years at university probably cost taxpayers in subsidized university tuition fees.

That realization may increasingly become incentive for many Arts and Science students to get very specific about what they want to do. The days when our society and young people could afford the luxury of spending years getting a "higher education" seem to be ending.

Douglas Alder
Editor and Publisher
publisher@tcp.mindlink.bc.ca

newsbytes

North America

IBM Intros Aptiva For Home — IBM is making a fresh start in the home computer market with a new product line called Aptiva. In a twist that may indicate the growing importance of the home market, the Aptiva machines have some features not yet available in PCs aimed at the business market.

Compaq's New Portables — Compaq Computer Corporation has introduced a new set of portable computers to its Contura product line.

Bell Canada Consolidates Discounts — Bell Canada, the largest of Canada's regional telephone companies, has announced a new long-distance discount package that merges existing plans.

Globelle, It is — Computer Brokers of Canada has taken a new name and announced plans to go after international markets following its acquisition a few months ago of Minneapolis-based Technology Marketing Group, Inc. The new name is Globelle.

WinComm Pro Does Internet — Delrina Corp. has added a graphical tool for sending and receiving Internet mail to the latest release of its WinComm Pro communications software for Microsoft Windows.

HP Intros OmniShare — Hewlett-Packard has announced OmniShare conferencer, the first of a family of document conferencing products which feature simultaneous voice and data transmission. The pen and tablet-based product is capable of receiving, storing and transmitting faxed documents which can be annotated while voice transmissions discuss possible changes and additions.

Internet Anywhere For NetWare — Mortice Kern Systems Inc. of Waterloo, ON has announced a version of its Internet Anywhere software for local area networks (LANs) running Novell Inc.'s NetWare operating system.

Picture Publisher 5.0 — Micrografx Inc. has released version 5.0 of its Picture Publisher software for Windows.

IBM Delays PowerPC Systems — According to press reports, IBM is delaying further production of its much anticipated, next-generation personal computers based on the new PowerPC chip, until sometime next year.

Kodak Intros CD Writer — Eastman Kodak Company has introduced a drive to write data, including digital audio, to custom CD disks.

Autodesk Cuts Generic CADD Price — In response to the diminishing market for DOS-based computer-aided design (CAD) software, Autodesk Inc. has announced that it is lowering the suggested retail price of its Generic CADD 2D DOS design software to US$99 in the United States and Canada.

First 80MB 1.8" IDE Flash Drive — SunDisk Corporation has introduced the SDIA-80, which the company says is the world's first 80MB 1.8" flash storage device. According to Sundisk, effective storage capacity of this solid state device can be doubled to 160MB with a pre-loaded Stacker compression option.

IBM's Creative Thinking Award — IBM has a new award, the IBM Leonardo Award. According to officials with Big Blue, the award, which is named after the great artist, mathematician and inventor, Leonardo da Vinci, aims to stimulate, foster and reward creativity amongst all levels of computer enthusiasts.

➤

A New Look For Apple

Mac OS

Apple Computer Inc. has rolled out a new face that the company says will being to appear on millions of Apple Macintosh computers. The company also says the new Mac OS identity will help it increase its worldwide market share for its Macintosh personal computers and upcoming compatibles.

Starting with the next release of Apple's Macintosh operating system (OS) will now go by the name of Mac OS. The company says the press has been using it all along, and that Mac and PC users prefer it.

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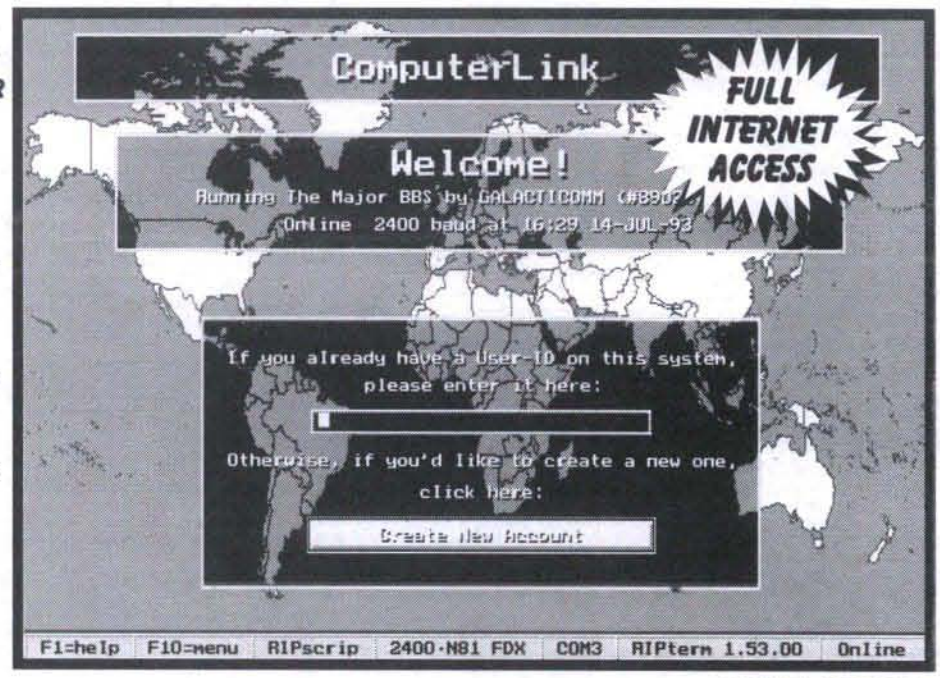

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THIS IS VOLUME 7, NO. 11, NOVEMBER 1994

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Canadian Publication Mail, Sales Product Agreement #10251 Printed in Canada ISSN 1195-3454
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newsbytes

Computer Tops In Chess Challenge — A chess-playing program outscored human grand masters for the first time in the fifth Harvard Cup Human Versus Computer Intel Chess Challenge at the Computer Museum in September.

Cartoon History Of The Universe — Putnam New Media has announced "The Cartoon History of the Universe: Volumes 1-7," a CD-ROM "adaptation" of Larry Gonick's cartoon history of the past 13 billion years.

Quarterdeck's QEMM 7.5 — Quarterdeck Office Systems Inc. has announced version 7.5 of QEMM, which is described as the leading memory manager. According to the company this new release marks the first time a memory manager has been released with native Windows installation, configuration, and reporting utilities.

North American Digital Standards Group Formed — TV/COM International, formerly Oak Communications, put out a call earlier this year for a North American Digital Group (NADG) to standardize digital TV broadcasting in North America. The firm reports a good response from the satellite, consumer electronics, terrestrial broadcasting, and cable television industries.

Canon & Caere Scanner Bundle — Canon Computer Systems Inc. and Caere Corp. have joined forces to offer small office and home office workers, what the companies call, a "cost-effective, full-featured" grayscale flatbed scanner.

Sony's Magic Link — Sony's new Magic Link Personal Communicator will avoid the mistakes of previous handheld PCs by concentrating closely on the "communications that people need," top officials of ➤

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newsbytes

Sony, AT&T, and General Magic told hundreds of journalists at a major press conference in New York City.

Animator Studio For Windows — Multimedia developers using Autodesk's Animator Pro, a Windows-based twodimensional (2-D) animation program, are now being offered the "next-generation"—Autodesk Animator Studio release 1.

Monotype Intros Font Programs — Monotype Topography has announced three new products to be added to its font libraries and related products: Monotype Bulmer, a new PostScript typeface; BorderMaker, a Mac-only borders program; and Toulouse-Lautrec fonts, an addition to its Type Designers of the World Collection.

Newsbytes From Europe and Asia

Fuji's Floppy Breakthrough — Fujifilm's UK operation has announced a high-density recording media for 3.5-inch floppy disks with a storage capacity of over 100 megabytes (MB) and data transfer rates over 30 times faster than the industry standard 2MB 3.5-inch floppy.

NEC To Expand Scottish Chip Plant — NEC has announced plans to invest UKP530 million in a new chip fabrication plan in Livingston, Scotland.

Toshiba Building $1 Billion Chip Plant — Toshiba will invest, over a period of three years, 100 billion yen (US$1.01 billion) to build a next-generation memory production facility at its Yokkaichi plant in Japan.

EC To Act On Telecom Monopolies — The European Commission (EC) has finally taken off its gloves in the battle against monopolistic telecoms markets in member countries. After years of hot air and threatened action, the Commission has begun the process of passing legislation to make such practices illegal.

IBM Aids Danish Software Package — The Danish Concorde system is now the best-selling economics-program in Scandinavia. Earlier this year, IBM Denmark bought 50 percent of Damgaard International, a privately held software house, which at the time already dominated the Danish market.

New Phone Net for Czech Republic — SPT Telecom, the state telecoms operator in the Czech Republic, has announced plans to accelerate its massive refurbishment and replacement project for the Republic's entire telecommunications network.

Korean Semiconductor Industry Booms — According to a survey by the Federation of Korean Industries of 1,156 domestic economists, the competitiveness of the domestic semiconductor industry has reached 87 percent of that of advanced countries like the US and Japan, and 103 percent of rival countries like Taiwan and Hong Kong.

Card-Sized Video Camera — British technologists have created what they claim is the world's first commercially available miniature video camera able to capture and incorporate images directly on to a portable personal computer. ❑

Film Collection On MPEG CD-ROM

Hollywood Select Video has granted High Technology Distributing worldwide distribution rights to its library of CD-based titles.

The CD-ROM disks, in MPEG (Motion Picture Experts Group) format and mastered by IBM, will cost US$9.95 and will run on PCs equipped with MPEG boards.

The firm said about 30 additional titles per month are planned, with the initial focus on home entertainment. They will be digitized, encoded, reproduced and shrink-wrapped for the project by IBM. Later titles will address both "edutainment" and education, with original interactive content.

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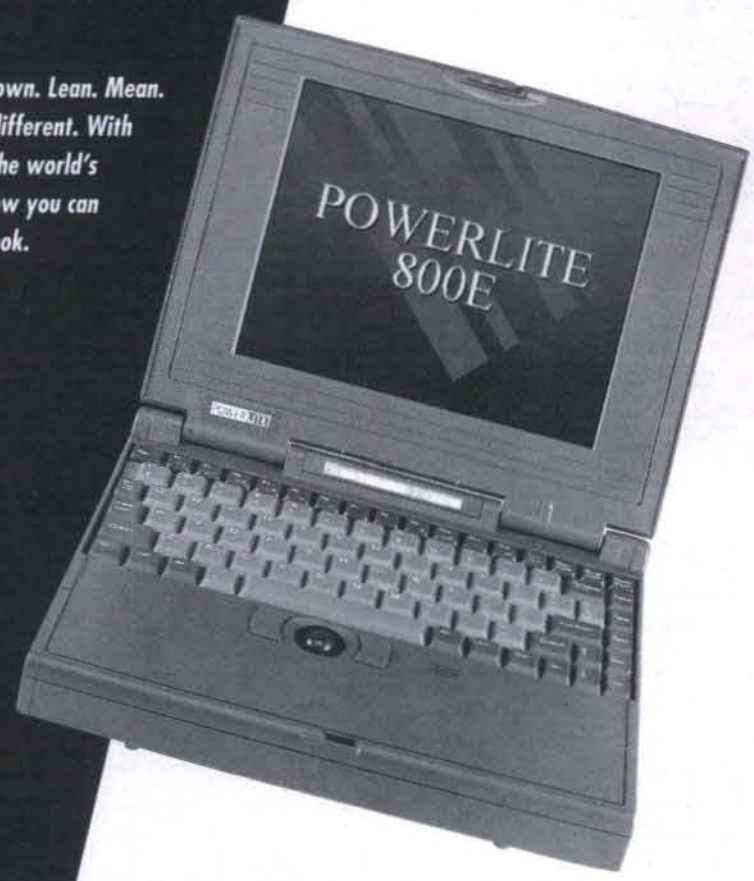

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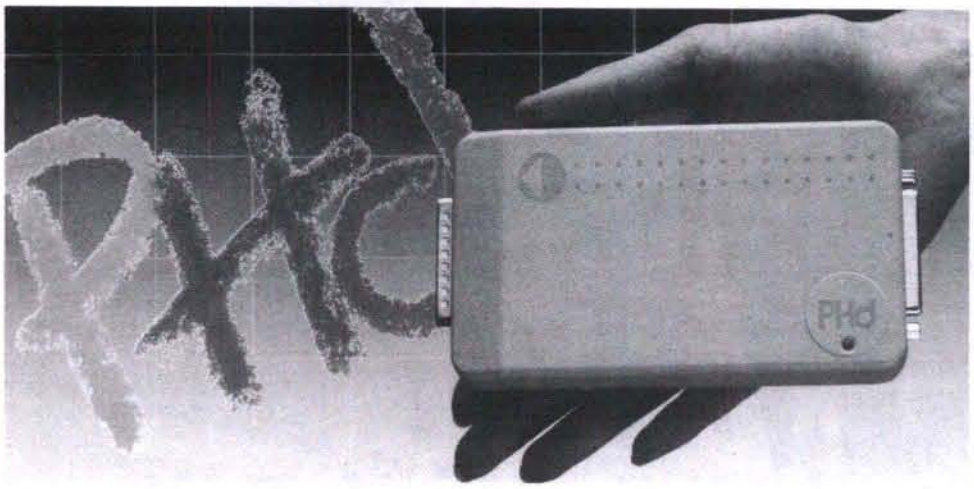

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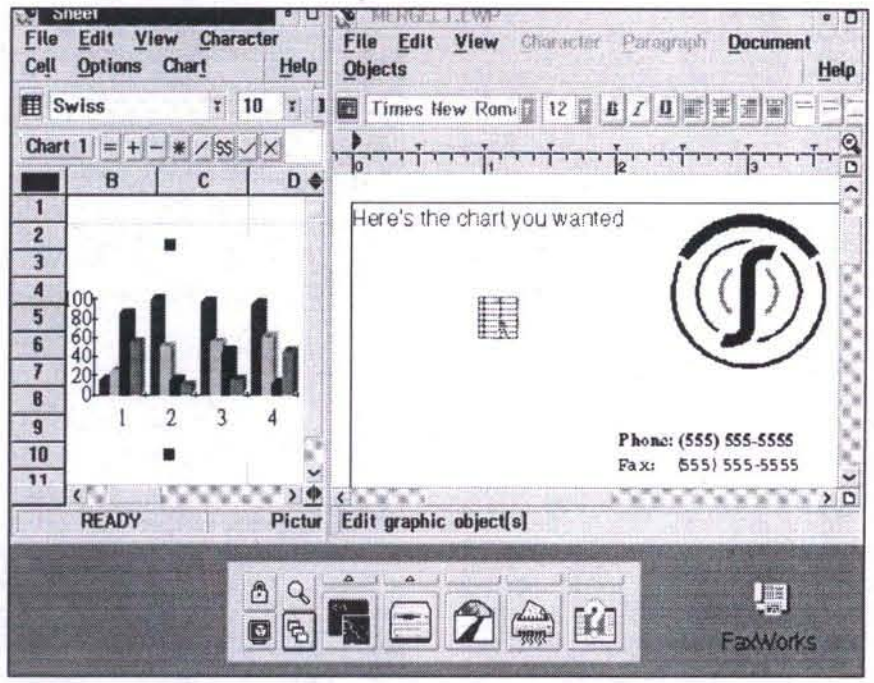
NEW RELEASE

OS/2 Warp Hits Its Stride

BY GEOF WHEELWRIGHT

If you believe in symbolism, then the events surrounding a recent press briefing about OS/2 Warp Version 3 have to bode well for IBM. On the way to an international press preview event at IBM's Personal Software Product division in Austin, Texas, more than half a dozen of the attendees were seriously delayed by an unexpected problem at the airport of a certain major US city, where the air traffic control system broke down. The name of that town: Chicago.



As many PC users will know by now, that also happens to have been Microsoft's code name for the next version of Microsoft Windows. This lies at the heart of IBM's plan of attack for the launch of OS/2: IBM has even had t-shirts printed saying that "Flight 4.0 to Chicago has been delayed" and advising people instead to "take off" with OS/2.

Microsoft has now, of course, announced that Chicago has been rechristened "Windows '95" and will make its debut considerably later than anticipated, being promised only "for the first half of 1995." That delay has prompted Wally Casey, IBM's director of marketing for Personal Software Products, to declare that IBM has nine months "to make hay while the sun shines."

IBM 0S/2 Warp V3 is, of course, the vehicle for making this hay and was launched in October with the accompaniment of a huge advertising campaign and lots of hype by IBM about how OS/2 will be "your on-ramp to the information superhighway" through ➤

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the inclusion of Internet access services and tools with OS/2.

But when you cut through all the information superhighway marketing hype, and the "we beat Microsoft to market" brouhaha, the question arises of what IBM has accomplished in developing OS/2 Warp Version 3. The answer to this must start with a look at exactly what it is the company was trying to achieve in this new release.

The first point to take on board is that IBM has actually responded quite quickly to demands for changes to OS/2. According to IBM's Casey, OS/2 Warp Version 3 was actually only under development for one year — one of the fastest turn-around times IBM has ever provided on a "re-rev" of a major operating systems product.

OS/2 Flavors for Everyone

In doing so, IBM also recognized from the outset that it would need to develop this next version of OS/2 in several flavors; hence, the simultaneous upgrade of the whole lower-end OS/2 Warp "family", including OS/2 Warp for Windows, OS/2 Warp LAN Client for Windows, OS/2 Warp LAN Server — as well as the base desktop version of OS/2 Warp Version 3.

In addition, an OS/2 "superserver" version, an OS/2 for SMP (Symmetric Multi Processing systems) and an OS/2 for PowerPC implementation will be out next year, taking the operating system from 4MB notebook systems right on up to superfast, multiple processor minicomputer-replacement servers.

"But these products are supersets of one another, not different versions," Casey hastens to point out - promising that OS/2 applications will run on all of these "supersets" of entry-level. "It is a family of products that have their base in the same operating system."

IBM apparently did a fair bit of soul-searching in the design of OS/2 Warp Version 3, having been at the job of selling a 32-bit pre-emptive, multitasking operating system for desktop PCs since March of 1992. Back then, says Casey, the market was divided into entry-level 4MB RAM systems on 386SX machines and the high-end was fast 386DX and 486DX systems with 8MB of RAM.

IBM has aimed for what it calls a "one-button install," so that once you have pressed the install button, there are no further questions to answer, things to look up, buttons to press or system changes to make.

OS/2 was smack in the middle of what both needed. The hardware requirements were higher than most people had (really needing 8MB to perform in any reasonable fashion), which Casey says was not surprising given that OS/2 was conceived as a client/server "industrial strength" product for corporations. "It was not a productivity application platform, but the one to run their businesses on," he explains.

Casey claims that, from this standpoint, OS/2 has achieved what it set out to do, with OS/2 for Windows and OS/2 2.11 winning more than 40 awards and becoming popular at the server end of the system in corporations running Lotus Notes. When compared to the 50 million-plus copies of Microsoft Windows sold, however, it is all small beer. And Casey admits that IBM made some mistakes in allowing that to happen.

"Our previous approach to selling was to challenge Microsoft. We wanted users to get a 'real man's' operating system," says Casey. "But people had spent so much time getting Windows to actually work for them that they didn't want the hassle of changing again. So we brought out OS/2 for Windows (code-named Ferengi) that could co-exist and work with Windows. And 300,000 people bought OS/2 for Windows in the first 90 days. But the side of box still asked for 8MB of RAM or more, and the market still wasn't ready for that."

So what was the market ready for? To give you IBM's answer to that question, here's a run-down of the features in OS/2 Warp Version 3. Remember, too, that all editions are supersets of this entry-level OS/2 Warp Version 3.0 and thus the features in it are common to all of the others.

OS/2 Warp Version 3 and OS/2 Warp Version 3.0 for Windows are the entry-level versions of the new OS. They are identical, except that the latter should be slightly cheaper as it doesn't need to include the cost of royalties to be paid to Microsoft for Windows 3.x code. IBM says they are targeted at the "home edutainment, home office and ➤

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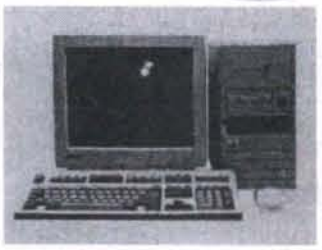

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mobile computing" markets and, as such, include strong support for games (both DOS and Windows), remote links (including Internet and Compuserve access) and a good suite of productivity applications.

The first thing previous users of OS/2 will notice is that IBM has aimed for what it calls a "one-button install," so that once you have pressed the install button, there are no further questions to answer, things to look up, buttons to press or system changes to make. Most of this is done via "polling" of on-board PC hardware so that Warp can make a "best guess" about a PC's hardware configuration without having to bother the user. This best guess can be changed if a user sees something in it that's wrong, but IBM seems to think that this won't happen much.

Once you've hit the install button, then it's just a matter of inserting and removing disks until Warp is installed (unless you are lucky enough to have a CD-ROM and you then won't have any disks to swap). IBM promises that OS/2 itself won't eat up more than 30 Mb of hard disk space during this installation.

Workplace Shell Redux

When OS/2 Warp is up and running, you'll quickly realize that you're not in Kansas any longer. The well-known OS/2 Workplace Shell has been redesigned to make it cleaner and easier to use, with the most noticeable change being the addition of a LaunchPad. This is similar to the "Start" button in Windows 95 (at least the current beta versions of it), and allows you to quickly use a single-click of the mouse to launch commonly-used applications. The applications are stored in on-screen file cabinet drawers which "pull-out" when pressed and from which the applications are launched once you select their representative icon.

New, more three-dimensional icons have also been produced for 0S/2 Warp Version 3, along with a "Comet cursor" (IBM's version of mouse trails) and animation for some of the icons. Hardware enhancements include a recognition that some users will need to share the parallel port between printers and CD-ROMs (where parallel-to-SCSI converters are used) and that Plug and Play features are needed for existing PCs that don't support P&P. On the latter point, IBM has designed Warp so that it allows "hot plugging" (insertion of add-ons while a PC is switched on) of PCMCIA cards without the PC having to have a Plug and Play BIOS.

OS/2 BonusPak Apps Bundled

Probably the biggest difference between this version of OS/2 and previous incarnations, however, is the breadth and depth of the bundled software. IBM is trying hard to get across the idea that OS/2 users are getting these "for free" when they buy Warp and they will be compartmentalized (a new word courtesy of the IBM phonics and acronym team) in a separate area within the Warp box.

This collection is being touted as the 0S/2 Warp Version 3 BonusPak and IBM hints that it may not always be included with OS/2 (a line sure to spur early sales of the product). The BonusPak includes:

- An OS/2 CompuServe access package
- An Internet "information highway productivity kit" comprising IBM Internet Express services, IBM Gopher for easily browsing pictures and documents, NewsReader for gathering together information from commonly-accessed newsgroups, IBM UltiMail 'Lite' for electronic mail access to a number of mail services, FTPPM for file transfer, Telnet for remote login to services and SLIP connection software
- A copy of IBM's Person to Person group communications, data exchange and conferencing software
- A set of productivity applications based on IBM Footprint (also known as IBM Works) that will include word-processing, spreadsheet, database, report writing and charting functions
- A personal information manager (PIM) that will also have fax send/receive and management capabilities.

The company is not shy about what it thinks all this provides for users. "0S/2 Warp Version 3 provides small office, home office and mobile users with a high performance, low memory version of the premier 32-bit operating system for industry-standard personal computers, setting a new standard for entry operating systems," concludes Wally Casey. "0S/2 Warp Version 3.0 provides Windows 3.1, Windows 3.11 or Windows for Workgroups 3.1 or Windows for Workgroups 3.11 customers a clear upgrade path to advanced 32-bit functions now, with full support for current DOS, Windows and OS/2 applications as well as superior stability and reliability." ❑

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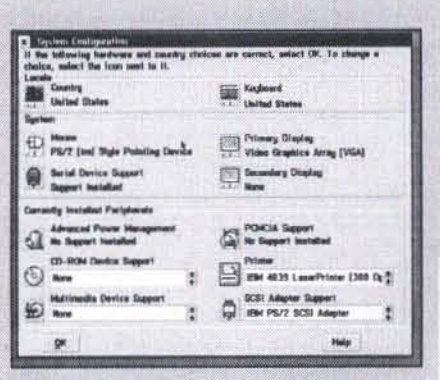

There were a few very telling comments made by Wally Casey, IBM Personal Software Products' director of marketing, at a recent briefing on OS/2 Warp V3 that suggest the depth of commitment that IBM has to this product, as well as provide a fairly realistic idea of just how much of a market "window" has been created for it by recent turns of events.

The first turn of events has been the overwhelming interest in the "information highway" concept that has worked its way into all manner of mainstream radio, TV, magazine and newspaper media. It is hard to read a newsmagazine or serious newspaper these days without seeing this phrase crop up once or twice.

This has given IBM a highly public buzzword to which it can hitch OS/2's star. It is a buzzword that currently has even more pizzazz and gleam than Microsoft Windows itself, which is now just assumed to be the engine on which the rest of the computer industry will run. And given that IBM has accepted that Windows 3.x compatibility was one of its first orders of business in the design of Warp, it appears that the company wanted to set that aside as a marketing issue very early in the agenda.

That brings us to IBM's second lucky turn of events: the unexpected huge delay in the arrival of Chicago (now renamed Windows 95). The next version of Microsoft Windows will not only be a complete 32-bit rewrite of Windows, but it will look and feel completely different and not arrive now until "the first half of 1995" (by which you can gather it might not be available much before June).

Casey doesn't intend to look this particular gift horse in the mouth, emphasizing that the time between now and when Windows 95 ships will be "make or break" for Warp.

And he says that Chief Information Officers (CIOs) at large corporations have told him that they would be willing to move to Warp if IBM can get the user community excited enough about it. "CIOs are already clear with us that if we can make users neutral to OS/2 or Windows they will take it from there (in terms of selling users on OS/2)," he says. "This is a race. Microsoft wants to learn how to sell to the enterprise and we need to learn how to get to end-users better. They want what we've got and we want what they've got. We want guys in corporations to come in to their MIS departments and say 'OS/2 Warp V3, now, please' and to create that demand we'll need kids playing games on it, guys running their businesses on it and using it on notebook computers. For that reason, we are going to be on (the) consumer (market) like white on rice."

Another element in this strategy of selling against Windows 95 will be to emphasize that Chicago will actually have far fewer native 32-bit applications running on it than OS/2 when it is launched. While Windows 3.x has a user base of some 50 million or more, Casey says that he will sell Warp as the information highway on-ramp that will run all Windows 16-bit software, include a vast array of new applications and provide users with access to the best, most mature and stable 32-bit software.

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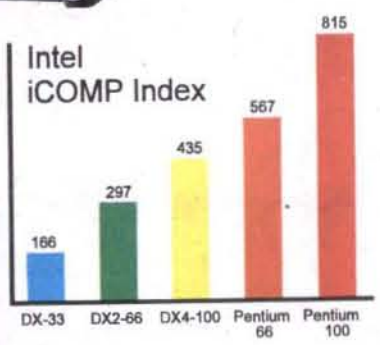

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Window of Opportunity

Continued from page 15

Another turn of events that is likely to help IBM is the concern by corporations about the cost of transition to Windows 95. Many corporations have already said they are not interested in seeing a completely new interface offered to their users, along with an entirely new platform that may or may not be entirely stable.

They also express concern that Windows 95 will accelerate demand for memory and processor upgrades on their PC populations as users crave the performance scalability that Windows 95 should bring. IBM suggests that it could provide a "middle way" for users.

IBM says that it can do a better job of easing transitions for corporations, will run quite happily in 4MB and will completely preserve the Windows 3.x environment where users are running Windows "sessions" within OS/2. The company also claims that OS/2 Warp V3 is likely to be more stable than Microsoft's Windows 95 since it has been a 32-bit operating system since 1992 — and this new release is an upgrade (and not a complete rewrite of 16-bit code as is the case with Windows 95).

IBM will also be very aggressive on the pricing of this product to ensure that there is no way Microsoft will be able to offer an advantage on the cost of using Windows 95 over OS/2 Warp V3. Big Blue will be helped in this matter by Microsoft's agreement in July to a consent decree which allows Microsoft competitors a better chance to compete for contracts to have alternatives to DOS and Windows loaded at the time of a PC's manufacturing.

Microsoft agreed to change the way it structures agreements with computer manufacturers for the sale of licenses to use DOS and Windows and lighten up the terms of its non-disclosure agreements for testers of its pre-release software.

In order to comply with the terms of this agreement made under the consent decree it signed with the US Department of Justice, Microsoft is now having to offer less constricting agreements to manufacturers when they license MS-DOS (so that MS-DOS competitors such as IBM PC-DOS and OS/2 Warp V3 can be used instead).

If you bundle all those factors together — and consider the fractured history of the current version of DOS (which has been offered in four different versions over the past year as Microsoft first fixed some technical problems and then changed DOS due to the loss of a lawsuit filed by Stac Electronics) — IBM's chances to succeed with OS/2 Warp V3 looks better than ever. ❑

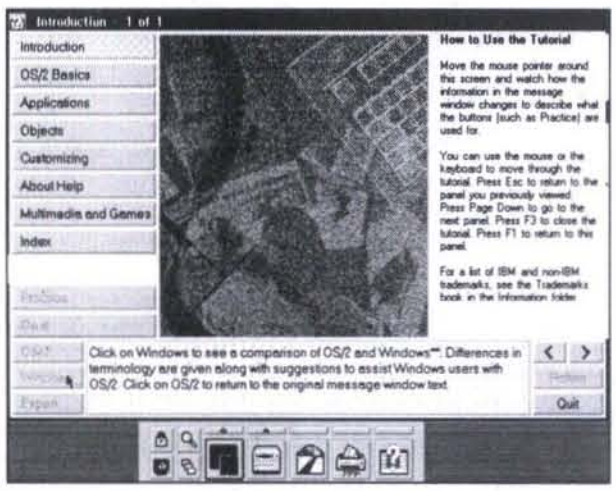
— GW

NEW RELEASE

OS/2 Warp V3 Arrives With Internet Boarding Pass

BY GEOF WHEELWRIGHT

With the release of a completely overhauled OS/2, IBM is launching an all-out, take-no-prisoners assault on the desktop operating systems market.



How to Use the Tutorial Screen Shot

Known simply as OS/2 Warp V3 (and developed under the code name Warp), IBM's latest operating system revision will run on only 4MB of memory and be sold ready-made to provide its users with immediate access to the Internet global computing network. Included will be free registration and 10 free hours of access to IBM's existing worldwide Advantis network (available in Canada beginning Nov. 1). Upon registration, users will get at least 40 hours of access time per month at a flat rate of approximately $25 per month via either local phone or 1-800 number access.

IBM says Advantis already has the necessary number of telephone lines established in 11 countries to handle the expected 10 million users IBM is counting on signing up in the next 12 months via OS/2 Warp V3 purchases. In fact, this ambitious Internet join-up plan — which will also include IBM WorldWide Web access software, IBM Gopher client software, a NewsReader utility to quickly scan Usenet conferences and worldwide Internet e-mail, telnet and FTPPM services in the price of purchase — will be an integral part of selling OS/2.

The new OS/2 will be available in four versions to address desktop, network client and high-end server markets. The most basic versions of OS/2 Warp V3 — known as OS/2 Warp V3 and OS/2 Warp V3 for Windows — include all these Internet access and utility functions as part of the OS/2 Warp V3 BonusPak and will sell for only $129.95. The operating system will be sold with the tag line "OS/2 Warp Version 3 is your ambassador to the global community along the information highway."

There will also be an OS/2 V3 LAN Client for networks that sells for US$129.95 and an OS/2 V3 Server for US$795. These are to be joined later by versions that support Symmetric Multi Processing (SMP), run on the PowerPC platform and provide "superserver" capability. But the lion's share of the company's marketing efforts will initially go into selling the base version of OS/2 Warp V3 as a way to get on the "information superhighway".

According to Wally Casey, IBM Personal Software Products director of marketing, IBM is keenly aware of the momentum behind the information highway and wants to associate the company very tightly with that growth — and educate them at the same time.

"The information highway is probably the hottest topic in the market today, yet people have no idea what it is," he says. "The Internet has become an arcane thing with a million people joining every month, but 400,000 falling off the other side because it is too hard to use."

Casey says the IBM Information Highway will have "on-ramps" available in major metropolitan centres worldwide, "and we will spend tens of millions of dollars in the first 90 days publicizing this. We will be advertising in People magazine, Time magazine, on billboards, in movie trailers, inflight magazines, and even consumer titles like PC Gaming World. In each ad, we want to tell people to get on the information highway via the IBM information superhighway. We will make it (OS/2) synonymous with the information superhighway."

At press time, IBM was also negotiating with modem manufacturer USRobotics to provide a coupon to go into the OS/2 Warp V3 box that would allow OS/2 buyers to purchase a V.Fast 28.8 high-speed modem for less than $150. In addition, all of the access nodes on the Advantis network are equipped from Day One to communicate at this high speed. "We have done the best we know how to make the Internet more attractive to end users," says Casey. ➤

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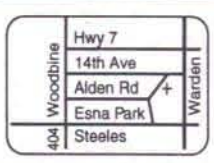

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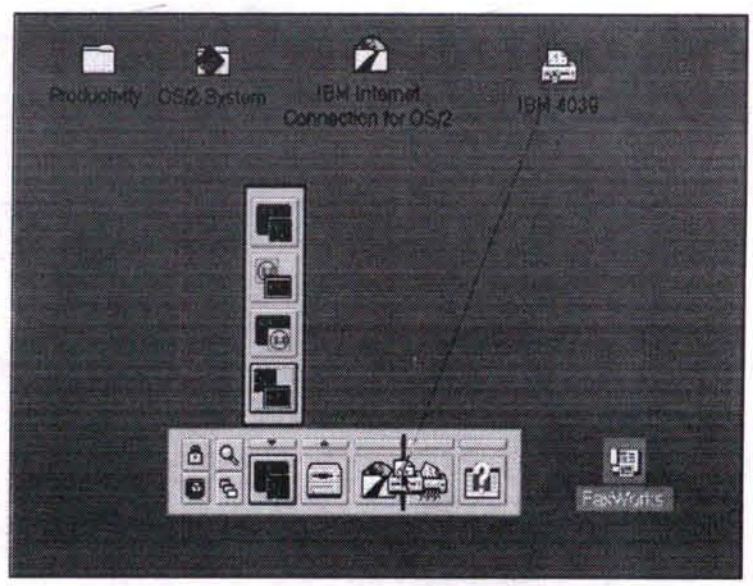

Launch pad screen shot

CompuServe users will also be happy to note that IBM is including a free copy of CIM (CompuServe Information Manager) for OS/2 with OS/2 V3 so that CompuServe users automatically gain access to a full, 32-bit connection communications package designed for use with their existing information service.

Gamer's Delight?

IBM also recognizes that as part of its effort to provide greater appeal to home users, it needs to get closer to the games and entertainment market. One result of this is that the company commissioned some new games for OS/2 V3 - the most notable of which was a native OS/2 version of the three-dimensional Doom "shoot-em-up" game from ID software.

The company worried, however, that it could be taken to task for inciting young children to play violent computer games and backed off the idea of including Doom for OS/2 in the box. Instead, Doom will be available as shareware on the Advantis network and will be downloadable by all OS/2 users who register on the network.

Further to its games software commitment, IBM recognized that the vast majority of popular PC games still run under DOS and wanted to "tweak" the operating system so that it did a better job of running them. As most DOS games are memory-hungry and require the loading of the minimum possible number of other external drivers, IBM tested the top 100 DOS games running in DOS sessions under OS/2 and put together settings that allow each of these to run in optimally set DOS environments when run from OS/2.

"We can't afford to miss those guys (who use PCs for playing games)," explains Casey. "And since most DOS games are pretty crappy under Windows, we thought 'wouldn't it be really cool if OS/2 ran DOS games better than Windows'."

Reserved Seating For OS/2 Apps

Finally, IBM also realized that a perceived lack of native-mode OS/2 applications had held users back from buying OS/2. There are only so many people who will buy OS/2 to run Windows applications. The rest will have to be sold on the merits of OS/2 as a platform for running OS/2 applications.

So, not only is IBM including a huge number of bundled applications as part of the "BonusPak" that comes with all versions of OS/2 Warp, but it is also putting together a plan that will see the company "buy" shelf space from PC dealers for the display of OS/2 applications. OS/2 will ship with a complete integrated software suite (previously sold as IBM Works in Europe and Footprint Works in North America), a personal information manager with phonebook, fax links and cover sheets, and Hilgraeve's HyperAccess terminal emulation (the basis for Delrina's WinComm Pro and also for the HyperTerminal application being developed for Windows95).

To convince users that there really is lots of third-party OS/2 software, IBM will pay retailers an unspecified amount of money to set aside shelf space to display OS/2 applications software and utilities near the OS/2 section in their retail outlets. The company is hoping that this will help it overcome problems that in the past, have caused OS/2 itself to be available, but not the applications to go with it, with retailers saying that they couldn't afford to carry OS/2 applications until there were more OS/2 users and potential OS/2 users saying that they wouldn't buy OS/2 because there were no applications available for it.

IBM also expects computer manufacturers to be much more receptive to the idea of bundling OS/2 — rather than DOS and Windows — with their PCs now that Microsoft has signed a consent decree with the US Department of Justice eliminating its practice of "per processor" licensing, under which many manufacturers signed low-cost deals for licensing DOS on their PCs. It meant that they would pay Microsoft a royalty for every PC that they sold that was capable of running DOS, whether or not it was actually loaded onto the PC.

Since the Microsoft consent decree, IBM reports that is has signed CompuAdd as a customer for preloading OS/2 Warp V3 and Wally Casey suggests that this is only the beginning. He also admits that IBM is willing to sacrifice OS/2 licensing revenue to win the market share battle of the desktop with Microsoft.

"We are not allowing OEMs to have financial or other barriers to preloading OS/2," he says. "And I have been asked by my sales team for some extraordinarily aggressive things (for OEM customers)."

These include allowing customers to brand their own versions of OS/2, have their own install routines, and make whatever custom changes are needed to make OEMs comfortable with buying OS/2. "We are prepared to win this battle by selling shrink-wrapped packages one at a time. But where we can, we want to get it pre-loaded before people buy their PCs," concludes Casey. ❑

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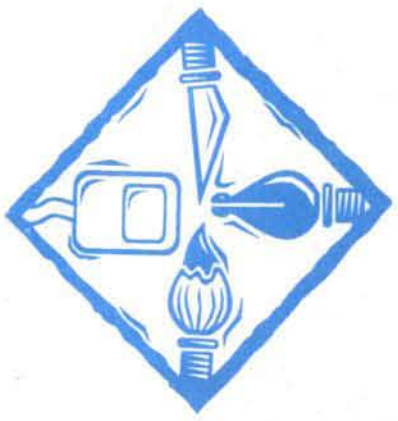
DESKTOP PUBLISHING

DTP versus WP

BY GEOF WHEELWRIGHT



It used to be that if you wanted to flow text around graphics, or have a headline at the top of a page in a different typeface, or include photos in a document, or rotate text — and then see exactly what that document would look like on-screen before it was printed — you had to have a DTP system.

There was simply no other way of doing the job. But anyone who makes a living by selling desktop publishing systems is in for a challenging time over the next couple of years. DTP software publishers are finding themselves squeezed at the low-end by Windows-based word-processors with many layout and graphics-handling features (such as Microsoft Word for Windows 6.0, WordPerfect for Windows 6.0 and Ami Pro for Windows 3.1) and at the high-end by electronic publishing systems (such as Atex and Interleaf) that are moving "downmarket."

These days, a good Windows word processing package is as good — if not better — at handling the day-to-day document production requirements of most users. It is only a select few who now really require the kind of precise and delicate control that something like PageMaker, QuarkXPress or Corel Ventura offers.

Publishers of many word-processing packages suggest the reason people bought DTP five years ago was that they wanted WYSIWYG (What You See Is What You Get) output. That's one of the reasons why the Macintosh was embraced early on by DTPers. Now that everyone using a PC has WYSIWYG available to them through Windows, the marketplace is changing dramatically. So the role and function of the high-end DTP applications is increasingly becoming that of a niche market.

DTP producers, meanwhile, have often taken the view that the DTP package and word-processor will never meet — that the fundamental architectures and paradigms used by them is so different the those who really want DTP will never be swayed to word-processors.

For them, DTP is still the system you purchase for your computer to mimic professional typesetting and printer equipment. It is for producing documents ranging from a neighborhood newsletter up to a professionally laid-out magazine or even an entire book.

And, according to this view of the world, you need to be willing to spend time learning basic publishing skills including lay-out of columns mixed with pictures, use of fonts (the whole appearance of the letter including the size of the printed character, the typestyle and typeface) to be your own publisher. In other words, you have to be a one-person art department, typesetter, editorial consultant and general all-around publisher.

This vision of computer-based layout and design work, however, fails to take into account the vast range of features built into today's word-processors that bypass the need for many traditional layout and publishing skills.

Ami Pro 3.1

One of the first to build such features into a Windows-based word-processing package was Lotus Development's Ami Pro (available either on its own or as part of Lotus SmartSuite). Currently released as Ami Pro 3.1, this product uses a layout metaphor that is much closer to Quark Xpress than old-style DOS word-processors such as WordStar or WordPerfect for DOS.

To start with, Ami Pro offers very fine control over things such as creation of multiple columns and running text around graphics. In addition, freehand drawing tools are included directly in Ami Pro that use Bezier curves, boxes, arrow heads and provides fill with patterns or one of 16 million colors. You can also rotate text or drawings to any degree with Ami Pro.

In order to insert these drawings — or charts, tables, equations or scanned images — in a document, you must first create a "frame." Having created the frame, you can then resize and position it. When you've got it where you wanted it, you can then insert whatever you like in the frame.

You can insert text in the frame to create a headline or 'cross-head.' There's also a scientific and equation editor that displays all equations WYSIWYG style, including a full range of mathematical/Greek characters. Based on the TeX equation language, Lotus says the Ami Pro equations editor can be used to "create virtually any scientific or mathematical equation."

Equations are not the only things you can insert in frames. Tables — comprising anything from complete databases to the named range of a spreadsheet — can also be inserted in a frame. If, for example, you insert part of a Lotus spreadsheet, you can still move around it as if it was still a spreadsheet. You can even use the Add function to total up columns from the spreadsheet after they have been inserted as a table.

In addition to its ability to handle newspaper-style columns and the insertion of almost any form of text or graphics in frames, Ami Pro also includes a variety of pre-drawn images in its built-in, 100-symbol clip art library.

And if you don't like the images it offers, a quite comprehensive set of import facilities is provided — allowing you to insert TIFF, CGM, PCX, HPGL, EPS, WMF (Windows Metafile) and clipboard images. If the imported image is a TIFF file, you can also play around with it in Ami Pro itself, adjusting contrast, brightness or the smoothness of edges within the image itself.

The frames into which you insert these images can also be represented in a wide variety of ways. Using options on the Frame pull-down menu, you can add background shades and colors to frames and provide the frame itself with rounded corners or automatic drop-shadows.

And, correcting something which has always been an annoyance in Windows word-processors, you can actually adjust graphic images on-screen, within your document - cropping, reducing or enlarging them as necessary.

Finally, you can even do some things in Ami Pro that PageMaker for Windows refused to do until recently, such as rotate text or graphics in single degree increments.

The similarities to desktop publishing packages do not end there, however. Ami Pro provides a number of document views, including a draft mode for basic text editing and a layout mode that allows you to see that page exactly as it will printed and work on it at the same time.

Until Ami Pro came along, most Windows WP systems only allowed you a preview mode to see what the page would look like when printed.

The real innovation here is that you can actually conduct editing and layout work on the document in one or two page views (i.e., the equivalent of PageMaker's Fit in Window option). Until Ami Pro came along, most Windows WP systems only allowed you a preview mode to see what the page would look like when printed. But you would not be make any changes to the page while previewing it.

That being said, if you find Ami Pro a little slow when running in anything other than draft mode — perhaps due to running on an older PC — Lotus does provide several preference options to minimize this problem.

The default setting of the system, for example, is that when you place graphics onto a page, they will automatically be displayed inside the frame in which you have placed them. But if you have placed a complex graphic or are running Ami Pro on a slower PC (or both), you may want to set preferences so that the graphic is not displayed while you're still editing your work.

With the extent and flexibility of Ami Pro's layout facilities, it is fair to say that anyone with a need for DTP-style power in a word-processing package might be the first candidate to use the package.

The final issue facing anyone who might want to use Ami Pro in this way in a large organization is that they often will need to produce large documents or reports. The business of producing tables of contents, chapter headings and page numbering can be a pain. This is particularly true when different people author different parts of the report.

In most word-processing applications, you would have to collect all the documents from different users into a single file in order to carry out indexing, creation of tables of contents and page numbering. Ami Pro, however, has a master document feature which eliminates the need for this.

Chapters of a book, for example, can be kept in separate files and the master document function will manage the rest. It even has hot links such that if you insert a new graphic or chart in your text and have a list of illustrations in your table of contents, that will automatically be updated as you carry out the insertion.

Word For Windows 6.0

In Microsoft's Word for Windows 6.0, meanwhile, layouts with newspaper-style multiple columns are easier to work with, easier to change and easier to understand than in previous incarnations of Word.

Starting a new document with multiple columns is now simply a matter a clicking on the columns button on the standard Toolbar. Once you click on this button, you just drag the mouse to the right to select the number of columns you want to be used in the document. Highlighting three columns, for example, will immediately create a three-column document.

It may well be, however, that you don't want columns of uniform widths; that you would prefer a layout with, for example, two wide columns and one thin column. If that's the case, a better option is to simply switch to page layout view and then drag the column markers on your ruler until the column widths are what you want them to be. Use the increments on the ruler to make sure that the columns are the dimensions that you want them to be.

If you want to be more precise, select the Columns command from the Format menu and enter manually the width and spacing details in the Width and Spacing section at the bottom left-hand of the box. These allow you to be highly-specific about the widths of your columns.

There are a few tricks to working with multiple column documents in Word for Windows 6.0. The first is to remember that, in the most basic multiple-column layouts, all the text is "connected". This means that if you add some text to the first column, all the text in the second and third columns will automatically be moved down the page to accommodate the change.

Secondly, if you want to have text that will stay in one place no matter what happens to the rest of the multiple-column layout, it makes sense to use Ami Pro-style frames. Frames are "boxes" that contain text or graphics - and the information contained

➤

within the frame doesn't change, no matter what changes you make to the surrounding layout.

A good use for such frames is to place pictures, diagrams or "boxed" text on a page. It can even be useful to put headlines in a frame so that they can be edited and changed independently of the rest of the multiple column layout.

To put existing text in a frame, simply highlight the text, select the Insert menu and choose the Frame command. A frame will then be drawn around the text and that text can then be changed, edited, resized and moved around the page without impacting the underlying multiple-column layout.

The other thing you will notice about framed text on a multiple-column page is that the multiple-column text will automatically wrap around the framed text - no matter what shape you make the frame. Frames also have properties that determine whether they use a border, whether there is any shading inside the frame and how much space is to be left between the edge of the frame and the multiple-column text beside it.

Frames on multiple-column pages, however, are not just free-floating pictures and bits of text. They can be quite rigidly tied to certain parts of a page - and aligned quite precisely. To change the alignment of a frame on the page, select the Frame, then the Format menu and then the Frame command.

This Frame dialog box gives you the opportunity to change the method of text wrapping, the size and height of the frame (which can be expressed quite precisely), the horizontal and vertical position of the frame - relative to both columns and paragraphs - and whether or not you want the frame "anchored" to a paragraph or a page. If the frame is anchored to a paragraph, then it will always stay with that paragraph - no matter where on the multiple-column layout that paragraph ends up moving to.

Using the multiple-column capabilities of Word for Windows 6.0 — along with its ability to flexibly handle frames containing both text and graphics — it is relatively simple to design page layouts with variety and flair. Most of the basic capabilities of desktop publishing packages can be carried out by using these functions making Word for Windows 6.0 and appropriate vehicle for designing newsletters, flyers, menus, and simple brochures.

WordPerfect For Windows 6.0a

WordPerfect for Windows handles the insertion of frames (which it calls graphics boxes) and multiple columns in much the same way as Word for Windows.

The primary method for controlling your use of graphics boxes in WordPerfect, however, is three different sets of toolbars. The top toolbar is the standard Button Bar, below that a Power Bar offers control of layout of tables, sizes of font used, cutting, pasting and so on. Finally a graphics box feature bar allows you to put captions on your graphics boxes, change their position, size, borders, content and the styles which can be applied to them.

It should also be mentioned at this point that any of the above-mentioned word-processing packages can achieve some quite credible desktop publishing results without having to get into the intricacies of multiple column layout and frames (and/or graphics boxes) by simply using one of the many document templates which come with the package.

These are particularly good in WordPerfect and are known as ExpressDoc templates. They are a series of several dozen interactive template documents (70, actually) that can get you working with standard layouts quite quickly.

WordPerfect provides template documents for six different document categories including secretary and administration, business, Home, Education, Calendars and Legal. In terms of anything that actually smacks of standard desktop publishing and layout work, there are really only two templates that make extensive use of multiple columns and they are both styles of business newsletter.

WordPerfect's TextArt takes type manipulation in a word processor to new heights. If you've seen Aldus TypeTwister or some of the text manipulation features in CorelDraw, you'll understand what this WP feature allows you to do. With TextArt you can manipulate the shape of letters and words in all manner of ways, skewing their alignment; twisting, stretching or otherwise transforming their shape; and filling them with patterns.

Conclusion

It should also be made clear, however, that as the work gets more complex, word-processing packages become less and less suitable for such tasks. Documents with many small boxes of text, lots of graphics and complex layouts are still better handled in packages such as PageMaker and Quark Xpress. ❑

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DESKTOP PUBLISHING

DTP Software: The Right Tool, But for What?

BY DAVID TANAKA

What's desktop publishing? That's easy, putting text and graphics on a page, right?

A decade ago this basic definition pointed to a revolution in what personal computer software could do. Now, any old word processor will allow you to include pictures, diagrams and charts in your document. If you already use DTP software, you know what benefits it offers. However, if you are wondering whether you should trade in your trusty word processor and enter the "real" world of desktop publishing, here are a few guidelines to help you make an informed decision.

Text Streams

As the number of sources of text increases, the easier it is to accomplish the layout task with DTP software. If you compare a word processing file to a DTP file, you'll see a fundamental difference. The word processing file is a single text stream, whereas the DTP file comprises many text streams. When we lay out *The Computer Paper*, for example, each article is a separate word processing file.

The difference becomes significant when you want to make changes to a tentative layout. Suppose you have been using your word processor to produce the company newsletter. You've created the main newsletter file by merging the president's monthly message, the results of the annual charity fund drive, departmental reports, personnel changes, etc., into your word processor. Then you applied a variety of formatting styles so that you have nice, big headlines, columns for the body text, and borders around the pictures or charts.

So far, so good. Then the boss comes in and says he wants to add two paragraphs to the president's message. You add the text and then realize that the extra text has displaced the headline for the next story. Not a problem, you can make adjustments. But suppose you have everything but the president's message, and you don't know how long it's going to be, even though you know it has to start on page 2. Or maybe you are dealing with two vice presidents and the controller who all want last minute changes. You'll eventually reach a point with a word processor where revisions alter your text stream so radically that your entire layout is no longer workable.

In a DTP package, you can lay down the stories in any order, and because the president's message is in a different file than the controller's report, changes to one won't automatically alter the layout of the other. Of course, you'll still have to deal with the president's late message and last minute changes to the submissions, but hey, isn't that why you love your job?

The suitablity of a DTP package over a word processor has less to do with the length of your document and more to do with its complexity. If you have a long report with multiple chapter headings and subheadings, for example, a word processor will work admirably to format it.

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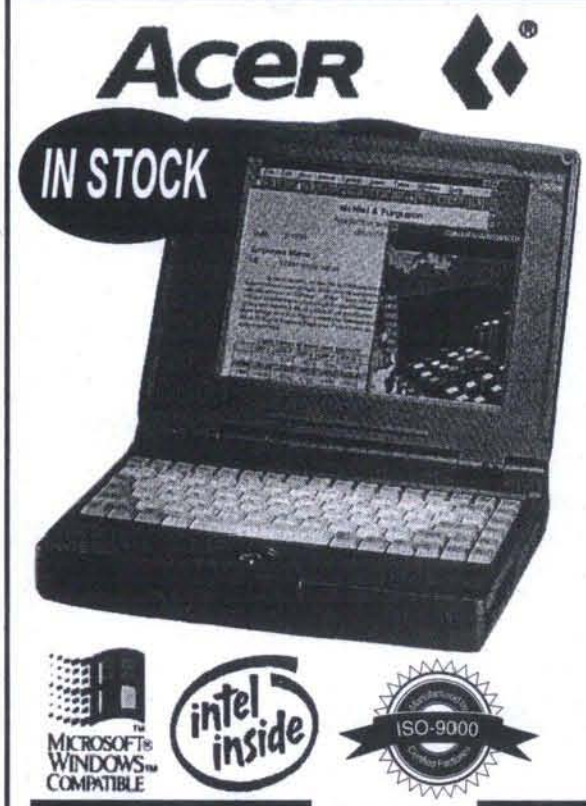

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processor that uses frames, you might be able to accomplish a similar look, but a DTP package is much better at placing text blocks precisely.

Type Control

Most word processors allow you to specify type size in points, just as you would in a DTP program (a point equals approximately 1/72 of an inch). However, word processors still retain the interline spacing convention from the days of the typewriter — single spacing, double spacing, etc. DTP software uses the spacing conventions — and terminology — from typesetting. This allows you greater control over the amount of space between lines, as well as between words or between individual characters.

Setting type in an attractive and easily readable format is an art in itself, and if you want to treat your text as a design element, a DTP program is the only way to go.

Publication Format

Word Processors are geared for printing out documents in office-type formats: letter or legal-size paper, envelopes, labels, etc. DTP programs will handle larger types of paper — WordPerfect will allow a paper size of up to 27-by-27 inches, compared toPageMaker 5's maximum size of 42-by-42 inches, for example — but unless you have an extra wide printer or a plotter, you may find it difficult to print a document with those dimensions. Designers often send their large-page DTP files to a service bureau, which can output larger page sizes. If you send a file created in your word processor to a service bureau, you may find them unable or unwilling to deal with it.

Color

The ability to deal with color is one of the key features that distinguishes high end DTP programs from word processors. "Dealing" with color usually means preparing a file so that a printer or service bureau can create color separations from which color printing plates are made to print each color. The latest versions of high-end DTP programs like QuarkXpress or PageMaker include better color handling and are far more capable of dealing with color than a word processor

Which DTP Tool?

At the high end, two packages rule the DTP roost — QuarkXpress, now in version 3.3 and PageMaker 5.0. These are available in both Windows and Macintosh versions, and both packages claim that the file formats are interchangeable between Windows and Mac versions. These have undergone only minor changes since they were last reviewed in our August '93 issue.

FrameMaker, once a program for Unix users, now has Windows and Macintosh versions that all share a common file format. (See "The Three Faces of FrameMaker 4" in April '94 TCP). Intergraph has also introduced a Windows version of its workstation DTP application.

However, unless you plan to design sophisticated layouts, send most of your files to an imagesetting service bureau, or design coffee table art books, a low-end desktop publishing package will meet most of your needs. A number of entry-level DTP packages provide most of the functions of the big ones, but at less then one-quarter the cost. Among these are Aldus Home Publisher for the Macintosh, reviewed in this issue, and Microsoft Publisher and PFS:Publisher for Windows (See "Two for the Page: Low End Desktop Publishing" in July '94 TCP). One advantage of these entry-level packages to beginner desktop publishers is the inclusion of pre-formatted designs. HomePublisher includes 50 AutoCreate templates, while MS Publisher has Page Wizards, for example. ❑

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GRAPHIC UPDATE

Photoshop Power-PC Accelerator

Adobe has released version 1.0.2 of the PowerPC Accelerator plug-in for Adobe Photoshop 2.5.1. The plug-in replaces the entire Photoshop image-processing engine with native Power PC code. Using this plug-in, Photoshop users with Power Macintosh computers should realize speed gains of 1.5 - 4 times over a Quadra computer (for in-memory images). The update is available on major on-line services, including GEnie's DTP roundtable, accessed by typing "DTP" at any GEnie prompt.

The update also includes a Power Mac-compatible version of DirectCursors, a PhotoShop plug-in that modifies how the Macintosh draws some cursors, such as the lasso, to make them easier to see when moving over middle gray areas when the monitor is set to either thousands or millions of colors. The "DirectCursors 2.5.1 PPC" plug-in fixes incompatibilities between the "DirectCursors" plug-in and Power Macintosh computers. — (GB)

DESKTOP PUBLISHING

Aldus HomePublisher

BY GRAEME BENNETT

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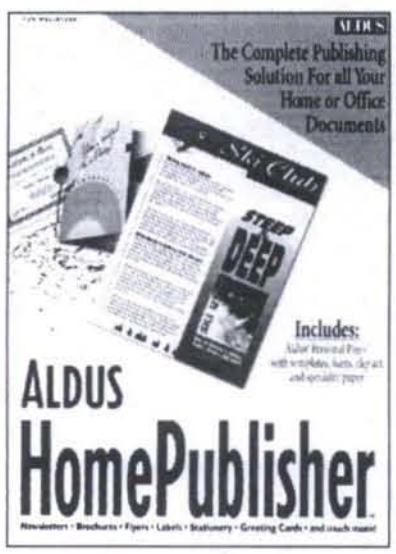
Requires: Any Mac with 2 MB or more RAM and a hard drive.
Summary: A killer deal

It's hard to complain about the Aldus Home Publisher package. For a measly $49.99, you get 12 good-looking Bitstream fonts, 100 pieces of clip art, a package of fancy paper for printing on, including preperforated color business card stock and letterhead paper pre-printed with full-color background and border textures, plus envelopes and a variety of coupons to get more paper, fonts, clip-art and so on at substantial discounts.



Oh yeah, there's a desktop publishing program in here too — version 2.0 of Aldus' Personal Press. PP is a program that is more than enough for the casual DTP'er, and used to sell for much more than the price of this whole package.

PP includes numerous templates for simplifying the creation of many common kinds of documents: brochures, newsletters, envelopes, etc. The program has a feature called AutoCreate Templates that further streamlines the page creation process.

There's extensive on-line help and a series of tutorials in the manual to get you up and running, and a 100,000 word spelling checker and a 660,000-word thesaurus to help you get the wording right.

The program can also create spot color separations and includes the ability to make rudimentary changes to grayscale images, in much the same way PageMaker does. One of the package's best features is its Advanced Halftoning ability. This feature, which can be used with any printer, creates much better grayscales than those normally possible on a standard 300-dpi laser or inkjet printer, greatly improving the printout quality of scanned images. It's almost as good as the enhanced grayscale output of an expensive laser printer.

If you are a Mac user who can't afford a program like PageMaker, or you just want to get your feet wet in the waters of DTP, this is a great place to start. ❑

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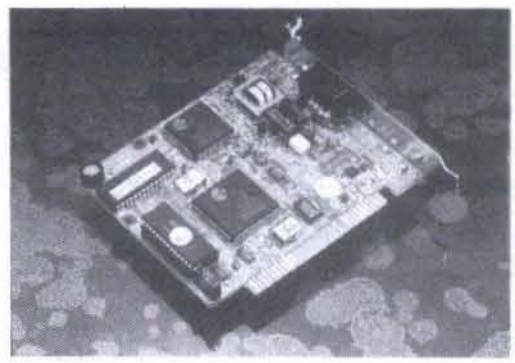

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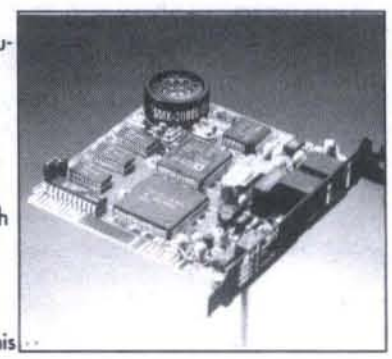
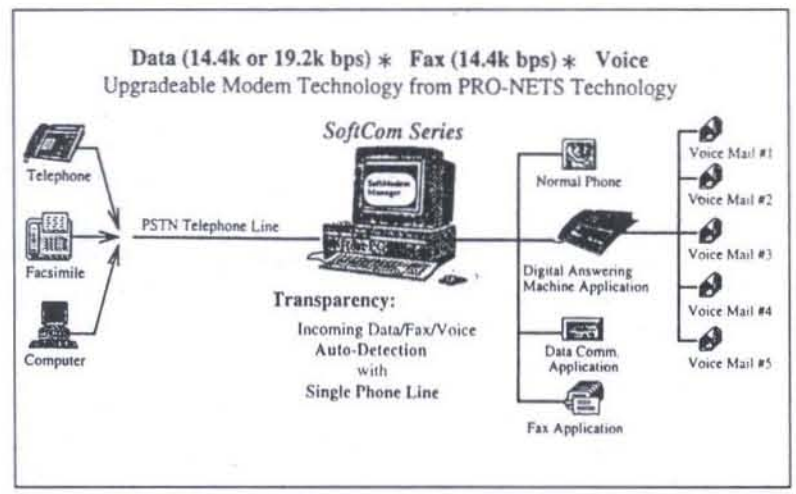


because it uses a RAM-based DSP (Digital Signal Processor) architecture, instead of an EPROM-based system. This design reduces the overall system cost by using on-board RAM and integrating formerly separate hardware functions into a single piece of DSP code.



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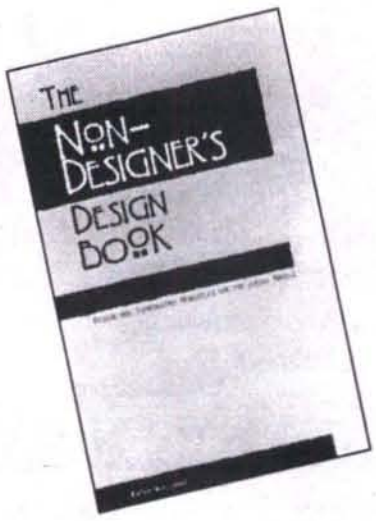
BOOK REVIEW

A Must-Have for Aspiring Designers

BY GORDON GOBLE

Title: *The Non-Designer's Design Book*
Author: Robin Williams
Publisher: Peachpit Press, Inc.
Price: $20.95



With no more than a decent computer, a few quality peripherals and two or three software packages, anyone with designs on design has all the necessary tools to create in a few hours what may have taken a team of artists and typesetters several days just a decade ago. Painstaking paste-up work is but one of the frustrating and tedious tasks that have been all but eliminated as amazing programs work with lightening fast speed and accuracy to provide even the artistically bankrupt with an awesome arsenal of design and typographic possibilities.

But just as putting a million dollar IndyCar in the hands of a student driver is most surely not a promise of success, even the best desktop publishing equipment, no matter how much it has streamlined the entire procedure, can't guarantee a pleasing, eye-catching finished product.

The fact is that the fundamental nature of good design has never varied, and purchasing the right tools for the job is just the start. Just because a person has access to monsters such as CorelDraw 5 and a Pentium-based computer, does not mean he/she can turn out great work. Yet more and more often, nervous rookie designers are being asked to do so.

Frazzled neophytes take note — there is hope. Into this over-equipped, untrained environment strides a superb new primer on the subject of good design, *The Non-Designer's Design Book (Design and Typographic Principles for the Visual Novice)*. The book is penned by Robin Williams (no silly, not *that* Robin Williams, *this* Robin Williams taught traditional and electronic design for 12 years before funneling the essentials into this highly digestible publication). *The Non-Designer's Design Book* is targeted for those among you (and you know you're out there!) who posses only scant traces of designing aptitude, yet want your finished product to have at least some sort of visual appeal.

The Non-Designer's Design Book works. It won't teach the intricacies of a computer or specific software, but it will spell out the conventions that must be adhered to in order to build that brilliant brochure, beautiful business card, mouth-watering menu, lovely letterhead, or virtually any printed item. Well-written with generous doses of humor, plentiful "before and after" examples, and a distinct lack of triviality, *The Non-Designer's Design Book* exudes the author's joy in its compilation, and that translates well to the reader, who will then read with more enjoyment and ingest some hard-hitting designing essentials along the way.

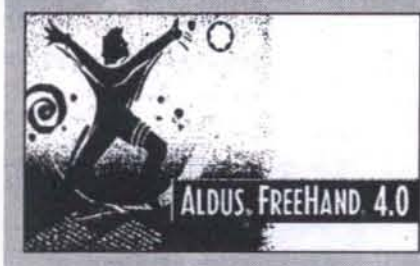
The book is based on Williams' four basic elements of good design: Contrast, Repetition, Alignment, and Proximity, all of which make a great deal of sense. Williams tells us pearls of wisdom, such as : "Never centre a headline over flush left body copy," "Nothing should be placed arbitrarily on a page," and "Everything (on a page) should have a visual connection with each other," and supplies the examples to back these and dozens of other suggestions.

We are warned that if two (or, perish the thought, more than two) typefaces are used on a page, we should make darn sure there is a **distinct** difference or contrast between them (an excellent principle that is often ignored), or that if we're going to indent, indent just two spaces, *not* the five spaces we learned on our high school typewriters. One of my personal pet peeves, "trapped white space," is dealt with in detail, and Williams explains critical design facets such as the difference between good and bad white space with clarity and intelligence. (Although in the "Geez, how picky can you get?" category, it is ironic in a book such as this to see the extra space between the words "doesn't" and "take" that occurs on page 27, line six.)

Published mere months ago by famed Peachpit Press, and still fresh on the shelves, *The Non-Designer's Design Book* comes complete with a number of intriguing exercises and quizzes, a strong bibliography of additional reading materials that Williams states are indispensable, and a list of the actual typestyles used in the book, including their names and point size. More fun than a barrel full of fonts, and a great "instruction manual" to design and typography, *The Non-Designer's Design Book* is required reading for anyone with designs on improving their printed image. ❑

GRAPHIC UPDATE

Aldus Updates FreeHand for Mac



Aldus has released an update to FreeHand 4 for the Mac. Available on on-line services (we found it in GEnie's DTP roundtable, accessed by typing "DTP" at any prompt), the Aldus FreeHand 4.0b updater installs a set of enhancements that speeds up selection and transformation of an object or a group of objects. The enhancements improve the performance of transformations by approximately 700% over Aldus FreeHand 4.0 or 4.0a. — (GB)

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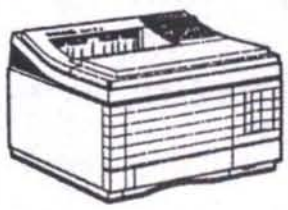

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DESKTOP PUBLISHING

A Desktop Publisher's Resource Guide

BY GRAEME BENNETT

The following are some products that have crossed our desks in the past few months that may be of interest to electronic publishers, designers and computer graphics enthusiasts.

Books & Magazines

Step-By-Step Electronic Design — This will be of interest to users of Illustrator, FreeHand, Photoshop, PageMaker, QuarkXPress and other popular graphics apps.

Subscribe to this monthly newsletter by calling 800-255-8800.

Before & After — Probably the single best investment anyone using PageMaker and FreeHand can make, this full-color newsletter is chock full of intelligent advice and design tips. Strongly focused on Aldus products, the basic principles nevertheless apply to other similar applications.

Subscribe by calling 916-784-3880.

Dynamic Graphics Designer's Club — This is graphics service that supplies EPS graphics on disk, plus an interactive how-to magazine on CD-ROM. Per month, a subscription yields over 55 EPS graphics on CD-ROM or floppy disks, "Ideas and Images," a newsletter full of tips and tricks, the Idea Source CD-ROM, a printed pictorial index and a catalog in Aldus Fetch format. New subscribers also receive a desktop storage box and a binder.

Using a program such as Illustrator, FreeHand or CorelDraw, each element within an illustration can be rearranged, expanding the possibilities. Currently available for Mac only; the company says a PC version is coming soon.

Call Dynamic Graphics at 309-688-8800; fax 309-688-3075

Fonts

Monotype Fun Fonts PostScript for Macintosh — Monotype is one of the leading suppliers of high-quality fonts. This package consists of 25 high-quality scalable fonts, including several "Art Fonts," providing over 500 interesting icons with themes ranging from "A" (almanac) to "Z" (zodiac). The package also includes some display face standbys such as Gill Sans Ultra Bold Condensed and 20th Century Ultra Bold. These bold faces are just the sort of thing needed to fill the most glaring gap in the font collections that ship with most laser and inkjet printers — the sans serif boldfaces (Helvetica Bold, etc.), aren't all that bold. Being PostScript, Adobe Type Manager is recommended for improving the display of on-screen type and output to non-PostScript printers.

Monotype also offers the **PostScript Value Pack**, with 57 faces, ranging from classic text families such as Baskerville, Arial and Times New Roman (Monotype licensed these and numerous other faces to Microsoft for inclusion in Windows), as well as a number of useful display and script fonts. The large number of variations present in the Arial family makes it a particularly useful addition to the publisher's toolkit. It's not how many fonts you have, it's how many well-rounded font families you can put together. This package goes a long way to filling the gaps. The package includes a 36-page guide, "Designing Business Documents."

For more information on Monotype fonts, contact Mike Watson & Associates, 604-925-1141.

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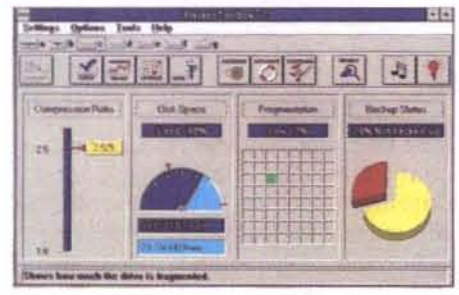

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CD-ROMs

Marbled Paper Textures from Artbeats is a collection of three — count 'em — CD-ROMs that, in a word, are gorgeous. We've used Marbled Paper Textures on several covers of *The Computer Paper* (most recently, in August, 1994, for the blue bars alongside the main illustration); it's one of our favorite titles. Image quality is excellent and the $399 package comes with a handy pictorial quick-reference card showing all of the images. The discs include both high-res and low-res versions of the textures, as well as a number of attractive EPS borders, bezels, and buttons.

Artbeats, 503-863-4429; fax 503-863-4547.

Training

Adobe Classroom in a Book — Adobe Illustrator for Macintosh is a workbook suitable for classroom learning environments. There are several titles in the *Classroom in a Book* series, covering Adobe products such as Illustrator and Photoshop, with lucid examples and solid training methodologies. The books include a CD-ROM disk, containing materials required by the course, as well as a number of "Adobe Teach" (QuickTime) movies.

We looked at the Illustrator course book and were impressed by its layout, scope and style.

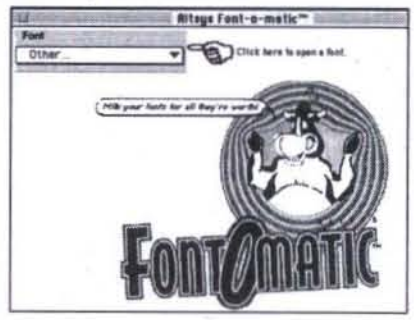
Adobe supports its products on CompuServe (GO ADOBE). There, we found out that one of the tutorials in the book doesn't work as described — oops! Nevertheless, we expect these books to be showing up in schools and computer graphics training courses as educators begin to realize the synergistic learning environment that book-and-CD-ROM training combos make possible.

Software

Aldus TypeTwister for Windows or Macintosh. Now bundled with all Aldus products for Macintosh, Type Twister is similar to Letraset's now-defunct LetraStudio, Broderbund's TypeStyler, and, to a lesser extent, Adobe's less-capable TypeAlign. Unlike its earlier kin, TypeTwister supports both cut-and-paste and OLE (Object Linking and Embedding), a Microsoft technology that makes it easy to insert TypeTwister creations into documents created with other applications, including word processors, DTP programs and presentation packages.

We're frankly a bit hesitant to recommend any font utility that, in the wrong hands, can create Truly Ugly results, but, what the heck. It's fun, it's cheap, and it's easy. TypeTwister includes 50 pre-set styles and doesn't require a PostScript printer. Just don't show your creations to anybody who designed the fonts you mangle, okay?

From Aldus, 1-800-333-2538



Font-O-Matic — If you liked the sound of TypeTwister, you'll love this one. How about a font utility that lets you put cow spots on your favorite typeface, or devastate the æsthetic sensibilities of the older generation by adding cactus spikes, shark bites or swiss cheese holes to your next headline font. If you're tempted, this one's for you.

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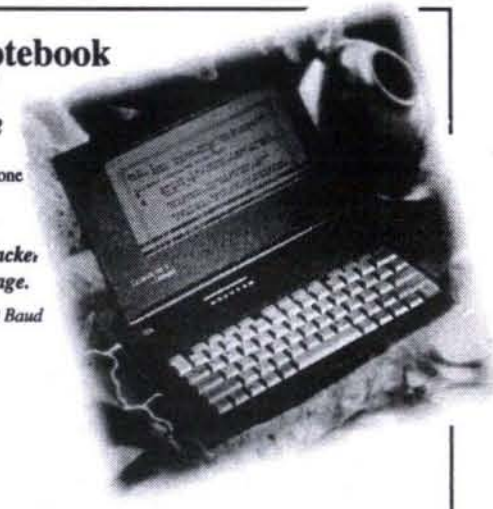

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3-D

TrueSpace for Windows

BY ERL TEICHROEB

Product: TrueSpace 1.02
From: Caligari Corporation,
1955 Landings Drive, Mountain View,
CA 94043. Phone 415-390-9600
Price: U.S. $795

I have to admit to a mixture of excitement and uncertainty on first hearing about TrueSpace. Its low price and utilization of Windows made me wonder whether it would live up to the reputation of Caligari Corp, the producers of well known Amiga software. That there is finally a low end animation package available for the PC is good, but the question is, how will a low end package compete with the high end software?

After some time with the software, I have been quite impressed with what it can do. Certainly, it cannot provide the power of high end animation, but what it does provide is quite surprising, considering its low cost and its platform.

Installation is simply a matter of typing install at the prompt, although, for some reason the manual says to look for a readme file on disk for installation instructions, which I never found. They could simply leave it out. I had no problems installing and setting up the program.

The first thing I notice is that the screen is reminiscent of high end SGI software — you are presented with a 2D grid base upon which the model building takes place. As you build your model you rotate, zoom, or pan the model and the grid it is resting on from the point of view of your eye, from the point of view of the center of the grid, or from the point of view of the model.

This is quite refreshing compared to many other PC based software packages where you often have to work with three or four different windows displaying top, bottom, and side views. When you move the grid/object you see it moving in real time, instead of a 3D axis as with other software.

The command icons can be placed where you want them, usually along the top or bottom of your screen, and they've been grouped in logical series. Many of them are utilized with a left button mouse click and lead to further subcommands or adjustable variables with a right button mouse click. Added views (top, bottom, left, etc.) can be arranged with extra windows which can be placed anywhere on the screen and easily accessed.

Modeling is where this software really stands out. TrueSpace has one of the best spline based/extrusion modelers I've worked with. You might start out with a primitive object, a box, let's say. Highlight one of its faces and twist, deform, scale, or move it with the mouse, (or numerically as you wish), then extrude it the distance you want. It's fun and surprisingly easy.

Organic shapes, one of the more difficult things for computers to define, become somewhat easier to create. Any one of the faces or objects can be subdivided with the click of the mouse button, for as many subdivisions as you want, allowing for further extrusions of individual faces.

A deformation lattice, also subdividible, can be called up to enclose the model. You can then pick faces or points on this lattice for deformations over a user selectable portion of the model. For me, this ease of modeling is easily worth the price of the package. Creating dimensionally accurate models is a bit more difficult. It can be done, but the modeler is best for freeform creation of organic objects, where accuracy is not much of a concern.

Other tools provide basics such as circular sweeps of objects and the creation of beveled edges. The basics for doing good texture mapping, animation, and lighting are provided with the same relatively quick and easy use, and rendering is done with a good raytracer. Mapping textures and rendering previews are easily done, although rendering isn't faster than most other renderers I've used.

The program also includes Boolean capabilities, but they operate only at 2d level. You build in 2D and extrude after.

A few textures and models are included to get you going. TrueSpace needs at least a 24 bit computer for reasonable work, and is even "Pentium optimized." My computer is still an 8-bit ISA variety. It is still usable, but the usual degradation of images happens and I had some difficulty reading the little icons and seeing the grid clearly, although the object being worked on was easy to see, as, I assume, it is vector based, rather than bitmap based.

Caligari has a BBS, which I accessed to download some patches. Since version 1.0. three (minor) patches have been issued.

There's one manual (and it's easy to read), a few tutorials to get you started and then a reference to all commands. Lots of screenshots help to make it very readable. As is always the case when you work from technical manuals and tutorials on your own, there may be times when you get a bit stuck or something doesn't work out as clearly as the book makes out it ought to.

This is not unique to Caligari's manuals, it is simply a bane of learning manuals on your own. I say this because most of you will be teaching it to yourself in this way, and so it might be helpful if you have had some prior experience in learning from manuals. But if not, it's still worth a go.

You can import and export cob (TrueSpace), dxf, and a couple of other 3D meshes, and it accepts many formats for bitmaps. They only provide you with a few texture maps, though, so you would definitely need access to other paint programs or files.

TrueSpace has a fairly quick learning curve, and, as already said, has a great modeler. It cannot have all the features and sheer power of high end animation software, but for someone interested in having some 3D fun, it's a good start.

Contact: Bibiana Gasparik, Caligari, (415) 390-9600

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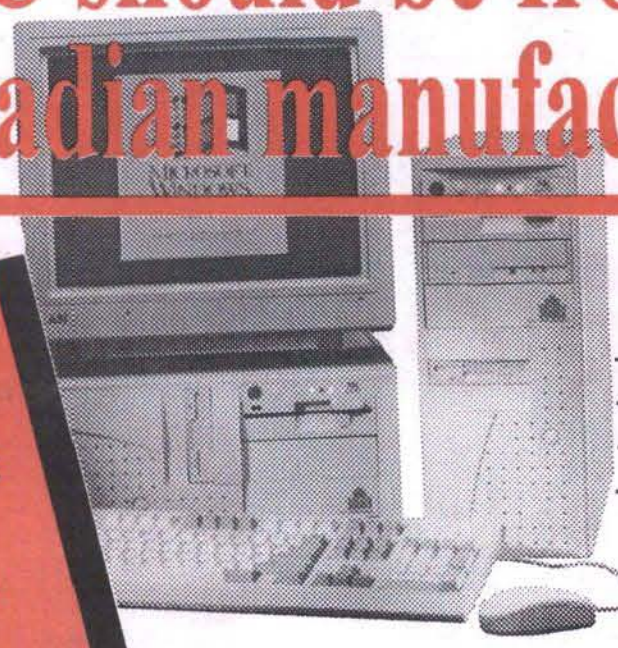

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3-D

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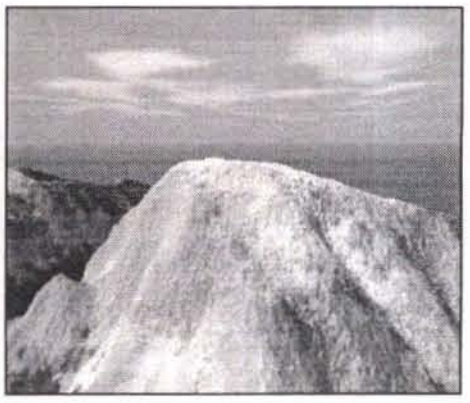

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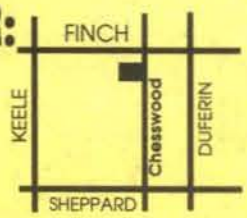

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KPT Bryce

BY GRAEME BENNETT

Product: KPT Bryce
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If you've ever wanted God-like power to build worlds with, HSC Software's KPT Bryce is for you. Ostensibly one of Kai's Power Tools, Bryce is different than the other KPT products in that it is a stand-alone application, not a Photoshop plug-in.

Bryce, named after the awe-inspiring Bryce Canyon in Utah, is a real one-trick pony — but what a trick! The program generates 3-D scenes of great beauty. Reality is optional. It's not hard to create a scene of stunning realism, but it's equally easy to generate a fantasy world straight out of a Roger Dean album cover.

The Bryce package comes with a well-written manual, three floppy disks and a CD-ROM with a number of scenes that can be rendered at any resolution. The program requires an FPU. At least in its inital release, the program does not work on Power Macintoshes.

In the manual, Kai Krause hints that a future release of Bryce will support animation. On the CD-ROM, several animated scenes suggest that this capability is not just wishful thinking.

The user interface is, uh, atypical, to say the least. Basically, you're God. You want clouds? You just grab the sky and pull clouds out of the heavens. You want fog? Pull some up above the the ground. You position the sun, move the mountains, terraform the landscape. What fun!

The only catch is that Bryce is slow. Glacially, petrifyingly slow. This is due to the fact that the program uses a technique called ray tracing to render its scenes.

Bryce, named after the awe-inspiring Bryce Canyon in Utah, is a real one-trick pony — but what a trick!

In ray tracing, the light hitting every object in the scene is calculated, along with the reflections and surface textures of the objects. While this yields very realistic results, it takes several hours to complete a screen-sized image. As the manual says, "give us your Macintosh while you sleep and in the morning we'll give you a thing of beauty." This program cries for a native Power Mac implementation. Until then, we'll leave our Mac on at night. After all, the world wasn't built in a day. ❑

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LASER PRINTERS

Laser Printers in Review

BY GRAEME BENNETT

Laser printers have changed a lot in the last few years. A few years ago, a 300-dot-per-inch laser printer with limited graphics abilities was the norm. Bitmapped printer fonts for specific programs had to be installed, taking up huge amounts of disk space, unless you were content with Courier (ugh!) or a few other drab typefaces.

To get higher-res print, you needed an imagesetter that cost tens of thousands of dollars, used toxic photographic chemicals and smelled awful.

Today, a variety of printer manufacturers offer printers promising high-resolution text, enhanced gray scales, scalable fonts, and a number of other fancy sounding buzzwords like "plain-paper imagesetting," "emulation sensing," "automatic port switching," "PostScript compatibility" and "bidirectional communication." Let's examine what these terms mean.

LED vs Laser — not all page printers actually use a laser. The OkiLaser 400, for example, isn't a laser printer at all (now there's marketing chutzpah for you!), but actually uses light emitting diodes and thus is correctly termed an LED printer. We know of several owners of low-end LED printers that are very happy with their units.

Resolution enhancement — your computer monitor's screen displays graphics at a resolution somewhere between 72 dpi (where a 72 point character on the screen is exactly one inch high), to 100 dpi. An inkjet or low-cost laser printer typically prints at 300 dpi or so. Better laser printers offer higher resolution — say, 600 dpi. But several manufacturers have developed ways of modulating the laser beam to create dots that are smaller than normal. These smaller dots are used to automatically fill in the stair-steps that create jaggies on lower resolution printers. A 300-dpi printer with RET, or resolution enhancement technology (that's HP's term for the process) can output pages of substantially higher print quality than their unenhanced bretheren.

Higher resolution printers sometimes use "microfine toner" to achieve the best print quality. Such toner (a sort of plastic compound that is melted and bonded to the page by the fuser unit) is composed of smaller particles than standard toner, and thus produces images that are better defined.

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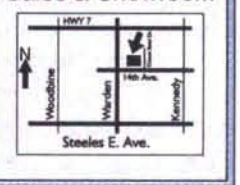

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Printers with a "true 600 dpi" print engine have a mechanism that can advance the drum in smaller steps than a 300 dpi print engine that uses some form of resolution enhancement. A true 600 dpi engine with resolution enhancement is even better.

Enhanced gray scales — As you probably know, laser printers can't print a true gray — they only simulate shades of gray by assembling patterns of black and white dots. This is known as a halftone.

As well, standard laser printers (i.e., units without enhanced resolution features) can print only one size of dot. In order to make up various grayscale patterns, your software instructs the printer to lay down a group of dots that simulate a larger dot, and then assembles these dots into patterns that simulate the traditional halftone patterns, such as you might see in a newspaper photograph. Hence, your 300-dpi printer is going to have less dots to work with if the dots are larger. To make a long story short, an unenhanced 300 dpi printer such as the original Apple LaserWriter can only manage 53 lines per inch of these composite dots, if it assembles them into 16 different halftone dot shapes. Newer units, such as Hewlett-Packard's LaserJet 4M Plus, can achieve 120 grayscales at 600 dpi.

Needless to say, we recommend that users who plan on printing graphics — especially scanned photographs — choose a printer with enhanced grayscales.

Scalable fonts — back in the bad old days, fonts were stored on your computer's hard disk or in the printer's memory as bitmaps. In other words, fonts were of a fixed size. While this was okay for word processing, it wasn't good for desktop publishing in graphical environments such as Windows or the Mac, where documents could be created with fonts of any size. Adobe popularized the concept of scalable fonts with its PostScript language, built into the first LaserWriter, back in 1985.

Today, there are several scalable font technologies. Windows and the Mac directly support scalable TrueType fonts on the screen and on output devices. PostScript is still around, and Windows or Mac users can use scalable PostScript fonts on-screen or on any printer using a program from Adobe called Adobe Type Manager. ATM, by the way, is built into OS/2.

Hewlett-Packard's printer control language (currently PCL5e) has its own scalable font support. There are several other systems as well, including Speedo, Compugraphic, SpeedoGDOS, QuickDraw GX, etc.

Plain-paper imagesetting — this, we think, is mostly marketing hype. We've tested the output from virtually every high-res tabloid-size printer on the market, including those from Apple, Dataproducts, NewGen, Printware, QMS, and Xante and frankly, none of them come close to the halftone or text quality you get from a photo-imagesetter such as a Linotronic or a Varityper. However, considering the vastly lower costs of the plain-paper printers — in initial purchase price, consumables and maintenance fees — they are still worth a look. We recommend that you look for a unit with true Adobe PostScript Level 2, and local servicing or suppliers. Because these printers create pages of much higher resolution than lesser printers, don't be surprised if you need to add abut 40 megabytes of RAM to it, and add Ethernet to the printer and your computers to keep print speeds tolerable.

Emulation sensing — some printers can sense the type of data being sent to it and switch to the appropriate language to output the data correctly. This feature can cause trouble if it doesn't work reliably. If emulation sensing is important to you, test it thoroughly before buying.

Automatic port switching — some printers can have more than one computer connected to its ports simultaneously and process data from any port without manual intervention. Even more than the emulation sensing mentioned above, we've seen ample evidence that this doesn't always work the way it should — especially on some older designs. Try before you buy.

Bidirectional communication — although Apple Macintoshes and LaserWriters have had this feature since 1985, the concept of two-way communication between the computer and printer is something of a new one for most PC users. Hewlett-Packard and Microsoft pioneered the concept a year and a half ago, with the Windows Printing System, which gives a LaserJet series 3 or earlier the ability to tell Windows its print status (e.g., "The printer is out of paper," etc.). You can even set the Windows Printing System to speak these printer messages, although we find that most users usually turn this feature off after about two weeks.

The most recent (Series 4) LaserJets use their own proprietary "Explorer" to provide feedback from the printer, while several other companies, including Lexmark and Microsoft, are pushing for the Microsoft At Work standard. Still others, such as Brother and Epson, ➤

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What to Look For In a Remanufactured Toner Cartridge

If you choose to buy a remanufactured toner cartridge for your laser printer, you'll save about 30 percent on the cost of a new one. However, not all reconditioned toner cartridges are of equal quality.

The following information was provided to us by LaserWorks Printer Services Inc. of Richmond, BC — DT

In 1990 the Canadian General Standards Board (CGSB) developed a voluntary Certification Listing Program for the Rejuvenation of Laser Printer Cartridges, plus standards that applies to their re-manufacture. This standard defines the minimum performance levels for such attributes as print quality and density, smudging adhesion, packaging, marking and warranty.

Cartridge rejuvenation services are classified as follows:

CLASS 1 — Services consisting of diasssembly of the cartridge, disposal of the remaining toner, inspection, cleaning and adjustment of all components, refurbishing the organic photoreceptor cell (OPC drum), repair where necessary, replenishing the supply of toner ans reassembly and testing of the rejuvenated cartridge.

CLASS 2 — Services listed in Class 1 plus replacement of the OPC drum with a new unused drum in lieu of refurbishing the orginal drum.

What to look for

The CGSB Certification Mark is a buyer's assurance that the Rejuvenated Laser Printer Cartridge has been manufactured, tested and listed in accordance with performance requirements of the CAN/CGSB-53.148-M90 and the quality assurance requirements of the Program.

Today in Canada 37 percent of laser printer users recycle their toner cartridges, the projection for 1996 is 55 percent. ❑

Laser Printers In Review

Continued from page ***36***

use their own proprietary systems to accomplish similar results.

Although we don't think it's particularly important which system you choose, we heartily recommend a printer with such communication skills. Given the choice, though, we'd go for the system that's directly supported by the operating system you plan to use. Check with your dealer or the vendor to determine whether drivers for the printer you choose are available for your platform before buying. If you don't have the right driver, you may not be able to access all the features of your printer.

Windows GDI — Some printers, such as Lexmark's WinWriter 600 (reviewed in the June '94 issue) or NEC's SilentWriter 610, are Windows-specific printers. They utilize the graphics language of Microsoft Windows to create the images. Thus, such printers cannot be used from DOS or on other computers, such as Macintoshes or Amigas. There are both advantages and disadvantages to these "bit-blaster" printers. Because the computer is handling the rasterizing process (in other words, the page image is constructed in the computer's memory, courtesy of the Windows graphics handling routines and then sent as a simple bitmap to the printer.) Because the printer is essentially "dumb," such units are typically low-priced. The printing speed, naturally, depends on the speed of the CPU handling the rasterizing, but generally, GDI printers are very fast. Atari, I think, had the honor of offering the first such "bit-blaster" printer, when it released the SLM804 back in the late '80s.

Our Pick of the Pack

Seeking the state of the art in office printer technology?

We think that HP's latest series 4 LaserJet printers provide the best mix of resolution enhancement technology, enhanced gray scales, and power-saving features on the market. The LaserJet 4M Plus offers true Adobe PostScript Level 2, 10Base-T and BNC Ethernet, AppleTalk, parallel and serial connectors, and prints with excellent enhanced 600-dpi quality at 12 pages per minute. Although we weren't particularly impressed with its optional output stacker (which, at least on out test unit, tended to cause paper jams), the printer itself gets a hearty thumbs up.

For offices where several users need to share a single printer, the 4M Plus is ideal. ❑

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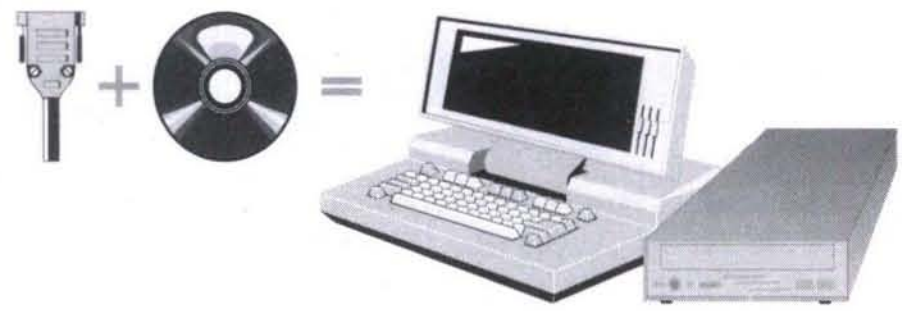

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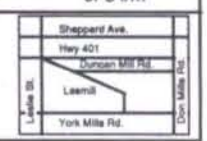

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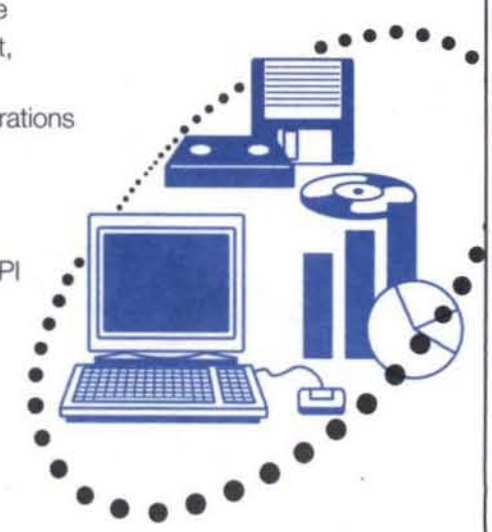

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LASER PRINTERS

Epson's ActionLaser 1600

BY DAVID TANAKA

Product: Epson ActionLaser 1600
600 dpi laser printer

From: Epson Canada, 550 McNicoll Ave., Willowdale, ON, M2H 2E1

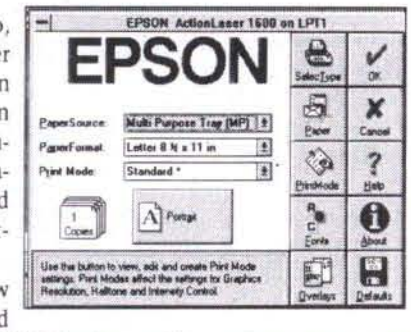
Price: Canadian SRP $1,499; est. street price is $1,350

We liked: Data compression allows you to print a full page of graphics at 600 dpi with the standard 2MB of memory; fast RISC processor.

We didn't like: Fragile looking paper stop and cord clips.

The name Epson became well known in the early days of PC computing, when the company's dot-matrix printers gained a reputation for being relatively cheap and virtually indestructible. Even today, you find most dot matrix printers will be "Epson-compatible."

About two years ago, Epson America took over the Canadian operation and the "new" Epson Canada was born, the beneficiary of the US company's larger ad budget and more aggressive marketing.



Last year, the new Epson Canada introduced the ActionLaser 1500, a 300 dpi printer with an attractive price. This year, the company is back with the ActionLaser 1600. Built around a Minolta print engine and a 17.6 MHz SPARClite RISC processor, the ActionLaser 600 is rated at six pages per minute. It comes standard with 2MB memory, one parallel and one serial port, and HP-4 (PCL 5e)-compatible printer language. The memory can be increased to 64MB, and PostScript Level 2 compatability is optional, as are AppleTalk-compatible (Epson Talk) and Ethernet interfaces.

Based on our experience with other 600 dpi printers, we were skeptical when the Epson service representative assured us that 2MB was sufficient to print a full page of text and graphics. We're happy to report that, although other printer manufacturers claim their printers' built-in data compression allows you to print a full page of graphics at 600 dpi. Epson's ActionLaser is one of the few 600 dpi, printers we've looked at over the past several months that actually does so. The trade-off is speed, so if print speed is important to you, budget for more memory.

The printer comes with its own Windows printer driver and printer control menu interface. The menu allows you to change the various parameters of your print job — landscape or portrait printing, 600 dpi or 300 dpi and paper source, for example — directly from the desktop. Its menu uses a series of buttons and an active help feature we've come to like on other Windows programs like WordPerfect 6.0 and Word — as you pass the mouse pointer over each button, explanations of that button's function appear in a window.

Changing toner is a snap. Depressing a lever on the printer opens the printer, clamshell-style, to expose the paper path and toner slot.

Print quality, particularly on half-tone images, was noticeably better than output from a 300 dpi laser printer. The quality depends a lot on the characteristics of the image itself. Lighter areas of a photo print acceptably, but dark shades tend to come out a bit muddy — a characteristic we've noticed on other 600 dpi printers too. We'd say it's as good as other 600 dpi printers we've looked at recently, such as those from Brother, Hewlett-Packard and Lexmark.

We have a minor quibble with the design/construction of the paper stop, which is a thin plastic piece that slides into one of three slots that you choose depending on what size paper you are using. The tab seemed too flimsy and we envisioned it being accidently snapped off some day. Without the tab, your print job would flow off the printer and onto the surface of the desk or the floor, since the paper output tray sloped downward towards the floor. Another odd feature is the clipping system that holds the power cable to the printer housing.

Given its price and Epson's reputation, we expect this will be an attractive alternative to HP's LaserJet 4P. ❑

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Borland Launches Database Dynamic Duo

BY KEITH SCHENGILI-ROBERTS

Borland International is playing off its traditional strength in the database market as it releases two new major database products. According to new Borland Canada President Stephen Lee Ying, Borland has "drawn a line in the sand" in the database market by releasing both Paradox 5.0 and dBase 5.0 for Windows. It is staking much of its future and reputation on these two products.

At the official Canadian launch, it was revealed that there are strong customer bases for both products in the country. For reasons that were not revealed, preferences for Borland's database products differ from region to region.

If you live in the province of Quebec and are using a Borland database product, chances are you are using a version of dBase for DOS. At the other end of the country, if you own a Borland database product and live in one of the Prairie provinces, chances are you are using a version of Paradox.

In fact, Calgary has the distinction of having the highest concentration of Paradox users per capita in North America. While Borland risks confusion in the marketplace by releasing two Window database products at once, both dBase and Paradox 5.0 for Windows are solid applications which will be greeted enthusiastically by their loyal supporters, and pose a real challenge to Borland's competitors in the database market.

While there are no merger talks underway, Borland still retains its links to WordPerfect and to WordPerfect's new parent company Novell. Paradox 5.0 will soon be included in the Borland Office, a software suite comprising Borland's database and spreadsheet software along with the WordPerfect 6.0 word-processing package. Borland will continue to work with WordPerfect Corporation on the Borland Suite, but according to Stephen Ying, no further tie-ins are planned in the foreseeable future.

Both of Borland's new database programs are strong contenders in the increasingly competitive database market. While they have many features in common, they both build upon the respective strengths and features found in previous versions of each product.

Paradox 5.0 for Windows

Paradox 5.0 for Windows is Borland's new flagship database program, capitalizing on the success of Paradox 4.5 for Windows. Borland claims that it has been designed for beginning and power database users alike, and Paradox 5.0 does a good job of trying to please both ends of the market.

While the power (and the price) of Paradox is more likely to appeal to seasoned database programmers than to beginners, Paradox 5 for Windows offers both beginners and database wizards speed and performance without sacrificing ease-of-use.

There are many features which people new to Paradox will like, especially a series of interactive tools designed to help users to navigate their way through the program and

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produce results quickly. Even if you have never used a database program before, Paradox's Interactive Coach will instruct you on the basics, and teach you how the program works. The Experts feature will allow anybody to quickly produce a variety of forms, mailing lists or reports easily.

This type of support is a great feature for new users, who can produce professional-quality work within minutes of using the program. It is also a convenience for more seasoned database users, as the Experts feature automates the drudgery of creating the same type of form or report over and over. Anyone who can program using Paradox's ObjectPAL scripting language can design new Experts that less experienced users can work with.

Upon start-up, users are greeted by the Project Viewer, which provides an easy way to manage and locate frequently used items. In many ways, it is what most people would like File Manager to be: Project Viewer provides an easy point-and- click overview of what the user has produced, and the options currently available. The icons in Project Viewer help you identify tables, forms, reports and other items as they are arranged in your directories. Paradox also lets you use Aliases, which helps you keep track of the associations between the files you use. These features greatly reduce the possibility of "getting lost" within the program when you are working on a project.

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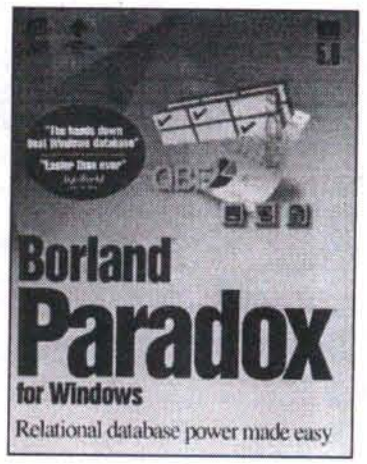
Paradox 5 for Windows is the only database program to utilize the power of OLE 2.0 in both its client and server modes.

Paradox 5 for Windows is the only database program to utilize the power of Object Linking and Embedding (OLE) version 2.0 in both its client and server modes. You can embed and work with objects and data drawn from other Windows applications within Paradox (client mode). In server mode, you can drop a Paradox table into a second application, say a word-processor, and still have complete editing functions available for that Paradox table while working within the word processor. The OLE 2.0 functions can greatly speed up and simplify



many operations, reducing the amount of time you have to spend switching between Windows applications.

There are a lot of features in Paradox 5 for Windows that power-users will enjoy. One of Paradox's traditional strengths has been its ability to easily query a database to find the information you are looking for. Up until now, anything you edited in the Answer Table that was produced by the query was not reflected back to the original data. If you needed to make a change, you had to go through the tedious process of going back to original data, editing it, and then seeing if the changes you made were correct by doing another query.

Paradox 5 for Windows' new Live Answer Table lets the user edit the original data after doing a query on it. You can also link complex relationships between tables using the new Visual Data Model Designer. Seasoned database users will also appreciate the flexibility that comes with the addition of seven

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new Field types within the program, including autoincrement, logical, long integer, timestamp, binary coded decimal, raw and binary data.

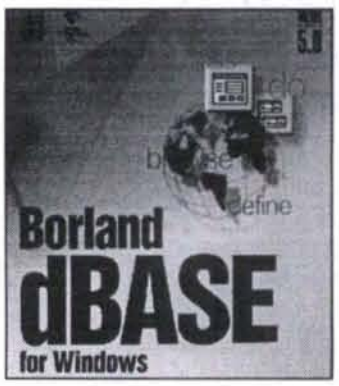
One of the most important new features in Paradox 5.0 for Windows is how seamlessly it is able to connect to other databases and provide workgroup functions. Paradox now lets users query both local SQL databases and those running on a network server.

Available separately is Open Database Connectivity (ODBC) support, which can give users access to information available on more than 50 other major database programs ,including DB2, Btrieve and many others. The Workgroup Desktop lets users share information with other workgroup members directly via a LAN, or via a mail program.

There is also extensive support for programmers. The ObjectPAL Integrated Development Environment lets programmers easily edit and de-bug programs written using Paradox's native language. Over 300 new Methods and Properties have been added to ObjectPAL to provide greater power and flexibility to developers. For people who want to build and compile their own programs around the Paradox engine, Borland promises that a run-time version of the Paradox engine will be available shortly, perhaps by the time you read this.

Borland's new Paradox 5 for Windows is an impressive database program, fully utilizing the Windows environment to make the program easy to use, and it does not compromise when it comes to the power of its tools. It is a fully object-based, event-driven database that will prove to be a strong competitor in the Windows database market. The estimated street price for Paradox 5.0 for Windows is $530, and it is available as an upgrade for approximately $300.

dBase 5.0 for Windows



Borland's original dBase for DOS set the standard by which all subsequent database programs were developed. Today, there are estimated to be seven million users worldwide that rely on the dBase standard. Despite the fact that competitors have made major inroads on the database market with their own Windows-based applications, there is still a huge base of users who continue to use dBase III+ and IV for DOS. Borland has finally released dBase 5.0 for Windows. It has taken over 3 years for Borland to produce, but for many users it is well worth the wait.

In an effort to lure even the most die-hard dBase for DOS users to the Windows version, Borland has made the transition from DOS to Windows as easy as possible. Borland guarantees that any application written in either dBase III+ or IV for DOS will be able to run instantly in dBase for Windows. While the resulting programs look very DOS-like, dBase 5.0 automatically adds Windows functionality, including mouse support for the program.

In an effort to lure even the most die-hard dBase for DOS users to the Windows version, Borland has made the transition from DOS to Windows as easy as possible.

A lot of effort has gone into making the learning curve for current dBase programmers as small as possible. Programmers can use all of the commands they are already familiar with to create new programs for dBase 5.0 for Windows. Its visual design interface automatically translates everything you do into programming statements. Using so-called "two-way" tools, you can write code in a Command-line window and automatically see the results of your code in another. It's never been easier to program an event-driven database application than with dBase 5.0 for Windows.

One of the most significant advances for DOS-based dBase programmers is its object-oriented design. Once users have created components designed for one application, they can easily change its properties for use in another application. It also has Open Plug-and-Play Architecture, which allows programmers to instantly access external

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Windows tools like VBX, to add new components and structures to their programs.

There's a lot here to appeal to non-programmers, as well. Many of the people likely to use dBase 5.0 for Windows are those who have inherited a legacy of older dBase for DOS programs and databases. Chances are they do everything else they have to do at work in the Windows environment, and find it a hassle when they have to shell out to DOS to run their dBase program.

The Windows' version of dBase 5.0 carries all of the extensive help features Borland puts into its other Windows products. dBase 5.0's Navigator looks and behaves in exactly the same way as does Paradox's Project Manager: it provides an easy way for the user to find and locate tables, forms, reports and applications using a point-and-click icon-based interface. In addition to the Navigator is the Catalog window, which is Paradox's Alias feature by another name. Paradox's Interactive Coaches are re-named Interactive Tutors in dBase 5.0, but they also work exactly the same way. They teach users database basics, and act as a tour guide to the many features of the program. dBase 5.0 only provides one Expert as opposed to Paradox's three, and it is devoted solely to creating forms.

Experienced and novice dBase for DOS users will also appreciate the relative ease with which they can create professional-looking forms using the Forms Designer built into dBase 5.0 for Windows. dBase 5.0 generates reports automatically through a customized version of the popular Crystal Reports package. While it produces good-looking reports, it is also significantly slower than the other parts of the program, and does not offer much in the way of flexibility when producing output.

dBase 5.0 for Windows also lets people use and manipulate information that could not be used in its DOS incarnations. Users can add many complex data-types to their databases, including graphics, sound and multimedia objects. This feature ensures that users can take advantage of the latest advances in multimedia, and produce more professional-looking applications.

dBase 5.0 for Windows is also network-ready, allowing users to share the same data over a network. Automatic record and file locking measures ensure that all users on a network can share the same information without a problem. There's also extensive SQL support for dBase 5.0 for Windows, which enables users to access SQL files as easily as accessing a dBase file.

There are a lot of features in dBase 5.0 for Windows that will entice dBase for DOS users. For dBase for DOS programmers, there's virtually nothing that has to be unlearned, and its easy-to-use Windows interface will convert many DOS-based dBase application users on the spot. In many ways, however, dBase 5.0 for Windows acts like a stripped-down version of Paradox 5.0 for Windows.

The trade-off for dBase-DOS compatibility seems to be a loss of some of the elegance, simplicity and extra features found in Paradox. However, the upgrade path for many dBase for DOS users is clear — dBase 5.0 for Windows delivers when it comes to DOS-compatibility, and will not disappoint. The estimated street price for dBase 5.0 for Windows is $520, and the upgrade is available for approximately $300. ❑

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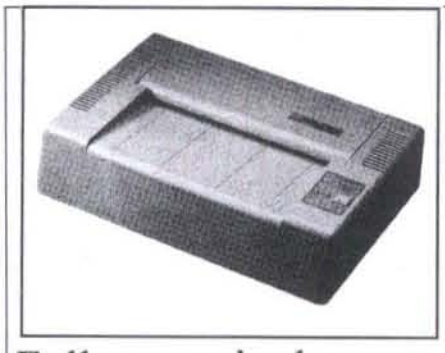

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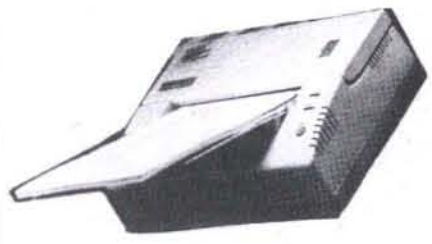

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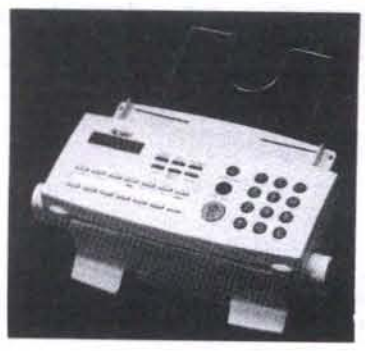

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Project Planning Made Easy

BY COLIN MACGREGOR STEVENS

A brief introduction to project planning and a review of the latest versions of Microsoft Project and Symantec's Time Line.

People don't plan to fail, they fail to plan.
— Unknown

Planning is bringing the future into the present so that you can do something about it now.
— Alan Lakein in *How to Get Control of Your Time and Your Life*

A few years ago I purchased a 1989 project management computer program in the hopes that it would help me to plan projects for myself and my co-workers. When I presented the results to my superior, he took one look at the huge printout that measured about six feet by six feet, and banished it to the back room.

The program could "do the job," but the lack of flexibility, the difficulty in understanding it, and the lack of a satisfactory summary presentation format were major handicaps. The potential was there, but the tool needed more refining.

Project planning involves laying out the tasks required to complete a project, putting them into a logical sequence, and then looking for ways to avoid bottlenecks and make the process more efficient. The bottom line, of course, is to see that the project is completed successfully, on time, and within budget. Avoiding mental breakdowns or resignations — of yourself and your staff — is also very desirable.

The traditional methods of project planning have included a variety of charts, often with little rectangles of paper laid out on a table or stuck to a wall. Cumbersome calculations were required to determine the critical path, and the project completion date. Any changes or "what if" scenarios meant a lot of recalculating.

A simple example, sometimes used for project planning training, is the construction of a wheelbarrow. First, you must have suitable plans and materials. Then the materials need to be cut to size, painted and assembled. By laying out the various tasks, you can see that some tasks must be done before other tasks can begin (e.g., you cannot paint before you cut the lumber). If the paint on the wooden body takes a day to dry, however, perhaps you can plan to spend that day assembling the wheel and axle.

For a small project like a wheelbarrow, this process is easy to sketch out on a piece of paper, complete with arrows and notes. An eraser can accommodate changes.

Where project planning has traditionally been very difficult is with large and/or complex projects that have hundreds or even thousands of tasks. Each task often has notes on who will do the work, the dates it is to start and end, and the budget available.

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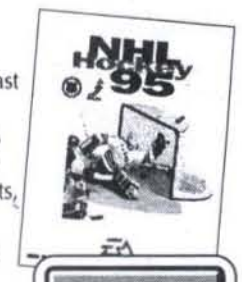

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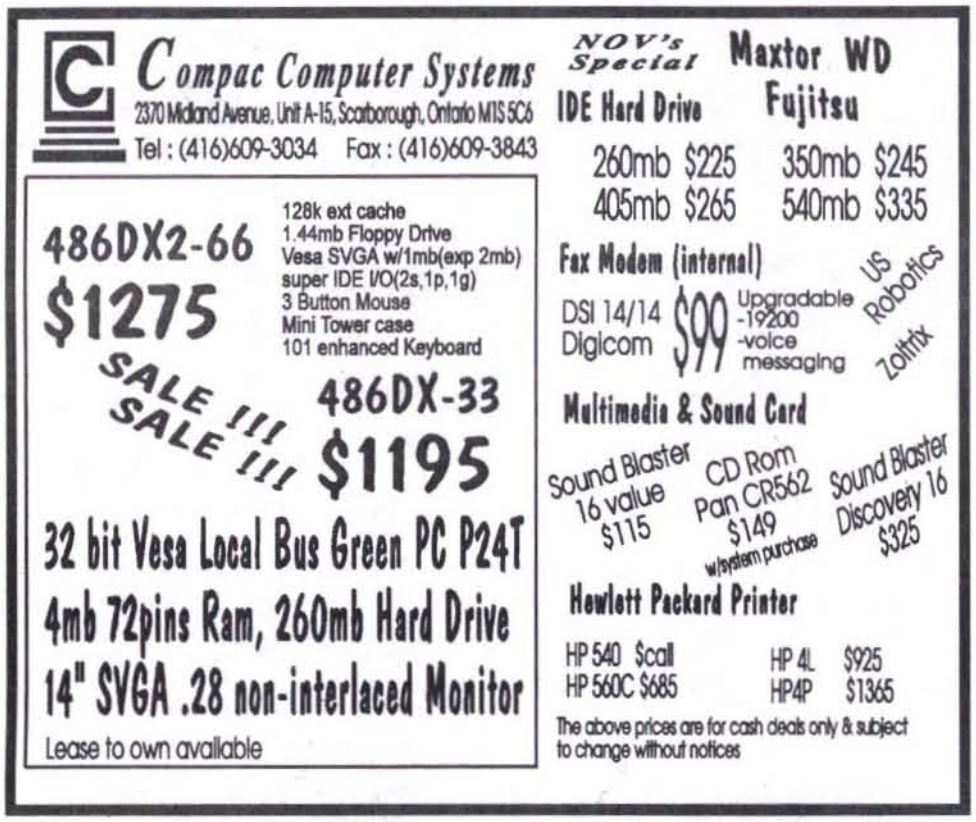

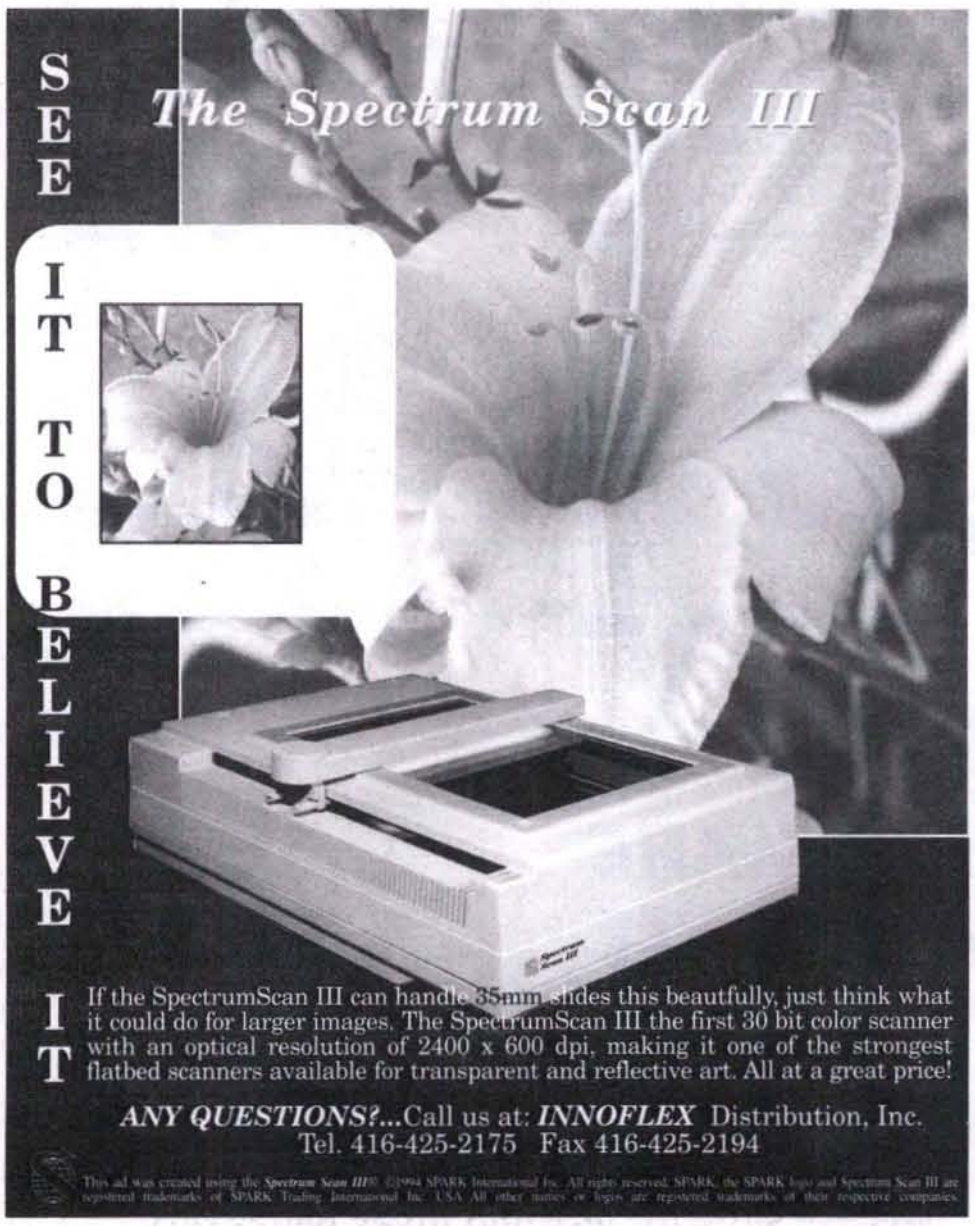

When the icebreaker Henry Larson was being built in North Vancouver some years ago, this writer saw an entire room filled with a planning chart showing all of the major tasks. Not every business has a spare wall for this.

Managers want to be able to see the overall picture of a project, the sequence of tasks, the "critical path", the different ways of looking at a project, and lists of details. They also want to be able to assign and balance resources, monitor costs and be able to explain or "sell" the project to others. The resulting plan must not be a one-shot deal which is created at the beginning of a project, and then filed away, forgotten, in a drawer. Above all, you must be able to use the resulting plan regularly to monitor the progress of the project.

"That's all very well for people with time to plan, but I'm so busy that my desk looks like a paper recycling plant!" you say. Managers are often swamped with more to do than they can possibly get done, so how can they take the time to plan? The answer is simply that time taken in planning can actually reduce the amount of time needed for many projects, and goes a long way towards ensuring the success of the projects. "Plan your work and work your plan" is a common but very valid expression.

Training in project planning less than a decade ago included extensive coverage on calculating and recalculating time intervals. You used to have to manually calculate each path's total time. The good news is that a computerized project planning program can automate many of the mundane tasks, and greatly reduce the chances of error. Project Planning becomes very much easier in the Windows or Macintosh environment.

Project Management Terms

BASELINE — The original version of a project against which progress and changes may be compared.

CPM — Critical Path Method. A scheduling system that calculates the total length of a project based upon the sum of the duration of the tasks that are critical. If any of the tasks on the critical path are shortened, the whole project is shortened (or vice versa). CPM was developed by Dupont Corporation & Remington Rand in the 1950's.

CRITICAL PATH — The chain of tasks linked by dependencies that determines the shortest possible length of the project.

GANTT CHART — A bar chart which graphically represents tasks across a time scale. Tasks are listed to one side, and each task has a bar plotted beside it on the time scale. Developed by Henry L. Gantt.

LEVELLING — The process of delaying tasks (during recalculation) to reduce or eliminate resource overbooking.

MILESTONE — A reference point marking a major event in a project.

PERT CHART— Program Evaluation Review Technique. A network diagram showing the tasks that must be done to reach the completion of the project. Each task is in a box and is linked to other tasks with lines. The PERT Chart was developed by Lockheed for the U. S. Navy during the 1950's during work on the Polaris Missile Project.

PROJECT MANAGEMENT — The planning, organizing and managing of tasks and resources (money, people, etc.) to accomplish a defined objective, usually with constraints on time and cost.

RESOURCES — The people, equipment and supplies used to complete tasks in a project. —CS

Planning Arrives on the Desktop

In the last five years, project management tools have improved dramatically. The computer is an excellent tool for planning projects and developers have now come up with some very good programs.

Project planning programs can cost in the area of $700 by the time the taxes are paid. Who, then, is going to buy one of these computer programs? Will it be computer buffs?

More than likely, it will be busy business people who have to plan the success of their business or other projects. Managers are too busy to be able to spend a lot of time learning a new computer program. I believe that they will want a program that is primarily easy to use. It must, however, also be powerful enough to get the job done, be flexible, be able to present clear reports, and be able to list tasks in ways that everyone can understand and use.

Due to their cost, these programs are obviously oriented towards businesses. This exclusivity, however, is only in the cost, for anyone could put such programs to good use, e.g. in planning a business project, the construction of a house, a vacation, the restoration of an antique car, a conference, and so on.

A Software Publishing Association tally of North American microcomputer software sales for the first half of 1994 shows estimated sales of project planning programs which work out to a surprising 4.4 percent of all microcomputer software sales dollars — more than was spent on DTP software, and personal information managers, and just a little less than was spent on presentation graphics software.

Product Review Overview

The general process for building a project schedule is to create a file, and to list the various activities in approximate chronological sequence. Both programs reviewed here use a list of tasks and a bar chart called the Gantt Chart. A list of tasks is in a column on the left side, a default time duration value is automatically entered by the program for the time estimated to complete each task, and a corresponding time line bar automatically appears on the right.

This first view makes it look like all of the tasks will be done at the same time. Since this is usually impossible, you now have to schedule them efficiently. You start this aspect by entering any known dates (for start or completion), and linking tasks.

Linking tasks is usually done with one of four methods. Most will be a Finish-to-Start (FS) scenario, where a task starts when its predecessor task finishes (e.g. First you draw the plans, and only when that is done do you cut the materials). Sometimes you can have activities that can start at the same time (Start-to-Start relationship - SS) or finish at the same time (Finish-to-Finish relationship - FF). A fourth type is the Start-to-Finish (SF), though it is seldom used.

Project planning allows you to efficiently schedule overlapping tasks and to match

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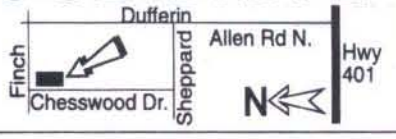

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them up with resources (such as cash flow and available project workers) so that balanced and efficient progress can be made

Tasks in a project can have indented subtasks. You as the planner need to know the details, but for reports or simply for clearer viewing, you may want to be able to hide these sub-tasks. This is very important when you must make a presentation. The new Windows look and flexibility mean that you can now present a concise professional summary report, or extract and print selected aspects. This may be of a certain time period, or work to be performed by a certain team member. You can enter milestones with a zero time duration.

An example of a milestone would be a key date, such as the ending of one phase of a project. Manual project planning systems often had errors caused during recalculations. Using a computerized project planning program can greatly reduce the risk of errors occurring. A project calendar can also be adjusted to reflect your hours, days of work, vacations, etc. The Gantt Chart automatically incorporates this calendar information.

Project planning programs offer a variety of views of projects, including the Gantt Chart, Network or PERT chart, Calendar, Cross-tab View, Resource Allocations and a host of forms and special views. You can also use different views of the resources.

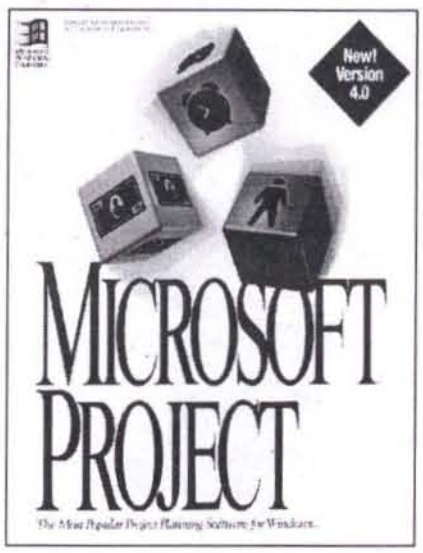
Advanced work with these programs can include Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), multi-project links, macros, importing and exporting, e-mail and networking. Symantec states that its Time Line has Open Database Connectivity (ODBC).

General areas for improvement on both programs include making these tools even easier for busy managers to learn and to use, putting them on CD ROM as an option, and the reduction in the program's street retail price to $200 or less so that this valuable tool can become common on home and small business machines.

In reviewing these two programs, Microsoft Project V 4.0 emerged as the clear choice due to its ease of use.

Microsoft Project
Version 4 for Windows

From: Microsoft Canada
1-800-563-9048



Microsoft lives up to its reputation for friendly software with this excellent project planning program. I was immediately impressed with the helpful screen. The tutorial, called "Quick Preview", uses the planning of an exhibit as its sample project. In addition, there are "Wizard" and "Cue Cards" to help guide the user. Microsoft Project is also very fast compared to Symantec's Time Line. Microsoft Project runs on Windows or on the Macintosh.

You can save the project file with a "baseline" version. This allows you to make changes and yet be able to compare revisions with the original plan. It is easy to add notes to any stage of a plan. These are hidden until called for, although a small symbol alerts you to their presence. Reports are easy, either by printing the screen (there is a preview button to assist you), or by generating a report. You can also filter a report.

New features in Version 4.0 include the Cue Cards and Planning Wizard as learning aids, easier entry for tasks including drag and drop, recurring tasks and baseline (to compare planned progress to actual progress). There are also new report formats, new viewing features, multi-project consolidation, electronic mail support, improved network support, and OLE support. Customization and automation of repeated operations are also possible.

A colleague who upgraded from Version 3.0 reports that the process was very easy. Files created in Microsoft Project V 3.0 were easily read by Version 4.0, and the improvements such as the Wizard and the increased usefulness of the mouse were very welcome.

The Spell Checker is fine except that when a word is presented for review, the background text does not move to show it in its context. Unlike Symantec's Time Line, Microsoft Project's editing is unfortunately

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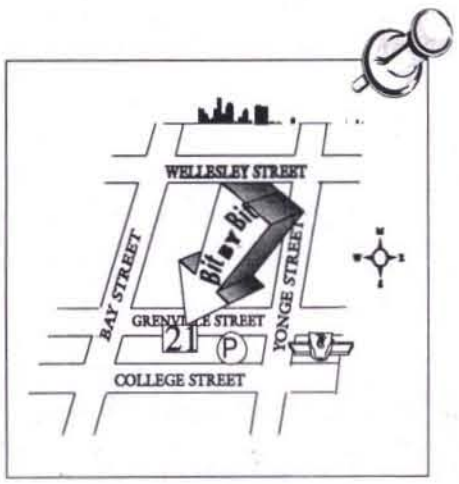

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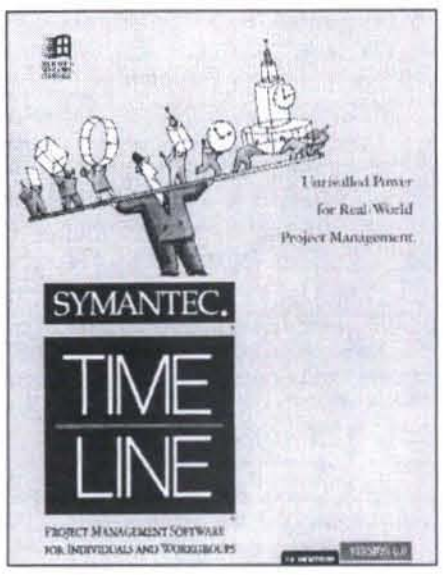
not in place, but is on a bar above the work area.

The street price of Microsoft Project is approximately $660 Canadian, plus taxes.

Symantec Time Line
Version 6.0 for Windows

From: Symantec Canada,
250 The Esplanade, 5th. Fl.,
Toronto, Ont., M5A 1J2
1-800- 441-7234



Symantec is well known for its quality programs such as Norton Utilities and Norton Desk-Top. Time Line 1.0 (1984) through 5.0 (1991) were DOS based programs. Version 1.0 for Windows came out in 1992, and 1994's Time Line 6.0 for Windows is the next and latest in this series. Version 6.0 also has two separate add-on products: Time Line Guide Maker and Time Line Report Maker. Time Line V 6.0 occupies just over 27 MB of hard drive space, 6 MB more than Microsoft Project.

Time Line places all of your projects into a single large database. When you open Time Line you are presented with three open windows, i.e. Overview, Resource and Gantt Chart. The Overview lists Projects, Calendars, Resource Views, Layouts, Conditions and Custom Columns. This gives the user quick access to any aspect of the project. The main window that a new user will work with is the Gantt Chart.

Some new features in Time Line Version 6.0 are Overview (a new view that allows access to all project management functions in an hierarchical structure); Guide Line (a series of questions to help you build a custom plan quickly); global editing in place; macros; the capability to deal with overtime; passwords; shift scheduling; and the fact that it is electronic mail enabled, so that co-workers can send reports.

As a reviewer, I was impressed with several things about Time Line V 6.0. Symantec has provided global editing in place, included an "uninstall" command with the program, and provided a comprehensive user's manual in addition to the on-line help. The thick manual is very welcome for those of us who like to personalize our manuals with a high-lighter pen and stick-on notes, and who also tend to forget what the previous screens showed or how we got to where we are. Microsoft Project on the other hand, leans heavily towards the on-line help and a small manual.

Symantec's Time Line is, however, not nearly as user friendly as Microsoft Project. Busy managers will likely find that it has a fairly steep learning curve. There is a Tutorial but it would not run on this reviewer's machine without computer "tuning".

The lack of user friendly interface is apparent when you first open the program and the "Open Database" box appears. If you have no existing file, you must somehow deduce that you should close it down and then create a new file. The windows that appear do not have a HELP button. There is also a major problem with moving and linking tasks on the Gantt Chart.

Time Line is very, very slow! On an i486DX33 machine, creating a new blank project file takes about one minute. Opening up the sample database takes three and a half minutes. You are constantly kept waiting while using Time Line. The "Co-pilot" automatic help only appears occasionally, and is not very helpful. It is really only useful for resolving ambiguous situations, not as a constant helper. The floating icons' palette can be modified slightly, but does not have the option for being placed in a line along the top of the working area, which this user prefers.

Symantec's Time Line gave me the impression that it is very powerful and can do anything — you just have to take the time to figure out how to do it.

The suggested retail price Symantec's Time Line for Windows 6.0 is $699.00 US, but the street price in Canada was about $620. ❑

Colin Stevens is a museum curator in Burnaby, BC

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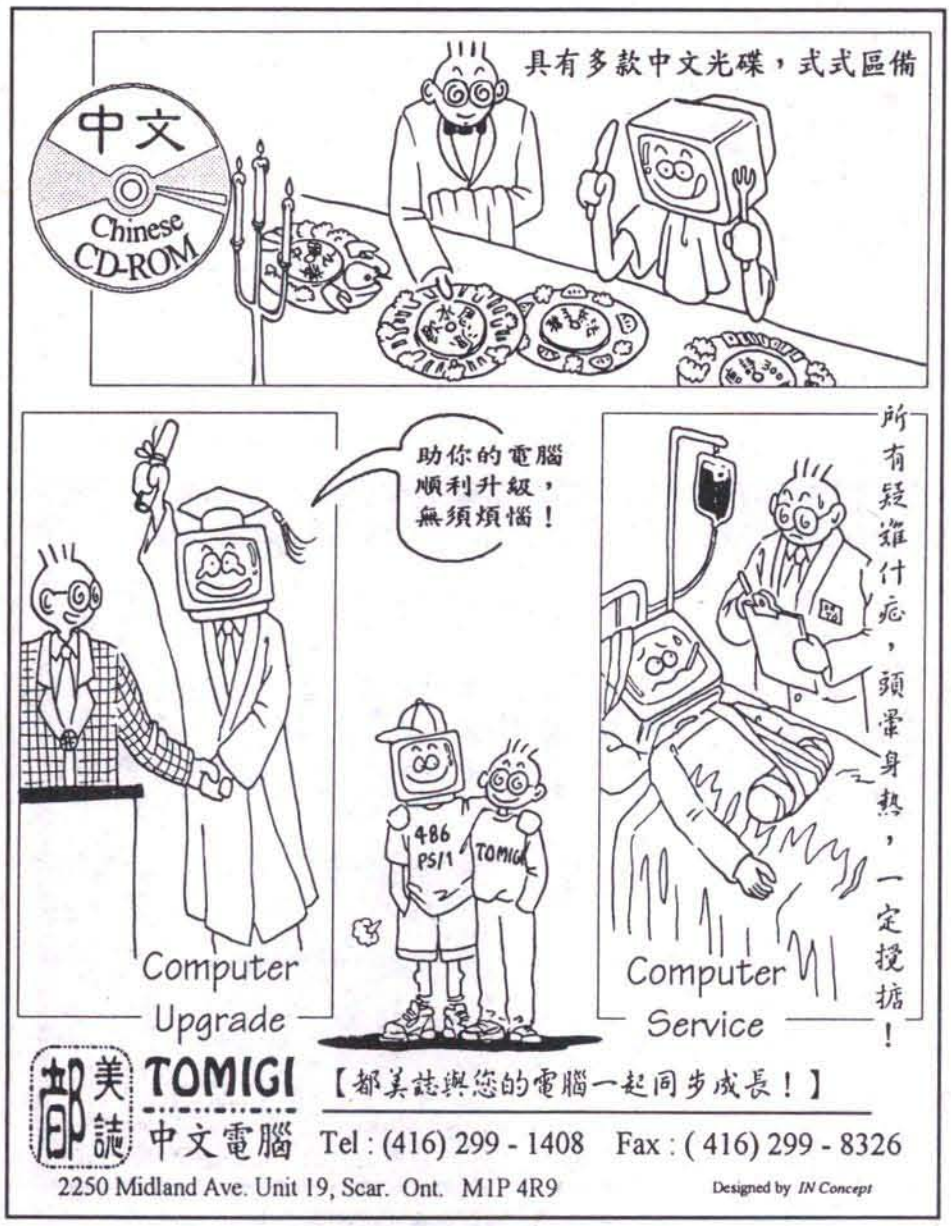

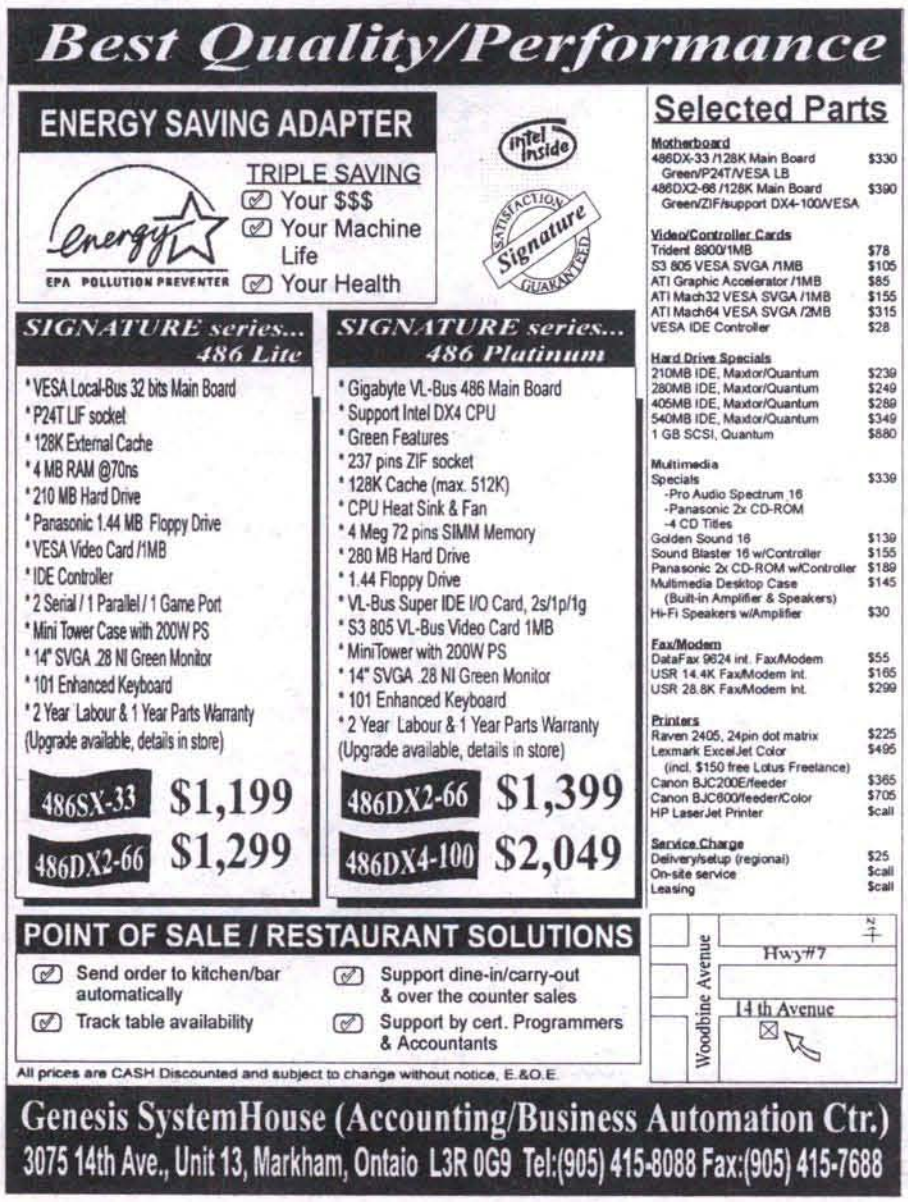

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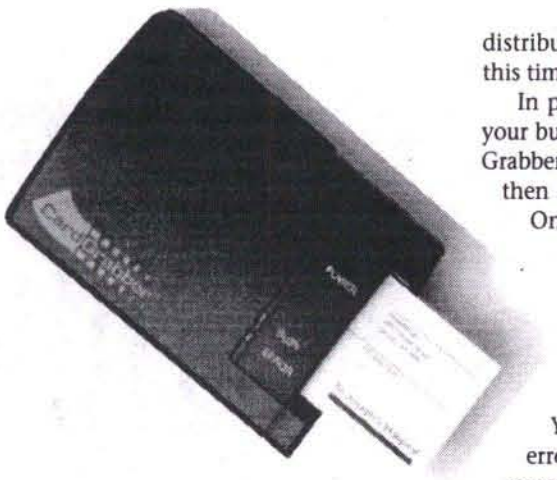
A Little Scanner Just for Business Cards

BY ROSS MACDONALD



Product: The CardGrabber
From: Pacific Crest Technologies Inc. 4000 MacArthur Boulevard, Newport Beach, California, 92660, tel 714-261-6444, fax 714-261-6468
Estimated street price: US$239

If Willy Loman were alive today, indeed, if he ever had been, he'd use it. I use it and I'm neither dead nor a salesman. I am, however, a journalist who, after staggering home from yet another booze fueled press lunch, ceremonially empties his pockets — business card, cigarettes, business card, olive pit, business card, business card, hors d'oeuvre toothpick, business card — you get the idea.

Now, I know what to do with everything else in that curious little pile, but frankly, my vinyl business card organizer has become anything but. Cheap print shops and rabid neo-entrepreneurialism have fostered a pesky barrage of that 2 X 3 1/2-inch bumff which freely leaps from the pockets of every luncheon companion.

Which is the exact problem the CardGrabber ostensibly solves. Some equally card-shocked luncheonee has been blessed with enough surviving brain cells to come up with this handy, palm-sized scanner which can feed an avalanche of business cards directly into a data base.

In theory it works like this: you get all your business cards together, plug the CardGrabber into your computer's parallel port then feed each card through the scanner. Once scanned, an image of the actual card appears on your screen while optical character recognition (OCR) software reads the printed text and automatically places all the information into the appropriate database fields. You are then free to organize your now digitized cards by various categories (Company, Name, City, etc.) and use that database for contact management or simply as an address book. You can even call up the pictures of the cards alongside your data records or on their own.

A Pacific Crest spokesman says the company is working on Canadianizing the software so that the database includes provinces and Canadian postal codes. However, no distribution has been set up in Canada at this time.

In practice it works like this: you get all your business cards together, plug the CardGrabber into your computer's parallel port, then feed each card through the scanner. Once scanned, a variably blurred image of the actual card appears on your screen while the OCR software mis-reads random quantities of the printed text and automatically places much of the information into the wrong data base fields. You are then free to correct all the errors in your now digitized cards and re-position the data into the appropriate fields AFTER WHICH you can use the data base for contact management or simply as an address book. You can even call up the fuzzy pictures of the cards alongside your corrected data records or on their own.

Despite these discouraging realities, the CardGrabber is, in essence, a great concept that Pacific Crest followed through with solid hardware and a useful database. It's the OCR software that stinks. But anyone who's tried any of the many OCR brands on the market knows this is a technology that stubbornly clings to infancy.

The illustrations show the CardGrabber's particular brand of OCR software — fresh out of the scanner and uncorrected — at its best, at its worst and at some point in between. I deliberately chose relatively plain business cards to give the software a fighting chance. And I used the "ultra high-res" option which, while improving image quality, uses more storage space per card and slows the whole process down. It DOES NOT, however, improve OCR accuracy. Though a single screen can't show all of the CardGrabber's options and abilities, these images give you a firm idea of what to expect.

Even with the inherent OCR weaknesses, the CardGrabber remains a very handy tool. True, you spend a lot more time correcting errors than you'd like, but it still amounts to less effort than typing all the information into a database from scratch. And, though I can't figure out any practical use for it, I like having the card pictures on screen too.

The CardGrabber's Windows operated database is reliable and it's flexible enough to include a space for notes to each record, a merge utility, auto-dialing to your fax/modem, plus it allows the import/export of records with many popular database packages (though this is a bit cumbersome, requiring no less than four pages of the manual to explain).

This package's considerable price tag ought to scare off any frivolous hardware hoarders, though it remains a relative bargain for those of us who can really use it. Even at its worst, the CardGrabber reads somewhat more clearly than one particular post-lunch journalist. ❑

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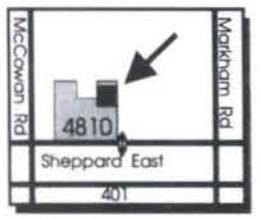

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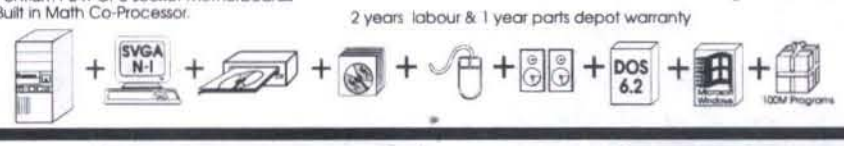

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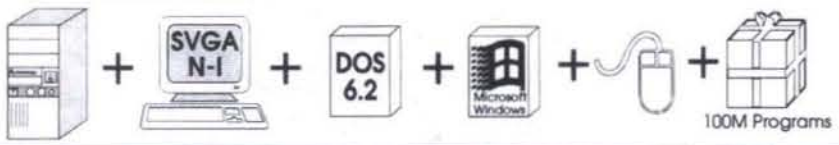

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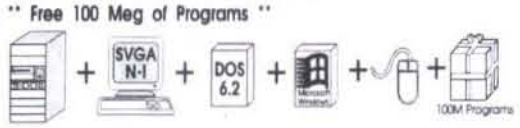

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HARDWARE/SOFTWARE

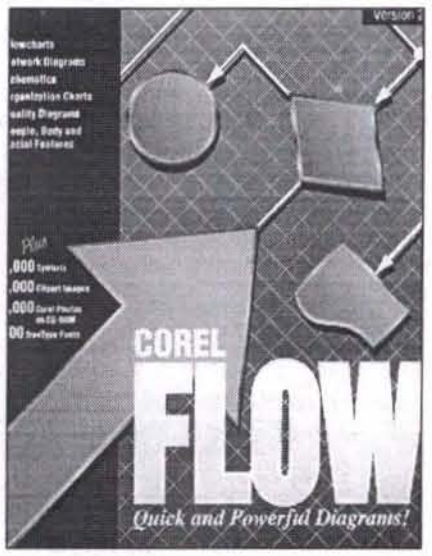
Corel Flow: A Serious Drawing Tool for Serious People

BY ROSS MACDONALD

Product: Corel Flow — 3 diskettes with extra images on CD-ROM
From: Corel Corporation
Street Price: $99.95

Corel Flow promises a lot on the box: 2,000 symbols, 1,000 clip art images, 1,000 Corel Photos on CD-ROM and 100 TrueType fonts. All for only $99.95. However, the box also promises "Quick and Powerful Diagrams" while delivering anything but.

Since the product was specifically created to assist business people to construct flow charts, network diagrams and organizational charts, I expected to be able to choose from a number of templates for each application, and then simply customize the format to suit my needs.



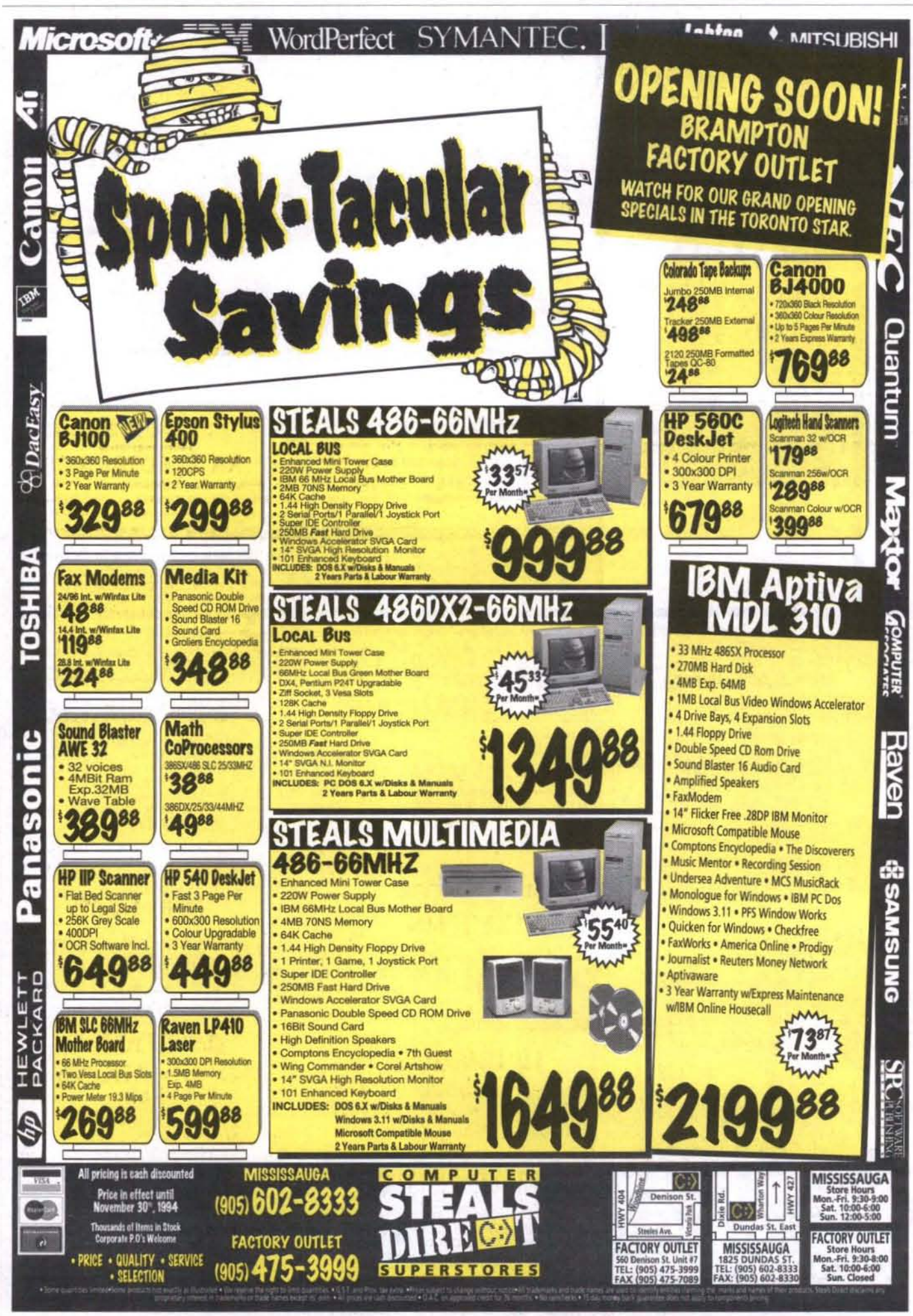
Instead, what Corel Flow contains is a vast myriad of icons and symbols that would likely be extremely useful for such projects... and that's it. You soon learn from the 10 pound manual that this programme is manual, too — you have to actually create your own flow chart, network diagram or organizational chart by hand, and *then* you get to delve into the wonderful world of icons and symbols to make it look nifty.

Which means that what Corel Flow really is is a variation on the old basic paint program, but with a much bigger paint box to play with. Arrows and pointers abound, accounting symbols quickly add up, architecture and interior design symbols are easy to live with, Boolean logic icons are sensibly included and there's a bushel of landscape tools to choose from, too.

A complete list of Corel Flow's symbol library is quite simply too long to list here. But you might also be tickled by their inclusion of several human bodies of various ages and genders along with a variety of clothing, face parts and hair cuts to choose from — just in case you want to approximate a specific person or even build a somewhat recognizable family tree.

Money, vegetables and fruits are here too and, in obliquely related fashion, Corel has curiously thrown in hundreds of marginal cartoon portraits of business tycoons (Gates, Trump), historical figures (Khomeni, Einstein), politicians (Hussein, Olly North), sports stars (Witt, Agassi) and movie and rock stars (Willard Scott and John Tesh?).

This ought to tell you that, in the end, Corel Flow can be useful as well as fun. But any diagrams you finally manage to produce will, I can assure you, be neither quick nor particularly powerful. ❑



HARDWARE/SOFTWARE

Miro's Board Brings Video to PCs

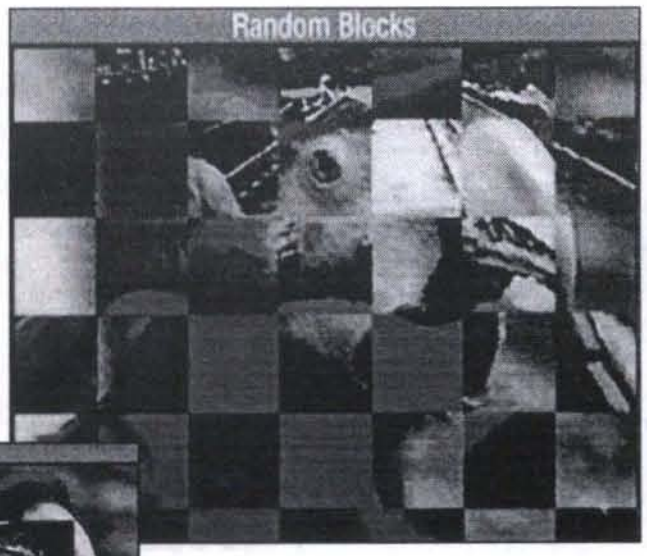
BY GEOF WHEELWRIGHT

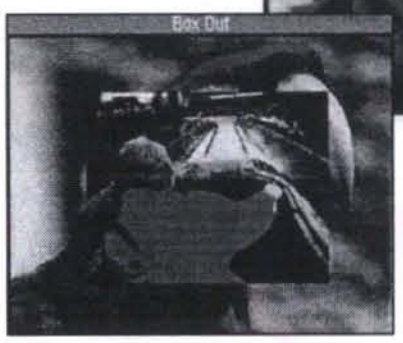
Product: MiroVIDEO DC1 tv video capture/editing board
From: Miro Computer Products Inc., represented in Canada by Great North Marketing
Street Price: $1,000(estimated)

Video capture boards for PCs used to be complicated, expensive and highly questionable in the results they produced.

If Miro Computer Products' new MiroVIDEO DC1 tv is any indication, however, the ease of use and quality of end-results is much better than before. And about that high price — we've also learned that Miro reduced suggested retail prices in the U.S. to about US$700 at the beginning of October. A spokesperson from Great North Marketing, Miro's Canadian rep firm, said she expects the board will sell for about $1,000 up here.

The MiroVIDEO DC1 tv board is a 16-bit ISA video capture board that requires a full-length slot, and 10MB of free hard disk space, and needs to be hosted in a PC with a 486 or better processor, 8MB of RAM and Windows 3.1 or above (Windows for Workgroups 3.11 is recommended). All the necessary drivers and DLLs (Dynamic Link Library) files for Microsoft Video for Windows 1.1 are included with the package and installed as part of the bundled software.





MiroVIDEO allows you to capture video and sound from any video source via standard RCA connectors. Be aware, however, that the MiroVIDEO DC1 tv will not provide the sound support by itself. If you want to capture synchronized video and sound from your home movies, for example, you will ➤

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need to make sure your PC already has a sound board (such as Sound Blaster or Microsoft Sound Systems) and the sound software installed.

Getting started

When we first unpacked this video capture board, we were immediately impressed with the high quality of production. The circuit board was very clean, lacking the clutter of jumpers, switches, odd wires and last-minute "patches" that are not uncommon on specialist add-on boards from smaller add-on board manufacturers.

Because the board is jumperless, you configure it entirely in software, allowing you to firmly install the board and put your PC back together immediately, without having to wait until the jumpers, memory addresses, IRQ conflicts and other problems are sorted out.

Having said that, configuring the MiroVIDEO DC1 tv board was not entirely a snap. To start with, our test system was supposed to include an "install" program on the board installation disk which came with it. The install program (which is supposed to run from Microsoft Windows) was not there. Instead, we had to simply install the .DRV file as a new device under Windows for Workgroups 3.11 and sort things out from there.

This process worked reasonably well, except for the fact that the area of memory needed for the video memory range required by the MiroVIDEO was already in use by a network connector card. We had to disable the network card, and include some "memory exclude" instructions in the part of the CONFIG.SYS file that called EMM386, as well as add a EMMExclude line to the SYSTEM.INI file.

If we had the time and inclination, we probably could have fiddled around and found a memory address that would have suited both network card and video capture board. However, be warned that this process may take you a bit of time. Roll on the day when Plug & Play is standard in all new PCs and cards.

With the hardware side of things configured properly, it was time to get started with the software. There are four applications included with MiroVIDEO, the first being Adobe's Premiere (Windows edition) and the other three being part of VideoStudio. VideoStudio included Video Capture, Video Editor and iPhoto Plus.

We started our work with the VideoStudio software by using the Video Capture application. The video we were capturing was from a home movie from a standard Sony Video8 camcorder. It was connected to the MiroVIDEO board via a standard RCA cable — a cable which did not, incidentally, come with the system. The company ought to consider making this simple item a part of the package, as it was annoying to have to scramble around to find an RCA cable to link up the video board and camcorder.

In the US, the company has just started selling a camcorder/microVIDEO DC1 tv board bundle for US$1599 US - which doesn't sound like a bad deal when you consider the C$1399 street price of the video board by itself in Canada. And at that price, we would bet that an RCA cable is included with the system.

Up and Running

Once we hooked up the camcorder to the video board and started running the video

capture software in VideoStudio, we were pleasantly surprised. We pressed the "play" key on the camcorder and VideoStudio immediately began displaying the images from the camcorder on the computer's display in full-color (although at a default speed of 15 frames per second).

This "preview" function allows you to see your video before capturing any portion of it to your hard disk and gives you a better view than you get by looking through the black and white viewfinder on the camcorder. The MiroVIDEO DC1 tv board offers a maximum of 16.7 million colors (using Motion JPEG compression) and provides two-dimensional filtering of images including MPEG (the Motion Picture Expert Group standard for compression). The board also includes its own integrated digital video encoder. You'll get a maximum display resolution of 1600 x 1280 from the MiroVIDEO DC1 tv (although how close you get to that ➤

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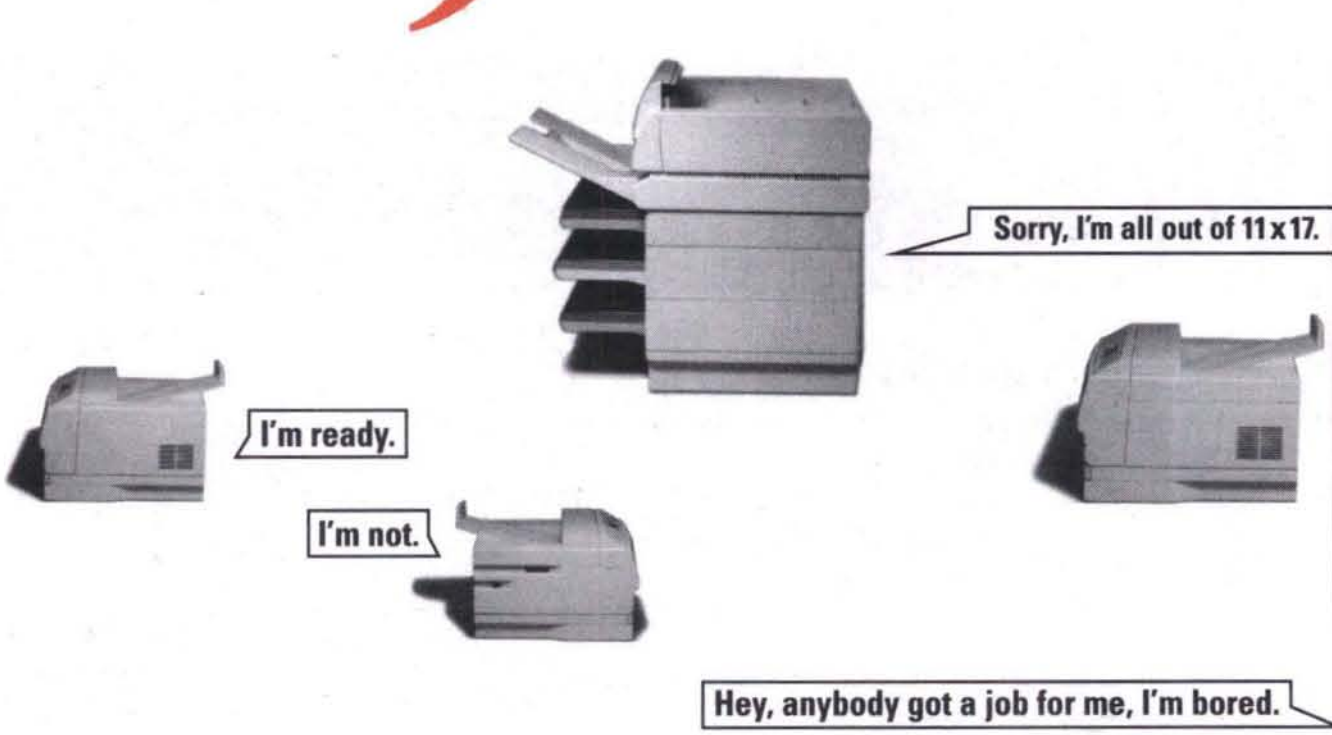

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maximum will depend on your video card and display) and a maximum color depth of 24 bits. You also do NOT need a feature connector (such as PCI or VL-Bus) to install the MiroVIDEO in your PC.

All of this results in being able to get better-than-TV-quality images from the MiroVIDEO board, although you may not want to pay the storage price for this high a quality. The reason for this is easy to see when you start saving files.

A 30-second piece of full motion video captured at 30 frames per second hogged slightly more than 10MB of hard disk space, yet provided output that equaled that which you get on TV. Taking the frame rate down to 15 frames per second reduces the amount of hard disk space consumed by more than 50 per cent, but the motion does begin to look a little jerky on doing so.

It is a credit to the quality of the Video Capture software, however, that choices such as frame rates are easy to make. It is an excellent "on-screen VCR" that provides you with lots of choice and flexibility in not only how you capture your images but also the type of video you can capture.

A number of video types (including S-video and FBAS broadcasting signals) are supported, as are various international video signal formats (including the all-important PAL, SECAM and NTSC standards). The latter is particularly important for those who may wish to have their video work captured and distributed internationally.

By capturing video onto digital PC video files, you completely eliminate the need to worry about whether things are recorded in PAL, SECAM and NTSC. The images from all those different broadcast standards are converted to simple Motion JPEG .AVI files that can be played on any PC with a MiroVIDEO DC1 tv board.

If you want to play your captured video on anything that doesn't have the MiroVIDEO board in it, be prepared to use the bundled Adobe Premiere to export it to another format. While the default .AVI files will play happily with the Microsoft Windows 3.11 Media Player while the board is installed in your PC, they lose the ability to be decoded once the hardware is no longer in your machine.

The video editing software in VideoStudio, meanwhile, offers you the opportunity to do lots of basic video editing on your PC - from digitally splicing together short video clips, to adding soundtracks, to carrying out transitions between video clips. The software provides for 20 different transition effects - including dissolves, box-outs, random blocks, wipes and others.

Beware, however, that this splicing can take up considerable time, particularly on systems that don't have masses of memory or that suffer with slow hard disks. Even on our 486 33 MHz 8MB test system with 240 Mb hard disk, extracting 14 seconds from a 30 second video clip took the system several minutes.

That 14-second clip was also fairly hungry for hard disk space, requiring a not immodest 4.7MB to be stored. Keep in mind, however, that this was once again a 30 frame per second clip. If you lower the frame rate, you can reduce the amount of space consumed.

The other point to make here is just how much compression has actually gone on to achieve even this result. To give you an idea of this, we tried using PKZIP to compress the .AVI file containing the 14-second video clip. The file size we ended up with was only two per cent smaller, demonstrating how highly effective the Motion JPEG compressor actually is. This is even more impressive when you consider that the .AVI files produced by the VideoStudio software are being decompressed and played "in real time" and show no degradation in performance as a result.

One of the reasons for this is that in addition to using Motion JPEG compression/decompression, the VideoStudio software also supports all major Video for Windows "codecs" such as Cinepak, Indeo 3 and MS-Video 1.

The final point to make about the VideoStudio software is that you are not limited to editing video with it. Using the bundled iPhoto plus application, you can also carry out image editing of video "stills" (or other image files) in 24-bit TrueColor. Most popular graphics application file formats are supported, including BMP, TIFF, PCX, EPS and JPEG.

So there is lots to offer in the VideoStudio software bundled with this innovative board, to say nothing of the power of the Adobe Premiere software, already well-established in this end of the market. The whole package is a great way to get started with video editing on your PC. It is still a little on the expensive side, but should provide you with quality results and enough flexible editing tools to yield the final product that you want. If you have $1,000 or so to spare and love to work with video, this has to be high on your "I want" list. ❑

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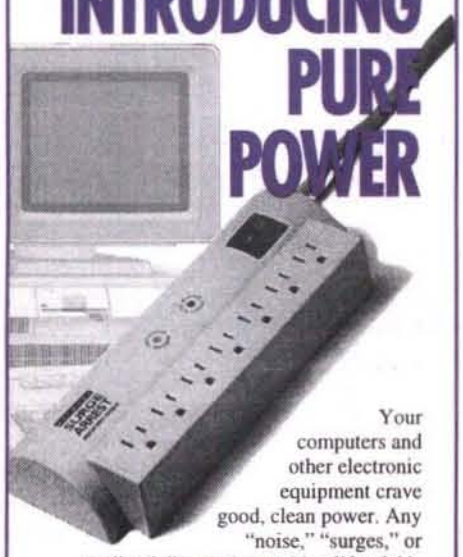

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BY GORDON GOBLE

As I write, Homer Simpson sporadically lets loose with a wonderfully disgusting belch at every inappropriate keystroke. Homer's superlative audio gymnastics warn me that I can't go to the end of a line that I've already reached, that I can't choose an icon that I've already chosen, and (burp!) much more.

Earlier, as my computing day began, I was greeted by the opening strains of Beethoven's Fifth (in stunningly realistic and bombastic fashion), and when I leave the computer for better things at day's end, Ren Hoeck (you know — Stimpy's best friend) informs me in no uncertain terms that I am a "bloated sack of protoplasm." Why I permit Ren's daily abuse is something I will undoubtedly be discussing with my psychologist, but the fact that he hurls it, in a voice that perfectly mimics the original recording, and that a symphony orchestra sounds pretty darn close to the real thing, and that Homer is Homer is audible proof that PC audio has come a long way, baby.

While good sound undoubtedly has much to do with amplification and speaker quality (I do run my compu-sound through a free-standing amp and good speakers), the reason my sounds are so realistic, so true to life, can be credited to gadgetry located inside the computer itself. Amps and speakers have been around for quite some time, but the computer-based source has just recently experienced the amazing developments that allow such awesome audio delights to become a reality.

Today, computer game players can hear the SWOOOOSH of an approaching aircraft as it soars across the room, the suit and tie crowd can accompany their computer-based business presentations with their own vocal strains, and computer using musicians can accurately compose their masterwork, all on the same personal computer.

So, what makes all this tantalizing ear candy possible? Why...sound boards, of course! The constant stream of innovation being poured into this little device has the audio end of computing experiencing some of the greatest strides of any facet within the industry. In fact, the latest generation of sound boards (just now being released) alters the audible landscape forever (or at least until the next generation arrives).

Later, we'll look specifically at three sound boards, Creative Labs' Sound Blaster AWE32, Advanced Gravis' Ultrasound Max, and Logitech's Soundman Wave, but for now, a little history and a brief overview of the subject matter are in order.

Beeps and Squawks

Way back when — when the earth was still cooling — computers were mute. Really, there was little reason for them to make noise as most hackers jumping into this brave new digital world were far too busy just trying to boot, load, and run. But in the mid-seventies, teeny tiny speakers began to appear in personal computers, producing a robotic, rather digital "beep," that would generally come into play when the user needed boot-up and assorted error notification. Inspect the interior of today's computer and that very same style of speaker remains resident, proving that some things are just too darn good to change (Not!).

This puny on board speaker was, and remains, ineffectively positioned with no volume control, but nevertheless it initiated computer audio. Within a couple of years, "chirps and squawks" were added to its repertoire and suddenly, a fatal system error could be defined from something less threatening.

Meanwhile, the technology of "synthesis," the electronic simulation of sounds, was quickly developing elsewhere. Companies such as Yamaha were at the forefront, and musicians were becoming increasingly capable of generating a reasonable facsimile of a trumpet, or a guitar, or a drum merely by sitting at a keyboard.

And elsewhere, home video game manufacturers such as Mattel (remember Intellevision?) and Coleco were offering games accompanied by various levels of noise to simulate cheering crowds, explosions, the crack of a baseball bat, etc. Soon, home computer beeps, chirps, and squawks took on various new shapes and forms, but the computing world was ready for the next step.

Enter the Sound Card

Sporting a Yamaha-made synthesizer chip that could perform all the necessary mathematical operations with enough speed to emulate music, the first AdLib sound board hit the market. As programs began writing code to support this new arena, computer users everywhere were presented with a whole new world of sound.

But it was awkward sound, with short low tones representing drums, and longer low tones representing electric bass notes (or maybe that was an explosion!). Higher tone combinations might depict the whine of an aircraft, or a flute, but because the card didn't have any digital audio capabilities (meaning actual human voices could not be incorporated), verbal utterances were most often simulated with a garbled audio burst.

Pre-recorded sound effects and voice emulation wouldn't arrive on the scene until Creative Labs developed their first Sound Blaster. The Sound Blaster was an immediate success, and even today, is the standard to which most game, music, and business software is written.

Cranking up the Technology

The original Sound Blaster worked on an 8-bit format. That is to say, eight bits (as in bits and bytes) were used to digitize a sample of sound. At the time, the results were earthshaking. But as more players entered the burgeoning market, it was only a matter

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of time until Sound Blaster's 8-bit resolution gave way to bigger and better methods.

Enter 16-bit resolution and 65,536 levels of sound, quite a step over the 256 generated by an 8-bit card! Today's latest boards (such as the examples to follow) all work on that 16-bit platform, but with vast improvements.

Before we go any further, a quick tip of the hat must be made to digital sound pioneer Roland, which was busy with its own projects during this time of "Card Wars." The MT32, a stand-alone desktop unit that came into being way back in the mid-1980s, did wonderful things to computerized music.

Based on a synthesis technology Roland dubbed "Linear Arithmatic," the MT32 quickly became a (somewhat expensive) choice for musical purists. To this reviewer anyway, the MT32, often heard on display at high end computer shops and music stores, was responsible for allowing me a glimpse into the capabilities and future of PC audio. More importantly, Roland's toying with methods of synthesis was a spark that led to the fire of revolution we see today in this new breed of sound board.

Synthesis, you see, is multi-leveled, and not all those levels are of equal stature or audio ability. For years, Frequency Modulation Synthesis has been the norm in computer audio. FM synthesis is built on algorithms that artificially create the subtle nuances of a given sound wave.

Roland upped the stakes in offering their Linear Arithmatic technology, but the current cutting edge is Wave Table Synthesis, wherein a very small recording of an actual instrument is built upon to create every sound possible from that instrument (or sound effect). As you will see, the new generation of sound board incorporates this technology, and comes darn close to recreating true-to-life audio in almost every aspect.

We've come this far into this article without using the dreaded M word, but Multimedia — bringing with it an increasing demand for sound quality, combined with the digitizing of music and the quest for realism from gaming fanatics — is contributing to this new and somewhat expensive gain in sound board performance. So if any of the preceding areas of computing are of interest to you, please read on, as we take a look at some great sounding new products.

Sound Boards: The New Generation

The trio of sound boards we'll be discussing here is a sampling from some of the premier names in the business, yet is by no means all-encompassing. These products feature a number of similarities, some innovative, others duplicating tried and true technology from the past. A quick *The Computer Paper* check list shows the following important common traits:

1) None of these babies will run on anything below a 386 processor.

2) Each has CD-ROM interfaces (although each card won't support each and every drive directly — check packaging before purchase. If a certain drive is not directly supported, adapter cables and/or cards may be available.)

3) All are MIDI compatible. (MIDI, standing for Musical Instrument Digital Interface, is the recognized protocol for the interchange of date among musical instruments, synthesizers and sound boards.)

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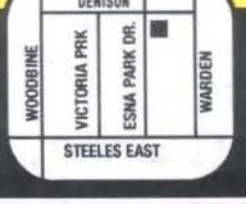

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8) All boards offer both the new wave table and older FM synthesis. In theory, this means that the best possible sound will come even from software written only to FM technology.

9) Each board supports audio CD play, so we can all kick back and crank some ABBA while we compute.

From first glimpse, while the wallet remains in the pocket, even the casual computer user will observe something new in the updated world of sound boards: their boxes are bigger!

There is good reason for this. While the boards themselves have indeed grown some, much of the packaging has been filled with bunches of diskettes containing sound related software (the Ultrasound Max is bundled with a ton of associated programs), accessories (the Sound Blaster AWE32 comes with its own sleek little microphone and tons of software!), and manual after manual after manual (the AWE32 comes with seven!).

Yes, fellow audio buffs, it seems that as sound board potential and capabilities grow by leaps and bounds, so too do their complexities. Finding a free 16-bit slot is just the beginning in this wacky journey to audio excellence.

To be fair, not all written instruction refers to set-up and installation. The new wave table boards are full of innovation and capable of a whole lot more than their earlier counterparts, so appropriate documentation is essential. Yet much of the paperwork drudgery will be of interest only to musicians and/or those who wish to record their own sounds. Therefore, the average computer user won't ever need to crack open the bulk of the written material.

For gamers and those who wish merely to playback pre-recorded audio, the procedure will be much simpler. There are the usual switches to switch and jumpers to jump (with the exception of the SoundMan Wave, more on that later), but on the whole, set-up requires the usual Einstein-like basic knowledge of the computer's inner workings.

As for compatibility (game players take note), a quick caveat emptor must now be extended. While games and entertainment software containing code written directly for any of these boards will come frightfully alive to even the most tone-deaf ear, software that does not contain specific code may or may not.

All three boards indicate a compatibility with games written for AdLib, Roland, and earlier versions of Sound Blaster, yet certain audio bits within said games may become, shall we say, somewhat interesting. Playing some of these non-specific games may require the addition of switches at the end of command lines when loading, or other tedious and specific complications, and some older games may not be audible at all (although this is indeed a rare scenario).

The good news is that this audio revolution is definitely here to stay, and by the time you read this, patches will be popping up everywhere, while new games will be taking full advantage of the wave table technology. Buying into one of these units now would seem to be a smart move into the future, but keeping an old sound board around for a while has its advantages.

Gravis Ultrasound Max

from Advanced Gravis
1-604-431-5020

The first board to incorporate wave table technology, the Gravis Ultrasound Max (GUS, for short) is the first of two really big things (the other being the Phoenix, a visually spectacular two-handed joystick/ gamepad/ throttle/ everything-but-the-kitchen-sink-device) due this year from Burnaby, B.C.'s Advanced Gravis.

So, how does it sound? Well...in this board, wave table technology is partnered with something Gravis calls 3D Holographic Sound, supposedly a sort of audio virtual reality. More than just a marketing ploy, 3D

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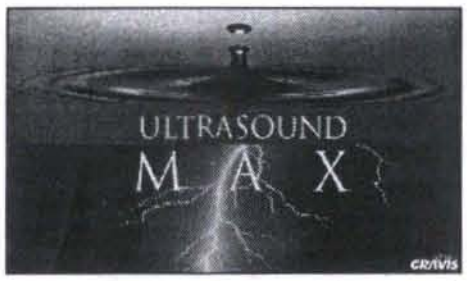

Holographic Sound, supposedly a sort of audio virtual reality. More than just a marketing ploy, 3D Holographic Sound honestly seemed to add something to the depth of music and sound effects in entertainment software that had been written specifically for the GUS.

Doors opening and closing emanate from a different part of the room than the musical score, footsteps seem to plod across the floor, etc. Naturally, and as is the case with all the boards here, there was a noticeable improvement in music. The GUS board is a powerhouse, and instrumental pieces were loud and dramatic, sounding that much closer to the real thing. Synthesis isn't perfect, and certain instruments will still carry a teeny-tiny digital edge in all the new boards, but this is not a big problem.

Games tested with this and all the boards here included Doom, a soon-to-be-released CD-based product from Accolade called Cyclemania, IndyCar Racing, Star Control II, and Lemmings. Generally, spectacular things happened to the musical tracks in specific-written games such as Doom and Cyclemania. I heard choirs where none had before existed, cymbals where something altogether different had resided, and my ears were made happy. Even in products not written specifically for the GUS, musical alterations were credible.

But specific sound effects in older games were sometimes mutated with undesirable effects. Engine notes and crashes in IndyCar, for example, were preferable on my good old Sound Blaster. Even with the recommended command line switches thrown, this condition did not improve, and it must be mentioned that gamers should be wary of software not written expressly for the GUS.

Of the three boards tested here, however, GUS appears much more frequently in entertainment software set-ups, and for current specific compatibility is the board of choice.

For those interested in recording their own sounds, the GUS is capable of simultaneous recording and playback with up to 32 simultaneous digital channels (freeing up processor resources), and there are 197 individual instruments available (197 is the highest total available of any board here, and that is good because the higher this number, the more actual instrument sounds are able to be produced without substitution).

Bundled software includes Patch Manager, a simple sound patch management program that showcases the diversity of the Ultrasound Max. With Patch Manager's on-screen keyboard, one will soon understand how just a single patch can become either haunting or joyous, depending on where it is played on the keyboard.

A personal favorite patch is FX 6 (goblins), an eerie sci-fi/horror/echo that sounds so un-digital that it will surely pop up again in one's nightmares. Other bundled software of interest begins with Patch Maker Lite, a Windows based application for the modification and creation of new instruments; Wavelite, a Windows based .WAV file editing tool, and Midisoft Recording Session, a Windows music composition and sequencing program.

Other features include a speed compensating joystick port that eliminates drift in systems up to 100 MHz, and built-in interfaces for Sony, Mitsumi, and Panasonic CD ROM drives.

Sound Blaster AWE32

from Creative Labs
1-800-998-5227

Creative Labs' latest entry into the realm of sound boards is the awesomely named Sound Blaster AWE32, a total package that will not only improve one's musical enjoyment, but keep one busy for weeks simply trying out new stuff .

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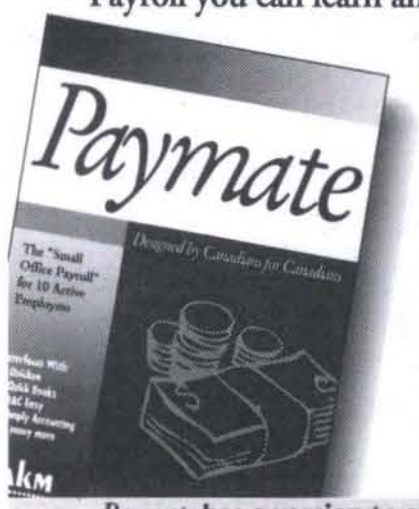

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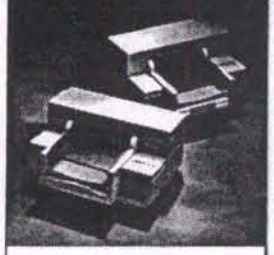

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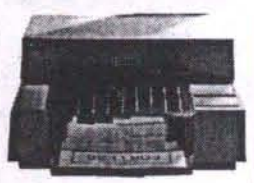

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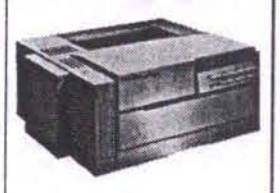

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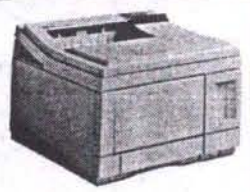

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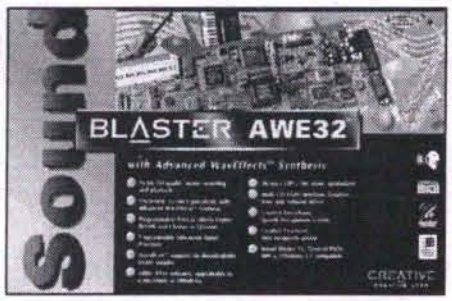

ing on wave table synthesis technology, and like the GUS, offers a 32-voice polyphonic synthesizer. In playback testing, the AWE32 sounds not unlike the GUS (complete with its own successful three-dimensional sound placement technique, called QSound), but with a few exceptions. On the upside, the AWE32 comes with built in reverb and chorus (are you listening, musicians?), two features that certainly add depth to music. The AWE32 also comes with its own desktop microphone — sleek and futuristic in design — with which you can enter voice commands while in Windows, thereby helping to stamp out computer deafness.

On the downside, the AWE32 seemed to pack less audio wallop than the GUS and I found myself cranking up the volume on my out-of-computer amplifier in order to compensate. Additionally, the AWE32's 128 General MIDI instruments were a substantial decrease from the GUS' 197. Finally, although Creative Labs assures that thousands of titles will soon come with AWE32 code (and one must believe that a Creative Labs sound product will induce support), very little in the way of supporting software (can you say Doom) is currently available.

Within Windows, this sort of thing just doesn't matter, but I must admit to having no DOS based games that would take advantage of AWE32 audio processing.

However, as for compatibility with older (FM synthesis) software, programs such as IndyCar and Lemmings were up and running and sounding as they always have without so much as the throw of a switch or command line addition. Undoubtedly, the fact that all these games had been written to previous Sound Blasters had something to do with such a pleasant discovery, and prospective purchasers can be assured that most older programs certainly won't sound any worse (and only better as AWE32 patches are written). The AWE32 comes with built-in support for Creative, Sony, and Mitsumi CD-ROM drives.

Bundled software includes Twelve Tone System's Cakewalk Apprentice for Windows, a MIDI sequencer for the seriously hooked; Text Assist, a good Windows-based text-to-speech program (with the odd mispronunciation); HSC Interactive, with which multimedia maniacs can create presentations with a minimum of frustration; and a whole slew of other soft stuff.

Soundman Wave

from Logitech
1-800-231-7717

As alluded to earlier, there is one really good reason to love this board. But that reason is so startling, so shocking, that you must place yourself in a seated position before learning of it. ...Ready?

This board has no jumpers! That's right, the SoundMan Wave is jumperless, and that means once this baby has been physically installed into its dark computer recess, it doesn't have to come out again! Potential configuration conflicts that in other products involve repeated and time-consuming board removal and physical modification are now completely software resolvable with this, Logitech's latest entry into the world of PC audio.

In testing, the SoundMan Wave software installation procedure successfully dealt with a scanner DMA conflict in a matter of seconds, resulting in at least one less Hardware Headache for this reviewer. In fact, the entire install procedure, enhanced with sound and graphics, and automatically popping into Windows for the Windows portion (what a concept!) was enough to make a grown compu-nerd cry for joy.

SoundMan Wave's relatively small size, in relation to the other products reviewed here, results in more in-cabinet space for cables and wires — another plus.

As for audio proficiency, the SMW is on par with other wave table boards — musically astounding — although, much like the AWE32, it doesn't seem as powerful as the GUS. Also, there isn't yet a whole lotta software written directly to it, so patience is the keyword while waiting to sample wave table delights. The SMW features 44 voices (vs. 32 for the other two boards) and has 128 General MIDI instruments built in. It is advertised as being 100 percent compatible with current board standards, and running FM games without direct support, such as IndyCar and Lemmings, proved to be no problem at all.

The SMW package is less complex than either of the other boards reviewed here and that means less work, but also less potential experimentation. Logitech documentation, as always, is clear, sensible, and written for the non-technically minded person. Bundled software of note includes MCS MusicRack, a convenient primer in sound mixing, .WAV file recording and MIDI playing; Recording Session, a more advanced MIDI program; and BeSTspeech Readout, a text-to-speech reader that doesn't sound quite as good as AWE32's Text Assist. Finally, CD-ROM drive users may have to purchase separate connector cabling (available through Logitech).

Also from Logitech comes the Sound Advice CD, an audio compact disc that is geared to educate both resellers and end users about PC sound. Industry professionals discuss in layman's terms the recent advances in compu-sound, followed by several musical selections that will emphasize the differences between various technologies, such as wave table versus FM synthesis. The no-cost package also includes a $10 rebate coupon for any Logitech product, a good deal in anyone's books. Serious parties can call Logitech toll free at (800) 889-0046. ❑

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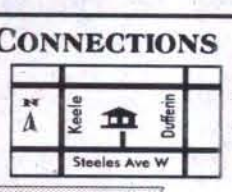

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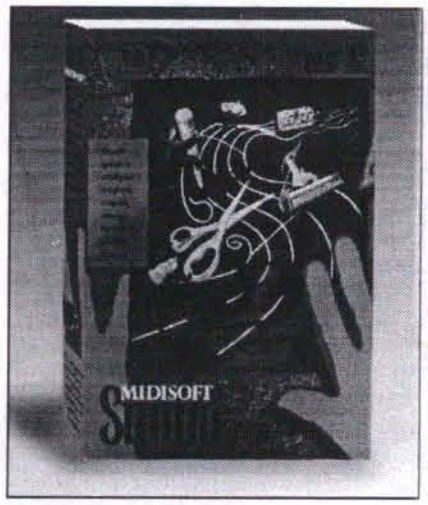
PC MIDI SOFTWARE

Variations on a Theme

Reviews of Music Mentor with Recording Session, MusicMagic Songbook, Multimedia Music Library, and Sound Impression.

BY MARK HANEN



Joni Mitchell sings softly on my stereo, creating images of the open road and freedom from phones and deadlines. But phones ring, deadlines beckon, and I trade the freeway for the colorful flotilla of Midisoft's music software awaiting atop my 486.

The flagship in Midisoft's fleet is Studio for Windows, a powerful sequencing program for composing, editing, and printing music (previously reviewed in the June '94 issue). Studio for Windows is for professional musicians and features standard music notation that appears on the screen in real time during recording, editing, and playback. It records up to 32,000 tracks and offers several interfaces, or views, for working with your compositions.

The score view presents music notation while the MIDI list view displays your composition as actual MIDI data. There is also a studio panel view and a tape deck view. My favorite is the mixer view, offering point-and-click control of loudness, pan, mute, solo, chorus, reverb, and instrument selection.

Music Mentor With Recording Session

Because not everyone needs the musical equivalent of a luxury yacht, Midisoft takes the basic engine that drives Studio for Windows and markets it in several creative ways. The package with the closest look and feel is Recording Session.

Recording Session comes bundled with Music Mentor. If you look for the box in the store it reads "Music Mentor with Recording Session." They are separate applications, but they are designed to interact with each other. Mentor is a tutorial program; Session is a sequencer.

Recording Session is similar to Studio For Windows, but not as powerful or flexible. Three critical differences must be noted immediately: 1) Recording Session will not print your musical score. 2) Recording Session plays and records 32nd and 64th notes but does not display them. 3) It has no provision for MIDI sync. This means that you cannot use Recording Session to control more than one sequencer at a time.

Session is aimed at students rather than professionals. Nonetheless, it does retain many of Studio's best features including score, mixer, and MIDI views, real-time recording from a MIDI keyboard, real-time notation, and a scale velocity command that automatically creates crescendos and decrescendos.

Also, like Studio it offers sophisticated transcription abilities and a quantize command permitting three kinds of quantization. There is, unfortunately, no undo command available when transposing or quantizing.

Music Mentor, Session's companion, is an enjoyable music tutor that teaches music fundamentals and music history using audio examples played through your sound card, on-screen scores, and good old-fashioned text. Mentor is divided into three parts: Basics, History, and Notation.

The Basics section covers six areas: melody, rhythm, harmony, texture, timbre, and form. The History section explores each of these areas in the context of Early, Baroque, Classical, Romantic, and Modern periods. The Notation section explains how to read music.

Mentor does not pretend to replace books, teachers, or fine recordings. But what distinguishes it from a textbook or tape is that the three sections are dynamically linked to each other, as well as to Recording Session.

For example, you might start by clicking on the Harmony button in the Basics menu. When you have finished reading about, and listening to, major and minor triads, you can click the History button. This moves you to an area that explains and demonstrates how Baroque composers used harmony. One of the examples used is Bach's E minor Bourree. From the History section, you can invoke Recording Session and Bach's Bourree will be automatically loaded. In Session, you can change the bouree's key, alter its tempo, change instruments, and mute or solo various parts.

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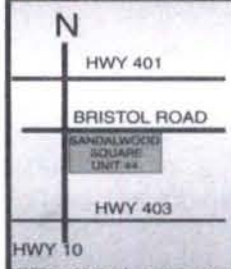

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From Recording Session you can return to your point of departure in Mentor. The only problem with this process is that every time you move between Mentor and Recording Session, you close one program before opening the other. This really slows things down. But the ability to play, and play with, musical examples certainly enlivens the study of history and theory. Music Mentor and Recording Session are a solid match.

MusicMagic Songbook

Another variation on Midisoft's theme is found in MusicMagic Songbook. Available on CD-ROM, this package comes with about 150 songs, a song player called Songbook, and a limited version of Recording Session, now called MusicMagic because it has no record button.

Recording Session and MusicMagic are built on the same platform: Studio for Windows. However, as we drift even further away from Studio, power and performance are sacrificed. MusicMagic is a pleasant sequencer, but it lacks, among other things, one essential component: you cannot input or record music from a MIDI instrument.

As was the case with Music Mentor and Recording Session, MusicMagic and Songbook are separate, but interactive applications. Songbook is a friendly song player that asks you to choose a music category and then a song within that category. Like all of Midisoft's programs, it's a case of point and click.

If you want to edit the song, remix it, mute or solo tracks, or simply follow the score, you select Score View, and Songbook is closed while MusicMagic (the sequencer) is opened.

All of the songs are in standard MIDI format, so they work with any sequencing software. However, Songbook itself is proprietary. Of course it plays the 150 MIDI files that come with it on the CD, but it won't play other MIDI files. MusicMagic, on the other hand, plays any standard MIDI file.

Songbook is proprietary because it does a bit more than play back the songs. In two of the seven musical categories, Kid's Tunes and Holiday, lyrics appear on the screen, and in all other categories, including Classical and Pop, a brief discussion of the selection appears as the music plays. The annotations are short, informative, and well written; the arrangements traditional and pleasant. But the written documentation is spartan.

When you buy Music Mentor with Recording Session, you receive a 300-page manual, with 200 pages devoted to Recording Session. MusicMagic has a 47-page booklet, half of it explaining Songbook. It's true that the online help for MusicMagic is extensive, comprehensible, and context sensitive, but I like to have a lifeboat handy even if I'm wearing a life jacket.

As is the case with Music Mentor, one reason to consider buying MusicMagic Songbook is the inherent fun and power of the sequencing software. Professional musicians need Midisoft Studio for Windows. But casual musicians and beginners will have fun with either Music Mentor or MusicMagic. I prefer Music Mentor because it has superior documentation, more complete screen displays, greater access to MIDI parameters, and excellent music tutorials.

Multimedia Music Library

The music libraries shipped with Mentor and Songbook are good starter sets. But, if you are looking for original compositions that you can use in your own multimedia presentations, then consider Midisoft's Multimedia Music Library.

Library is the musical equivalent of clip art. It comes with about 350 royalty-free musical clips, and it's beautifully organized.

Using a format similar to Songbook, Library's front-end software works like a database. Called MIDIBase, it categorizes each song by library, title, length, description, and comment, as well as several other fields. Previewing a theme is only a click away.

Say you're looking for a piece of music to launch a new product. Try the library called Big City Beat. There you'll find a main theme with nine variations ranging in time from two minutes to five seconds. MIDIBase describes the theme as an "agitated, intense, hard rockin' guitar feature." In a mellow mood? Click on the Gentle Inspiration library and preview "a soft, simple piece with a positive emotional quality."

The songs are great for multimedia and desktop presentations since they are royalty-free. It would take a constitutional expert to decode every noun and verb in the Music Use License, but it is clear that you can use the

➤

music at business meetings and trade shows as long as you do not make or cause to be made in excess of 100 copies of any song. That's good enough for me. Of course you can't sell the songs or bundle them with your own software. They are intended for use as part of your multimedia presentations.

All the themes and variations I listened to were of professional quality. They were solid, original compositions, professionally arranged, recorded, and sequenced. Provided you have a good sound card, such as a Roland Sound Canvas, high-end speakers, and a good ear for the music to create the mood you want, Multimedia Music Library will enhance your presentations 10-fold. And just for good measure, it comes bundled with MusicMagic.

If Studio is a luxury yacht, then Recording Session is a power boat, and MusicMagic is a dory. Music Library is just that, a library, and it would be at home aboard any of the aforementioned vessels. So far, the analogy works, but then we are presented with Midisoft's Sound Impression.

Sound Impression

Sound Impression is a different kettle of fish. It manages not only MIDI files but also wave (WAV) files and audio compact discs. It is MIDI song player, a CD song player, and a waveform editor.

Sound Impression has the look and feel of component stereo equipment. Four components are stacked on your screen, each offering a wide selection of buttons. Since some of its graphics can be confusing, let's start with an easy component.

The CD player is the bottom component in Sound Impression's rack. Provided your system has a music compliant CD-ROM drive, you can play music CDs, program play lists, and save the lists to disk. There are skip, scan, loop and eject buttons, and with the mixer panel you can set volume and balance. Without resorting to a technical discussion of frequency response, suffice it to say Joni Mitchell sounds just fine on my computer's CD.

MIDI files are also easily managed with Sound Impression. Using the MIDI component, you can load up to 48 files at once as well as create and save play lists. Volume, balance, skip, scan, loop, and pause buttons are present. While Sound Impression manages MIDI files, it does not edit or record them. It is not a sequencer.

Sound Impression, does however, record and edit wave files. At this, it excels. It will record waveforms such as voice or music from microphone, or from CD or tape line inputs. Using a microphone plugged into my Sound Blaster, I recorded my voice as a wave file. Technically, everything went well, but no amount of editing could redeem my vocal styling, although reversing the waveform did mask a lot.

On a more serious note, I recorded a few seconds of the motorcycle sounds used on the old sixties hit, "Leader of the Pack," then used Sound Impression's sophisticated functions to play with the waveform.

My motorcycle sound appeared on the screen with all the peaks and valleys associated with waveforms. First I selected a portion of the sample by clicking and dragging over a small area of the waveform. Applying a noise filter cleaned up unwanted pops and hiss. I added a little echo, experimented with chorus, flange, fade, crossfade, gain, and pan — modified the sample size and rate, switched from mono to stereo, and with a little work, produced a clean sound effect that could be embedded into a spreadsheet, word processor, or any OLE application.

The only reservation I have about the wave editor component is that the buttons that appear during an editing session bear cryptic graphics. It is impossible to deduce their functions. But, by pointing to a button and clicking the right mouse button, a window opens announcing the button's function.

Sound Impression is an impressive, functional, and intriguing package. A handy manager for CD-ROMs and MIDI files, it also weathers the stormiest wave files with grace and ease. Like most of Midisoft's software, I found Sound Impression easy to install and well-documented with thoughtful on-line help screens.

If you're interested in Midisoft's software, but hesitant to buy, start with a copy of Midisoft's Sound Explorer. It's a CD-ROM sampler that lets you test drive limited versions of all the software mentioned above as well as one other program called The World of Music Sampler. It's a great way to get your feet wet. ❑

About the Author Mark Hanen lives, writes, and works in the cold, moral north: that's Mile 0, the start of the Alaska Highway. By day, a teacher for Northern Lights College, by night, a writer, MIDI musician, and composer.

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Plug and Play CD-ROM With Aztech's Explorer Deluxe

BY GRAEME BENNETT

Product: Aztech Explorer Deluxe Personal Multimedia System
For: PC
From: Aztech Labs
Price: $549

The Aztech Explorer Personal Multimedia System is the first product we've seen that fully incorporates Plug and Play technology using the Intel Configuration Manager Plug and Play software. All the settings on the hardware can be configured without resorting to setting jumpers, switches, etc.

Once this utility is installed, you are theoretically ready to go if you already have a PC with Plug and Play capability (but who does?). The rest of us also need to run something called a Configuration Assistance utility.

Once the Intel utility had successfully run, we cycled the power on the PC and installed the sound board. After a reboot, the system automatically recognized it as "Aztech Plug and Play ISA Sound Card." So far so good.

Then, we had to install the Explorer software, as you would with any other CD-ROM drive. So, in essence, the "Plug and Play" didn't speed up the installation, it added two additional steps. However, the whole idea of Plug and Play is jumperless I/O configuration, and in this regard, the Aztech setup worked like a charm.

However, it created conflicts with our network card and software that we were not able to resolve. So much for plug and play.

The Aztech hardware proved to be a better-than-average performer, with fairly realistic wavetable sounds, plus FM synthesis and perky double-speed CD-ROM access.

Like several other sound cards we've seen recently, the Aztech kit comes with a sizable collection of bundled software on CD-ROM.

• audio utilities from Voyetra, including audio recording, MIDI and audio CD playback, Monologue for Windows command recognition utility, and the capability to add your own sound effects to system events. There's also an Audio Calendar.

• Aristo-Soft's Wired for Sound Pro CD - a collection of sound effects, animated cursors, bad impersonations (Bill Clinton exhorts you to register your software, Clint Eastwood extols the virtues of the 486 CPU, a sultry damsel asks if that's a mouse in your hand, and so on), and other silly stuff.

• Midisoft Session — a "lite" version of Midisoft Studio, a MIDI sequencer with musical notation.

• Action — a "lite" version of Macromedia's multimedia authoring toolkit. You'd probably never use this software unless you wanted to create your own multimedia presentations.

• Professor Multimedia — teaches you how to use Windows. Also contains some audio utilities.

• Outpost. Although we were prepared to be disappointed by another memory hogging DOS-based game, we were pleasantly surprised by the wit and humor of this Windows-compatible title from Sierra On-line, which requires as little as 1644K of hard disk space — another welcome surprise. The animated photorealistic 3-D graphics in this game are beautiful — similar to the kind of spaceship scenes you might see in Babylon 5 or The Last Starfighter. The animations are accompanied by a rousing semi-symphonic rendition of Holst's Planets.

Perhaps the company will come out with a version that supports full-screen animations in the future. That would address our only complaint with the graphics in this version. Graphics seem a little less stunning somehow when they're the size of a playing card.

Nevertheless, it's an intelligent, non-violent (well, as non-violent as one can be when the entire population on planet earth is destroyed) game that looks great.

• Software Toolworks Multimedia Encyclopedia CD-ROM. We're sure it's better than no encyclopedia at all, but it bothered us a little when the startup screen announced that this was the "1992 edition."

We're reasonably impressed with all of the software we've seen from Software Toolworks; this encyclopedia has good searching capabilities and enough pictures, sounds and video clips to keep things interesting.

• Software Toolworks World Atlas CD-ROM. Maps from the world of 1992. The Former Soviet Republics are shown correctly. It's your basic atlas — nothing too fancy here, but it does the trick.

Sounding Off

Despite the fact that the Aztech sound card supports wavetable sounds, they aren't of particularly good quality. We found the samples to be rather noisy, with the kind of sound degradation typical of heavily compressed waveforms. To its credit, the card contains waveforms for the full range of General MIDI instruments, including fairly realistic pianos, string ensembles and drums.

Turning off the Mute button on the Mixer volume control revealed a lot of noise that the Mute function otherwise supresses — another giveaway that the card is not exactly up to audiophile standards. However, these fidelity quibbles are not serious gripes. Even mediocre wavetable audio is preferable to our ears over sounds produced via FM synthesis. Our main complaints with the Aztech system are the lockups related to our network software. We sucessfully installed and configured several non-plug-and-play audio cards without these hassles. Perhaps it was foolish to expect more in this case. Maybe next year? ❑

Contact: Aztec Labs, 1-800-886-8859; or Morice Assoc. 514-683-0053

Gravis Gets Personal With Piano System

BY GORDON GOBLE

Product: The Gravis Personal Piano System
From: Advanced Gravis

Wave table synthesis, the latest technology to sweep through the world of PC Sound, does wonderful things for computerized music. Most major software houses are now writing code for the new wave table standard, and computer users interested in improved audio output will no longer be singing the blues. At last, musical instruments sound like musical instruments.

But there will be those among us interested in using wave table to its full potential, and for them, great output is just the first part of a musically creative equation. These artistic souls will want to compose and score their own marvelous works, learn a little bit about the piano/synthesizer/keyboard, or perhaps gain a little insight into musical theory. The Gravis Personal Piano System from Advanced Gravis is aimed directly at that audience and scores a direct hit with what is truly a complete package at a surprisingly low price.

Yes, there is a MIDI keyboard, but more on that later. The Gravis Personal Piano System includes everything but the proverbial kitchen sink, starting with the Gravis UltraSound wave table synthesis sound board. Not a modern medical procedure, but one of the new breed of audio cards that, quite simply, takes any computerized musical sound to new heights, the UltraSound is the little brother of the UltraSound Max, documented elsewhere in this issue. The bevy of diskettes accompanying the UltraSound board is full of programs that showcase its abilities, however it must be noted that the UltraSound, unlike its smarter sibling, is incapable of 16-bit high fidelity recording. 8-bit recording is all you'll get from this board, and although that won't adversely affect playback, any custom-made musical marvels will require the additional purchase of an expansion daughter card for proper recording.

The GPPS package also includes a pair of powered and shielded speakers that supply ample sound, a MIDI adaptor for connecting keyboard to computer, all necessary cabling, and Musicware's Piano, a thorough software/book tutorial that teaches the basics of both the piano and music theory. From the viewpoint of a semi-competent guitarist who knows little of actual theory or the piano, the Piano teaching guide made a lot of sense to me, dealing with issues interactively and from the ground up. Piano is certainly a lot more enjoyable than the ramblings of my elementary school music teacher, one Miss Johnson, who had some unfortunate and profound influences on my young psyche. But I digress...

The co-star of this show is the four octave keyboard itself which, with a four octave range, full size keys, and touch sensitive keypad that really works as advertised, mimics many of the qualities found in stand-alone units that retail at twice the price. Although bereft of any controls such as volume and instrument selection, the unit has a great feel to it, and the software/UltraSound combination provides a great deal of flexibility for the aspiring musician. The UltraSound board has 192 General MIDI instruments built in to its circuitry, and playing a synthesized Grand Piano is as easy as playing a synthesized helicopter, gunshot or fretless bass. Needless to say, hammering on a real keyboard beats the heck out of an on-screen imitation.

As any computer user knows, installing a new piece of hardware ranks Number 1 on the list of least favorite pastimes, but once the UltraSound is configured and set up (actually a relatively painless task), the rest of the procedure is a breeze. Keyboard plugs into MIDI adaptor, MIDI adaptor plugs into power supply and joystick port, and voila, you can take that old piano that claims half the living room and give it the old heave-ho. Why, the aforementioned MIDI adaptor even has two built-in joystick ports so that the family game players aren't left out in the cold!

The Gravis Personal Piano System is a versatile package that addresses a number of issues without breaking the compu-bank. Retailing at less than $600, it must be considered a best buy. ❑

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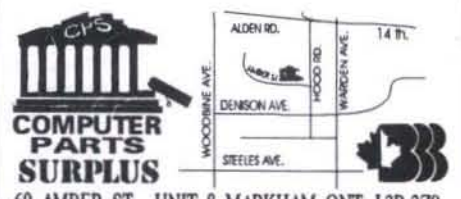

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Running Out of RAM

Why the *!?& Do I Need More RAM?

BY ROEDY GREEN

Question: One of my programs complained it did not have enough RAM. I bought eight more megabytes. It is still complaining! What gives?

Answer: You have implied two questions:

1. Why is this happening to me?
2. What can I do about it?

To understand why this is happening to you, you need to understand a little history. Although there are only a few physical kinds of RAM, there are many different ways of accessing it. You may have enough physical RAM, but have run out of the kind your program wants to access. It is most likely hungry for conventional RAM, though it could also want more expanded, extended, DPMI, GDI or System RAM.

Sometimes you can create more of the kind of RAM your program wants from your physical RAM, and sometimes you cannot. When you can't, you have to find ways to reduce your usage of the particular kind of RAM in short supply.

What Is RAM?

RAM stands for Random Access Memory. It is your computer's high speed, short term memory. When you turn the power off, the RAM forgets the entire contents of this memory. If you had a 1MB machine, the memory is organized into 1,048,576 cells numbered 0 through 1,048,575. Each cell can contain one character (letter of the alphabet, piece of punctuation or digit), or an 8-bit binary number between 0 and 255.

To handle bigger numbers, programs gang the cells up in groups of two, four or eight. A pair of cells (16 bits), called a word, can store a number between -32,768 to 32,767. A group of 4 cells (32 bits), called a dword, can store a number between -2,147,483,648 and 2,147,483,647.

More precisely, we should refer to this memory as DRAM, –Dynamic Random Access Memory. DRAM is used to hold programs only while they are executing. It also stores the part of a document you are editing. The bulk of storage is on the much slower hard disk.

➤

If RAM Were Beer . . .

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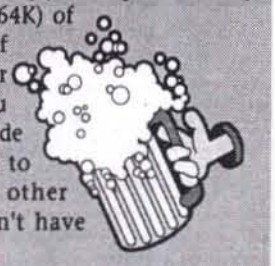
Unfortunately, there are government regulations allowing you to produce only 65,536 bottles (64K) of certain types of very popular beer (GDI). All you can do is persuade your customers to switch to your other brands that don't have quotas. — RG



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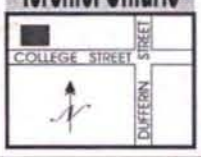

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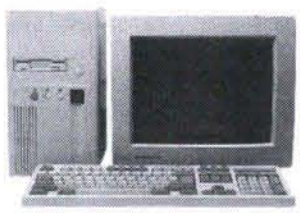

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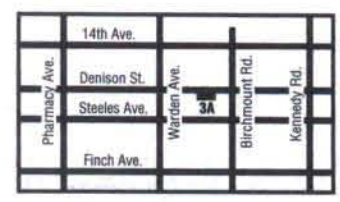

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How Much RAM Is Enough?

Asking how much RAM is enough is like asking how much money is enough. However, here are some rough guidelines to give you an idea of the relative RAM hungriness of various operating environments:

OFFICIAL	REASONABLE	COMFORTABLE	
256 K	1 MB	2 MB	DOS
2 MB	6 MB	16 MB	Windows
4 MB	6 MB	8 MB	OS/2 Warp (beta)
6 MB	8 MB	16 MB	OS/2
6 MB	8 MB	32 MB	Unix (many flavours)
12 MB	20 MB	32 MB	NT

History of the PC

Unfortunately, the answer to the RAM cram problem is complicated. It only begins to make sense when you learn the history.

The early S-100 CPM microcomputers used the Intel 8080 CPU chip or the Zilog Z80. These chips allowed for a maximum of 64K RAM. My own IMSAI CPM machine had only 8K.

When the IBM PC came out, it used the more advanced 8088 chip. Although the 8088 supported up to 640K of RAM (plus 384K of ROM), to maintain partial compatibility with the earlier 8080, the 8088 CPU could only "see" four 64K segments at a time. In the early '80s, 640K seemed like a huge amount of RAM. Early IBM PCs sold with only 64K. They came with built-in Basic that could handle programs no bigger than 64K.

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The 80286 and the AT

As you would guess, we soon filled the 640K and wanted still more. By this time, IBM had released its AT computer that used the Intel 80286 chip. The 80286 supported 16 MB of RAM. (1MB = 1024K; 1K=1024 characters). However, exploiting this new addressability would have meant redesigning the way we write programs. So instead, we told the 80286 to pretend to be an old 8088 with only 640K. (Technically speaking, we ran the 80286 in real mode, instead of the new protected mode.)

EMS Expanded LIM RAM: Lotus, Intel and Microsoft then invented a kludge (temporary Band-Aid fix) around the RAM crunch problem. Their solution is known by various names: EMS, expanded RAM or the eponymous LIM. It allowed you to add an extra 8MB of RAM. However, the CPU could not directly address it. EMS would let the CPU "see" only four banks of 16K at a time. Switching between EMS banks required quite a bit more effort than the scheme the CPU used for switching between its own 64K banks. Because accessing this EMS RAM was so different from ordinary RAM, very few programmers figured out how to use it for code. Caching programs used EMS to speed up the hard disk. Some word processors and spread sheets used it for storing large documents.

The 80386

Meanwhile, Intel released the 80386 chip that could support a whopping 4096 megabytes of RAM, and could simulate even larger amounts. And, to the delight of programmers, the CPU could directly address the whole shebang — no more of this clumsy banking. Again, in the interests of compatibility with the 8088, we made the 80386 pretend to be an ancient 8088 with only 640K RAM.

XMS Extended RAM: To exploit some of the power of these newer chips, Microsoft invented yet another kludge, XMS RAM, sometimes called extended RAM. The 80286 is a sort of Superman: as Clark Kent, conceals its true powers. To access the XMS RAM in your machine, the 80286 CPU temporarily remembers its true Superman identity (by flipping into protected native 80286 mode), gets the data directly out of the huge RAM, and copies it somewhere into the first 640K. Then it resets (knocks itself out, a sort of mini-reboot), and wakes up again thinking it is Clark Kent (real 8088 mode).

The 80386, 80486 and Pentiums streamlined this process, but any access to the XMS RAM still meant the overhead of making a copy into the first 640K and switching

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modes. The lack of direct addressibility meant it was hard for programmers to use XMS to store program code.

Summary of the Problem

Perhaps you now see the problem. Adding physical RAM does nothing to increase the size of the conventional RAM part of the computer, the 640K part that DOS sees. Since we insist on fooling an 80486 into thinking it is an 8088, it does not even know more RAM can possibly exist.

Solutions

There are several ways out of this bind:

1. OS/2, NT, Unix, NeXT
2. Windows
3. DESQview
4. QEMM, 386Max

Switching to a new operating system such as OS/2 is the only satisfactory answer. However, you might consider that move too drastic, and might only be willing to try a temporary solution, such as QEMM.

OS/2, NT, Unix, NeXT

If you buy a new operating system such as OS/2, NT, Unix or NeXT, native mode programs can be as big as they please — even bigger than the physical amount of RAM you have bought. Here, the 80486 and Pentium CPU chips exploit their full powers. The chips can simulate still more RAM by relegating the least active parts of RAM to the hard disk.

Ordinary DOS programs can also run under OS/2, NT and some flavours of Unix, but they are still bound by the 640K limit. NeXT does not support DOS programs.

The other advantage that native mode programs have over DOS programs is they can access the RAM 32 bits (four characters) at a time. DOS programs access in dainty 16-bit (two character) chunks of RAM, since they maintain the fiction that the CPU is an 8086 that can only access RAM 16-bits at a time.

I calculated that if I rewrote my DOS-based Abundance database program for 32-bit native mode, it would run five times faster. For most programs, the improvement would not be so dramatic. Unfortunately, 32-bit programs are more than twice as large and some even run more slowly than the 16-bit versions.

Why avoid OS/2? Such operating systems are more complex to set up, and require 12 MB or more to run smoothly. You need extra RAM just to support the complex features of the operating system. IBM promises that Warp V.3 will solve these problems. To get the full benefits, you also need to buy new software, expressly designed for OS/2. Though OS/2 can run DOS programs better than DOS, and Windows programs better than Windows, it really does not strut its stuff until you have native mode OS/2 apps. There is a distressing lack of native mode OS/2 applications.

Why Use OS/2? In some parts of the country (Vancouver, for example), OS/2 has really taken off, and is the preferred platform for people trying to run several programs at once, particularly if they involve modems.

To learn more about OS/2, join the OS/2 SIG of your local user group. Check the USER GROUPS section in this publication for

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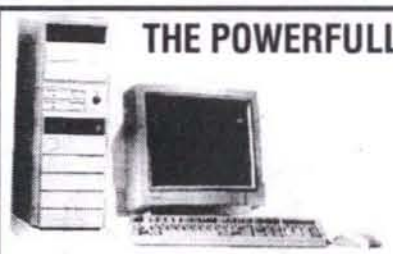

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With OS/2, you can provide highly customized DOS boxes for your programs to run in, with just the set of drivers and TSRs they need. The way OS/2 implements a DOS box, very little of DOS has to fit inside the 1024K box, leaving more room for your programs. With ordinary DOS, the entire DOS program also lives in the same region along with your program. Such customizing gives the programs more breathing room.

It is also possible to run multiple Windows programs in air-tight compartments where they cannot interfere with each other.

Before their falling out, Microsoft and IBM collaborated on developing OS/2. Since then, Microsoft has taken OS/2 off in the direction of complex high end systems (renaming it NT), and IBM has streamlined it for use in smaller systems.

Windows

Microsoft designed Windows around the capabilities of the 80286 CPU for the original IBM AT. It exploits a few of the features of the 80386, with more support for 32-bit operation expected in the summer of 1995, with the release of Windows 95 (previously known by the code name Chicago). Windows For Work Groups 3.11 already has some 32-bit support. Programs written especially for Windows are composed of an arbitrary number of 64K chunks. Writing programs for Windows is considerably more difficult than writing them for the original DOS.

GDI and USER RAM: Unfortunately, various 64K limits can still haunt you in Windows. These are even more severe than the 640K limits of DOS. For example, *.INI files must be 64K or less. Windows has two 64K pools of RAM called the GDI and the USER RAM that serve all the programs running.

To paraphrase the beer commercial, when you are out of GDI, you are out of RAM. If you run out of GDI or USER RAM, all you can do is close windows and stop running so many programs. Programs often do not work properly unless there is an abundance of RAM. For example, on my machine, icons fill half way up with black "ink," as RAM gets tight. Sometimes exiting and restarting Windows will help. Adding more physical RAM will not help. There are two other 64K "heaps" called MENU and STRING that behave similarly to GDI. Chicago will ease these limits.

Dashboard: Hewlett Packard puts out a Windows tamer program called Dashboard. Windows without Dashboard is like a bed without a mattress. Dashboard streamlines operations so you can get work done in one click that would take dozens in plain Windows. For example, if you have two printers, it lets you switch between them in one click, but what is important here is that Dashboard monitors GDI RAM usage for you. You can see the effects of adding or removing fonts, screen savers, etc. It will beep when you are getting low, instead of the traditional crashing.

System RAM: Windows in Standard mode (Win.com /s), is the fastest mode for most users. There, System RAM is the same as your real physical RAM. If you run out of System RAM, buying more physical RAM will help. If you run in Extended mode (Win.com /3), System RAM refers to the size of your swapfile. You can make your swapfile bigger, but after a certain point, programs just slow to a crawl. You need more physical RAM as well. Windows with 8-16MB of RAM is much more spritely than Windows with 4MB.

Why avoid Windows? Windows allows you to run many programs at once. All these programs muddle together in RAM with no mechanisms to prevent a failure in one from affecting another. In a true multitasking system, such as OS/2, the tasks are isolated from

Continued on page 86

Persistence: RAM vs ROM

You may have seen terms like SRAM, DRAM, VRAM, CMOS, FLASH RAM, EAROM, EPROM and ROM. They are all similar in that they can store information electronically and regurgitate it very quickly. The difference is how difficult they are to erase or change. To put it positively, the more difficult they are to change deliberately, the more resistant they are to accidentally losing the information.

DRAM — dynamic RAM — can be changed in about 60 nanoseconds. It must be refreshed 250 times a second or it loses the information. There is automatic refresh circuitry to do this. If power is lost for even an instant, the contents are lost.

SRAM — static RAM — can be changed in about 15 nanoseconds. So long as power is provided, it retains the information. If power is lost for even an instant, the contents are lost. Static RAM is bulkier and more expensive than DRAM.

VRAM — video RAM — is a type of static ram used in video cards. It has two access ports, so the video circuitry and the CPU can both access the RAM simultaneously.

CMOS — Complementary Metal Oxide on Silicon — is used to store your configuration information, such as the size of your hard disk, and which kind of floppies you have. It can retain the information with only a tiny trickle of power from a lithium battery. It is notorious for accidentally losing the information. See Karen Kenworthy's column in the October *Windows* magazine on my solution to that problem.

FLASH RAM is used to store modifiable BIOS code. It retains its contents for 10 years even with no power at all. For PCI bus machines, FLASH RAM will allow you to easily upgrade as the plug and play features are standardized. Sometimes called EEPROM - Electrically Erasable Programmable Read Only Memory.

EAROM — Electrically Alterable Read Only Memory — is used in some types of computers or printers to store configuration information. The memory retains its contents even with no power. However, you can only change the memory a limited number of times before you burn it out.

EPROM — Erasable Programmable Read Only Memory — is used to store BIOS code. It can only be erased and changed by exposing a window in the chip to high intensity ultraviolet light. The memory retains its contents without any power.

PROM — Programmable Read Only Memory — You can program the chip once only by blowing its fuses with relatively high-power blasts. These cannot be erased.

ROM — Read Only Memory — is used to store BIOS code. The contents are permanently set by the photolithographic masks when the chips are manufactured.

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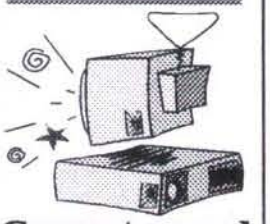

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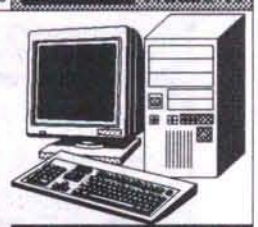

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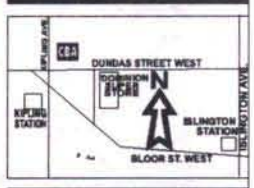

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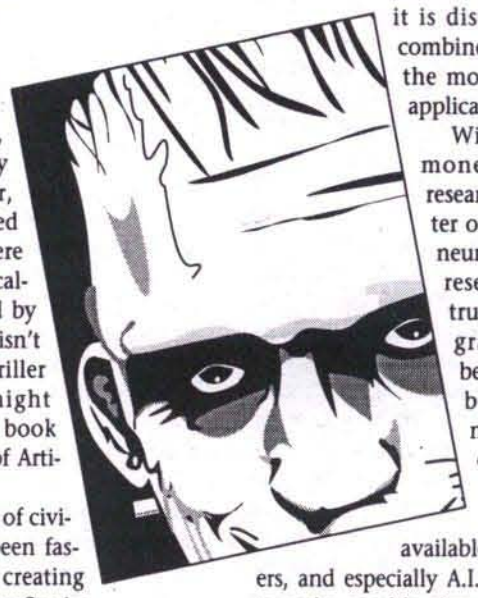
book*review*

Fascinating History of A.I. Revealed

BY KEITH SCHENGILI-ROBERTS

Title: *The Brain Makers: Genius, Ego and Greed in the Quest for Machines that Think*
Author: Harvey Newquist
Publisher: Sams Publishing
Hardcover 488 pages 1994



Looking for a story where millions are made and lost, where people viciously back-stab one another, where careers are ruined in an instant, and where the goals of the practically-minded are thwarted by ideologues? This story isn't found in the latest thriller novel, where you might expect it. It's all in a book looking at the history of Artificial Intelligence (A.I.).

Ever since the dawn of civilization, people have been fascinated by the idea of creating artificial, thinking beings. Stories abound in the folklore of many cultures, where "brazen heads", Golems, Frankenstein's monster and robots turn on their human masters The deranged creatures seen in this book are not flailing mechanical contraptions, but the all-too-human creators of A.I.

The first part of this book looks at the academic world where A.I. first took root. When most people think of academic life, they think of professors teaching students in the idyllic ivy-covered settings of a University campus. The truth is often less than idyllic, as shown in this book. The "Father" of A.I., British mathematician Alan Turing, committed suicide shortly after being convicted for offenses relating to his homosexuality. In the States, military funding underwrote all initial academic research into A.I. These funds soon became the life-blood of the centres investigating A.I. The result was that anybody who opposed the basic academic tenants of the emerging A.I. was quickly quashed and forced into silence.

A prime example of this occurred when Marvin Minsky co-authored a book slamming the concepts behind the work of A.I. colleague Frank Rosenblatt, who was investigating the possibilities of neural networks. Neural networks took a "bottom-up" approach to programming, exposing a computer to stimuli and then telling it whether or not it had succeeded in its task. The computer would then re-set its internal values and would eventually get better at what it was doing. Nothing close to actual conscious "thinking" was involved, and Minsky criticized neural networks as being essentially limited. The book went to press, and such was Minsky's authority in the field that military funding for neural network research quickly dried up, and Rosenblatt died feeling cheated of his academic opportunities. Today, a quarter-century later, neural networks and the mathematical concepts behind "fuzzy-logic" (to which it is distantly related), have combined to provide some of the most successful practical applications for A.I.

With all of the military money pouring into A.I. research, it was only a matter of time before entrepreneurs got into the act. A.I. research started the first true "hacker culture", as grad students slept beside their University's behemoth computers, not wanting to miss out on the chance for processing time whenever it became available. Unfortunately, hackers, and especially A.I. hackers, did not tend to make good businessmen. Initial successes came from firms that manufactured computers designed to run LISP, a language developed for A.I. research. In the early to mid-1980s, A.I. became the darling of the press and venture capitalists, who expected great profits from practical applications for A.I.

Problem was, none of the A.I. companies could deliver on that promise. Even Japan's Fifth Generation Project, whose aim was to build a thinking machine within 10 years, fizzled out with little to show after a decade of effort.

Financial collapse eventually claimed most of the fledgling industry, and A.I. became such a dirty word to American investors that no company today dares to market a product under the A.I. banner.

The book is an entertaining read, though the writer takes a very flip attitude to his subject which some people will find amusing, and others will find tiring. At almost 500 pages, the book is scattered. It would have been much better if it had been more focused in its approach to the history of A.I.

One of the ironies of A.I. as outlined in this book is that practical uses for A.I. were beginning to be found just as the industry was dying. A.I. has made significant advances into many different fields. In hospitals, aids doctors in their diagnosis of what's wrong with a patient, while in the stock exchange it helps brokers diagnose what's going on with the market. There is still the hope of a bright future for further endeavors into A.I., but many corporations would do well to read this book and see how easy it was for some of the best and brightest of the computing community to end in financial collapse. ❑

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book*review*

A Different Look At Word for Windows

BY JIM CAUGHRAN

Title: *The Underground Guide to Word for Windows — Slightly Askew Advice From a WinWord Wizard*
By: Woody Leonhard
From: Addison-Wesley, 1994
Price: $25.95.

Many books on computer applications are little more than a restatement of the manual. Your money may buy a simpler or more readable explanation but you don't get anything new.

This book is a refreshing exception. It doesn't spend a lot of time restating Word's features, but tells you how to use Microsoft Word 6.0 effectively. If you want to customize WinWord's toolbar to work more efficiently, create a document template that fits your letterhead, or learn tricks to speed up your editing, this is the place to look.

The book is also the place to find out what's wrong with Word, and where possible, how to get around the bugs.

There are loads of tips and tricks. Leonhard tells you how to control curly apostrophes, and gives you three ways to insert an em-dash. If you want to display crop marks to tell a print shop where to trim, he provides detailed directions.

I learned several things. I had spent an hour or two trying to change the FileNew Default button on the toolbar to a FileNew which would allow me to pick a template. I'm embarrassed that I didn't find Leonhard's solution: delete the button and add it again.

Or, to see what command is assigned to a key-combination or which keys to a command, type control+alt+numeric-pad-plus, then type the combination or select the command from the menu.

The book is not an appreciation of Microsoft. Leonhard tells you frankly where things are wrong with Word. He is hard on Microsoft's marketing department (and the computer press), who emphasize flashy demonstration features, rather than useful ones.

For example, the standard toolbar contains the Microsoft-correct "Insert Excel Spreadsheet" button, but omits something as necessary as a "Print Envelope" button. The Excel button is a good demonstration feature to show off OLE 2.0. But, unlike printing an envelope most people won't use it every day. Leonhard's first chapter tells you how to replace the toolbar buttons you won't use with more useful buttons.

There is a chapter devoted to the bugs in Word 6.0. Some are serious: Word may freeze the computer or not be able to save your work. Some are inconvenient: Word doesn't behave as it should — for example, it sometimes refuses to keep a sidebar together with text. Some are simply poor designs that no one cleaned up: you can't find a symbol inserted with the Insert/Symbol command, and many dialogs weren't designed well.

The writer's style, though not smooth, is fresh and irreverent, often flippant. This is Leonhard's personal Word diary, telling you his gripes and his ways of doing things. Occasionally, he presents his preferences as The Way Things Ought to Be. If you can ignore him when you don't agree with his way of doing things, this is good; too many authors are afraid to express an opinion.

If you want to customize WinWord's toolbar, create a document template or learn tricks to speed up your editing, this is the place to look.

The Underground Guide follows many people's tendency to over-use the mouse. With a word processor, I try to use the mouse as little as possible. It must cost me about 30 seconds each time I pick up the mouse, so I've made an effort to learn the keystrokes, rather than using toolbars or menus. I'm not rigid about it — I'll use the mouse when it's necessary or convenient. But I suspect you can save yourself a few minutes each day by avoiding it.

Occasionally, Leonhard is stuck in Word2, and complains about things which were fixed for Word6. Or he uses Word2 work-arounds which can be done more simply in Word6. The em-dash didn't break a line in Word2 but does in Word6. He creates a macro to insert a date. then convert it to text; it can be done directly in Word6.

Word 6 is a resource pig. On a 386, it not only is slow, but it even slows down other programs! Leonhard talks a little about how to speed it up, but really is unsympathetic; his advice is to get a faster machine or use Word2. There are many things he could have recommended to speed up a slower machine.

Microsoft delivered Word for Windows 6.0 in haste, to compete with Word Perfect 6.0. It is an excellent word processor, but of all the Microsoft products I have used, it has the most bugs and poorly designed features. Leonhard stands up to Microsoft, telling the company what's wrong and why, and why we don't like it. We need more books like this. ❑

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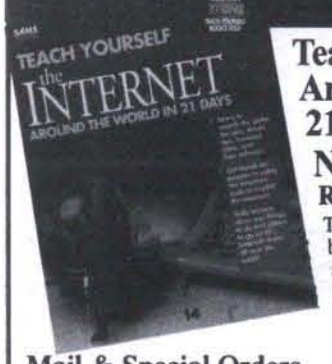
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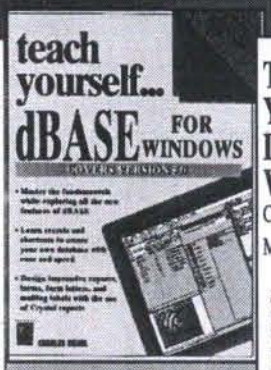
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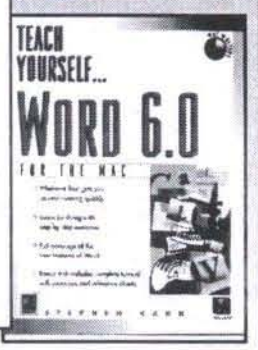
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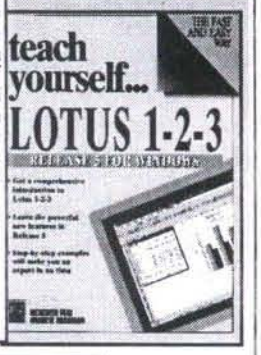
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V.WHAT? A Guide to Knowing Modems

BY JAMES MACFARLANE

When it comes to using senseless computer jargon, modems are the worst. Shopping for a modem can be frightening: no matter which box you pick up, it's full of vee dot this and bis that. It kind of makes you want to simply put the unit back on the shelf and go hide under your desk.

But things are really not as complex as they seem. All of the jargon on modem boxes falls into the following categories:

Transmission standards — What languages the modem knows and at what speeds it can talk.

Error correction standards — What types it can use.

Data compression standards — What types it can use.

Advanced features — What other goodies are thrown in (like caller-ID).

Here's what you might see on a typical box:

14,400 bps — This is the maximum speeds at which the modem can operate. The "bps" part stands for bits per second. BPS should not be confused with baud rate. They have completely different meanings.

For Macintosh — There's no difference between the hardware found in a "Mac" modem and a "PC" modem (as far as external units go). The only difference is the included software (see "Includes MooTerm" below) and serial cable, if included.

External — If you're using a Mac you need to buy an external modem. PC users have the choice of internal or external. I highly suggest paying the $20-$30 extra and getting the external for the following reasons:

- If it misbehaves you can shut it off
- It has lots of pretty blinking lights that are helpful in troubleshooting
- You can actually hear the modem's speaker
- You don't have to spend two hours trying to configure DIP switches in an attempt to prevent it from having interrupt conflicts with your mouse and other serial ports (if you don't know what this means, then there's another reason for buying an external unit)
- You don't have to crawl around behind your machine to fiddle with phone cords
- You can't impress your friends with what they can't see.

V.32bis — This is the transmission standard the modem supports. This means it can talk the V.32 language at a speed of 14,400 bits per second (bps). When you see V.32 without the "bis" that means the modem talks the same language, but only at a maximum of 9,600 bps. If you see V.32ter, that means the modem can talk at a speed of 19,200 bps.

As a rule, any two modems speaking the same language can talk to each other, but only at the speed of the slower of the two modems. So if you have a 28.8 V.FC modem that also supports V.32bis and your friend has only V.32bis, you're restricted to 14,400 because that's the maximum speed of the other modem.

Other languages include: HST, which is used primarily in older USRobotics modems;V.FC, which is a new high speed protocol supporting speeds of up to 28,800 bps; and PEP, which is used mainly by Telebit modems in UNIX applications.

There is currently some confusion about the differences between the V.FC (V.FAST Class) standard and the V.34 standard (once termed V.FAST). Both are 28,800 transmission standards. Here's a typical example of technology being created faster than the standards committees can "approve" it. In this case, the industry seems to be standardizing on V.FC to such an extent that V.34 (what it will be and when it will be approved), is considered relatively unimportant.

In general, the faster, the better (and more expensive). Buying anything slower than 14,400 is a waste of money right now.

Throughtput of up to 57,600 — Don't confuse this with the actual speed of the modem (i.e., 14,400). This "throughput" speed takes data compression into consideration (see V.42bis).

V.42, V.42bis and MNP5 — These refer to different types of data compression and error correction:

V.42 is an error correction protocol. This is built into the modem and it works by sending checksum information along with each packet of data it transmits to the other modem. When the other modem gets the data and the checksum it mathematically determines whether there has been a data transmission error. If an error has occurred, it automatically re-sends the corrupted packet. These errors are typically caused by telephone line noise.

V.42bis and MNP5 are data compression techniques. Before each packet of data is transmitted, the modem's software examines the data and determines whether it can compress the data. Text files, databases and spreadsheets are highly compressible, allowing a two to three times speed increase on average. Ignore the claims about 8:1 compression. The only time you get that kind of ratio is when you're sending a one megabyte file full of the letter "A."

Files that are already compressed (GIF, ZIP, CPT, SIT, ARC, etc), gain no benefit from the modem's data compression. These types of data compression are actually much better than the type found in the modem's firmware. You're far better of compressing your data with PKZIP or Stuffit than to depend on the modem to do the work.

Group III, Class 2 Fax — This jargon deals with fax. Modems that include fax capabilities can communicate with any regular office fax machine. Group III refers to the transmission standard supported (all fax machines support group III fax).

Class 2 refers to the method used for your computer to control the fax modem. Class 2 is more "intelligent" than class 1, but class 1 is more flexible. Class 1 allows you to use advanced features like binary file transfer, which allows you to transfer data using fax protocol. This is supported in some of the fancier fax software, like Delrina's Winfax Pro 4. Choose class 1 over class 2 when buying.

V.22, V.22bis, V.21, Bell 212A/103, V.23 — These are transmission standards for slower rates, 300, 1200, 2400 etc. Usually they're nothing you have to worry about, unless you're doing some obscure mainframe connections.

DSP-based — Modem designs come in two flavors: "DSP" (digital signal processor), and "Microcontroller." DSP modems use sophisticated digital/analog technology that is based on the same types of chips found in sound boards. They can usually do some pretty fancy things, like voicemail.

Some DSP modems include soft-modem technology. This allows you to upgrade the features of the modem by changing the modem's on-board software. While this can save you money in the long run, manufacturers are usually sadly behind the times when it comes to actually providing these upgrades. The 28.8 modems came out in March of this year, but you'd be hard pressed to find any DSP modem manufacturers that have come out with upgrade ROMs or disks yet.

Microcontroller-based modems, such as the popular Rockwell chip set, have a dedicated modem/fax chip. They're cheaper and usually have fewer "gee whiz" features. They're generally not upgradable.

Includes 16550 UART — When using a high-speed modem under Windows, it is very important to have a 16550 chip on internal modems, or a 16550 chip on your serial port if using an external modem. The reason is that

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*on*line

CTV Accelerates Onto The Information Highway...

BY GRAEME BENNETT

GEnie now has a Canada Roundtable, where you'll find people eager to discuss topics of interest to Canadians. Recently, CTV opened a new area called Inside CTV. There, you can interact directly with the CTV television network.

"We're trying to provide a high-profile response mechanism to our viewers by bringing in a sense of immediacy and a certain amount of access," explains Drew Williams, director of marketing for the CTV Television Network, who adds that the GEnie on-line service was chosen because of its dedicated commitment to Canadian content.

"We're pleased to play such an integral part in creating this on-line television/viewer relationship," said David McIntosh, manager of GEnie Canada. "Giving Canadians direct access to culturally relevant information has always been one of the priorities of GEnie's Canada RoundTable."

For ease-of-use, the Inside CTV RoundTable will be broken down into various subgroups: Buzz, an area where members can post questions and comments about CTV programming and/or their favorite celebrities, politicians, etc.; Pipeline!, a direct line dedicated to getting answers from people in high places; Live & Interactive, a real-time conference area where members can debate the issues-of-the-day with featured, high-profile Canadians; and TV-Files, an electronic CTV press room filled with recent press releases and photo files.

Access to GEnie is provided in Victoria, Vancouver, Calgary, Edmonton, Winnipeg, London, Kitchener, Hamilton, Mississauga, Metro Toronto North, Ottawa, Montreal, Quebec City and Halifax. People in these cities and surrounding communities are able to access GEnie with a local telephone call. GEnie rates are $10.95 per month for four hours of access and $4.00 per hour thereafter (non-prime time). GEnie is also available via Datapac with a surcharge of $6.00 per hour.

GEnie, an on-line service from General Electric's Information Services Division (GEIS), was established in the United States in 1985 and became available in Canada in June of 1987. GEnie is also available in Japan, Hong Kong, Germany, Austria and Switzerland. ❑

GEnie (voice), 905-886-8086 or 1-800-638-9636

Commtalk

Continued from page **77**

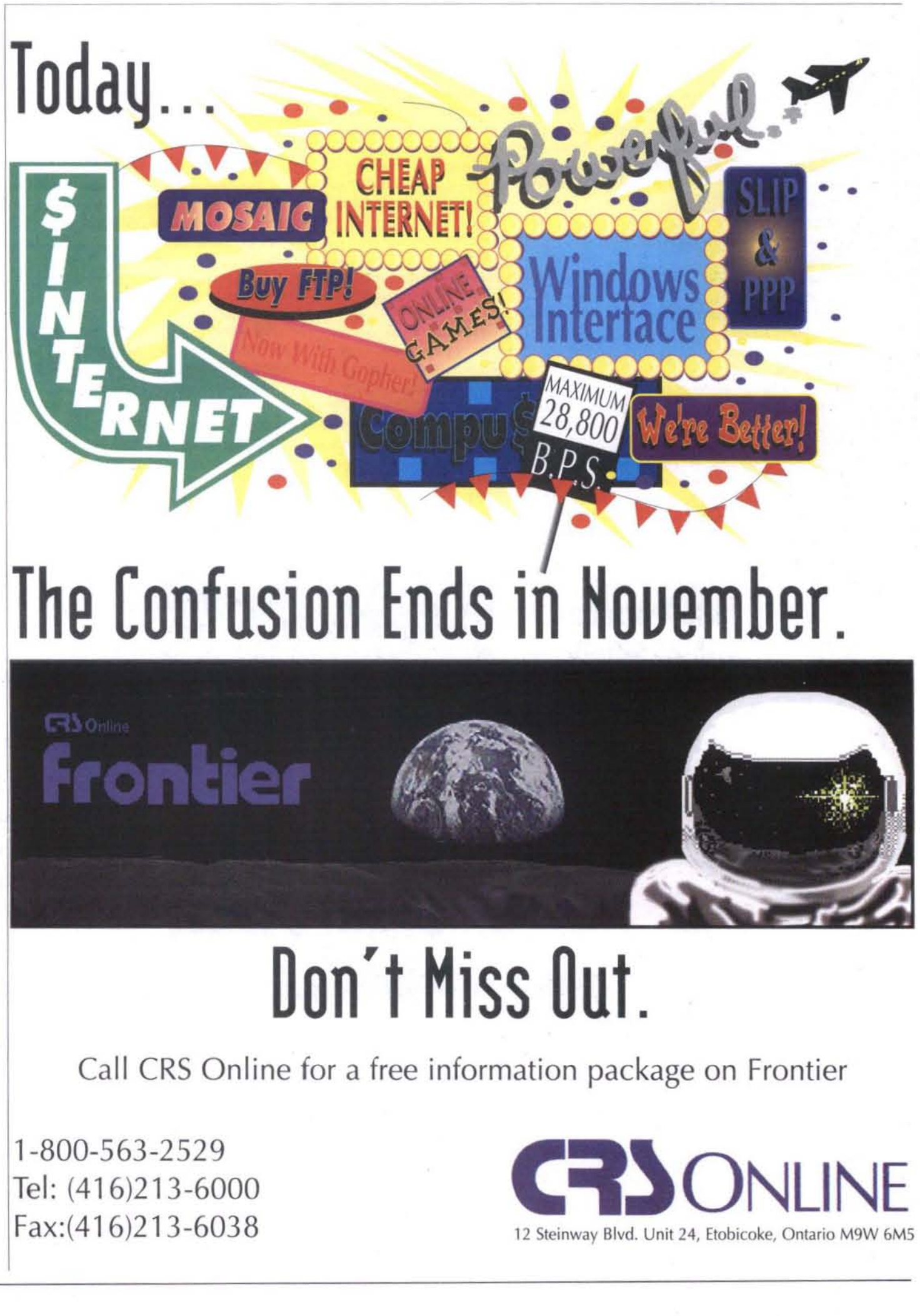
Windows is so resource-intensive that high-speed modems send data to the computer faster than it can digest it. This causes garbled data. A 16550 chip has its own internal buffer to alleviate the problem.

Includes "MooTerm" fax/communications software — Look around the store — if you don't see "MooTerm" being sold separately, there's probably a reason why. Bundled modem software usually falls into two categories: crappy and completely useless. Save yourself the headaches and be prepared to buy some real software.

Other Suspect Features — "background operation," "fax broadcast capabilities," "multiple file processing." All of these things refer to what the modem can do with the right software, and have nothing to do with the modem itself. Don't buy a modem based on anything other than the hardware specs (see includes "MooTerm").

One ad I saw said "Automatic speed negotiation allows DTE rates up to 115.2K bps even when connected to slower modems." This bit of technobabble would lead some people to believe that this modem is really fast, even when connected to slow modems. Think about it.

Other things to look for, that usually aren't on the box: Is the power switch on the back, where you can't reach it? Does it have a volume control? Does it have more blinking lights than the other? Does the case look flimsy? Will the software I buy support this brand of modem? ❑



*on*line

Cardiff's Movie Database — An Interactive Web Site

BY FRANK GARCIA

If you're a film or TV buff as I am, and if you're the kind of person that keeps Leonard Maltin's *Movie & Video Guide* handy by your TV set, have I got a Web site for you! Tap out the following addresses on your browser and get to know Cardiff's Movie Database.

The main site is at:
• http://www.cm.cf.ac.uk/Movies/moviequery.html
The U.S. Mississippi mirror is at:
• http://www.msstate.edu/Movies/

Plus, there are mirrors in Australia and Iceland with CineBASE, an interface for MS-DOS.

As you travel to this site, you will be greeted by three buttons that allow you to search films by name, title and character name. The beauty of CMD, which is a lot more powerful than Maltin, is that you set the parameters and it does the work for you.

The Movie Database's FAQ list describes CMD as an international volunteer effort centralized via the Usenet Newsgroup rec.arts.movies. The FAQ states that, "The objective of the database is to provide useful and up to date movie information freely available on-line, across as many systems and platforms as possible. It currently covers over 32,000 movies with over 390,000 filmography entries and is expanding continuously.

The database includes filmographies for actors, directors, writers, composers, cinematographers, editors, production designers, costume designers and producers; plot summaries; character names; movie ratings; year of release; running times; movie trivia; quotes; goofs; soundtracks; personal trivia and Academy Award information.

Several thousand movies are covered completely from the major actors to the minor bit players. In their ASCII form, the source datafiles currently occupy about 18MB of disk-space."

The source datafiles are available via FTP sites and by E-mail requests. The FAQ reveals 22 specialty lists covered by the database and about 12 maintainers to look after the lists.

CMD is searchable not just as a WWW interface but via even more powerful parameters. The most frequently requested searches via the movie mail-server and the Unix movie database are: information on a particular movie; or a particular person, filmographies of everyone associated with a particular movie, movies associated with a person, directors, movies released in a particular year, movies starring two particular persons, persons who have played a particular character (at the WWW site only), dates when people were born/died, and on a more limited basis, how to contact actors via agents' addresses.

What's also fun about CMD is that users are able to vote and rank their favorite movies. Results show up when the film is called up.

Too many Web sites are still 'under construction' or creators are 'still experimenting', but CMD has had the benefit of having at least five years in its Internet life to buildits structure. More on that later. I would say CMD is way ahead of a lot of other interesting sites just due to the sheer size it has available at your fingertips.

Recently, a friend and I tested the database. We threw at it as many obscure actors or actresses we could think of, hoping to stump it. Quite frequently, it was able to give us information on obscure guest stars of some of our favorite TV shows, pleasantly surprising us.

When it failed to answer our queries, we just sat there lost in wonder and curious as hell, as to whatever became of...?

If you search for the name of actors or actresses, you will be give a list of all known films or television titles that they have done. Web pages offers easy point and clicking, so if you mouse on to one credit, you will be given the film's title, year produced and all the other known credits associated with that film.

As comprehensive as the database sounds, we found many gaps in the information presented. The bulk of the known information is on actors, actresses, writers, and directors, with the rest of the production crew consistently unknown. The compilers are aware of this and have installed instructions on how to request documents that explain how to make additional entries or corrections.

For example, we discovered an actor named Robert Colbert credited as a composer. This is wrong. We knew that the real name of the composer was Robert Cobert. Typos creep in from time to time. But as users continue to use the database, errors such as this should be identified and corrected.

For fun, I searched for a movie titled Sneakers (1992), a techno-thriller starring Robert Redford. It gave me a list of all the actors who appeared in the film and their roles in alphabetical order. Six movie reviews were also available for downloading. The voting results revealed users rated this film as 7.1 out of 10.

Continued on page 81

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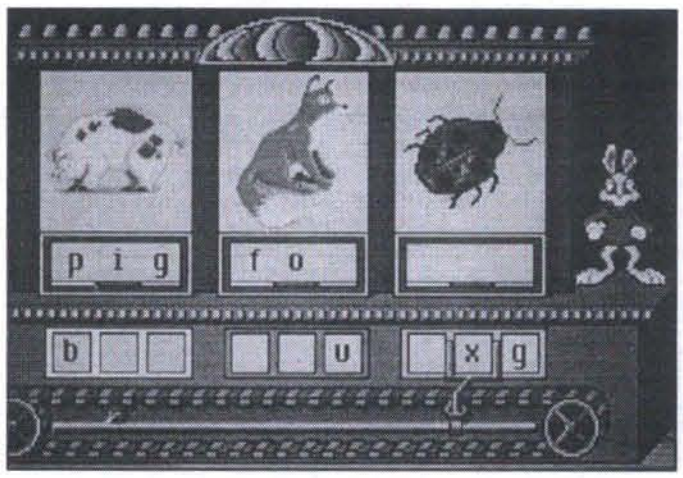
GAME REVIEW

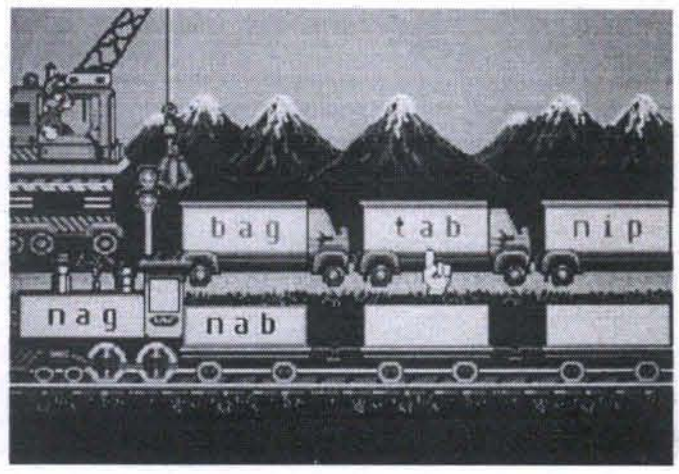
Reader Rabbit Does Windows

BY PEDRO ARRAIS

The more things change, the more they remain the same.

Title: Reader Rabbit 1 for Windows
From: The Learning Company 6493 Kaiser Dr., Fremont, California 94555
For: Ages 3-6
System Requirements: Windows 3.1, VGA Graphics, 386 or better, 4MB RAM, sound card and mouse.
Suggested Retail: US$ 59.95





But the market for computer software does not stand still and old games are rarely ageless.

With this in mind, The Learning Company recently re-introduced what has been a very successful title for them: Reader Rabbit 1. This program has been touted as the "World's top selling reading program" for ages 3-6. With this re-incarnation, the company has made the program run under the increasingly popular Windows environment with familiar on-line help for parents to guide their children's progress.

The program comprises four modules: The Match-Up Game, Word Train, Labeller and Sorter. Match-Up matches pictures to words and is quite simple, with computer cards that have to be turned over to match them up. Except for the variety of pictures, it did not seem to capture my child's interest.

The Word Train was more difficult, with sequencing practiced repetitively. Parental guidance is recommended to help the child understand the object of the exercise.

The Labeller does just that, spelling names to the various objects that appear on the screen. The word retriever for this module was clumsy, requiring a set sequence to put the respective word in place.

The Sorter presented word recognition of letters and spelling patterns in a fun and learning way.

Overall, this program feels dated, with token sound support and dated graphics that moved much too slowly. Although it is mouse driven, the program abounds with links to its humble DOS roots. The program does not offer progressively more difficult exercises like some of the competition, and the "rewards" for a successful exercise are monotonous.

While this program does not offer state-of-the-art graphics nor sound, the teaching component is dependable — and fun. If you are looking for a starter program for your pre-schooler, this born-again classic may be right for you. ❑

Contact: The Learning Company, 510-792-2101

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GAME REVIEW

Mystery Game Provides Intrigue and Reward

BY PEDRO ARRAIS

Title: Eagle Eye Mysteries
From: EA*Kids A Division of Electronic Arts, 1450 Fashion Island Blvd., San Mateo, Ca. 94404 Tel: 1-800-245-4525
For: Ages 8+
Platform: 386SX/16 or better, 256 color VGA, DOS 3.3 or higher, 10 MB free hard drive space
Recommended: Mouse, sound card, EMS
Suggested Retail: $49.95

As former kids, many of us remember The Hardy Boys or Nancy Drew mysteries. They offered intrigue and excitement. I wondered what was available for my 10 year old in today's electronic world to match the adventures of my youth.

Eagle Eye Mysteries by EA*Kids was ready for me (or rather, my son). What I was not ready for was how my son did every household chore assigned to him just so he could solve another case.

Luckily for me the program comes with over 50 progressively harder cases to solve. My only regret is that it was not 150!

The game itself is a model in simplicity to master. You are paired with either Jennifer or Jake to solve crimes in Richview, searching for clues and questioning witnesses. Users without a mouse can rejoice, as this is one of the few programs around which still works with just the keyboard. As well, the game remembers your name and your solved crimes in a scrapbook that praises your contribution to the Eagle Eye Detective Agency.

From treehouse offices to crime scenes, the graphics encountered are attractive and entertaining. The sound support provided is "cool" and adds to the flavor of the game but a sound card is not necessary for solving the mysteries encountered. The sounds can also be turned off if one desires.

With the cases progressively harder to solve, the children's interest is always held and upon the successful completion, positive reinforcement is doled out appropriately. Imagine you had your face on the front page of your daily newspaper for solving a major crime that had the local boys in blue scratching their heads. That is the kind of reward that not only a 10 year old dreams of, and in this game they get the recognition. My son was so proud of his accomplishments, he wishes he could print the "Richview Courier" headlines collected in his computer scrap book.

It is nice to know that a good mystery is not exclusively found in old Hardy Boys books from a generation ago. But, I've got to go — I'm off to solve the "Case of the Ghostly Ghost." ❑

Contact: EA*Kids A Division of Electronic Arts, 1-800-245-4525

Cardiff Movie Database

Continued from page **78**

All actors in the film, with one mouse click, had filmographies in the database.

Having a small affection for all things Star Trek, and since the Captain of the upcoming Star Trek: Voyager series is actress Kate Mulgrew, I looked her up. I was given a list of 19 entries including the credit that she's most famous for: the TV series Mrs. Columbo.

The database has a long, eventful history that demonstrates what a democratic, international volunteer organization is capable of constructing.

Cardiff's Movie Database was created in 1989 as a result of a conversation thread in the rec.arts.movies Newsgroup. A discussion began on who were the most attractive actresses around. A college student somewhere in the U.S. began a list. When he disappeared, a man named Andy Krieg picked up the list, organized it, and posted it monthly to rec.arts.movies under the title "THE LIST".

Meanwhile, in mid-1989, Chuck Musciano began compiling a Movie Ratings Report, a weekly polling of favorite movies. These two projects remained separate for many years.

To condense the long history, interested parties from all over the world jumped in with suggestions and offers to build their favorite specialty lists.

In 1990, Colin Needham wanted a list of actors, so he took that up. Several others came forth and volunteered to create lists for directors, writers and production personnel.

One man, Kevin Arvin, contributed on a monthly basis for the last four years what is estimated to be 100,000 cast entries.

In September 1990, a post-graduate student in Edinburgh requested a search engine so master reference lists were created. By 1992, an FTP site at the University of Colorado was obtained to centralize the data, eliminate duplications and make it available at all times. More fans jumped in with offers to do up the character names list, a trivia list and a plot summaries list.

By early 1993, the material was made public on-line via a London PC users group and started up and running with 400 requests per day. Just as Mark Harding set up the biographies list, Robert Hartill set up the WWW interface for the database.

According to Needham, "The WWW server receives tens of thousands of requests each day and again this figure is rising."

And so, by mid-1993 mirrors in Mississippi, Iceland, Australia were created, with CineBASE, a MS-DOS edition also released.

Continued on page 95

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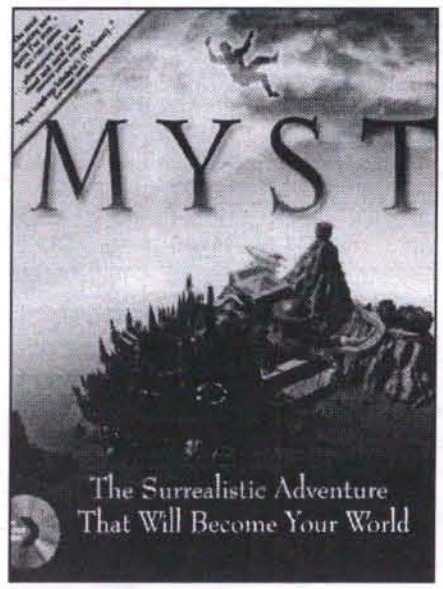
CD-ROM

Myst Comes to the PC

Myst is not so much a game as a phenomena.

BY KEITH SCHENGILI-ROBERTS



Title: Myst
Manufacturer: Broderbund
Minimum System Requirements: 386DX/33MHz running Windows 3.1 with 4MB RAM, 256 Color Super VGA Display, CD-ROM drive, Sound Card

Originally released for the Macintosh last year, Myst has recently been released for the PC, and is taking the gaming world by storm.

Much like Virgin Game's 7th Guest, Broderbund's Myst is a trend-setting game; a showcase for the type of entertainment we can expect to see when the huge storage capacity of CD-ROMs is utilized fully. It's also lots of fun.

Using your cursor to click on an image of a book, you are suddenly transported to the island of Myst. There is a bare minimum of instructions given for this game, and it is up to the player to decide exactly how they will approach the riddles of Myst island.

You can go for a tour of the island (the game is completely mouse- driven), viewing the series of stunning photorealistic scenes that the game makers have rendered, and interacting with the various moving objects, switches, and doors. The game play is deceptively simple, but you soon discover that there is a purpose to your wanderings. As you delve further into the world you are presented with, you learn more about the plot you have entered into.

This plot is sketchy at first, and all you really know for sure is that something has gone very, very wrong. The puzzles you find in Myst are intricately woven into the mystery of the plot you have to uncover. And, like many good mysteries stories, there are a few red-herrings thrown in as well.

The beautiful scenery is compelling to look at, and its photorealistic imagery invites further investigation by the visitor (somehow the phrase "game player" doesn't seem appropriate). Quicktime for Windows video clips are used sparingly but effectively within the game, and add to the reality of your explorations of Myst. Whether you are admiring the natural vistas of Myst, or trying to figure out how the artful Industrial-Victorian mechanical contraptions work, Myst sets new standards for the graphics and artwork used in computer games. Sound is an integral part of the game — if you do not have a sound card, then Myst is not for you. Not only do original music and sound-effects lend atmosphere to the game, but sound is essential to solve many of the riddles and ultimately provide the plot to Myst.

While many of the puzzles are tricky to figure out, the game has been well designed to minimize the frustration-level of users. Most solutions come about by the visitor suddenly making a connection, and that Eureka! element only spurs the visitor to explore further. Most visitors to Myst are guaranteed a few sessions that will last late into the night.

Despite all of this, Myst will not appeal to everybody. People more accustomed to fast action-paced games will probably find the game a bit dull in comparison. If you like a good mystery, chances are this game is for you. The game's ending is a shameless plug for Myst II, but until something else even remotely similar comes along, Myst is a truly unique computer game. ❑

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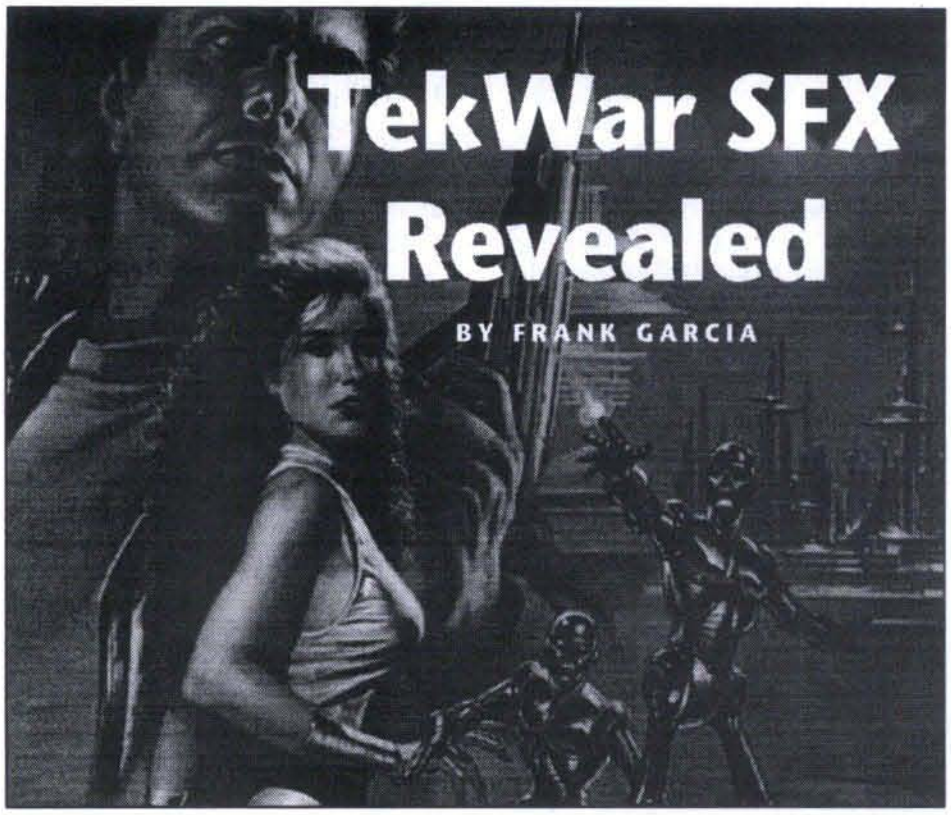

The concept of TekWar first sprang from William Shatner's gleaming eyes during the making of Star Trek V: The Final Frontier. It was during down-time in the filming of that movie when Shatner sat down (with a little help from a friend, novelist Ron Goulart) and wrote a story that melded the genres of detective crime drama, placed in the future and generous blobs of science fiction to spice things up.

To date William Shatner, actor-director turned novelist, has written five books about the futuristic adventures of detective Jake Cardigan and his partner Sid Gomez. The books' success prompted Marvel Comics in 1992 to create a comic book spinoff. That too, was successful, although recently, the title was cancelled.

The books' high profile also caught the eyes of Seaton McLean, who is the president of Atlantis Films, a film production company in Toronto. McLean became intrigued with the idea of translating TekWar into film.

McLean forged an alliance with Universal Studios in Hollywood to create a series of four TekWar TV-Movies. Packaged as one spoke of an umbrella with several other TV Movies, TekWar was presented as part of the Action Pack Films.

Armed with about $5 million dollars per film, the creators of the films realized that placing the drama 200 years into the future was too far out, given the budget. Understanding radical changes were needed, Shatner agreed to bring the time frame down to 50 years in the future. He also lowered the age of his protagonist so that actor Greg Evigan could play the role.

The unusual challenge that TekWar posed was to create special effects (SFX) that actors could openly interact with. Unlike Babylon 5, where everything outside the station was a computer generated effect, TekWar required interactive-actor effects in the setting of a futuristic Los Angeles.

To address the extensive and varied two-dimensional and three-dimensional SFX that TekWar demanded, TekWar brought together a core staff of about seven people to execute some 268 SFX shots for the first TV film alone. Although experienced in commercials, none of them had ever before worked in the long form, and each were experts in their particular technical fields.

The 'Tek' in the title refers to a computer chip that can project users via a sensory-controlled helmet, into a super-realistic 'virtual reality'.

John Gajdecki signed on as Computer Effects Director, with Bob Munroe as Visual Effects Supervisor. Under them were a small army of computer animators and artists who were promptly dubbed 'cyberjocks'. The collective team consisted of Kyle Menzies, Derek Grime, Bill Choi, Claude Theriault, Gudrun Heinze, and Bret Culp.

The team's specialties comprised of three 3D animators, two digital paintbox artists, one Macintosh artist, and one visual effects supervisor. Plus a sub-team worked on model work and motion control camera work.

The technical set-up included a network comprising seven Amigas, four Sili-

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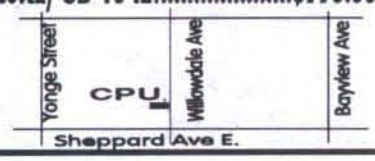

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con Graphics workstations, and a Mac Quadra 950. The capacity topped 40 gigabytes of HD storage. The power of this system allowed the artists to generate images, animation and 3D quality geometry.

There isn't space to detail all the effects completed for the four TV films, but several representative or 'signature' effects stand out. For the opening main titles, we enter a very electronic-looking, cyberspace-y graphics-drenched trip through the interior of a Tek chip. Red-colored geometric shapes float in concert in zero gravity to form the show's title — TekWar.

The 'Tek' in the title refers to a computer chip that can project users via a sensory-controlled helmet, into a super-realistic 'virtual reality'. The addictive nature of the Tek chips in the future made it illegal and outlawed. Detective Cardigan spent time in cyrogenic prison for allegedly peddling and using 'Tek' chips.

Much of the Cyrogenic Prison, where Jake Cardigan was released, was also computer-generated, juxtaposed with live-action shots of actor Greg Evigan.

Plus, there was the 'Cyberspace' sequence in the first film, where a hacker used sophisticated, high-tech equipment and attempted to break into the Internet to locate Jake Cardigan's missing ex-wife and son. This took two 3D animators five months to plan, design and execute.

A scene such as this echoed the works of Science Fiction novelist/Vancouver resident William Gibson. Shatner has openly acknowledged that he read everything of Gibson's work that he 'could understand' and let it fester in his brain in the making of the films.

Now that all four 'Tek' films — TekWar, TekLords, TekLab and TekJustice — have aired in syndication and on CTV, the next goal is a weekly TV series. Shooting in Toronto for 18 episodes of the series began in September.

Visual Effects Supervisor Bob Munroe maintains that the magnitude of the SFX in upcoming episodes will be at the same level as the four television films.

"What you will see are effects of the same quality and the same concepts as the first four movies that we completed," remarks Munroe. "As the series goes on, we'll be adding ideas and trying out different experiments. Every now and then, you'll get a good dose of cyberspace like we had in the first movie. Predominantly, you'll see things like the Adway, which we also saw in the first movie."

Adway was a sociological prediction of the future of advertising. Governments are in ruin, so giant corporations subsidized the construction of highways, complete with video ads running as signs.

Munroe also says that "What you'll see is an improvement in the evolution of the characters. Evolution of the stories with more cohesive writing teams from the movies."

As Munroe and his team work to create the shows' SFX, scripts provided by writers are not the only source of inspiration. Munroe and his team of imagineers openly collaborate with the producers and writers suggesting SFX images. "Bill Shatner has asked us on a number of occasions for ideas of effects and he'll have the writer put it into the show," says Munroe.

The most striking example of this was in the first film, TekWar, where Cardigan hired some underground 'cyberjocks' to crash into the Internet to search for his missing wife and son.

"The whole cyberspace scenes in the Pilot were done by us," continues Munroe. "The concept came from Steve Roloff, one of our producers and production designers and he developed it as he could and then asked us to see what we could come up with. The whole design, most of the concept and even some of the dialogue while going through the cyberspace areas was done by us." Munroe cites this segment to be among his favorite SFX shots.

Some of the recurring SFX in the hour-long shows will include more of the 'Pulse Gun', the 'Morph Mask', the Adway, as well as continued use of holograms and high-tech screen displays.

Munroe says work for him has been "extremely rewarding. Actually, it's one of the most rewarding productions I've ever worked on in my life! We've had a lot of good feedback from the cast, crew, and the producers. The audience seems to appreciate the work we've put into it. There was quite a lot of talk of the SFX on the Internet and on Compuserve when the films first aired. People had different opinions about the stories, the acting but everyone was very complimentary about the SFX."

The SFX team have meshed together so well that Munroe says, "We've sprung a company out of it to do SFX. Contracts with other productions [have come in] in addition to TekWar. We're currently working on Johnny Mnemonic."

Munroe refers to the upcoming feature film starring Keanu Reeves adapting SF author William Gibson's story.

"We're also doing development work for other videos in Canada and a couple of things in Los Angeles.

"I don't know if you know this, but William Shatner is a partner in our company," reveals Munroe. "We had a very good relationship with Bill during the making of the films. He was extremely impressed with what we were doing. When we decided to build the SFX company, we had a standing invitation for Bill to join the company so he did, and he's part of the company, now."

Vancouver screenwriter Chris Haddock, creator of CBC's Mom P.I., wrote the third installment in the series, TekLab. Haddock says that writing the film was inspirational for him. He had never before dealt with a project that involved such extensive special effects. The first film had not been completed while he was writing TekLab, and as a result, "I was working blind for a great deal of the time not knowing what it was they were visually capable of. It was a bit of an odd sensation," says Haddock.

He confirms that the SFX team were very helpful, even making suggestions on how to present a sword fighting scene between actors Greg Evigan and Michael York.

"I suspect there will be even more input when they go to series," he says. "Sometimes I would call them and ask, 'What the hell am I talking about?' and they'd say, 'We don't know either! But we'll find our way!' It was a real pioneering effort between the writer and the SFX people. It's all quite new for television. Some of the stuff will work very nicely on television and others you wouldn't buy in the big screen." ❑

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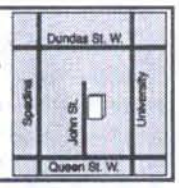

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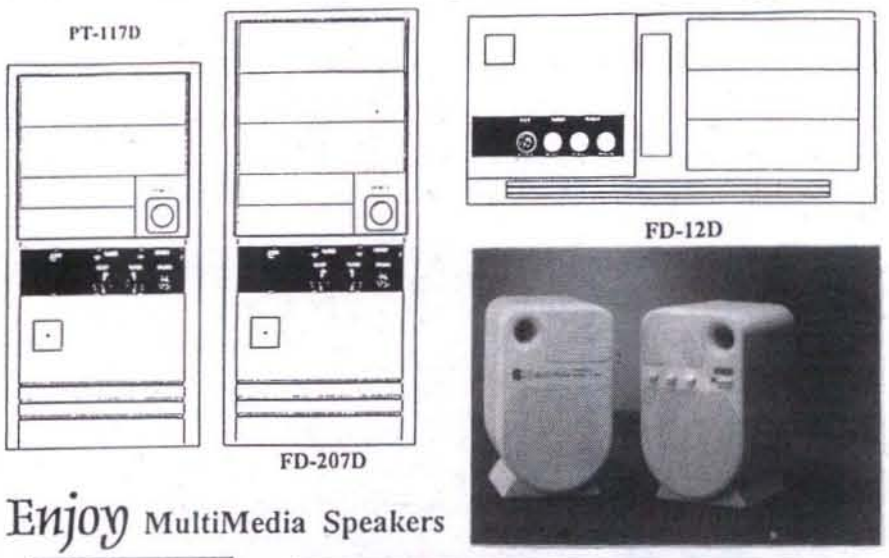

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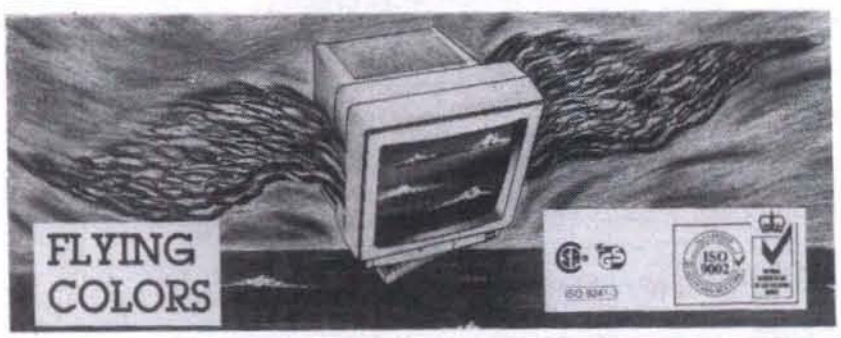

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Upgrading RAM

Continued from page **73**

each other. Windows can drive you crazy freezing up or acting bizarrely when just one program misbehaves. Windows does not multi-task well. If you have a program running in the background, it can often make the foreground program run impossibly slowly. No amount of tweaking will solve the problem.

Windows is notorious for problems with modems. (Make sure you have a 16550 UART chip for any Windows modem applications.) Windows applications take up considerably more disk space and RAM than their DOS ancestors. When Chicago comes out, and if you buy new 32-bit apps, many of these problems will be solved. However, even with Chicago, existing 16-bit apps (application programs) will have the same old problems.

Why Use Windows? However, Windows is the hot solution to the RAM-crunch problem right now. The main advantages of the Windows approach are:

1. Most programs are available in a Windows version.
2. It does let you crack the 640K barrier.
3. Installing programs is much simpler than under DOS, since Windows handles the details of what kind of screen, mouse and printer you have.
4. Windows provides yet another kind of RAM called DPMI, used by DOS-extender programs. These programs can run in true 32-bit native 80486 mode and fully exploit the CPU's powers. Unfortunately, there are not many extender programs around, except AutoCAD and the Microsoft Visual C compiler.

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Keep in mind, however, that even though you can run most ordinary DOS programs in a DOS box under Windows, they are still limited by the 640K barrier. Only programs written explicitly for Windows can be bigger than 640K.

DESQview: DESQqview is a lean, fast, multitasking scheme for DOS. It does not let you crack the 640K barrier directly. However, it does let you put each program in its own separate, reasonably-airtight 640K box and run them all at once. This means TSRs needed for one program need not be loaded for all programs, thus freeing up a small amount of space. DESQview can only run standard DOS programs, not those designed for Windows.

QEMM, 386Max: I lied a little bit earlier. The DOS limit is not actually 640K; it is 1024K, one megabyte. There is a 384K region above the 640K usually used by hardware like your video card, LAN and the ROM BIOS (the burned-in program that does the fundamentals such as control your keyboard, floppies and hard disk).

Usually, this 384K upper memory region is not 100 percent full. QEMM is a crazy quilt collection of kludges to fill unused pockets in this region with real RAM, and stuff TSRs and device drivers (config.sys and autoexec.bat stuff) into them.

It also takes any spare physical RAM you have lying about and makes it accessible either as EMS expanded or XMS extended RAM. It creates a common pool from which programs can draw whichever type they prefer.

QEMM has many tricks up its sleeve, some of which don't always work — such as the stealth feature to steal even the region occupied by ROM BIOS for use by TSRs. Installing QEMM requires patient trial and error.

Using a QEMM feature called **VIDRAM**, you can borrow 64K from the video card when you are using plain text without graphics. With VIDRAM enabled, you can often have access to over 700K of conventional RAM with all your TSRs and device drivers tucked away in pockets above that in upper memory, leaving an astonishing amount of room for your DOS programs

Further, there is a 64K region called the HMA, out past the 1MB mark, that is easy to access, with just a few fiddles of something called the A20 line. QEMM will move much of DOS up into the HMA, further freeing up the main conventional region. QEMM also provides DPMI RAM to DOS extender programs

DOS 6.2 itself now has some of the capabilities of QEMM, but QEMM wrings out more free conventional RAM. Qualitas 386Max and Quarterdeck QEMM are the Hertz and Avis of DOS memory managers. They are both excellent products. As of this writing, QEMM is a little ahead, but they often leapfrog.

Buying RAM

If you have decided that buying RAM will help, what kind do you buy? The most sensible way to handle this is to take your computer and the motherboard manual to a dealer. (When you buy a computer, refuse to take delivery without a motherboard manual.)

Most new machines use SIMMs. These look like small rectangular cards with a row of teeth down one edge. Older ones use SIPPs or DRAMS. SIPPs look like little cards with a

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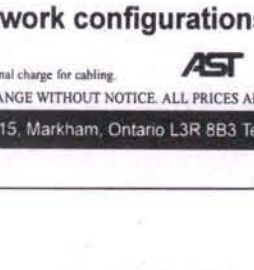

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row of tiny wires poking out one side which fit into holes. DRAMS are individual black rectangular plastic or ceramic chips with legs that fit into sockets.

Old-style SIMMs have 30 pins (teeth). They commonly come in 1MB, 2MB, 4MB, 8MB and 16MB sizes. New-style SIMMs have 72 pins and fit into larger sockets. They come in 4MB, 8MB, 16MB and 32MB sizes. You cannot stick a 30-pin SIMM in a 72-pin socket or vice versa.

Unfortunately, you can't just cram any combination of 30-pin SIMMs into your machine, either. See your motherboard manual for the magic combinations that work. Often you must have multiples of four of the same size, e.g., either four or eight 1MB SIMMs. You can't have six. This is because the CPU wants to access 32 bits at a time. Each old-style SIMM can only provide 8 bits at a time, so you need to gang them up four across to provide the 32 bits.

Rules for combining the 72-pin style SIMMs are usually more relaxed, since each SIMM module can cough up 32 bits at a time all on its own. Sometimes you must use them in pairs to provide 64 bits at a time for the Pentium.

RAM prices are volatile. In August 1994 RAM was going for about $50 to $55 per megabyte for SIMMs, and $70 to $80 for individual DRAM chips. SIPPs are hard to find. You would have to try a swap meet.

RAM Speed: SIMMs come rated for speed, e.g. 60 ns to 150 ns (the lower the number, the faster.) A ns (nanosecond) is a billionth of a second. Most machines sold nowadays are fitted with 60 or 70 ns RAM. Using faster RAM than rated usually won't make your machine go any faster. If you read the motherboard manual, sometimes there is a way to configure your machine for faster RAM, but then all RAM in the system must be of the faster type.

It usually does not hurt to buy RAM faster than rated. The advantage of doing this is that you have a better chance of recycling it later. However, a few older machines don't like RAM that is too fast

The part numbers of 70 ns RAM have -70 on the tail end, -60 for 60 ns RAM, etc. In the cutthroat competition of computer retailing, sometimes you will find your supposedly "60 ns RAM" is really only 80. It is easy to check; just look at the chips.

SIMM Contacts: There are two schemes for joining the SIMMs to the motherboard. They are subtly different. If you mismatch them, the RAMs will sort of work, but will be unreliable.

The "pillowy soft" technique uses little pillows of soft tin alloy on the SIMMs for the contacts. They look dull gray. To the untrained eye, they might seem corroded or dirty. Little pointed, curved silvery hooks in the motherboard sockets pierce the pillows for a gas tight seal.

The "paper clip" technique uses hard, flat, shiny gold-plated contacts on the SIMMs. The probes that reach out to touch them look like rounded Ds made of gold paper clip wire.

Both techniques work well, if you use the corresponding SIMM for the socket.

Parity: SIMMs have some extra bits used for parity error detection. Hardware continuously and automatically adjusts the extra parity bit to keep the number of 1s in each byte stored in DRAM odd. If something hiccoughs, and a 1 turns into a 0 or vice versa, the parity of the result will become even, and the circuitry automatically detects the error. This warns you that the results of the latest calculation cannot be trusted. Just in case this happened to be something critical like your income tax return, the computer stops, and you must try again after restoring from your backups. Some SIMMs don't have a parity bit. If you use a machine without parity, there are no checks. Calculations can go awry and you will never be notified.

Three Kinds Of Cache

The word "cache" is used for three different things:

1. The on-chip internal SRAM cache to speed up calculations.
2. The auxiliary external SRAM cache on the motherboard to speed up calculations.
3. The DRAM used to speed up the hard disk.

Internal On-Chip Cache: A 90 MHz Pentium CPU takes about 11 nanoseconds to do a basic operation, such as adding two numbers together. Ordinary DRAM takes about 70 nanoseconds to do a basic fetch operation — about seven times too slow. Inside the Pentium chip is a 16K cache of super fast 11 ns SRAM that can keep up. Hardware automatically keeps copies of the most popular parts of RAM in that internal cache.

External Auxiliary SRAM Cache: However, the internal cache is not nearly big enough to hold all the work in progress, so we use an external auxiliary SRAM cache, of about 256K. This auxiliary cache is 16 times bigger than the internal on-chip cache and about 32 times smaller than the main DRAM. It is slower than the internal cache, but it is still faster than ordinary DRAM. Its purpose is to speed up calculation by holding the most popular parts of your 8 MB of DRAM.

The external cache then helps couple the super fast CPU with the slow DRAM. The cache is managed by special high speed hardware circuitry, without the intervention of software.

Disk Caching: There is a similar mismatch in speed between the DRAM and the hard disk. Even though DRAM is considered slow relative to the CPU, it is still 1,000 times faster than a hard disk. So we use a piece of software such as SMARTDRV that allocates 2MB or so of your DRAM to hold copies of the most popular parts of the hard disk. This hard disk cache is managed by clever software that tries to guess which parts of the disk you will read next.
— RG

Installing RAM

RAM is extremely sensitive to static electricity. It must be stored in an anti-static bag. Don't take it out to look at it. DRAMS are kept in long anti-static tubes, or pressed into anti-static black foam. When you install the RAM, you should wear an anti-static wrist strap and do the work on an anti-static mat.

The world is full of people who take no precautions whatsoever and claim none are necessary. Yet even in humid weather when there is no obvious static, you can still generate charges sufficient to damage carelessly handled RAM. The damage usually shows up several months later as flaky operation, not usually as a hard RAM fault. If you buy RAM, especially at a swap meet, watch how the sellers handle it. If they are careless, buy elsewhere.

Configuring RAM

The CPU chip in your computer is faster than the fastest RAM you could possibly buy. The CPU has to mark time for a few beats of the system clock every time it accesses RAM to give the RAM time to catch up. The faster the rated speed of your RAM, the fewer of these "wait states" you need. You configure the number of wait states either with jumpers on the motherboard or, more commonly, by setting the value in CMOS. If you set the number lower than recommended in your motherboard manual, your machine may run faster, but it will be unreliable, and will freeze up from time to time. Even when you configure 0-wait states, there are still some wait states. This means there are no extra wait states.

SRAM cache: Your computer may have 64 to 512K of very fast 10 to 25 ns RAM called the static RAM cache. This comes in two parts: the cache proper and the tags. In the SRAM cache are duplicates of the most popular parts of your 8 MB main DRAM. The tag RAM keeps track of which parts are most popular. This way the CPU can quickly access the most commonly used parts of RAM, by taking them from the faster SRAM cache instead of the DRAM.

To the programs, this cache is invisible. All it does is make programs run faster.

➤

Increasing the size of the SRAM past 256K would not help much in a DOS system. Increasing its size will never help you get around any sort of "out of memory" error. However, in an NT system that juggles many tasks at once, a giant 1MB SRAM cache will speed things up considerably.

Check the motherboard manual to see how fast this SRAM should be. It might, for example, say the tag RAM should be 15 ns and the SRAM 20 ns. You can check that it is by looking for the -15 and -20 part number tags on the long, thin, removable rectangular SRAM chips on the motherboard. Careless dealers sometimes install SRAM that is too slow, which leads to flaky operation.

A RAM Crunch Solution

Here is how I solve my personal RAM crunch problem. At home I have a 486 and at work a Pentium. Both have 16 MB of RAM.

Since I write Windows code for a living, at work I use a combination of QEMM and Windows for Work Groups. I often run a DOS program called RC — the resource compiler. It requires so much RAM, I could not possibly run it without QEMM's help. QEMM neatly tucks the voluminous device drivers for Novell LAN and Windows For Work Groups into pockets of unused high RAM.

At home I use mostly QEMM and DESQview. I am in the process of switching over to OS/2.

Summary

First, determine what kind of RAM your program is short of. If you don't know, join the Novice SIG of your local user group.

If the problem is conventional RAM, QEMM is your best bet to squeeze out a little more. If you still can't get enough RAM, look for a DOS extender, Windows, OS/2 etc. version of the program. You then have to buy both the new version of the program and the new operating environment, and probably some new hardware to beef up your machine to support the new environment.

If your DOS program is running out of expanded EMS or extended XMS or DMPI, make sure to configure QEMM to provide adequate amounts. You might also configure caching programs such as PCKwik or SmartDrv to use less RAM. Most DOS extender programs can manufacture their own DPMI RAM out of ordinary RAM, but you may need to insert a QEMM DPMI driver, or run the extender program in a Windows DOS box.

As you can see, solving the running-out-of-RAM problem is much more complicated than you would have ever guessed. You are best off getting an experienced friend to help you solve it. ❑

Credits: I have been working on this article for over a year. During that time, many of my friends on the BIX electronic conference have made many suggestions. Special thanks goes to Armour Van Horn, Barry Nance, David Holm, Don Wilson, Ernest Davis, Karen Kenworthy, Marty Holcomb, Mike Blaszczak and Rich Shealer.

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CAD FEATURE

The State Of CAD In 1994

BY RALPH GRABOWSKI

It used to be said that you need to be a rocket scientist, or near-equivalent, to use CAD (computer-aided design). CAD's interface was user-hostile; the hardware demands were outrageous; the price was out of sight.

That's been changing over the last 10 years, primarily due to the influence of AutoCAD becoming the Number 1 selling CAD package by selling 80 percent of the features for 20 percent of the price. But in the last two years, AutoCAD itself has come under attack from competitors using the same marketing pitch and from non-CAD drawing programs.

The truth is that CAD doesn't matter anymore for most of today's computer users. The reason is that CAD software was never meant for the general computer user, even if it is sometimes mistakenly marketed that way.

Who needs CAD when drawing software (the likes of CorelDraw, Micrographx Designer, and Arts&Letters) provides all the precision drawing that users need — with CAD-like features to boot? Instead, CAD is an important tool (some would say the most-important tool) for a niche in the work place: architecture, engineering of all kinds, mapping, building construction, and facilities management.

CAD differs from drawing software in a number of important areas. CAD is awesomely more accurate than drawing software, often up to 14 decimal places. That's 0.00 000 000 000 001 or a ten-trillionth of any unit of measurement you care to use, whether inches, angstroms, light years, or surveyor's chains.

CAD does not place limits on the size of the design: you can draw the entire solar system full size to an accuracy of a centimeter.

CAD does not place limits on the size of the design: you can draw the entire solar system full size to an accuracy of a centimeter. Mathematically, AutoCAD and CadKey can handle a range of numbers from 1E-308 to 1E+308. In CAD, you don't draw with a scale factor: you always draw full size, then select the scale when it comes time to print the drawing or simply let CAD fit the drawing to the paper.

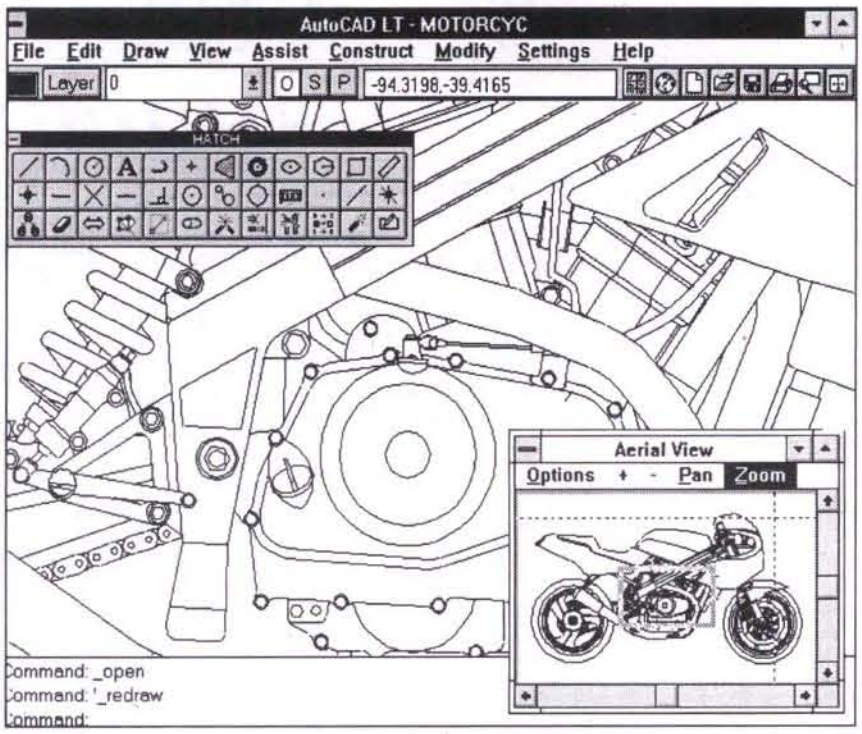
Although most lower-cost CAD packages draft two-dimensional drawings, it's CAD's 3D abilities that place it head and shoulders above drawing software. Interestingly enough, the drawing packages are beginning to back away from 3D; for example, Micrographx dropped all 3D capabilities from the latest release of Designer.

With CAD, you have the choice of working with wireframe models, surface models, or solid models — creating 3D models by sweeping or extruding profiles, and using boolean operations to merge simple objects into complex projects. Solid modelling is the most impressive, since it lets you discover location of interference, the mass of objects, and their centers-of-gravity. Once you have the drawing in 3D, most CAD packages make it a trivial matter (though CPU-consuming) to obtain a photo-realistic rendering and an animated walk-through. Further, 3D CAD is the stepping stone to stereolithography and virtual reality.

DWG Compatibility

With over 1,000,000 copies licensed worldwide, the dominance of AutoCAD in sales (though not in features) has made it the Number 1 target among competitors. The first marketing campaign by competitors was to price their CAD packages a lot lower than AutoCAD. Some packages are one percent the price of AutoCAD.

Then, two years ago, Bentley Systems (BSI) began a new trend: Instead of fighting on the basis of price, lure users with the promise of AutoCAD compatibility. BSI are the programmers of the Number 2 CAD software, MicroStation. BSI began by treading lightly for they feared a legal backlash from Autodesk. But since it is Autodesk policy to (publicly) ignore the competition, BSI and others became bolder in the last 12 months.



AutoCAD LT (See end of article: CAD Under $1000) for Windows is almost 100 percent compatible with AutoCAD Release 12 at 1/7th the price but is seriously flawed by its lack of a programming interface.

Most CAD packages (and most graphical software) can read AutoCAD's DXF files. The drawback to DXF is that you need to first create a DXF file from an AutoCAD drawing. That's an extra step that can be difficult if no copy of AutoCAD is handy to perform the superfluous translation. Also, DXF files tend to be four times larger than the equivalent AutoCAD drawing file, quickly filling the

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hard drive when many drawings are translated.

With its Nexus product, released in the summer of 1992, Bentley Systems allowed MicroStation v4 to directly read AutoCAD drawing (DWG) files. The industry watched with interest, then dived in. Today, most commonly-known CAD packages can read AutoCAD drawing files directly.

(Be aware that direct-DWG is no panacea, only a convenience. There are difficulties in accurately translating drawings from one CAD package to another. It's similar to the disaster you end with after bringing a heavily formatted WordPerfect document into Word. Microsoft's claims of WordPerfect compatibility are as hypothetical as they are for any CAD package claiming to cleanly read an AutoCAD file.)

Last year, AutoCAD's competition raised the ante. In v5, MicroStation adds the ability to write AutoCAD drawing files directly. More importantly, BSI added an AutoCAD "workspace" to MicroStation. The workspace helps AutoCAD users new to MicroStation find their way around more easily. Menus are more like AutoCAD's and an extensive help section translates the jargon used by both CAD packages.

Over at the Number 3 PC-CAD vendor, former Autodesk vice president Malcolm Davies is CEO of CadKey, Inc. Davies has a personal reason to overtake Autodesk. Thus, in addition to directly reading and writing AutoCAD files, CadKey v7 can run AutoLISP programs written for AutoCAD. This is to encourage the 2,000 third-party AutoCAD developers to bring their products over to the CadKey camp.

In addition, CadKey has invested heavily into an object-oriented programming environment called CODe (CadKey Object Developer). Mr. Davis says this will allow CadKey to come out with new features faster and more cheaply than Autodesk, and to develop vertical market software.

Vertical Market CAD

Another new trend is CAD software specific to a specific job. Autodesk was a forerunner with its Home Series (Home, Kitchen, Bathroom, Landscape) but then lost interest and pulled the plug on further development last year. After all, when your shareholders are spoiled by the profits gained from selling software at $3,750 a pop, they're not going to have patience with the puny profits realized from software retailing for less than $59.

The idea of vertical market CAD is not new. One of the primary drawbacks to CAD is that you really can't use it straight out of the box. To be efficient with CAD, you need to customize the software to your style of work, much more so than with any other software. Thus, a huge sub-industry of "third-party developers" exists to provide customized add-ons to AutoCAD, MicroStation, and CadKey. Autodesk claims it has 2,000 third-party developers producing 4,000 add-on products.

For example, you can buy AutoCAD specifically tailored for tracking corrosion to OSHA standards for $14,250 — in US dollars.

It's the pricing that been turned on its head. A few software marketers recognized that making CAD specific to a definite task could make the potential market larger, not smaller. A larger market means lower prices.

Frankly, the Home Series had a terrible user interface, something that the neophyte computer user isn't going to tolerate. Other CAD vendors learned from Autodesk's mistakes and have released several low-priced products (typically under $99) tailored to exact tasks.

Foresight Resources has released its Planix for Windows series. The Planix series is CAD software that looks an awful lot like Drafix CAD Windows but has been (so far) customized for Home design and Office planning. Abracadata has CAD-like software for architecture, landscaping, gardening, and home interiors.

Other Autodesk marketing moves have backfired on them in recent months. First, Autodesk released AutoCAD LT for Windows without the LISP programming interface promised to third-party developers. AutoLISP LT was pulled at the last minute at the insistence of dealers, who wanted to protect their higher profit margins from sales of the more expensive AutoCAD Release 12.

Second, Autodesk has been on a technology-acquisition buying spree, buoyed by the $270 million cash sitting in its bank account. Too many acquisitions have become AutoCAD add-on products — with names like AutoSurf, AutoVision, AutoMill, Designer, and WorkCenter — so that Autodesk has, in effect, become a competitor to its own "family" of third-party developers.

This has led some developers to abandon AutoCAD. With competitive CAD packages ➤

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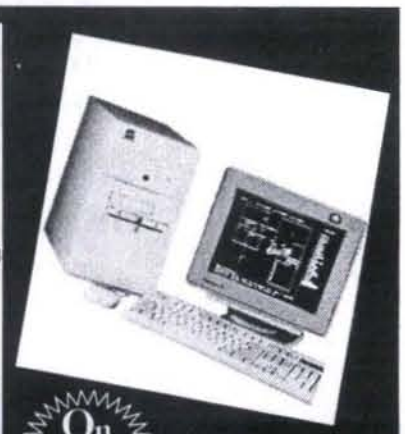
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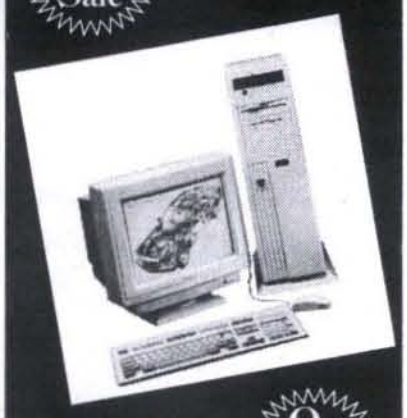
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offering AutoCAD compatibility at much lower cost, why saddle the customer with the added cost of AutoCAD's $3,750 "tax." LandCADD is the best example. They were developing a lower-cost landscaping design add-on for AutoCAD LT and got stung when Autodesk unexpectedly pulled the programming capability. LandCADD switched to Aritek's CornerStone CAD development system, which let them write Site Designer, an AutoCAD-compatible vertical-market standalone CAD software package (see figure [landcadd]). Autodesk ended up losing sales of both LT and Release 12.

The Influence of Windows

Windows has had a profound effect on all segments of the computer market. Nowhere is the effect more divisive than in the CAD market. Frankly, CAD runs best on a DOS system. The MS-DOS operating system, combined with the Intel hardware platform, gives CAD its best bang for the buck, particularly when networked properly.

CAD's outrageous hardware demands have become today's norm. Anyone with a computer capable of running Windows can run CAD.

Ironically enough, Windows is responsible for knocking CAD down off its pedestal. The hardware demands made by Windows (fast high-resolution color graphics, lots of fast memory, fast CPU, and big fast hard drive) turned high-end hardware into cheap commodity products. CAD's outrageous hardware demands have become today's norm. Anyone with a computer capable of running Windows can run CAD. At last count, that amounts to about 60 million computers.

In the 80's, the powerhouses of the CAD world — AutoCAD, MicroStation, and CadKey — adapted well to DOS. In the 90's, they are finding the transition to Windows a difficult and drawn-out process. The overhead imposed by Windows just plain slows down CAD to a speed that frustrates production-minded designers. Windows is currently a 16-bit system but all of the powerful CAD systems run in 32-bit mode; slicing the number of bits in half has all kinds of speed and programming implications. Windows is unfriendly to digitizing tablets and comes with really poor pen plotter drivers — peripherals that are the mainstay of the CAD operator.

It has taken Autodesk four years (and three attempts: R11, R12, and R13) to create a 32-bit Windows version of AutoCAD. Bentley Systems didn't even try to create a Windows version of MicroStation: they simply made their DOS version Windows-compatible and grafted on a couple of Windows drives to handle the display and the Clipboard. And CadKey, Inc. is probably still a year away from releasing their first attempt at a Windows version of CadKey.

For the new kids on the CAD block and for the lower-cost CAD packages, Windows is great. The makers of Visual CADD, XCAD, DesignCAD for Windows, Drafix CAD Windows, and TurboCAD for Windows chortle at the Big Three's difficulties.

Their CAD packages support some or all of TrueType fonts (no more CAD-like "stick" vector fonts), Clipboard copy and paste, OLE, DDE, Visual Basic programming, MDI, MAPI, ODBC, floating toolboxes with fly-outs, etc. Windows provides them with device independence, so their programmers don't have to worry about writing and supporting device drivers for every peripheral ever made. Windows provides a predefined user interface, so the programmers spend far less time worrying about the nature of the GUI and law suits from Lotus. And the lower-cost CAD packages tend to be 16-bit programs that aren't limited by Windows' bit manipulation.

Product Overviews

CAD is by no means a small software category. When I surveyed the CAD industry a year ago, I came up with the names of 270 CAD packages from 169 North American vendors — and the list did not survey CAD software specific to PCB and electronics design. There is CAD software available that runs on the fastest parallel processing mainframe and CAD for pen-based notebook computers; the prices range from over $70,000 to $0 (for freeware).

For PC users, there are just a dozen or so CAD packages that are industry leaders — either in sales or innovation. Here is a quick rundown of nine of the most interesting CAD packages on today's market:

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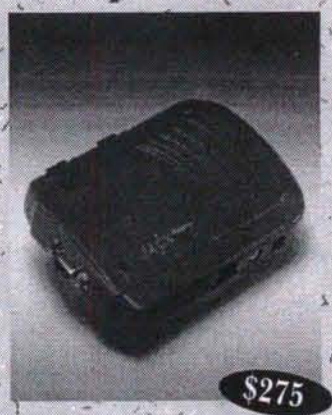

$275

- Supports Windows 3.0 and 3.1
- Built-in Flicker-Free filter
- Supports all IBM standard video modes and Hi-color modes (256/32K/64K colours)
- Resolution up to 640 x 480 in NTSC TV system or 800 x 600 for PAL TV system
- Underscan/Overscan and TV brightness control
- Input: Standard VGA
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Jack Selection is an external VGA to Video converter which can be used on any PC, laptop or notebook. Displaying up to 800 x 600 SVGA resolution on both the VGA monitor and the television set, Jack Selection comes standard with a flicker filter, positioning software, video cables and power supply. It also supports 3 video formats — S-Video, composite and RGB — in one of two video standards, PAL or NTSC.

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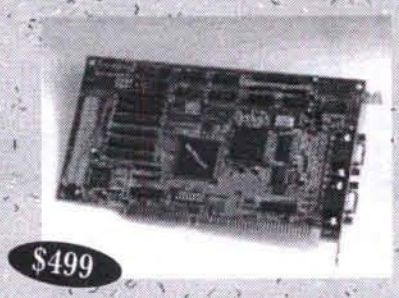
- Second generation Flicker-Free filter
- Supports all IBM standard video modes & high colour modes (256/32K/64K colours), resolution up to 640 x 480 in NTSC and 800x600 in PAL
- Supports Macintosh standard modes (640x480, 31 or 35 KHz)
- Full Underscan and Overscan
- Input: VGA D-Sub Connector
- Output: Composite RCA Connector, S-Video Connector
- Directional Panning with zoom
- Screen Freeze/ Unfreeze

Jack³ Selection, the latest addition to MicroJack Multimedia's bestselling video converter series, bridges VGA to video and offers the maximum flexibility for all your needs. Features include: second generation flicker-free filter, full over/underscan, panning with zoom, plus remote control function. Jack³ Selection is easy to use – it requires no software drivers and it has its own power supply! The Auto Mode Detection feature ensures optimum performance on any platform.

FULL-MOTION VIDEO CAPTURE AND DISPLAY

MICROJACK Video Commander



$499

- Inputs: Three selectable composite NTSC/ PAL video inputs
- Supports IBM standard video modes and Hi-color modes (256/32K/64K colours)
- Output: Standard VGA signal
- Real time two-dimensional panning
- Fractional zoom up to 1024 x 1024 pixels
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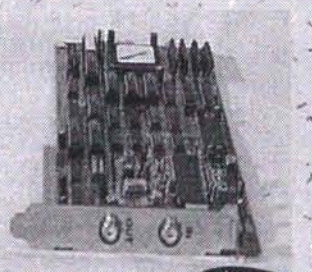
MICROJACK TitleMate



$399

- Supports two video modes: Computer–displays video data in memory; Overlay–displays external video overlayed with on board memory video data
- Displays 256 of 256K colours
- Overlay colour: 1 of 256 colours
- Display resolution: 640 x 480 (NTSC), 640 x 512 (PAL)
- 512 KB on board memory
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- Video Output: Composite Video with RCA connector

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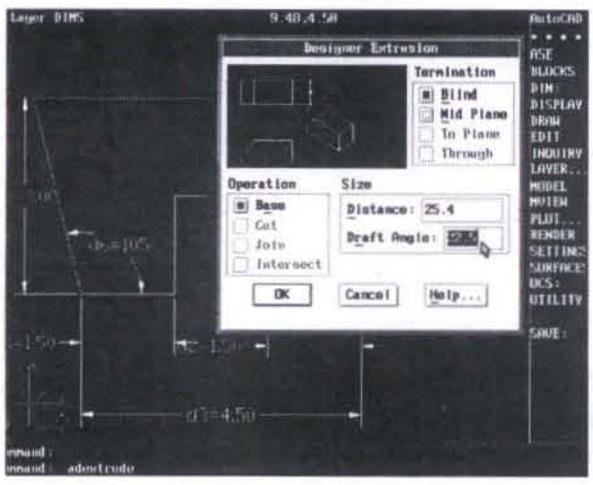


Now the #1 CAD package in world-wide sales, AutoCAD is coming under increasing attack from competitors on the basis of price, features, and compatibility.

AutoCAD 12 (Autodesk, Inc.) is now the world-wide market leader, having surpassed IBM in CAD sales earlier this year. At US$3,750, AutoCAD Release 12 is expensive, but it's the industry standard. If you work with clients or hope to land a job as a CAD operator, there's an 85 percent chance that you'll need to use AutoCAD. Autodesk also sells extra-cost add-on's to AutoCAD for photo-realistic renderings, parametric modelling, and enterprise-wide drawing access. Release 13 is due out on store shelves about the time you read this.

MicroStation 5 (Bentley Systems, Inc.) is the Number 2 desktop CAD package. Costing as much as AutoCAD, it offers features that are options costing several thousands of dollars extra with AutoCAD. MicroStation is favored by large corporations and government agencies (48 of US Departments of Transportation use MicroStation, for example). And MicroStation's gorgeous user interface (based on OSF/Motif) doesn't hurt, either.

CAD Under $1000

CadKey 7 (CadKey, Inc.) is the best selling desktop CAD package for 3D mechanical design. The firm's CEO is a former Autodesk vp and is determined to surpass AutoCAD sales. Earlier this year, the price of CadKey was slashed from US$3,495 to US$495.

Generic CADD 6 (Autodesk) has one foot in the grave and the other foot on a banana peel. A year ago, Autodesk announced that it would no longer continue to develop Generic CADD, the most popular under-$500 CAD package on the market. Autodesk continues to sell the software and provide buggy bug fixes.

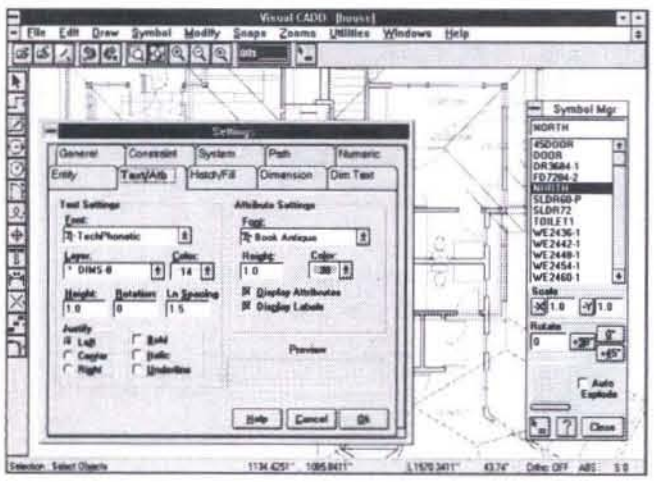
AutoCAD LT For Windows (Autodesk) is the marketing person's idea for a replacement for Generic CADD. LT is a dandy 2D replacement for AutoCAD Release 12 but in no way replaces Generic CADD for 1/7th of AutoCAD's price. LT is 100 percent compatible with Release 12 except in a few non-critical areas, such as advanced programming, database links, and solids modelling.

Visual CADD (Numera) is the programmer's replacement for Generic CADD. Created by the former programmers of Generic CADD, the 2D Windows-based CAD software boasts all the modern Windows features (OLE v2, tabbed dialogue boxes, Windows programming API) but maintains compatibility with Generic CADD: identical two-letter commands, GCD and CMP read and write, and commands like Like and Track .

Drafix CAD Windows 3 (Foresight Resources) is the most mature of the Windows-based 2D CAD packages — after all, Drafix was the very first CAD package running under Windows. The strengths are in its 5,000 symbols, user-friendly database connection, strong customization, and flexible file translation.

Design CAD (American Small Business Computer) is probably the best known of the "low-cost" CAD packages. Their ads constantly challenge Autodesk's pricing. The Windows version of Design CAD is a surprisingly strong release (it took Autodesk three releases to get the Windows version of AutoCAD right). Design CAD for Windows is weaker in programming and lacks a database connection but can place raster images into its drawings.

XCAD (Xitron) is the newest 3D Windows-based CAD package on the market. Coming out of nowhere, XCAD was suddenly introduced in June as ACIS-based 3D CAD. ACIS is the hot, new surface and solids modelling paradigm that all other CAD packages are shifting over to. Xitron is porting XCAD over to the Alpha chip with help from DEC. ❑



Visual CADD is the first CAD product from a group of former Generic CADD programmers.

Ralph Grabowski is CAD Series Editor for Delmar Publishers, edits the CAD++ Newsletter for CAD developers, and is the author of 14 books about CAD, including The Illustrated AutoCAD Quick Reference. He is based in Abbotsford, B.C.

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learning

Windows Keyboard Shortcuts

BY GEOF WHEELWRIGHT

Keyboard shortcuts are often a much faster way of moving around Windows than lifting your fingers from the keyboard, moving the mouse to the right position, clicking or double-clicking on an icon or button, and then moving back to the keyboard to do your next task.

ALTernatives to the mouse

A perfect example of this is the shortcut to saving a file. In virtually all Windows applications, you can save yourself the trouble of picking up the mouse if you just learn the following keyboard sequence: ALT-F, then S. This means holding down the ALT key on the keyboard, pressing the letter F to bring up the File menu and then the letter S to indicate that you wish to save the file.

Another strong universal keyboard shortcut is ALT-F and then P. This once again selects the File menu and then the printing option. Because is is part of the past file menu structure, it does not vary from application to application, and you can count on using this key combination in whatever Windows software you happen to be running.

The same can be said of many ALT key combinations to get certain key Windows commands running, including ALT-E to get the Edit menu on-screen and ALT-H to bring the Help menu to attention. To see which ALT key combinations work best in your favorite application, just look at where the on-screen underline is in the file menu name. The File menu name, for example, features an underline underneath the letter F. This means that holding down the ALT key and pressing the letter F will bring up that menu.

The Great ESCape

The next great keyboard shortcut to know is CTRL-ESC. This involves holding down the Control key, briefly pressing the ESC key, and then letting go of both. Doing so will bring up the Windows Task List, showing you a list of the applications and tasks that Windows is running. From this task list, you can quickly switch to any of the running applications on the list by scrolling to it and pressing Enter (or ALT-S, if you prefer).

The Task List also gives you a number of other options, including the ability to "cascade" all your application windows, so that you see them stacked diagonally across the screen, one behind the other. Another option is to Tile the windows, so that they each get resized to an approximately equal size on screen (depending on how many applications you have open at any one time. The more applications are open, the smaller the size of the tiled windows). A third window option on the Task List is to Arrange Icons, which is useful when all your applications have been minimized as icons and are littered all over the screen. The option will neatly arrange them at the bottom of the screen.

Other than Cancel (which just ends the Task List command), the only other option is End Task. This is particularly useful when you are running a DOS application in a window on the Windows desktop and it crashes. By using the Task List's End Task command, you can safely close down the offending DOS application without crashing the whole of your Windows environment.

ALTernate applications

If you want a simpler way to move between applications, just press ALT-ESC and that will move you from one application to the next. But the Task List and ALT-ESC are not the only keyboard shortcuts for moving between applications. By holding down the ALT key, quickly pressing the TAB key, and then quickly releasing both, you can quickly ➤

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learning

switch between one application and another.

If you have several applications running, it is better to hold down the ALT key and then press and release the TAB key while still holding down the ALT key. This will bring up the name of an application and its icon. Releasing both keys at that time will switch you into the displayed application. If instead you keep holding down the ALT key and press and release the TAB key again, it will display the name and icon for the next application. If you keep holding the ALT key and keep pressing and releasing the TAB key, Windows will page through the running applications. When you see the one you want, you just release the ALT key and you can start working with it.

The final ALT key shortcut you should known about is ALT-spacebar. This gives you a way of scrolling through all the menus on the screen without having to use the mouse. Initially pressing the ALT-spacebar combination brings up the Restore, Move, Size, Minimize, Maximize, Close, Switch To and Run options. The first six of these options are quite obvious and operate as you would expect. The Switch To command does the same thing as pressing CTRL-ESC, while Run will give you the option of going to the Windows Clipboard or the Windows Control Panel without having to go via Program Manager.

One of the best uses of ALT-Spacebar, however, comes from within DOS applications. If you start a DOS application from Program Manager's Run command (found under the File menu) and do not have a PIF (Program Interface File) for it, it will likely default to running full-screen. If you want it to run as a windowed application, just press ALT-Spacebar after it has been loaded and then hit the ESC key. You will see your DOS application running in a window on the Windows desktop.

CTRLing your Cuts

The last set of really useful shortcut keys are the ones that allow you to cut, copy and paste data. To copy a highlighted selection to the Windows clipboard from almost any Windows application, you just hold down the CTRL key and press the letter C. This will then put a copy of that data in the clipboard for pasting back into that application or any other Windows application.

Likewise, to cut a selection using the keyboard, you just highlight the data you want to cut, then hold down the CTRL key and press the letter X - which will remove the data from your application, but leave a copy of it in the clipboard for movement to another location if you wish. Remember, however, that this data only stays in the clipboard until you copy or cut something else into the clipboard, at which point that data replaces what was previously in the clipboard.

You can also use the DEL (delete) key or backspace to delete a selection, but be aware that each of these keys does something different. DEL, like CTRL-X, will copy the deleted information into the Windows clipboard for later use if needed. If, however, you press the Backspace key after highlighting a block of data, that will completely erase the data from your work. You will not be able to retrieve it using Paste or by going into the clipboard.

Pasting information from the clipboard back into any Windows application is also possible using a simple key combination: CTRL and then the letter V. This puts a copy of the clipboard data into your application but does not remove the pasted data from the clipboard. It will be available for pasting anywhere else until you cut or copy some other data into the clipboard. ❑

Cardiff Movie Database

Continued from page **81**

Robert Hartill created the hypertext WWW interface while in the United Kingdom. He now works from Los Alamos National Laboratory in New Mexico where he's continuing work on WWW. Via E-mail, he says that the database "is developing all the time, but at a slower rate now because I'm now working in the U.S." He also says the title Cardiff's refers to the University of Wales College of Cardiff, in whose Computing Mathematics Department it originated.

"I'm currently working on a list of suggestions collected from various sources, and adding support for new lists, e.g., a genre list (now separate from the plot summaries), and a production companies list," says Hartill. "I'm also trying to make the forms interface to adding new/missing data easier to use and easier to process by the list managers."

Hartill also acknowledges the database's popularity with specific figures.

"We did some calculations the other day and worked out that there were around 20,000 to 25,000 requests a day for raw information — that's not counting the number of connections for the icons that come with each page," such as buttons for the movie reviews, he says. "The figures are growing steadily. The mirror site in Mississippi is also servicing a number of requests a day — I haven't looked recently, but last time I guess it was around 20-25 percent of Cardiff's load."

As for feedback, Hartill says that he used to get feedback "all the time" with the occasional, silly request. Are films on video? In what movie did such-and-such an actress appear nude? Or, how do I get clips of the film?

"I (and the list managers) also occasionally get mail from people who have appeared in or worked on some films - no big stars yet though," remarks Hartill.

"A lot of the feedback I get is from people asking for new features which are already supported, e.g. 'I'd like to be able to search for a director's name - please add this feature'."

As it stands today, Cardiff's Movie Database is a testament to what a growing list of volunteers, all working towards a common goal, can accomplish. ❑

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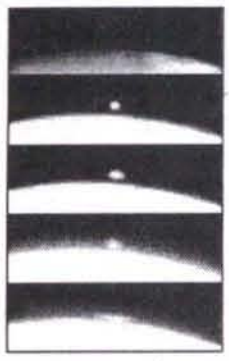
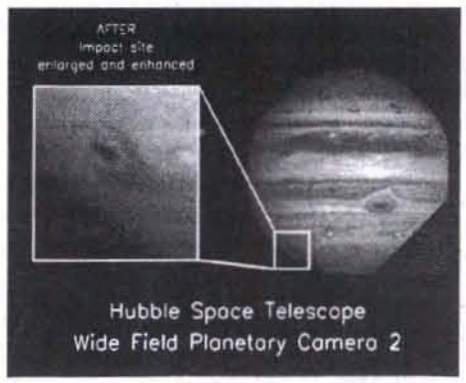
what's**new**

JUPITER/COMET COLLISIONS ON CD-ROM

• Earlier this year, the shattered remnants of the Shoemaker-Levy 9 comet slammed into the side of the planet Jupiter. While many people watched the event unfold on the daily news, those who had Internet access had the option of downloading the comet images to their computer. Now astronomy buffs can get as many of these spectacular images as they want from the SL9: IMPACT '94 CD-ROM put out by Network Cybernetics Corporation.



This CD-ROM collects many of the best images of the cometary collision from observatories from around the world, including some spectacular shots from NASA's Hubble Space Telescope. Hundreds of still images are accompanied by technical information



on the event. There are also 50 animation files, along with viewing utilities supplied for OS/2, DOS and Macintosh platforms.

Altogether there are more than 400MB of files on this CD-ROM covering the cometary collision. The suggested list price for the SL9 CD-ROM is $39.00 U.S. — K.S-R

Contact: Network Cybernetics Corporation (214) 650-1929 or via Internet e-mail at: SL9-ORDERS@NCC.COM

HEWLETT-PACKARD'S COLOR LASERJET ARRIVES

• Hewlett-Packard is billing its first color laser "the world's most affordable color laser printer."

The HP Color Laserjet will set you back $10,395, and for that you get a network-ready printer that will print black and white or full color on letter size plain paper or transparency stock at 300 dpi. It will also print on 11 x 17 paper — but only in black and white.

HP says the printer's main job will be to "bring color into the everyday business environment." One of the company's goals was to avoid the shiny, ironed-on color look that you get with thermal-type color printers, while avoiding the streaks and runs that occur with inkjet printouts when they get wet. Judging from the color samples provided by HP, the company has achieved "the look:" colors are the same, smooth matt finish that we've grown familiar with in monochrome laser output.

The printer incorporates what HP calls ColorSmart technology, which senses the type of color required (e.g., photographic or spot colors) and optimizes the output accordingly.

HP is claiming that the Color LaserJet will be very economical to operate in full color mode. It estimates that cost per page will run from about 3.3 cents for black only and 12 cents for the typical page with text and color graphics, up to a maximum of only 65 cents per page at full-color 100 percent coverage of a letter size page.

HP has also introduced two new LaserJet printers. The 4V and 4MV represent PCL and PostScript versions of the same printer. The 600 x 600 dpi printers will handle paper up to 11 x 17 inches, and are also the first HP printers to incorporate a built-in hard drive, which is optional. HP representatives emphasized that the 4MV includes genuine Adobe PostScript Level 2, not just PostScript emulation.

The LaserJet 4V has a suggested price of $3,495, while the 4MV — which comes with and HP DirectJet network interface card — sells for $4,995. — DT

Contact: Hewlett Packard (Canada) Ltd. 905-206-4725

MKS WINS AWARD

• Mortice Kern Systems Inc. of Waterloo, ON has won an Outstanding Business Achievement award from the Ontario Chamber of Commerce.

MKS was one of five enterprises receiving the award. The company develops software development tools, but recently introduced a consumer-level Internet access software package called MKS Internet Anywhere. —DT

CLARISDRAW 1 REPLACES MACDRAW

• Claris has announced that ClarisDraw 1.0 is replacing the MacDraw family of general drawing programs. ClarisDraw is an upgrade to MacDraw Pro with 75 new features including 2,400 pieces of clip art. Claris will continue to support MacDraw Pro until August 31, 1995. Current MacDraw Pro users can upgrade to ClarisDraw for $119 and users of competitive graphics programs can upgrade for $143. Users who purchased MacDraw Pro after July 1, 1993 can upgrade to ClarisDraw for $39.

The suggested retail price for ClarisDraw is $499. ClarisDraw is currently available for Power Macintosh and 68000-based Macintosh computers. A Windows version is expected in the first half of 1995. — RC

Contact: Claris Canada 1-800-361-6075.

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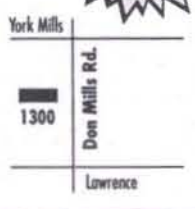

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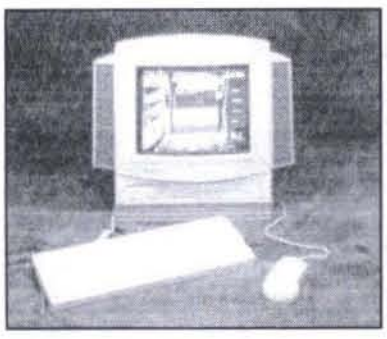

PACKARD BELL LAUNCHES MULTIMEDIA LINE • Packard Bell Canada has introduced a "designer" series of Pentium and 486-powered PCs including multimedia-ready models. The PCs include detachable color accent panels — teal, azure and sahara are available so far — that allow people to match the computers to their home-office decor. The PCs also use color-coding on the mouse, keyboard, monitor and other connectors to help users make sure that the cables are plugged into the correct slots.

The multimedia systems are MPC-2 compliant and include a double speed CD-ROM drive and 16-bit Sound Blaster-compatible sound cards. The speakers are built into the monitor housing.

Included with the computers are 27 software titles including 11 CD-ROM discs.

The systems are available with processors ranging from a 25 MHz 486SX to a 100 MHz Pentium. Prices start at $1,500. — DT

Contact: Packard Bell Canada, 905-564-1122

ISSUES FOR THE INFORMATION AGE • The University of Waterloo and Electronic Frontier Canada are sponsoring a symposium on "Free Speech and Privacy in the Information Age" on November 26th. The one-day symposium will look at the way the information superhighway will affect our lives, especially to how it will likely transform the way traditional freedoms like free speech and privacy will be understood and protected. — K.S-R

Contact Jeffrey Shallit at (519) 888-4804 or via Internet e-mail at SFSP@GRACELAND.UWATERLOO.CA.

COMPUTER ART WINNERS • Winners have been announced for the first contest designed to recognize independent art work created for the computer. The jury for the New Voices, New Visions competition selected three $5,000 U.S. Grand Prize winners, culled from over 500 entries from around the world.

The winning entries were: Hsin-Chien Huang's The Dream of Time, Todd Robbins' Sound Toy and George Legrady's An Anecdoted Archive of the Cold War. The winning entries, along with 21 other works that received special commendation, were featured in a special program that opened The New York Film Festival at the Lincoln Centre on September 30, 1994. — K.S-R

TECHNO ART AT THE ONTARIO SCIENCE CENTRE • Technology has opened new ways and means of expression for artists, as they find ways of shaping this emerging medium to make their message heard. For a limited time the Ontario Science Centre is displaying technological art created by artists from around the world at their TechnoArt exhibit.

Lasers, holograms, video, computers and other devices are combined to convey virtual vistas and environments that visitors can interact with. In Bicycle TV, visitors ride a bicycle through a virtual environment created by Canadian artist Nancy Paterson. You can walk up to a Cage Without Corners devised by American artist Gregory Barsamiam where small animals appear to be running within a huge sphere. Or you can visit L'Autre, created by French artist Catherine Ikam, which is as close to the experience of an alien encounter as most people will ever get; while the Helpless Robot created by the Canadian Norman White, desperately implores visitor's to help it perform different tasks. There are also several stunning light and hologram sculptures from noted Japanese artists, and a video theatre that screens images of virtual environments created by virtual reality artists. These technological art installations blur the distinction between the art, the artist and the observer as the visitor becomes an integral part of the artwork.

TechnoArt runs from September 27-October 24, and again from November 10-January 8. The exhibition is free with regular admission to the Science Centre, located at 770 Don Mills Road in Don Mills. — K.S-R

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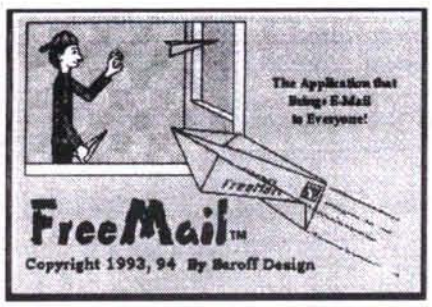

FreeMail for Windows 3.11 is an elegant implementation of a simple idea. With FreeMail, a creation of Saroff Design of Missoula MT, you create your own private bulletin board through which you send and receive e-mail and files.

When you purchase FreeMail (about $100 depending on the exchange rate) you become a Parent FreeMail site. The license allows you to create unlimited numbers of "Child" copies, which you may distribute to your friends, relatives, students, employees or colleagues. Saroff thoughtfully includes a sheet of preprinted FreeMail Child diskette labels, which give your copies that factory-made look. There's a button on the Parent menu bar that allows you to create child copies with a single mosue click.

Once you start distributing your Child copies, your e-mail system begins to take shape. You can send files and e-mail messages to All or to selected children. A Saroff spokesman told us he knows of one teacher that distributes copies of Freemail Child to his students. He can then post assignments to all, receive papers, and give private feedback to individual students.

We briefly tried FreeMail and liked what we saw. We attached a file on our notebook Child computer, destined for the Parent. When we dialed in the two FreeMail copies did their handshake and then the file was automatically transferred.

One disadvantage to a system like FreeMail is that you either have to leave the Parent computer — with FreeMail running — on 24 hours a day, or you have to make a schedule of when people can send and receive e-mail and files. Given the types of people you're likely to distribute your FreeMail children to, establishing a schedule doesn't seem like a major problem, however.

— DT

Contact: Saroff Design, 406-542-3867

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USER GROUPS

AMIGANAUTS MEETING On the second Sunday each month, 6-8 p.m., at 2975 Don Mills Rd. West, Oriole Community Resource Centre, 2nd floor, Games Rm. Full Amiga users support, monthly tutorials and presentations of latest software and hardware for the Amiga and, coming soon, a BBS.

ANIMATORS' GROUP — Interested in the creation of 2-D and 3-D animation? Zimgraphics Ltd. offers hands-on training and memberships for those interested in computer graphics. For more information call (416) 929-8155.

AS400 DEVELOPERS ASSOCIATION - employers, employees, suppliers and contractors share, learn & network on topics including connectivity, development standards, "best buys" and advances. Call 322-0449, FAX 322-7129.

CANADA ROUNDTABLE ON GENIE — Nightly and weekend meetings. Discuss Canadian Politics, Sports, Canada-U.S. Relations, Travel, Entertainment. Try En Francais, which includes a French tutorial. More info? 1-800-638-9636.

CANADIAN COMPUTER GRAPHICS ASSOCIATION — CCGA's mission is "to provide education and information in computer graphics technology and its applications." Additional benefits include; insurance, newsletters, subscriptions, employment liaison office, and annual art & design competition. CCGA, 2175 Sheppard Ave. E., Suite 110, Willowdale, Ontario, M2J 1W8. Fax: 491-1670 Tel: 491-2886.

CANAM COMPUTER CLUB - for serious computer hobbyists. Breakfast meetings are held every Saturday morning at WATTS Restaurant in Eglinton Square Mall, Scarboro. The Club has a sister group in the U.S. with whom info. ideas and help are exchanged. Membership is free but a full breakfast is $5.00 including gratuity. For info. call Bill Mancini at 757-1276.

CASE — Computer Aided Software Engineering is open to anyone interested in being tool and technology independent. 1-1 1/2 hours, monthly scheduled meetings. Vendor presentations as well as individual. BBS 497-5263, (log on if MIS Affiliated messages, into Tech 2nd category called CASE). Contact Joe Da Silva at 252-1408 or Rob Beckman at 928-2694.

CLIPPER DEVELOPERS ASSOCIATION OF TORONTO .For details call Mike Parente 905-336-5191 ext. 447.

CLIPPER DEVELOPMENT ASSOCIATION OF TORONTO. Meeting on Thursday November 3, 1994 atthe North York Central Library, 7:00pm. Speakers : Tony Makluta and Skip Morehead from Computer Associates will give a technical overview of VO. Call 905-336-5191 for additional information.

CLUB CUBASE — for user's of Steinberg's award winning Cubase MIDI sequencer, meets at 7:30 pm on the last Monday of every month at Trebas Institute, 410 Dundas St E, One block west of Parliament. Call 496-9905.

CLUB MAC COMPUTER GROUP OF ONTARIO — All Mac users, Macintosh OS & related issues, meets 2nd Tuesday, Michener Institute, 222 St. Patrick St., Toronto, 7 pm to 10 pm, infoline 462-1702.

COMPUTER TRAINERS NETWORK — meets the first Thursday of every month to discuss issues related to PC's & training.. Each meeting includes a presentation on relevant topic. Location: the CBC Building, 25 John Street. Call Lynn at 362-9215 for further details.

CYBERPUNK RESEARCH LABORATORIES — Merry hackers in search of picturesque mountains, RAM and fairytales. For further data write c/o CyberPunk Research Labs. Seneca College of Communication Arts, 1124 Finch Ave. West, North York ON M3J 3J3.

INTERNATIONA L PROGRAMMERS GUILD Meets every second week starting at 7:00 pm on Tuesday Nights in downtown Toronto at the Graf Bobby, 36 Wellington East, Toronto. Programmers who are not members are also welcome to attend. Ask at the front desk for the Programmers Guild. For more information or a free copy of the latest newsletter, call the IPG at 905-824-7947.

INTERNET USER GROUP now forming. Daniel O'Connell 416-365-1899 or Dan @ Grant.Yorku.ca.

KW-MUG — 376 Peel Street, New Hamburg, ON, N0B 2G0, (519) 662-2627. Focus: Public domain distribution; reviews of current software; meetings variable, no fees.

LOGIC — functions by: Meetings 1st (Macintosh) & 3rd (Apple II) Tuesday of the month, North Toronto Memorial Community Centre, 200 Eglinton Ave West at 7:00pm.. Messages 416-323-0828, BBS 416-487-9771, FAX 905-737-6159.

METRO TORONTO ADAM GROUP (MTAG) – Supporting ADAM, CP/M-TDOS Users contact: (416) 424-1352 or write to: P.O. Box 165, 260 Adelaide St. E., Toronto, ON, M5A 1N0. Meetings 2nd Monday of each month. 1485 Albion Rd (Community Centre) and 4th Sat. each month at the Pape Ave. Community Center. Bi Monthly newsletter.

Microsoft Access and Visual Basic User Group. Meetings held 1st Thursday of every month, 6:00pm at the Bramalea Building, 1 Queen St. East, 22nd floor. For more information contact the Microsoft Information Centre at 800-563-9048 or Fraser Dickson at 416-864-6542 or 905-822-1889.

MISSISSAUGA COMPUTER CLUB - Meets on first Wednesday of every month at 8pm at the Burnhamthorpe community Centre located at 1500 Gulleden Dr. in Mississauga. For online inof, call our support BBS at (905) 568-5294 or (905) 568-2496.

NORTH AMERICAN DESKTOP - A computer users group for PC and Apple. Useful, constructive exchange of ideas, business services and information through presentations, discussions and networking at an affordable price. Bi-monthly. For more information call (905) 889-5311.

Ottawa Banyan Users Group (OBUG). Meetings held on the first Wednesday of every month at Geological Survey of Canada, 601 Booth St., Alice Wilson Hall. (ground floor). For more information contact Gautam Subra at 613-738-3175.

PCCT (PERSONAL COMPUTER CLUB OF TORONTO) —IBM and PC clone users,, meets 3rd Tuesdays in the Burgundy Room of the North York Memorial Community Hall, 5110 Yonge St, North York at 7:00 pm. Membership includes shareware lib, BBS, 12 special interest groups & workshops. Voice info line: (416) 244-6786.

Repetitive Strain Injury Support Group meets the 2nd Thursday of every mpnth. Meet people who have this condition. We can help you with information, prevention or coping with this work related injury. For more information please call 416-493-3641, or 416-252-6471 x299.

TAF - TORONTO ATARI FEDERATION - XE/ST/Falcon computers. 300 members. BBS. Newsletter. SIGS for MIDI,DTP, General and more. Meets 7:30pm. Third Thursday of month in North York Memorial Community Hall in the N.Y. City Centre Ligrary building. 5110 Yonge St. at Park Home. BBS - (300-16.8) 235-0318. Info-Line (416) 22-55-823 CALL-TAF.

THE CANADIAN AUTODESK MULTIMEDIA USER GROUP — Interested Users of Autodesk Multimedia products are invited to call Pia Zimperi at (416) 929-8155.

THE CANADIAN INFORMATION PROCESSING SOCIETY - For further information call RickPenton 518-1437

THE COMMUNICATION NETWORK - Join our Social Network/Support Group for SHY people and enhance your social and interpersonal skills. Participate in weekly organized social and cultural activities. Weekly meeting from 7-10pm. Pre-registration is required. Call for more info at 851-6696 or 851-2980.

THE DURHAM P.C. USERS' CLUB - Meetings on second Thursday of each month at 7-10 pm (free admission). Meetings held at CAW Local 222 Hall, 1425 Phillip Murray Ave., Oshawa. Contact Linda Netten 905-623-2787 or Bruce Laycraft at 905-728-9351.

THE ELITE GROUP OF 3-D PROGRAMMERS — (E.G.3D P) in association with L.T.P.D. Dedicated to Atari users. For more information write to L.T.P.D. c/o (E.G.3D P), 37 Montye Ave., Box #2, Toronto, Ontario M6S 2G8.

THE INTERNATIONAL INTERACTIVE COMMUNICATION SOCIETY (IICS) is a non-profit professional organization dedicated to the advancement of interactive and multimedia technologies. Through monthly meetings, newsletters and networking IICS members are able to keep up-to-date in this growing field. Membership is $90/yr. For more information call Peter Richardson 416-288-0550 or fax 285-4395.

THE TORONTO COLOUR COMPUTER GROUP — meets on the 2nd and 4th Mondays of each month. For more information, call Larry Osborne at (416) 972-1809.

THE TORONTO GUPTA USERS GROUP (TGUG) - Meetings held in Feb, Apr, June, Sept, Nov each year. Contact Terry Lewis at 416-620-6565 X639 or 416-620-6913 (fax) for more info. Corp membership fee: $50/yr (up to 3 employees); Single membership: $25/yr.

TORCHI (Toronto Region Computer Human Interaction) — Meets every second Wednesday of the month from 7:00 pm-10:00 pm. For more information re speakers, topics and membership. We are the local chapter of Sigchi a part of ACM. Call M. Boshes (416) 448-2697.

TORONTO APL SIG — An educational and social organization concerned with the use and promotion of APL computer language. 4th Monday of each month at 6:30 pm (excluding the Summer) at BCE Place, 161 Bay Street, 10th Floor. Or write: Toronto APL SIG, Box 384, Adelaide Street P.O., Toronto, Ont., M5C 2J5. Contact Ben Best (416) 862-3193.

TORONTO AREA NETWARE USER GROUP (TANUG). The next meeting will be held on Wednesday, November 16, 1994 at 5:30 pm at the Education and Meeting Centre located at the Canadian Bar Association - Ontario, 2nd floor, 20 Toronto St. The cost is $20, including a cold buffet and pre-registration is recommended. Topic: Microsoft Office and MS Mail in a Netware LAN. Call TANUG at (416) 269-0940.

TORONTO BORLAND USER GROUP— meets 1st (C/C++), 2nd (Paradox) and 3rd (Quattro Pro) Thursdays of every month at 6 pm, 5:30 pm and 7 pm respectively. Meetings are held at Borland, 5001 Yonge St,14th Floor. For membership and meeting details please contact Doug Campbell 496-2120. Free BBS (905) 271-9795.

TORONTO USERS GROUP — User members support of Intermediate CL. Next meeting is held on Sept.22nd at the Howard Johnson Plaza at 400-401 Keele St. Please contact Wende Boddy at suite 2550, P.O. Box 77, Toronto Dominion Centre, Tor., ONT, M5K 1E7 for more information, or call (416) 607-2546.

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 pm; 3rd Thursday Alderwood United Church, 44 Delma Drive, Etobicoke, 7:30 pm, software library, newsletter & BBS, information (416) 253-9637.

TRACE — Toronto Regional AutoCAD Exchange: Presentations on the last Tuesday of every second month. Held at the Malton Community Centre, 3540 Morningstar Drive. For details call Tim Lucas at (416) 750-9765.

ZIM USERS GROUP — Revival of the Toronto Zim Users Group. Emphasis on exchange of ZIM technical expertise in a friendly environment. Contact Fay Rakoff: Phone (416) 979-6216, or Fax (416) 979-4888.

CLASSIFIEDS

CLASSIFIED ADVERTISING IS FREE FOR PRIVATE INDIVIDUALS. For businesses, advertising Rates are $7 per line (40 characters). Send in your ad along with payment for the December issue by October 31, 1994. (Personal Ads: an individual at a company can run an ad, but it must be for one-of-a-kind items for sale). FREE ads qualify for one month in the local edition only. Up to 2 ads per person maximum. All other ads classify as business ads and are subject to the $7 per line charge.

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EMPLOYMENT

32 Years with some ex willing to start at the bottom to learn PC, as a part time hard working honest employee. Wesley 416-237-1690.

ANALYST Programmer seeks contract/ft PC tutoring. C, Clipper, dBase, Data mgmt exp. 416-496-9035. lp.

CAD Designer, exp seeks p/t, contract work. Own eqpt. Satisfaction or free. Call Rubin 534-6063.

MAC Wizard. Quark, Ill, Photoshop + system troubleshooting, print background + training exp seek ft/Durham area/ Scar/ Markham. Call 905-839-3084 after 6 pm. Before 6, leave message.

PC and Network specialist experienced with Novell and Unix seeks permanent job. Call Sasha 905-472-4082.

PC Support specialist 9 yrs experience hard/software, seeks full/part time employment. Edward 416-459-0350.

PROGRAMMER Exp. in C, Novell, Clipper, dBase seeks full or part time job. Stephen 496-9035.

RECENT Seneca programming grad seeks entry-level position. Cobl, C, C++. Call Sheldon 416-638-7983.

SENIOR ANALYST/Programmer seeks contract in C++, Oracle, PowerBuilder. Call Eric at 416-540-5578.

SOFTWARE Analyst, very exp in C, OS/2. Presentation manager seeks part-time work after hours. Call after 6 pm at 416-345-8325.

WANTED PC TRAINERS for private college part time/ full time. P.O. Box 2344, 2300 Yonge, M4P 1E4

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YOU HAVE a Fully computerized home office. You are familiar with fax on demand, fax boards, bulletin boards, internet and E-mail. You are creative, innovative, willing to work hard and be trained. We are a large Financial service company. Fax a brief resume to Robert A. Gascon at 416-236-4218.

HARDWARE

1 YR Warranted 486-66 new multimedia computer. 4meg Ram, 400 meg hd, svga monitor, 1.44 floppy, keyboard and mouse. $1699. 905-627-9550.

1MB SIMMs $50 ea. Boca 14.4 fax-on-demand/voice/data modem $225. DataEase $50. 905-549-2840.

1.06 GIG, SCSI, 12mg, hdd, Fujitsu + SCSI adaptec AHA 1452 kit. 14 mths old. $900 firm. Call 6-9pm. 416-789-3028.

2 SUPRA Modems, 1-2400 for $45 and 1-14400 fax/modem for $100. Call 613-332-0377.

2MB Simms 256Kx9 (8 modules) $60 obo. Call 905-279-7949.

4,400 BPS internal modem with send and receive fax. Both v.32bis and v.42 bis. $125 obo. Call 492-6102.

4MB of Ram 70ns $190 & Hi-Tex CP-18 speakers 2-5w each. $30. Call Saeid 921-0902.

8MB 72 pins Ram Simms IBM Gold plated. 2 wks old. $450 ea obo. Call Fx Rajib 905-889-0793.

14" NEC MultisyncPlus svga monitor. $500 obo. Zoltan at 416-631-6648.

24 PIN Samsung. 3 mths old. $150. 9 pin Seikosha. Like new. $100. 2400/9600 fax/modem. $30. All for just $240. Everyday from 11 am to 8 pm. 416-494-0066.

40MB Quantum Godrive for laptop. C/w pcs adapter $50. Call Antoine 416-590-8721.

64 PIN SIMM 16mb 4 AST Premium mfm ctr. Arcnet. Call any time. 905-471-0809.

130MB Maxtor hd w/cable $175. 52mb Quantum hd $50. ATI 1mb d-24 video card $100. 416-412-0682.

250MB Jumbo int tape backup. Like new $200 or trade for CD-ROM int double speed drive. Call Mike at 905-668-1833.

286-12, 1meg Ram, 2 20meg hd, 1.4 meg floppy, coprocessor, mono (Amber) monitor, new keyboard, multi i/o, desktop, case. $400 obo. 905-508-5523.

286-80mg, 5.25, mon, key $270. 416-633-2160.

286 640K Ram, hdfd, 40mhd, mono, kb $260. 386 1m Ram hdfd, 40mhd, mono, kb $360. VGA color, add $100. Call daytime for details. Wai 416-298-9940.

286 AST Premium AT, 2mb ram, 43 mb hd, mono mon, 360k+1.2mb fd, 101 kybd, Run Win 3.1. $280. Call Lloyd 905-839-3996.

286 COMPAQ Portable suitcase type, mono. $250. 905-672-5556.

286 COMPUTER 40mb hd 1m Ram, 1 5.25 fd 9 pin printer with monitor $400. Call eves at 905-686-8281.

286 System, 2mb Ram, Math Co, 35 mb hd disk, 3.5" 1.44 mb, mono monitor & card, 101 kybd, mouse. $285. Call 416-534-1288.

286, 1m/40m, 1fd, ega, $300, 386sx, 1m/120m, 1 fd, vga $500, 386 dx, 4m/120m, 1fd, svga $650. 416-618-3592.

286PC, 1mb Ram, 30mb hd, 5.25 dd+3.5 hd, ATI vga wonder, coprocessor, 101 kb & mouse, no monitor, $175. Call Don Tues-Fri after 7 pm or weekends. 905-846-1389.

386DX-40, 4mb Ram, 1024x768 .28 ni monitor, svga 1mb, 130hd, 1.44fd, 96/24 int s/r fax/modem, mini-tower, mouse. 1 yr old, 2 yrs warr. $900 firm. 604-9347.

386DX25+387, 4m Ram, 120 hd+170hd, 1.2+1.44 fd, 1m svga, sound card, mouse, no mon $700. Also 286-2mb 42 hd 1.44 fd, ega, mono + card modem $200. Call 416-286-8165.

386DX40 Computer, vga 14" monitor, sound blaster, speakers, kybd, three button mouse and pad. For details. Call 905-389-7539.

386DX40 mainboard + 128k cache $100 obo. 398-6218.

386SX 40mb Hard Drive 1.44 floppy drive 2mb Ram b/w monitor $400 obo. 416-466-7153.

386SX-25, 40mb hard drive, 2 mb Ram, both 1.44 and 1.22 floppy drives, color vga video card with mono vga monitor, software. Call Steve at 905-770-8681. Asking $450 obo.

486DX INTEL. CPU only. $250. Paul evenings 905-279-8232.

486DX-33 with 4mb of Rami 530mb Maxtor hd both floppy; 1mb svga card; mini tower; 14" svga monitor, M10.28 dp. $1430. Call 242-6235.

486DX2-66 256k/16mb motherboard w/cpu-fan 6m old, perf cond. Mt case & floppies. Optional vlb.8 slots. $1250 firm. Bob 416-759-4943.

486DX33 4mRam 128k cache 256mhdd 1.44 fdd 512k vlbus svga monitor. $1150. 905-840-6384.

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486DX33, VLB, SCSI2 system 256k cache, 4meg ram, 1meg vid card with NEC multisync monitor, cd rom, fax/modem, 170meg hd, 1.44+1.2. $2400 obo. Call Barry at 365-2192.

486DX66 8mb Ram 345 hd svga. $1999. 905-542-7645.

486PX33 System w/ 4mg 60 ns Ram 213 ide hd 1 mb Tseng video card, keybd, case, 3.5/5.25 fdd $1000 obo. Optional 926mb hd negotiable. Call Howard 223-1330.

640K XT Computer - IBM compatible Packard Bell monitor, modem, 1 5.25, 1 3.5 floppy, keyboard. $280 obo. 905-669-1832.

640K XT Turbo, floppy 30hd, Fuji kb mono, i/o ctrl, Panasonic printer. Vg cond. $200. 905-770-8362.

1522 SCSI2 controller /w floppy kit. Adaptec. New driver incl. Rajib @ 905-889-0793.

14400 BPS Fax/data modem. Fully hayes compatible, internal with Winfax and DOS fax life and all manuals. 4 months old. Asking $90. Call Craig at 905-279-7472.

ACER 386DX, 4mb, 105mb 2fdds, vga monitor, 1mb video card, mouse, keyboard, modem, DOS 6.2, Windows 3.11, H deskjet printer $1100. Call Jason 416-321-6861. Good for student.

ADLIB Sound card. Great sound and good for all games with installation manual. Sell for only $38 obo. 9600/2400 bps modem with full installation manual. Sell for $38 obo. Call Jackson 946-9555.

AMIGA 500 1mb 1084 mon, Prowrite $475. 531-1559.

AMIGA 1200+40meg $650 obo. Microbotics M1230XA (40Mhz 030, 33 Mhz 82, 4 megs) $600 obo. Both for $950 obo. Zoltan at 416-631-6648.

APPLE IIe 2 disc drives printer. Pristine condition. Dozens of programs. $150 obo. Dave 905-852-7845.

ATARI 520ST col monitor, DS floppy, modem, dot mat printer, lots of software, mouse, joystick. $475 obo. 444-7193 or fax 441-9804.

ATARI 520ST With mono and color monitors, D500 floppy drive, original manuals, tons of software, joystick and power bar. Asking $250 obo. Call Steve anytime at 905-770-8681.

ATI Ultra + 2 mb ISA $190; ATI 9600 etc ext modem $100; 386dx40 mb $90; MS printing system $110; keyboard $12; ISA I/O hd/fd controller $8 obo. Call Chew after 7 pm 905-771-7033.

AUTOMOBIILE Computer for car $1500. 416-381-1620.

AVIATOR Bondwell-top line. Turbo fire selector, altit/level indic. Aircraft ctrl yoke and many more. Brand new. $55. 416-690-4203.

BRAND NEW Fax/modem IBM easy options 240 OBP3296/48 $70; Supra modem 2400 $50; PFS Window Works v2 $30' PFS Publisher $20; Seat support Obusform $50. Call 905-851-9404. Leave msg.

BRAND New SIS486 green PC Vesa local bus motherboard for sale. Asking $120. No cpu. Or $420 w/486dx40 AMD cpu. Call 416-603-2411.

CALCOMP 1045dm 8-pen plotter w/ acad dvr manual + supplies. $2700 Alex @ 778-0575.

CANON BJC 600 Color printer new 3 month old in very good condition. $540 obo. Marc 416-497-1270.

CANON BJC600 6 months old still with warranty registration cards manuals and ink, original receipt available $600. Call Richard at 905-270-3071.

CD-ROM Sony external with card $350. GVC-2400 modem ext. $40. 416-425-2512.

COLORADO Jumbo 250 external with 2x compression interface $400, Jumbo 250 external with interface $330, 42 DC2120 tapes like new $15 each. Exabyte 8505 10 gig dat $2100 obo. Call 416-787-8018.

COMPAQ Deskpro 386s 1mb Ram, 5.25 hd/40mb drives, vga, keyboard, (no mouse, mo monitor). $350 obo. Serge 416-510-2629 ev. 416-445-5860 (x 500) days.

COMPAQ Portable 386 80386DX 20Mhz, 2mb 200 mb hd, 1.2 fd manuals, carry ase. Ask $800. Dan 905-729-2383.

COMPUGRAPHIC Mcs-10 typesetter complete with manuals, disks, catalogue and service records. Used by NY publishing co. Used to create books + newspaper $$Pontial. Shahab 416-742-8144.

E-TECH Bullet 14.4k fax modem - internal fax modem with built in fax switch. Call 416-239-6464. $275.

EPSON 24 Pin LQ printer $195 w/cable. Call 416-490-8184.

EPSON-LQ1050, 24 pin, new. $150. 905-451-4283.

FOR SALE Roland Lapc-1 (MT-32 compat) $180 Chris 923-5840.

FOR SALE: 4 1*9 80ns Simms chips $50 ea or $190 for the lot. Call evenings 416-787-8931.

GAME Blaster original sound board from Creative Labs with game included in the package. $35 obo. 905-275-7949.

HARD Drive 40mb Seagate $50 obo. Lee 416-651-8239.

HD 40MB hard card $80; Bar Code Reader $99; Wangtech .25 in tape backup + card 100mb $125. 905-709-3883.

HP 4L Laser printer $750 firm. Wayne 698-1638.

HP 95LX including 512k flash card, pc connection cable, software and manual. $750 obo. Marc 905-896-4454.

HP Deskjet 500C with software and 2 year warranty. Asking for $400. Negotiable. Call Warner at 416-298-4566.

HP Paintjet XL300 (not used) paid $2850. Asking $1600. Logitech scanman color plus ocr (not used) paid $900 asking $325. Call 905-951-2829.

HP100LX Palmtop PC with 2mb Ram, 2 mb of software on ROM including Lotus 123, PCMCIA type II slot, serial port, CGA display and shareware remote control and phone dialing software & more. $950. 416-769-6341.

HP550C Desk Writer color printer. Brand new. Best offer. Daytime 905-873-2500.

IBM 286 1mg Ram 50 mg hd vga mon, 1.44 fd 101 kbd, mouse, Dos 6, Windows #.0, WP5.1, Lotus, dBase, games and more. Asking $600 obo. Call 416-425-4875.

IBM COLOR Display 8512 vga monitor, excellent condition. Kevin after 4pm. $100 obo. 291-6464.

IBM PC (a real one) 2 floppies, real IBM keyboard, IBM 5151 green phosphor monitor, IBM basic chipset. Excellent condition. $75 obo. 905-639-1423.

IBM PS/2 Model 50Z $900 obo. 1mb memory/31mb hd, 101-keyboard/mouse, IBM 8513 vga monitor/4216 laser printer. Wayne 905-712-4801. Pager 416-390-3004, leave msg with your number.

IBM Thinkpad 700c 12m Ram, 120m hd, 10.4" active matrix display. Docking station with 2 slots and 1 bay. $5500. Call and lv msg 363-2103.

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CALENDAR

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ONTARIO COMPUTER FAIRS. Oct 16, Ottawa, Nepean Sportsplex; Oct 23, Windsor, Caboto Club. Contact: 1-800-465-8286.

MACWORLD EXPO. Oct 18-20, Metro Toronto Convention Centre. Contact: Mitch Hall Associates 617-361-8000.

MICRO EXPO. Oct 21-23. Friday 10-9; Saturday and Sunday 10-6. Place Bonaventure, Montreal. Contact: 514-844-0502.

CLIENT/SERVER SOLUTIONS '94. Oct 24-26, Metro Toronto Convention Centre. Contact: 508-470-3880.

E MAIL WORLD Conference and Exposition. Oct 24-26, Metro Toronto Convention Centre. Contact: 508-570-3880.

THE INTERNET: EXPRESS LANE OF THE INFORMATION HIGHWAY. Seminar with Jim Carroll, co-author of the Canadian Internet Handbook. Tickets: $65.00. Thurs. Oct 27, 8:00-10:00 am. The Board of Trade of Metropolitan Toronto, First Canadian Place. Contact: Lisa A. Wilson 416-862-4506.

NOVEMBER

COMPUTER FEST Nov 4-6, Etobicoke, Skyway Centre. Fri 10-9,Sat-Sun 10-6. Contact: Ryhan Ahmad at 416-925-4533.

CANADIAN MULTIMEDIA SHOW. Nov 7-9, '94. Calgary, AB. Sponsored by the University of Calgary/CD ROM Store. Contact: Margaret-Anne Stroh at 1-800-265-2494 or 220-7101.

SCIB'94, The Canadian Computer/Office Technology Show. Nov 8-10, Montreal Convention Centre. Contact: ITCS at 514-270-8286.

ONTARIO COMPUTER FAIRS. Nov 28, Whitby, Soccer City. Contact: 1-800-465-8286.

CIO SUMMIT. Nov 28-29, Toronto Marriot Eaton Centre. Contact: Judith Sykes PR at 416-927-1069.

TRAINING

SCO STANDARD INTERNATIONAL TRAINING CENTER'S offer a variety of UNIX training courses: Introduction to SCO System V, Oct 3-5, '94. Dec 12-14, '94. SCO System V Administration I, Oct 6-7, '94. Dec 15-16, '94. UNIX System V Administration II, Nov 21-25, '94. To register or more info call: 800-667-UNIX.

SEMINARS

SOFTWARE LICENSING AGREEMENTS. Nov 17, '94, Toronto. Nov 16, '94 Ottawa. This one-day seminar will address the key elements of software licensing and proprietary rights under Canadian law, as well as the differences between software licences in Canada and the U.S. Call 416-674-9400.

DATA WAREHOUSING. NOV 3, '94, Toronto, Metro Convention Centre. A FREE half-day seminar in which you will learn how to plan and implement an Oracle-based data warehousing solution in your organization, etc... Call 800-263-8969.

NON-INCOME TAX PLANNING, Nov 2, '94. Planning tips to minimize the impact of "payroll" taxes, capital tax and municipal property tax, and, maximize provincial and federal tax recoveries.

DATA COMMUNICATIONS TECHNOLOGIES FOR NON-TECHNICAL PROFESSIONALS Oct 12-13, '94, Toronto. A comprehensive two-day seminar. Designed to give the non-technical professional a working knowledge of the most up-to-date data communications technologies and applications.

INTERNATIONAL

PAGEMAKER CONFERENCE. Chicago, IL. Oct 17 & 18, '94. Contact: Thunder Lizard Productions. Tel: 206-633-3431 or Fax: 206-633-0153.

PC EXPO. Chicago, IL. Oct 19-21, '94. Contact: Bruno Blenheim Inc. Tel: 800-829-3976. or Fax: 201-346-1602.

COMPUTER TRAINING & SUPPORT CONFERENCE. San Antonio, TX. Oct 25 & 26, '94. Contact: Ziff Institute. Tel: 617-252-5187 or Fax: 617-252-5113.

DESIGN ENGINNERING SHOW WEST. Anaheim, CA. Nov 1 & 2, '94. Contact: Reed Exposition Companies 203-964-0000 or Fax: 203-964-0176.

OBJECT WORLD. Tokyo, Japan. Nov 1 & 2, '94. Contact: Matt Mandino at IDG World Expo at 800-545-3976 or 508-820-8624.

MACWORLD EXPO. Hong Kong, China. Nov 3-5, '94. Contact: Matt Mandino at IDG World Expo at 800-545-3976 or 508-820-8624.

COMDEX FALL. Las Vegas, NV. Nov 14-18, '94. Contact: Interface Group 617-449-6600 or Fax: 617-444-0165.

WINDOWS WORLD. Oslo, Norway. Nov 15-17, '94. Contact: Matt Mandino at IDG World Expo at 800-545-3976 or 508-820-8624.

MOBILE COMPUTING. Copenhagen, Norway. Nov17-18,' 94 . Contact: Ole Larsen at IDG Communications: 47 36 44 28 00.

PROJECT WORLD Conference & Exposition. Dec 12-16, Santa Clara, CA. Designed to highlight new technologies, implement strategies and leadership skills. For more info contact: Don Dible, conference director at 408-730-6830.

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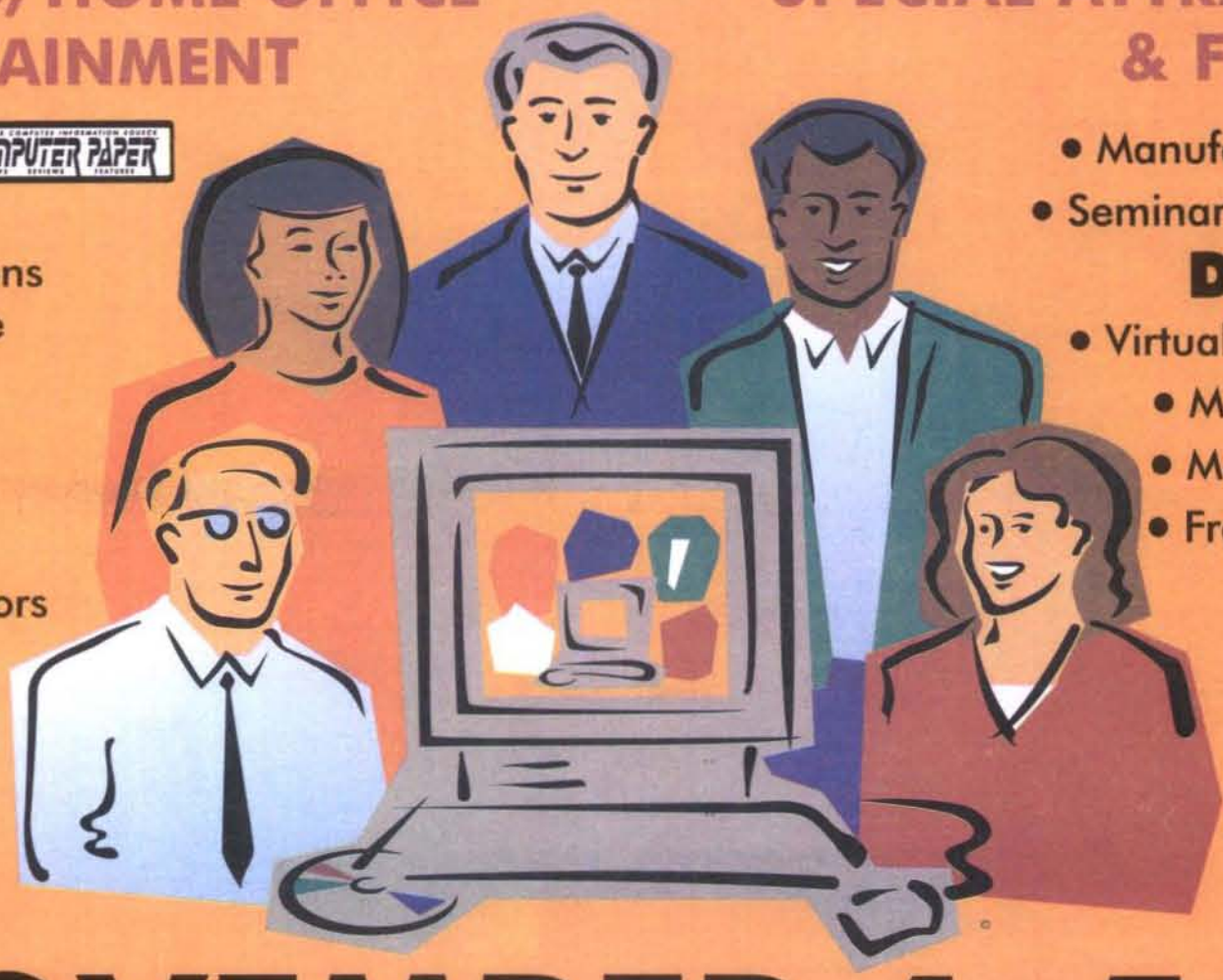

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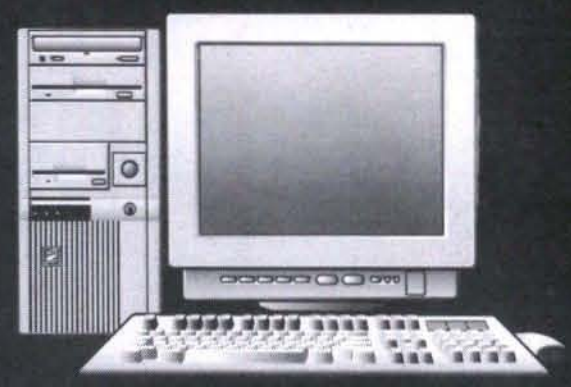

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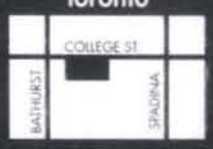

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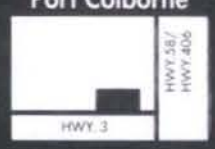

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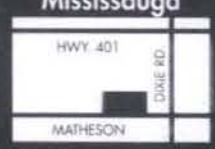

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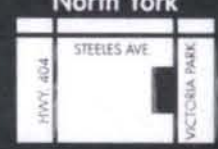

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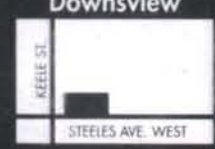

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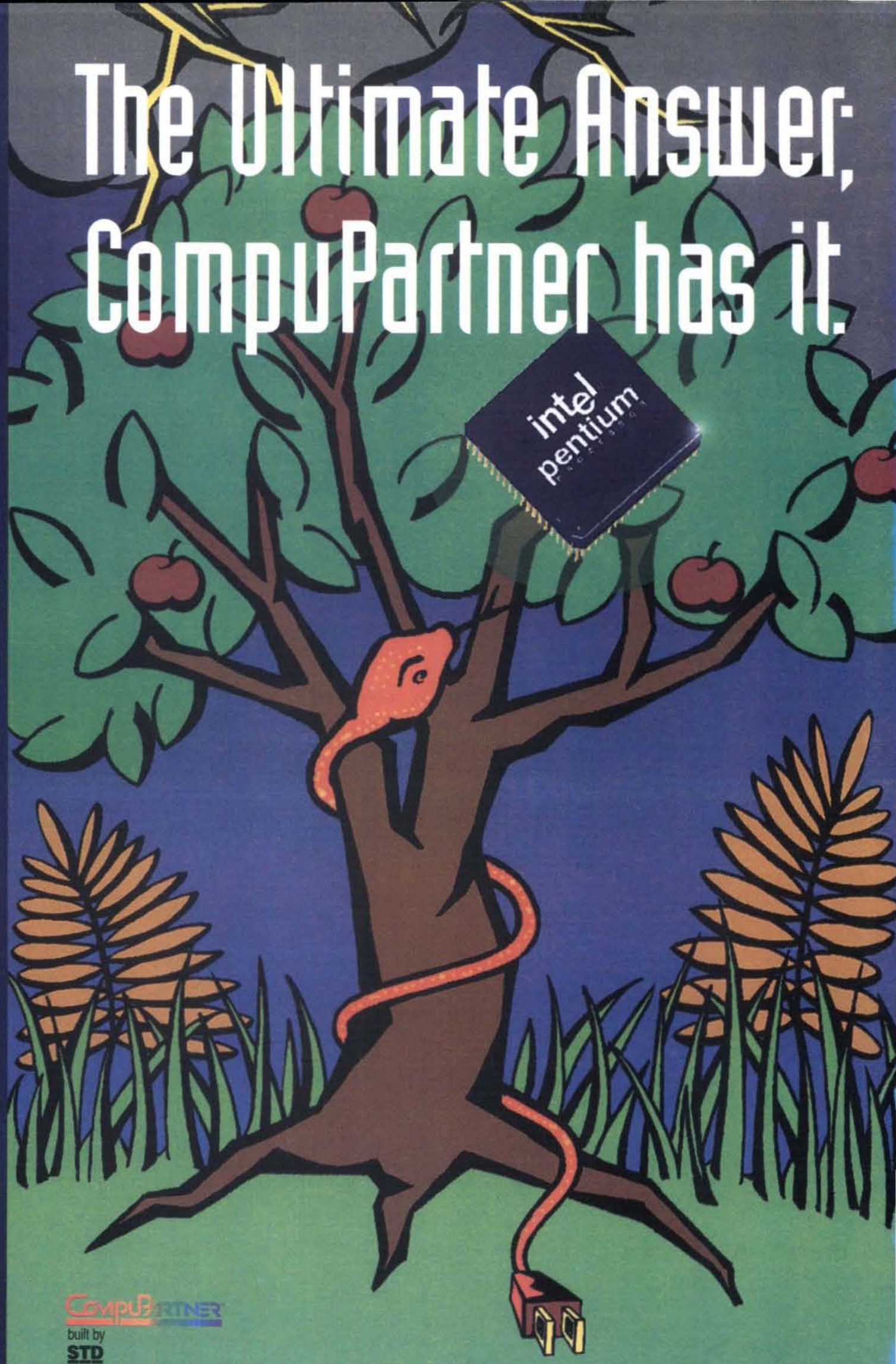

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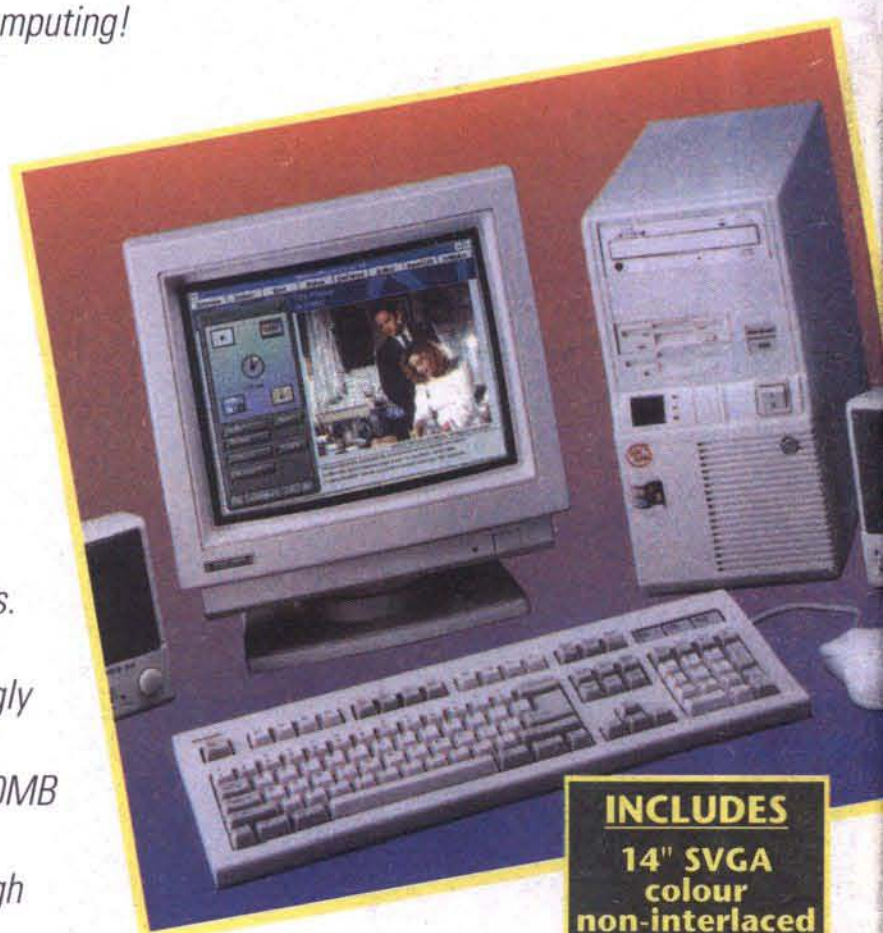

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