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Apollo: The Beginning

When the crew of Apollo 11 splashed down in the Pacific Ocean on July 24, 1969, Americans hailed the successful completion of the most audacious and complex technological undertaking of the 20th century: landing humans on the moon and returning them safely to Earth. Just over eight years before, when President John F. Kennedy proposed the manned lunar landing as the focus of the United States' space program, only one American — Lt. Comdr. Alan B. Shepard, Jr. — had been in space, on a suborbital lob ...

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Letter From The Editor

The Virtual Community
Telecommunications is a world that most computer users discover eventually. It is a world of online services such as CompuServe, GEnie and Prodigy with message areas, databases of information and downloadable files of computer programs or data files—places to meet, discuss, find information and communicate your views.

A new vocabulary has emerged to describe the phenomena. People talk about "going online," "cyberspace" and "virtual communities." Unfortunately, this vast array of information is notoriously difficult to access. I see a need for easier, more accessible, and affordable online services.

Failed Attempts
We have had a few noble attempts to create a Canadian national information service. Bell Canada has poured millions and millions into *Alex*. This service uses low-grade graphics to send pictures as well as words. It is user-friendly and similar to the U.S.-based Prodigy network and the French Minitel. It has unfortunately met with little success. *Suzy* was an attempt by the folks who brought you Bedford Accounting software to create a user-friendly service. They poured mere millions into their attempt, which sadly closed last year. I had high hopes for this one. Both these services had problems reaching the critical mass necessary to a large audience. *Suzy* just plain ran out of money.

Free Trade
GEnie, one of the American services, has been strong in Canada, and recently improved its service to include most major Canadian cities (they finally made it to Winnipeg). GEnie recently announced the Canada RoundTable, an area exclusively for Canadian topics—a forum where we might be able to reflect on our national identity.

Still, the lion's share of GEnie users are American and the service reflects the identities of its users.

Those Eastern BBS'ers
Many of these ponderings were brought up by a recent visit to the head office of Canada Remote Systems (CRS). Canada Remote is a Toronto-based, Canadian-owned BBS with over 100 phone lines, massive gigabytes of storage, doors to stock market reports, Newsbytes and loads of other good things. CRS is a great BBS. It is a large, well-run, affordable online service. But it is only available as a local call from Toronto and the immediate environs. They do have e-mail connectors with many remote BBSes throughout Canada (and a U.S. line in Detroit) but inter-BBS e-mail is not for the faint-hearted, and you don't get access to all the great stuff that is on CRS. Owner Neil Fleming sees a day when he can reach out across Canada with affordable access (he hopes that the Unitel bid to create competition will result in better telecommunications access for Canadians).

Make it Easier
Another shortcoming of most BBSes is a command-line interface. Although a windowing interface often makes life easier for PC users, in the online world, graphical interfaces are rare. The major reason is that they tend to slow down things substantially because everything is limited by the speed of the modem (those little boxes that allows computers to talk over phone lines). One service that has overcome this is America Online. This slick interface, which is available in both Mac and PC (GeoWorks) versions downloads many of the user-friendly screens to the user's computer, and just transmits data over the phone lines. This allows for point-and-click ease of use. Alas, it is American, not locally accessible from some major Canadian cities, expensive (Canadians pay a $12/hour surcharge!) and limited to Macs and PCs.

Somewhere Out There
Somewhere out there, there is some company or person that will eventually put together all the pieces. What I want to see is an affordable national service, instantly connecting all major Canadian cities through a local call, with a fast, user-friendly, windowing interface. In the long run, I believe this will do more for national unity than more constitutional conferences. Please—someone just do it!

Enjoy the issue.

Kirtan Singh Khalsa
Editor/Publisher

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LETTERS TO THE EDITOR

OS/2 2.0 Shows Windows the Door

I am very happy to finally be able to put both my DOS 5.0 and Windows 3.0 to bed. Both have given computer users years of service and their existence has been appreciated, but the time has come to give the business world an operating system which is extremely easy to use, faster and more flexible. So far OS/2 version 2.0 has met that demand (as far as I am concerned). I have been using the system for only three weeks and I can already perform all the system tasks I would perform on DOS/Windows systems at least twice my old productivity (the programs themselves also work faster but I can't estimate how much).

So far the third-party programs I have been using are all DOS or Windows applications; they are: WordPerfect for Windows, Timeline 4.0 and 5.0, ACAD 10.0, Quattro Pro, Lotus for Windows, Word for Windows, Borland C++ 2.0, dBASE IV 1.5, MathCAD for Windows, and CorelDRAW 2.0. As well, one of our staff has a Logitech Scanman and has had no trouble with it. I should note that all my comments are based on battle testing (getting project work out the door in a rush; I am a project engineer). I have not had time to play with OS/2 2.0 (although I have loaded Falcon 3.0 at home and it works fine except for the sound which I have not had time to fix) so I can't really comment on any issues involving tinkering or technical perks.

Now in fairness I have not tried Windows 3.1, and I most likely will not. Gates-Microsoft has kept DOS alive for far too long and I have no desire to keep living with a 16-bit operating system and a GUI which piggybacks. A PC-based 32-bit operating system should have been here long ago (I notice that most of the people poohpoohing OS/2 are people who make their living off the inefficiencies of DOS and Windows—Peter Norton take heed). Of course some of the industry gurus have predicted death to OS/2 2.0 and they may be right, after all Beta VCRs didn't beat out VHS, but the almighty voice lives in the wallet, and my $79 went to OS/2 2.0, *not* Windows 3.1.

Many say that we should wait for Windows NT to come out, but ask yourself this question: if you were a software development company would you prefer to develop software for an operating system (which works) owned by a company that doesn't attempt PC software development or an operating system owned by your competition? Now if I am wrong and in a year or two Windows NT does knock out all the competition, I will most happily change over—that's life. In the meantime I have made the transition to OS/2 2.0; it was painless, it's faster, and it works.

Boyd Mason, P.Eng.
Project Engineer
Stothert Engineering Ltd.
Vancouver, B.C.

All That You Need To Know

A friend of mine gave me your May 1992 issue of *The Computer Paper*. First of all I would like to congratulate you for your excellent publication.

I was impressed with the easy-to-understand writing style of your staff—especially Jim Clements' article on CD-ROM. It was very informative. Rather than calling it "What You Need to Know About CD-ROM," you could have called it "All That You Need to Know About CD-ROM."

I'm sending you a cheque for a one-year subscription.

Avtar Dhanota
Toronto, ON

DTP In-Depth

I really enjoyed your DTP report in the April '92 issue. Quite in-depth and informative. Please keep publishing this type of article.

Keep up the good work,
Gregory Volk
Toronto, ON

Enjoyed April issue

I really enjoyed your April issue when I picked up one in Vancouver. The articles on DTP and fonts were really helpful in selecting the kind of system and software I eventually bought. Keep up the good work!

Victor Nishi
Kelowna, BC

Important Publication

I was pleased to read the article in your March '92 edition, The Cellular Connection. The line between cellular phones and PCs is disappearing, as evidenced in the article you published about the alliance with IBM, with NovAtel building the cellular component for the PC Radio. NovAtel recognizes the importance of your publication in the industry and appreciates the space you gave us.

LaDawn Bly
Calgary, AB

Computer Literate

Computer novice turns into computer literate by reading your magazine.

Thank you—and keep up the good work!

A new reader,
Vancouver, BC

Care to drop us a line?

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What's New
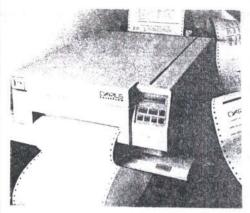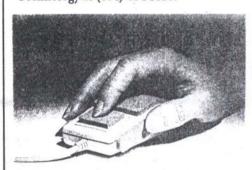
New Darius laser printer handles continuous stationery

Burnaby-based Darius Technology is now shipping its new Darius LaserFlow laser printer. It is designed specifically for high-volume continuous form applications—yet without the kind of noise traditionally associated with departmental, dot-matrix 'line printers'.

With its ability to handle tractor-feed paper, the LaserFlow would appear to be a good way of printing professional-looking large reports and running mailing labels. It runs at 16 pages per minute, provides a resolution of 600 dots per inch and uses the PCL4 page control language popularized in the HP LaserJet II family.

For further details, contact Darius Technology at (604) 654-1830.

Mouse Ergonomics

No two human hands are alike, but many of the "mice" built for computer users are exactly identical in size and proportions. As a result, when you use your hand to move the mouse around, it may not always be a comfortable fit. It's the kind of problem you don't know that you have until someone offers you a solution to it. One company claims to have the answer: Ergopads.

These are ergonomically-designed soft foam pads which attach to the outside of your mouse so that you can shape it more closely to your hand. Ergopads come in a variety of colors, including blue, maroon, purple, grey and black. Canadian distributor Integra Ventures sells them for $7.95 each.

Call Integra Ventures at (604) 328-6580 for further details.

Print Connection established

You can buy a printer at almost any computer dealer, yet there has until now been nowhere in Vancouver that you could go to look at printers—and only printers.

The Print Connection, a new printer specialist store recently opened in Vancouver, claims to change all of that. The Print Connection handles all manner of printers—from simple dot-matrix systems up to high-end laser printers and color systems.

It is also a place to buy the well-received LaserPix 4.0 print enhancement system—a 16-bit AT bus expansion card that lets you print text from your LaserJet II or PostScript-compatible printer at 1200 dpi and half-tone images at 2400 dpi.

To hear further details on The Print Connection, call Cal Condy at (604) 879-7776.

What's New

Unauthorized Bill Gates biography promises to tell all

It had to happen. Given the massive publicity surrounding the success of Microsoft chairman and co-founder Bill Gates over the past couple of years, it was only a matter of time before someone sat down to write a book about him.

In this case, it was two someones: *Seattle Post-Intelligencer* reporters James Wallace and Jim Erickson, who have written what may be the first "tell-all" biography of the computer industry's biggest star.

The book, published by John Wiley and Sons, is called *Hard Drive: Bill Gates and the Making of the Microsoft Empire* and relishes in anecdotes such as Gates' appearance at Microsoft's most recent annual staff meeting for its more than 7,000 employees. Bill Gates entered the Seattle Kingdome on a Harley Davidson, escorted by a gang of bikers. It then tells how the company's multi-billion dollar profits, escalating sales and brilliant business projections were presented to Gates' devotees with the fervor of a religious revival meeting.

The authors point out that with Excel 4.0 and Windows 3.1 now launched, the company Gates had originally planned to keep small and private now dominates the computer industry. Having recently won part of a five-billion-dollar legal dispute with Apple over copyright issues, Microsoft seems poised to monopolize the world of personal computers—despite a U.S. Federal Trade Commission anti-trust investigation.

Wallace and Erickson claim that Bill Gates is driven and that there are many who believe that he is out of control. *Hard Drive* calls itself "a candid inside look at the man and the company that built PC software, including MS-DOS and Windows."

It further contends that Gates, with his unnerving passion for computers, unstoppable ambition, and intimidating intellect, has led Microsoft to wrestle with IBM for its control of the computer industry. Microsoft is supposedly "the little guy turned bully, who calls the shots in standards setting for PC operating systems."

To get your copy of this dirt-dishing tome, look in your local book store or contact the publisher: John Wiley & Sons Canada Limited at 22 Worcester Road, Rexdale, Ontario, M9W ILI or by phone on (416) 675-3580.

HARD DRIVE

Bill Gates and the Making of the Microsoft Empire

JAMES WALLACE & JIM ERICKSON

FUD REPORT

Microsoft claims DOS/Windows "2 to 5 times faster" than OS/2

In an effort to woo IBM PS/2 users away from the OS/2 2.0 operating system which now comes standard with their systems, Microsoft recently announced an integrated package of Microsoft Windows 3.1 and MS-DOS 5 for PS/2 machines at a special price. According to Microsoft, the offer is "for customers who want PS/2 machines but want MS-DOS and Windows to get faster performance, easier use, and superior functionality for desktop applications."

The offer has been made in reaction to IBM's recent announcement that OS/2 2.0 is being pre-installed on PS/2 models 56 and 57. Microsoft says that this "leaves purchasers of those machines with no choice of operating environments." So from May 31, computer resellers can preinstall Windows and MS-DOS on PS/2s for customers—or customers themselves can easily "upgrade" their machines from OS/2 to MS-DOS and Windows.

"In tests performed on a variety of PCs, including PS/2s, Windows is consistently two to five times faster than OS/2 (Not!—*Ed.*) in running applications for Windows," claimed Brad Silverberg, vice president of personal systems at Microsoft. "As a result, customers are asking us to provide an alternative. The overwhelming majority of customers buying PS/2s are using MS-DOS or MS-DOS and Windows, and they have told us they don't want to be forced to switch to a system that is slower and less compatible. Corporate customers told us that it is essential to have built-in support for major networks such as NetWare and LAN Manager, support that is included with Windows but lacking in OS/2. And IBM resellers are being put in the position of losing computer sales to other PC brands that come preinstalled with Windows, because Windows is in such demand. This package of MS-DOS and Windows gives all our customers the flexibility to choose the system that best meets their needs."

Microsoft says the package will install successfully over OS/2 2.0 on any new PS/2, regardless of the original configuration. The product will be available May 31 only to PS/2 resellers. The suggested retail price is $199.95, with a promotional suggested retail price of $149.95 through the end of 1992. Additionally, the new Microsoft package for IBM PS/2s includes a discount offer for Qualitas BlueMax version 6, the PS/2-specific version of 386Max. The memory management utility provides up to 623K of conventional memory for MS-DOS-based applications by loading as much as 244K of memory-resident programs into the upper memory area. A coupon in the Microsoft package entitles the user to acquire BlueMax version 6 for only $19.95 plus freight, 80 percent off the suggested retail price of $124.95.

What's New

GEnie attempts to inspire national unity

In an effort to add an online voice to the national debate, the GEnie information service has set up the online Canada RoundTable (CRT). It is GEnie's first French/English RoundTable and it is the first RoundTable to focus on Canadian culture.

Stephen Holtzman is the chief System Operator (Sysop) and Bob Marcy and Bob Perez are assistant Sysops. All three live in Quebec. On Thursdays at 10:00 pm - 12:00 pm EDT, you can join the Sysops for some lively discussion in the Real Time Conference (RTC) on page 1225.

GEnie says that the Canada RoundTable is for all GEnie users interested in Canadian news and politics, sports, travel, art and culture, Canada-U.S. relations, En Français segments and "The Great White North." Access to it is part of the $5.95-per-month GEnie*Basic Services fee. There are also library files about Canada, including travel and current events. GEnie has also recently added nodes for telephone access in Victoria, Winnipeg, London and Halifax. Contact GEnie Information Services at (416) 858-6589 or 1-800-231-0091 for more information.

Canada Newswire now available on Dow Jones

The full text of all news releases transmitted by electronic news provider Canada NewsWire is now available on Dow Jones News/Retrieval and DowVision. CNW transmits news for a wide range of corporations, federal and provincial government institutions, trade associations and public and investor relations agencies. News releases include earnings announcements, dividend statements, new-product announcements, mergers and acquisitions and government activities.

Canada NewsWire is headquartered in Toronto and maintains bureaux in Montreal, Calgary. Vancouver, Halifax and Ottawa. For further information contact Canada NewsWire Ltd. (418) 863-9350.

BC government software boasts $100,000 royalty payment

One of the British Columbia government's recent entries into the commercial software market has started to pay off hansomely. As part of its Technology Commercialisation programme, the BC government sold the rights to market its Correction Administrations Records Entry (CARE) software - originally developed for the BC Corrections Branch for use in prisons - to Richmond-based OCS Technologies Corporation.

OCS has succeeded in selling versions of the software to police and corrections officials in Alberta, Saskatchewan, Manitoba and Ontario - as well as to US law enforcement organisations in Washington State, Idaho, Texas and New England.

Under the terms of its agreement with the BC government, a $100,000 payment - representing the government's share of profits so far - was made to the province in early April. "The CARE software has enabled automation of a wide range of corrections information and has proven valuable in maintaining a modern British Columbia corrections system," said Attorney General Colin Gablemann.

Prisoner booking and court appearances, sentence calculation, prison visits, cell location, parole and release dates are among the information automated under modules of the CARE system.

For more details on CARE, call Neil Hummel at OCS Technologies Corporation at (604) 273-8045.

Vancouver Artist the Big Winner in Corel Design Competition

OTTAWA, ONTARIO, MAY 19 (NB)— At a formal ceremony held at the National Gallery of Canada, Corel Systems gave out prizes to nine winners in its third annual World Design Contest.

Corel launched the contest, for users of its CorelDraw graphics software, to publicize the software, recognize designers, and gather top-quality designs which it can then re-market to its customers.

This year's grand prize went to Bill Frymire of The Showmaker Productions (604-875-9880) in Vancouver, for "Rex," which also took top spot in the "People, Plants, and Animals" category. The grand prize was a gold bar worth $10,000.

Michael Cowpland, Corel's founder, president, and chief executive, told Newsbytes entries in the competition jumped from 1,000 to 3,000 this year.

"People have spent literally hours and hours on some of these designs," he said. Corel recovers some of the cost of the contest by selling a CD-ROM disk containing all the designs for $99. This provides buyers with ideas and allows them to study the drawings to learn about the techniques the winning artists have used, Cowpland said.
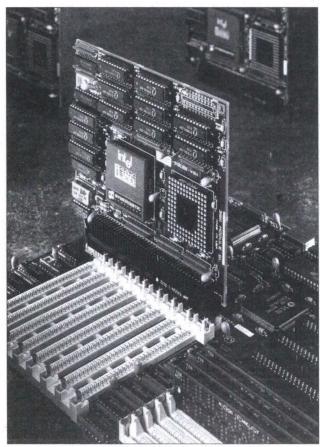
Corel, tel 613-728-8200

I N T E R V I E W
Alan Ashton
The President of WordPerfect Corp. Speaks Out

By Geof Wheelwright

ALAN C. ASHTON isn't a name you hear bandied around in the computer press very often. He rarely gives interviews and largely shuns personal publicity, yet he is president and co-founder of WordPerfect Corporation, the world's largest word-processing software company.

Despite his key position at WordPerfect, Ashton comes across as a soft-spoken and unassuming university professor from Utah. This shouldn't come as too much of a surprise, as that's exactly what he is. Ashton, now 49, graduated magna cum laude in mathematics from the University of Utah in 1966. He received his Ph.D. in computer science from the same university in 1970.

WordPerfect, in fact, evolved from an idea which originated as early as 1969 when Alan, then a graduate student, submitted two computer projects for possible research—one involving music and the other word processing.

His professors opted for the first idea. It was not until nine years later, in 1978, that Dr. Ashton revived his second idea and started on the path that eventually led to the best-selling WordPerfect 5.1.

Dr. Ashton was a full professor of computer science at Brigham Young University for 14 years. He says he enjoyed working with students on advanced degree projects and that his willingness to help others learn prompted BYU's computer science class of 1986 to elect him the "Outstanding Professor of the Year." Ashton continued to teach computer science classes until 1987 when he left BYU to work full-time as president of WordPerfect Corporation.

Ashton was given the Entrepreneur of the Year Award in 1987 by the Small Business Association of Utah. He says he is a family man at heart and enjoys spending time with his wife and 11 children in their family home in Orem, Utah. Ashton's other interests include farming, music (especially his trumpet) and competitive tennis.

Ashton is also interested in getting out to meet his company's users. *The Computer Paper*'s consulting editor Geof Wheelwright was granted an interview with him last month after Ashton's visit to The Winnipeg PC Users Group.
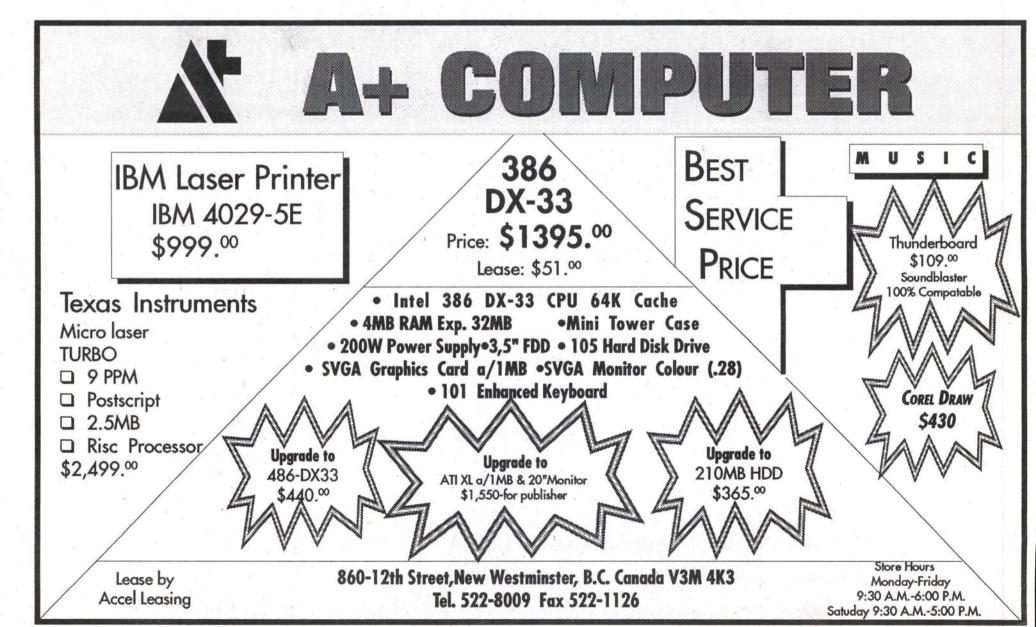
GW: What is your feeling about how well WordPerfect for Windows has been taken up? Is it more difficult to sell in the Windows market than expected, particularly as one Windows wordprocessor tends to look and feel a lot more like any other Windows wordprocessor than has traditionally been the case in the DOS world?

AA: We have been very excited by our sales of WordPerfect for Windows. Around 400,000 copies sold within the first month and around 800,000 copies have been sold in total. And last night, at the Winnipeg PC Users Group presentation, we showed a new interim release which includes new features such as drag and drop, the ability to incorporate dialogue boxes as part of your WordPerfect for Windows macros, so that it looks like an actual separate application launched from within WordPerfect.

So, we are very excited about future enhancements and releases of WordPerfect for Windows, as well as new OS/2 and DOS versions. Although it is difficult to measure [how big the challenge is in selling into a particular marketplace] because we sell through distributors, we have been happy and excited about the numbers sold in the Windows environment.

Admittedly, as GUI products develop, most companies will be looking to offer the same kind of features and the same ways of getting at those features. So we will have to also rely on the broad number of platforms we support: Windows, DOS, OS/2, Macintosh machines, NeXT, Unix and even the IBM mainframes.

It is important that our software becomes compatible and becomes a great strength on multiple platforms because we find that our customers require word processing on their multiple platforms rather than just the one.

GW: Where does WordPerfect sit in the battle between OS/2 2.0 and Windows 3.1? WordPerfect was an early OS/2 booster and had a fairly advanced beta of WordPerfect for Presentation Manager on show as long as two years ago. Can you explain how you now see approaching the OS/2 market?

AA: The OS/2 marketplace in general is of the utmost important to us. We began doing WordPerfect—the WYSIWYG version —for OS/2 but then Windows 3.0 came out. It was so well-accepted that we had to divert our energies to getting our Windows product out, because the customers were crying for it. Then we looked at doing a very quick upgrade of WordPerfect for Windows product to run under OS/2 and found that it already worked there because OS/2 2.0 runs Windows applications as well as DOS applications. So we decided instead that we would do our future enhanced version of WordPerfect and target it towards 32-bit architecture and the multitasking operating system under OS/2.

We are working very closely with IBM— as we have done in the past—in making sure that our existing software runs well on OS/2 and we're very excited about future versions of WordPerfect and our other software that will take advantage of the unique capabilities of OS/2 2.0. We are actually able to save money in our offices using OS/2 2.0 because, rather than giving programmers multiple computers, we can give them OS/2 and additional memory so that they can run multiple tasks simultaneously doing the linking and compiling along with other work. In the future, I see both operating environments as being viable. Windows on DOS—and on NT in the future—is a substantial operating environment and will serve quite a number of people.

I think that OS/2 is a great operating environment that will continue to get better. It's not a matter of making a decision and siding with one or the other. It's important for us to have our very best software available on both of the platforms. And while we do that, let's not forget DOS, where we are working to enhance our software and make it available in new releases with new capabilities and options. We are working very hard on that right now and certainly planning to show our next DOS version of WordPerfect at Fall Comdex. We are near the end of the beta cycle on it. The DOS marketplace right now is really exciting and we don't see so much competition there. We aren't concerned so much about competition in the DOS market as we are in other environments, and we will meet that competition by increasing our strength on multiple platforms.
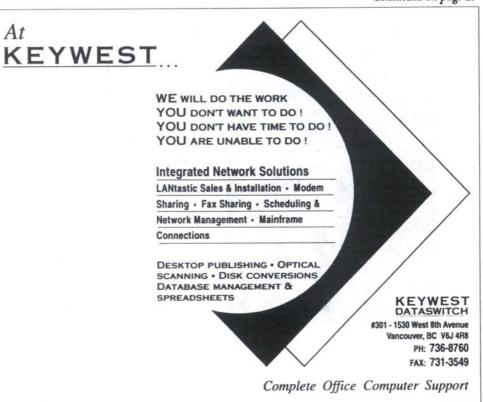
GW: WordPerfect was a pioneer in what everyone now calls "workgroup computing" with WordPerfect Office. How has the company's workgroup computing strategy evolved as this market has matured?

AA: This is a very exciting area for WordPerfect. Because WordPerfect has such a dominance in the documents area and it is used worldwide, it is very important that we provide software for workgroup computing. It is crucial, for example, for people working on the same proposal or a single document—and so our latest version of WordPerfect Office includes document management.

We are also now moving to have versions of all our products that are mail-enabled, so that as you move information around in the workgroup, you can send and receive messages from directly within

the package. It's also very important that we are able to pass around multimedia information—such as sound, video and other elements—and can ensure that they can be passed from place to place. If, for example, you are doing a large proposal with a budget in it, including graphs, spreadsheets with sound annotations and presentation materials, they should all be able to be integrated together in a single document. This is an area we have been working on, along with calendaring and scheduling. This has enabled us to help people work in an office environment with capabilities way beyond what existed.
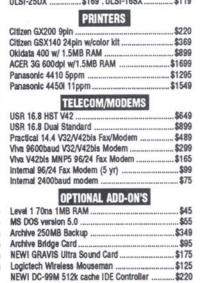
You can even reply to and forward messages cross-platform—forwarding messages and including in them documents and messages of all types, whether they are scanned-in images, compound documents and even video images. This is a very strategic and important area for WordPerfect. In the past, WordPerfect Office has been the name we have given to this, but we are now changing the name to WordPerfect Mail— although it is really mail and more. It offers capabilities such as scheduling that help people when they work in groups. Work on the Windows version of the product has begun, and our plans are to "mail-enable"

all our applications under Windows. There will, for example, be an option to send mail right from within WordPerfect. And we are being very open about the mail systems we will work with; if you use Microsoft Mail or Lotus cc:Mail, you will still be able to send mail.

GW: WordPerfect recently entered the "integrated" software market for the first time. What was the impetus behind this move?

AA: The product is called WordPerfect Works and the way it came about was that we had spent a lot of time in the past in proving and implementing spreadsheet technology, graphics technology and combining this technology (in products such as PlanPerfect and WordPerfect Executive). People have been asking us to upgrade our offerings in these areas and give further capability. WordPerfect Executive offered a limited number of functions but integrated very nicely. So after seeing the success of Microsoft's Works in the Mac market, we took elements of WordPerfect Executive and added communications facilities—and it turned out to be a very high-end product with high-grade functions.

We looked at putting all the major capabilities of all our products in it and found that it would be too large, so we put in it all the functions it made sense for people to want to take around with them. They include the functions of LetterPerfect (WordPerfect's entry-level word-processing product), which accepts complex WordPerfect files with items such as tables in them and, although they don't appear on-screen, they are still there and can be edited.

We have also taken the essence of DrawPerfect (WordPerfect's presentation graphics software) and PlanPerfect (the company's spreadsheet) code and our notebook (a flatfile database for notecard and address lists) and added that as a database capability. And people just cried for us to have communications capabilities, so we got together with Magicsoft and they did a marvelous job of providing us with comms capabilities for logging onto bulletin boards, online services, supporting different terminal emulations, as well as file transfer protocols such as kermit, X-, Y- and Zmodem.

We have also added fax capabilities so that right from LetterPerfect you can just do your document and fax it right off. All of these products are integrated well together so that you can be in the graphics portion and bring images right into word-processed documents, while databases of names and addresses can be easily mail-merged. It looks like one, complete operating environment. ∎

"My spelling checker said everything was spelled incorrectly. It turned out I had the Portuguese version."

Multimedia Design Issues

by Theresa Guay

D eveloping a multimedia application presents its own special set of challenges and potential pitfalls. This article will explore some of these challenges with the goal of providing the understanding needed to meet them, and avoid the pitfalls.

Picking a Religion
The first issue to consider is which platform you will use to deliver the multimedia application. The three most common platforms, in order of installed base, are PCs running MS Windows, Macintoshes, and Amigas. Each of these has its own set of advantages and disadvantages.

While PCs running Windows have by far the largest installed base, they are the least mature multimedia platform of the three. This has two main consequences: first you must purchase several add-ons, such as sound boards and an authoring package, to give the machine even basic multimedia capabilities; second, there is a lack of standards. A case in point: there is no standard authoring package bundled with PCs.
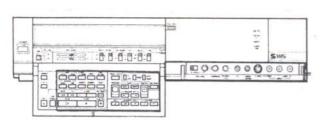
The Macintosh, on the other hand, is an excellent multimedia machine. It comes standard with sound input/output capabilities, a SCSI port for scanners and CD-ROM reader, the HyperCard authoring package, and, on color-capable models, the ability to run QuickTime movies. It is a mature multimedia platform with a wide range of add-on products available, and the recent price reductions make the Mac all the more attractive for multimedia applications.

Another mature multimedia platform is the Amiga. All Amigas have sound input/output, graphics and sound coprocessors, the ability to handle NTSC (television and VCR) video output, and a true multitasking GUI operating system. Hard-drive-equipped Amigas, the A2000, A2500, and A3000, also come with a SCSI port and are bundled with the AmigaVision authoring package.

Choosing Peripherals
Whichever platform you choose, the basic design issues are identical. Is the application to run totally off the computer's hard drive, or will some of the material be stored on CD-ROM, laser disc, or PC-VCR? The advantage of developing multimedia applications that run totally off a hard drive is that expensive peripherals are not needed. The disadvantage is that sound and graphics require an enormous amount of hard drive space.

Both CD-ROM and laser disc players share similar advantages and disadvantages. Both are far cheaper than a PC-VCR, there is an ever-increasing number of titles on the market, and they are easy to control. Their main disadvantage is the high cost of mastering a custom CD-ROM or laser disc. To master a laser disc costs about $2500 and a CD-ROM disc about $1500. This will give one test disc; if you want more discs it will cost $2100 for 100 laser discs, and $600 for 100 CD-ROM discs. It gets cheaper if you order more than 100.

A PC-VCR is a VCR (made by NEC) which is computer-controlled via the serial port. Since it uses standard videotape it is excellent for creating custom applications, such as interactive courseware, especially if you need less than 100 copies. While both tape and laser disc/CD-ROM require the production of a master tape, laser discs and CD-ROMs require the further step of mastering the disc from the master tape. Therefore mastering a video tape is significantly cheaper. The main disadvantage is that pro-quality VCRs are not cheap, ranging from $2500 to over $10,000, with the low-end models missing crucial features such as the ability to step back a single frame at a time. Also remember that if you choose to use video tape, a custom laser disc, or a custom CD-ROM, you will either need to purchase or rent time on a video editing suite in order to assemble the master tape.

Currently WORM optical discs are still rather expensive, but show promise as the future peripheral of choice for multimedia applications as they share the advantages of both laser discs and PC VCRs and have none of the disadvantages.

The User Interface

The user interface is the most crucial factor in the success of a multimedia application. The user will judge the quality of your multimedia application by the quality of its interface. Issues to consider are the amount of information presented on each screen, the intuitiveness of the interface, and the nature of the special effects used.

It is all too easy to clutter up the application's screens with too many buttons, too much text, and extraneous and/or obnoxious graphics. This is a temptation that even the big boys succumb to, as the latest crop of Windows applications seem rather cluttered.

There are several problems that the user of your application will experience if your screen is too cluttered. First of all, it will take longer for them to navigate the application as they search for the appropriate button among all the clutter. Secondly, the clutter will distract them from the real information. And finally, they will suffer from information overload.

The best applications are those that present only those buttons or text that are absolutely necessary to efficiently use and understand the application. You should also use only a plain background; cute graphics can confuse the user as to what is information and what is just decoration. Simplicity is beauty.

As well as simplicity, your user interface should be consistent. An inconsistent interface can not only confuse and frustrate the user, but can also paralyze them into inaction. An example of this was when I first encountered the Macintosh. I had been told that the trashcan was used to both delete a file and to eject a disk, a very inconsistent combination of functions. I hesitated to drag a disk icon to it; visions of the Mac equivalent to the DOS DEL a:*.* flashed through my mind.

The interface must not only be consistent within the application, but should also be consistent with other applications of a similar type, following the written or unwritten guidelines for that authoring package or platform. An example is HyperCard. HyperCard applications follow certain conventions in the design of their user interface: clicking on the home icon (a small picture of a house) takes the user to the

Home Stack, clicking on the right arrow takes the user to the next screen, the left arrow to the previous screen, and so forth. To reverse the functions of the arrow will cause problems for those users experienced with HyperCard.

Granted, there are times when you must break the conventions of the particular package or platform you are using, but think it through and do it if there is no other choice. If you do break with convention, make sure that it is well documented!

Besides simplicity and consistency, a user interface should be intuitive. But what is intuitive? Something that is intuitive to me may not be to you. There are several levels of intuitiveness which I will discuss, starting from the most intuitive and working down to the least.

The most intuitive things are those which all humans possess by the very nature of being human. Pointing is a classic example. All humans, once they've developed the necessary motor coordination, instinctively know how to point from a very early age. Therefore, a touch screen or pad is a

very intuitive input device.

The next most intuitive things are those which are culturally learned. These cultural artifacts include language, customs, and symbols. Examples of some of the symbols from North American culture are the stop sign, the question mark, and the home. Having a question mark icon trigger the help function is very intuitive to those users exposed to North American culture, as would clicking on a stop sign to halt the current operation. At this level of intuition, it is important not to assign a counter-intuitive meaning to a symbol. Again I use the example of the Mac trashcan. To use it to dispose of a file is intuitive; to use it as a disk ejector is counter-intuitive.

NEC's PC-VCR has a built-in character generator, search capabilities, even the ability to control its on-board AC outlet. Combined with a program like MediaMaker or ProMotion, it becomes possible to create on-screen animations and "print to video" as you would to a printer.
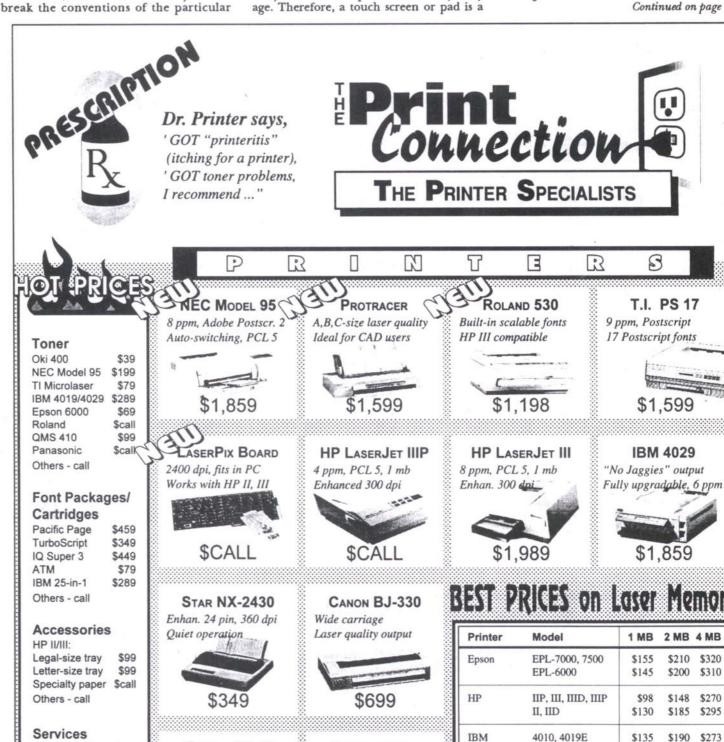
The next level of intuitiveness is at the level of the platform or GUI. All Mac, Amiga, and Windows applications tend to have a similar interface. Once the user has learned the interface, all applications following the interface guidelines for that platform or GUI are fairly intuitive to the user. It is at this point that a counter-intuitive aspect of an interface becomes intuitive, once the user has learned that dragging a disk icon to the trashcan ejects the disk, then it becomes intuitive. Violating the interface guidelines is dangerous, since it will affect those users who have become so comfortable with the interface that they no longer bother reading the manual. Confuse a beginner and they will blame themselves; confuse an experienced user and they will blame you!

The final level of intuitiveness is at the level of specific applications. An example of this is WordPerfect's command key sequences. Again, it is the experienced user who is most affected by changing the interface in the latest version of your application. Watch the look on the face of a WordPerfect for DOS user who presses ALT-F4 in WordPerfect for Windows (in the former, this means "Block text;" in the latter it means "Exit without saving changes"—*Ed*). Even if you tell the user of the changes, it is likely that they will, out of habit, use the interface in the same way as in the previous version of the application.

To sum up the issue of intuitiveness:
1. Strive to provide the highest level of intuitiveness possible.
2. Avoid including counter-intuitive items in your interface.
3. Once you've established a level of intuitiveness, do not violate it.
4. Document any aspect of the interface that may not be immediately obvious, such as clicking on a picture of a musical instrument to hear it play.

Navigation Issues

There are several issues dealing with how a user will navigate the application. The first deals with format: are the navigation paths linear, relational, or both? If the purpose of the application is to teach the user the sequence of steps in performing a task, such as learning how to tune up a car, then a linear navigation path is the best. A danger in using a linear path is that the application will end up a simple page turner. An application which is just an electronic page turner is best not written—a book on the subject is cheaper. Relational navigation paths are best when the application's purpose is to allow users to explore all the factors and relationships involved with the topic at hand. There are also situations where it is best to provide both linear and relational paths, such as in the case of a language tutorial.

The problems with using the relational navigational method, such as Hypertext, is that it imposes a high cognitive load on the user. The user has to remember both where they are within the application and what links they have already explored. Failure to do so will get the user lost and confused. This problem is compounded by the fact that most of our learning has been linear. The traditional book fosters a linear approach to knowledge. Hypertext and hypermedia are still, for the most part, an unfamiliar approach to knowledge.

Therefore you must provide the user with navigational aids when you employ relational navigation. These aids should include a means to backtrack, online context-sensitive help, and a graphic map of all the linkages in the application. This map should be dynamically updated to show the user what linkages they have explored and where they are at the moment. The cognitive load can also be reduced by minimizing the use of distracting graphics, sound effects, and transitions. Does the application really need to go "woot" while the screen shrinks and rotation-flips off to reveal the next screen? A simple, silent transition is usually best.

Conclusion

Hopefully this article has raised your awareness of the some of the issues involved in multimedia design. Remember: keep it simple, keep it intuitive, and focus on the informational needs of the user. Avoid creating yet another narcissistic monument to the developer's creativity. ■

Theresa Guay is employed as the technical coordinator for both the Department of Communication and the School of Resource Management at Simon Fraser University. She has over six years' experience in computing and four years in multimedia. One of her multimedia applications showcased at the 1990 Pacific University Consortium Conference. She can be reached via *Mind Link!* BBS (604-576-1214).

Multimedia
Buzz word of the '90s

by Peter Talbot

Ten years ago multimedia was little more than a glimmer in the eyes of computer enthusiasts. Most of us outside the industry thought of the term in the context of audio-visual presentations—a kind of 35mm slide show that magically cued the sound track whenever the projector advanced an image. But what multimedia has become is in fact quite different than even the most optimistic software engineers predicted.

Multimedia isn't just a way of *disseminating* the information through multiple media; today the term implies a way of *gathering* the information from different sources as well. This is important, because the ability to combine technologies is what gives multimedia its power of expression. Software engineers five and ten years ago foresaw the flexibility of multimedia, but few envisioned it would become the buzz word of the '90s.

Origins and Addictions

As a concept, multimedia has actually been around since human beings first attempted to supplement visual stimulation with oral. If you're fortunate enough to know a really good storyteller, watch how this person combines hand gestures and the spoken word to create a unique sense of realism. The same principle applies to multimedia: by supplementing the basic medium with another (and sometimes several), the message can carry far more information within the same time period.

It's possible the lost art of storytelling may disappear even further as multimedia grows in sophistication. Sure, the learning curve of some of the more complex packages—such as MacroMind Director—can be intimidating, but one look at a completed presentation is enough to turn many users into addicts.

Moreover, it's an addiction that's contagious. Today's software, coupled with video cards and camcorders, can do what used to require an entire studio of hardware and technical expertise to accomplish. What has emerged is a powerful and high-tech mode of expression. Best of all, it can be darn entertaining. Large organizations such as Pepsico are even using multimedia presentations on laptop computers to assist in their sales promotions. Non-profit interest is catching on too, as many educators are seeing its potential in a learning environment.

Is Multimedia Too Powerful?

Several years ago Congressional Hearings in the United States made national television as lobbyists for the film industry and arts community petitioned federal officials to enact an anti-colorization bill. The plea was an attempt to prevent or stall production companies from adding computerized color to black-and-white prints of movies such as "The Wizard of Oz" and "Manhattan." The legislation was intended to preserve the integrity of films, especially films such as "Manhattan" (1979), which

were *purposely* shot in black and white, despite the availability of color. As is the case with colorization, one thing that hasn't kept pace with multimedia's growth is society's receptiveness to change itself.

This mode of thinking is even more justified in the world of multimedia because the potential for altering the final product has never been so easy. Video frame grabbers and output cards mean you can now capture and manipulate images in a home computer, then save the new sequence in VHS tape format for viewing or transmission.

Continued from page 17

Some manufacturers, such as Canon, have taken the technology a step further and invented imaging cameras that capture pictures on diskette instead of film. Combine these technologies with readily available software, and you've got a final product that superimposes fiction onto film. If you've ever been fooled by those Duracell commercials with the Energizer Bunny parading across the screen with his drum, you realize where the controversy is coming from.

Nostalgia and the Generation Gap
But aside from the technology's use (or misuse) in the advertising field, many viewers continually reject multimedia for nostalgic reasons. The rejection is not dissimilar to the one that plagued television in its early years, because the new medium of television lacked "the creativity and polished image" projected by radio.

Nothing can change this, of course—except time. New generations will soon become accustomed to multimedia; perhaps today's youngsters will even come to regard it as passé when virtual reality and artificial intelligence mature.

Until such a time the medium will have its share of critics. A recent Aldus presentation at Calgary's Convention Centre is a good example. To many, Aldus' reputation for slick presentations was further enhanced through the use of animated sequences compiled with Adobe Premiere. But along with all the "oohs and aahs" could be heard the occasional comment of "overkill," proving once again that you can't please everyone...especially computer enthusiasts.

Neil Postman's latest book, *Technopoly*, addresses many of the concerns echoed by the critics of multimedia. Overwhelmed with oral and visual stimuli, and occasionally called upon to interact with the computer, it's no surprise that we sometimes accuse multimedia of overkill. This new technology demands more attention in a society that is aggressively competing for our interest. But multimedia, the mixing of video and animation, of sound and text, packs so much information into a given time frame that it's hard to ignore.

Using and Misusing the Technology
New technology often has a strange way of emerging through less-than-honorable intentions, such as the infamous 900 telephone numbers in the United States. Multimedia is no exception. Electronic bulletin board users have, for years, known about interactive HyperCard stacks designed by Macintosh fans tinkering with the medium. Although developed for entertainment purposes, some of these stacks challenge your definition of obscene, and have given multimedia a bad reputation.

Content aside, the success of computer users tinkering with multimedia for entertainment illustrates just how far the software has progressed. When technology becomes so accessible that even non-technical users can produce a film-quality sequence on disk, you know it will be popular. Employed for more productive uses, multimedia promises a lot of potential for the home-computer market.

It's not difficult to envision individuals producing studio-quality commercials or even movies from their own homes in the near future. Like the desktop publishing industry of the '80s, multimedia also offers some interesting possibilities for self-employment.

Unfortunately, assembling a multimedia production with a strong message or sales pitch in mind is no small task. Multimedia demands a multi-disciplined approach if it is to succeed here. Educational specialists, technical personnel, writers and marketing experts all have their place in the field. And just to ensure that the content emerges from the packaging, a subject-matter expert doesn't hurt either. What looks like a skepticism of the technology right now may in fact be healthy criticism of its content—an inability to comprehend the message through all the bells and whistles of the computer.

Multimedia is just now beginning to shed its reputation as a fringe technology. Critics who claim that the medium assaults the viewer with too much information may have a tough argument ahead of them; in fact, fans of the medium say it is a more *natural* form of communicating. The logic here is that, because multimedia appeals to both the visual and aural senses, it is easier to get a complicated message across to others.

This ability to express complicated messages is what has educators so excited by the medium. Not only does multimedia promise to entertain and hold our interest—it promises a way of interacting with the user like we've never seen before. Real-time medical software, capable of simulating human responses during surgery is already a reality. Coupled with digitized film clips of blood flow, heart sounds and nervous-system reactions, the educational possibilities here are impressive.

For students, what better way to explain science than by showing real-life examples captured on disk? Allow them to change the conditions of a dangerous chemical experiment on a computer, then show the resulting explosion on a color monitor with the sound turned on. The message gets across. No one gets hurt. There's no mess to clean up.

Getting Started in Mac Multimedia
If you're intrigued by multimedia and feeling a little left out, there are some reasonably priced software packages available for Mac users. You can do some wonderful presentations with the Claris HyperCard Development Kit, and you'll find no shortage of willing viewers as HyperCard is included with every Macintosh computer sold. ADDmotion, from Vancouver's

The new OS/2 can do mos
And all at the

Motion Works, is a good add-on to HyperCard, allowing users to incorporate both sound and color animation in a basic HyperCard stack. Both packages include fairly good documentation, and enable novices to create impressive multimedia presentations.

For power users and would-be moviemakers, products such as MacroMind Director and Adobe Premiere offer incredible flexibility. Three-dimensional productions aren't wishful thinking, either; Swivel 3-D Professional and SwivelMan are great fun. Keep in mind that these products require a fair amount of RAM and are painfully slow to work with on the lower-priced machines.

Whatever your level of involvement—from viewer to multimedia addict—you can be fairly confident that multimedia will grow in popularity in the years to come. Best of all, there's room for involvement for entertainers, educators, and computer fanatics alike.

If you remain unconvinced that the technology is accessible to non-technical users, take a look at the new *Canadian Multi Media Magazine*, published by the Alberta Communications Group. In it you'll find a diverse collection of articles and product information ranging from law enforcement to medical software. Better yet, consider attending the 1992 International Multimedia & Laserdisc Conference & Exhibition from September 3-5 at the Edmonton Convention Centre. Contact the Alberta Communications Group at (403) 448-7319 for more information.
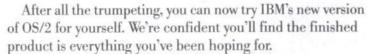
With this level of interest, multimedia could eventually become the information source, learning tool, and entertainment technology that makes television look rather pale in comparison. ∎

Peter Talbot is an editor with the city of Calgary in the Data Processing Services Dept., and a freelance writer for several local magazines. Contact him at 403/268-5321.

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OS/2's refined Workplace Shell (the way it organizes your screen) allows you to group files, programs and devices under a single icon. Click on the icon and everything you need for your work is automatically opened up. Information can be dynamically linked from a variety of application sources, so that the data you see on screen is always the latest. Graphics and text can be 'cut and pasted' between applications no matter what operating system the application was originally written for.

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IBM

IBM Multimedia Centre based in Vancouver

A wide variety of multimedia products and systems are available from IBM: video and audio capture/playback and networking, computer-based TV display, touch-screens, and software for authoring, presentations and education. From its multimedia division headquartered in Vancouver (reputedly due to the success of the company's Expo 86 touch-screen display kiosks and related developments), IBM's multimedia expert Cathy Munn spoke to *The Computer Paper.*

TCP: What does the Multimedia Centre do?

CM: We have account reps whose job it is to work with the client. We have product specialists knowledgeable in specific areas; videos detailing the benefits of the products. We do trade shows and consulting.

TCP: Where do you perceive the market opportunities to be for 1992?

CM: The market for 1992 is not home or retail. It is the commercial market. One of the most successful areas in B.C. is safety training. For one thing, the information these systems are installed to convey is not optional, it's critical. It's also an appropriate method of conveying information to users who may be semi-computer illiterate.

We're working on a lot of pilot programs. A bank, for example, is planning to roll out DVI (digital video interactive)-based training. You can have a video signal transmitted over your network for what you might call "just-in-time training."

A pilot project at one of the big brokerages uses our PS2/TV to put CNN and FNN on every desk.

A lot of people who have been in film production or advertising are now seeing that the next place to go is multimedia.

For the developers, we've created what we call the Ultimedia Developers' Program. For $4000 US, they get very deep technical support.

TCP: People have commented that DVI has the wrong price-point; that it's priced too high.

CM: Not everyone needs DVI in a multimedia system. The minimum requirements vary widely, depending on what the system will be used for. After all, a 386 system with a CD-ROM drive and a sound board is minimally "multimedia capable," but a fuller definition would include video in and out and mass storage.

Not too far in the future, we foresee portable systems that will have color, pen-driven touch screens, cellular communications capabilities, CD-ROM XA (an improved CD-ROM data format that supports the interleaved datastreams required for full-motion video with simultaneous audio), and a read-writable solid-state device for storage. When these systems hit a price-point of $1000 or so, multimedia will achieve critical mass.

TCP: What is Person-to-Person?

CM: P2P is a DVI-based video-conferencing system we will have available by the end of this year. A lot of the early development was done in IBM's Canadian Lab.

P2P is essentially a shared window. You can cut-and-paste, use it like a chalkboard, capture stuff. It runs under OS/2.

TCP: Will it run under Windows?

CM: No. We could do the basic functionality but it would break more often. It needs the multi-threading of OS/2 or something like Windows NT. ∎

IBM publishes a magazine called *IBM Multimedia Solutions.* Readers interested in subscribing should send their name and address to **IBM Multimedia Solutions,** 4111 Northside Parkway, internal Zip H04L1, Atlanta, Georgia 30327.

Contact: IBM Customer Relations, 1-800-465-6600.

Screen Machine
Live Video in a Window for PC or Mac

By Graeme Bennett

From: Fast Electronic GmbH, 508-655-FAST;
        fax 508/650-0447. Distributed in North
        America by Commercial Electronics,
        604/669-5525
Price: PC version (SM-PC) $2,500
        Mac version (SM-Mac) $2,900

Summary: a real-time color video digitizer for PC, PS/2 and Mac II that captures images in true color or gray scale. Screen machine is a multimedia board for the display of text and graphics on the screen and enables full-motion video in a window of any size, shape and position, controlled by the computer.

When it comes to high-tech, we've noticed that products from Germany tend to be deep, with rich feature-sets and a wealth of programming possiblities. Almost invariably, German engineers push the envelope of what's possible with software or hardware products that are "hacker's delights."

The Screen Machine is such a product. Sure, there are other video-in-a-window products for the PC and the Mac, but Screen Machine (SM) has more programmability, and more technically oriented documentation. It is one of the only products we've seen that can overlay a true-color (24-bit) image on a display of any bit-depth—even black-and-white. At $2,900, it's also one of the most expensive.

If you ever wanted to know how to build your own Sony L-Control Interface or how to remotely control a Canon Still Video Player, this is your kind of product.

PC and Mac Versions
We saw both the PC version and the Mac version in operation. Both have comparable feature-sets, with minor differences. For example, the PC version has color keying capabilities and an optional teletext decoder not available on the Mac version. The Mac version, on the other hand, supports QuickTime (allowing, among other things, JPEG image compression). The following review is based on the Mac version, which we tested on a Macintosh IIfx with 8MB of RAM, Radius and Apple video cards

and an NEC PC-VCR.

The Read Me file betrays the product's Germanic origin when it advises that "The behaviour of the grafics card pop up has benn changes slightly." Fortunately, the manual is clearly written in more-or-less proper English. Installation and setup procedures are clearly illustrated and described, although, as noted below, we did note occasional misinformation.

Software

The software is fully System 7.0 compatible, although it does not take advantage of 7-specific features such as Balloon Help or Publish/Subscribe. We experienced several program errors during our tests, but, as it turned out, the culprit was an incompatibility with the Radius DirectColor/GX video card. For example, one such problem was a "Save Image as JPEG" feature which we could not manage to invoke without aborting the SM-Pocket Camera program. The error occured even if our Apple video card was the one the Screen Machine was connected to, but the Radius card was still installed in the computer. We talked with a Screen Machine owner using Apple's Display Card 8•24; these errors apparently did not occur with that configuration.

Curiously, all functions on our system *appeared* to work—it just didn't save properly.

Screen Machine image quality is very good—the best we've seen from a computer video-capture device. The product includes a time-base corrector to stabilize video input signals, and captures in full 24-bit color.

RadiusTV, also reviewed this issue, only captures 16-bit color.

Capturing Images

We found the process of grabbing images to be very convenient. With a simple press of the Return key, an image may be captured and opened in SM-Snapshot for image-processing. Using the Enter key instead grabs the image without showing the "Darkroom" controls, using the last parameters. We did note, however, that on an eight-megabyte machine, the program frequently complained that it was unable to "develop" an image if we had captured more than 3 or 4 shots to the "Film Folder" it uses to hold images to be processed. No wonder Screen Machine lists 8 MB of RAM as its minimum requirement.

We were unable to use the Mac IIfx's internal audio capabilities to hear the sound. The product includes wires to connect the audio signals from a Mac IIcx or IIci's motherboard to the audio input, but this seems much less elegant than RadiusTV's "all-in-software" method. According to the manual, Mac IIsi owners may connect the audio source directly to their computers' audio inputs—advice that, we presume, also applies to other NuBus Macs with audio input capabilities, such as the Quadras.

We were mildly disappointed to find that image captures of the Screen Machine video window are only possible when the capture utility SM-Camera is the foreground application. In fact, the SM video window is not visible at all while running another application unless you are running the desk accessory (DA) version, or, using a feature called "Retain and Quit"—erroneously referred to as "Replace & Quit" in the manual—you can quit the DA, leaving the video window active on the screen. We noted with some amusement that the manual describes the key sequence to quit this "Retain and Quit" mode with the key sequence "Option-Alt-Shift-S." Unfortunately, we've yet to see a Mac keyboard with an Alt key. Actually, "Alt" should have said "Command."

Plug-ins are supplied for ColorStudio, ImageStudio, Photoshop, Quark XPress, and RagTime, allowing images to be captured and processed directly from these applications.

Programming Possibilities

For programmers who want to incorporate the possibilities of Screen Machine in their own HyperCard stacks, the package ships with an XCMD that is used to operate SM from within HyperCard.

The various features of Screen Machine are controlled using the XCMD. The XCMD is compatible with HyperCard, SuperCard, Plus, AuthorWare and MacroMind Director.

It is very simple to access Screen Machine from HyperCard. All you have to do is to tell Screen Machine which rectangle of the window should contain live video. Screen Machine manages everything else, such as changing the position of the window, overlapping or clipping, on its own. Function calls are included to control the video and audio facilities of Screen

Machine, as well as effects such as fading video, wipes or live/still.

According to the company, a Screen Machine development toolkit containing Pascal and C routines is available as a separate product.

4th Dimension Toolkit

The package also comes with a demo version of a Screen Machine external for 4th Dimension version 2.2.1. This release of the SM-4D extension already supports the compression manager of QuickTime. With the help of QuickTime you are now able to store a true-color image of the size 340*180 in less than 20KBytes without visible loss of image quality. This means 30-40 images on an 800K disk. This opens a totally new opportunity for database application.

Conclusion

Screen Machine offers more programmability than any other Mac or PC video product we've seen or heard about, and would make a good choice for developers interested in producing custom applications that take advantage of computer-based video.

Nevertheless, potential buyers of this, or any other hardware add-ons, should be wary of possible software or hardware incompatibilities. The safest bet is to assemble a system using components known to be compatible. Your dealer should be able to help you put together an optimal configuration.

Multimedia Must-haves

We were particularly impressed with the NEC PC-VCR graciously lent to us by Commercial Electronics (604/669-5525) for this review. This computer-controllable SVHS video deck performed like a champ, and has dozens of features that beg for experimentation, such as a built-in character generator, search capabilities, even the ability to control its on-board AC outlet. Combined with a program like MediaMaker, it becomes possible to create on-screen animations and "print to video"

The Amiga-based **Video Toaster** is still the king of low-cost multimedia production tools.

as you would to a printer. Although lacking the image fidelity of high-end decks, we feel it is the best unit for multimedia enthusiasts with modest budgets.

Commercial Electronics is also one of the only places in Western Canada where complete multimedia setups (with video cameras, laserdisc and videotape, digital audio, and computer-based editors, mixers and controllers) can actually be viewed and tested. The company also sells the Amiga-based Video Toaster—still the

king of low-cost multimedia production tools. Of course, in video-land, "low-cost" applies to just about anything under $15,000. At around $10,000 for a reasonably complete setup, the Video Toaster is a veritable bargain.

Fast Forward

Fast also promises to release later this year a new product it calls Video Machine, a PC- or Mac-based desktop video editing and special effects system said to be a "Toaster killer"—a reference to NewTek's popular Video Toaster for the Amiga. Video Machine is expected to retail for $6,000. ∎

RadiusTV
Multimedia TV for Mac

by Graeme Bennett

Product: RadiusTV
From: Radius International (Canada),
416-777-9900
Price: C$2199
Warranty: One year
Summary: Radius TV is a system for integrating television with the Macintosh. Radius TV converts raw television signals into sounds and moving images on your computer's screen.
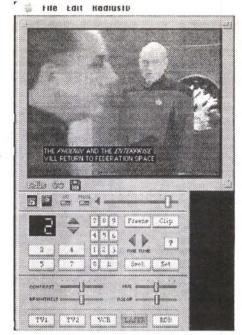
Radius Inc.'s RadiusTV is a system for integrating television with the Macintosh. Like computer-based video display systems for the PC such as TVM's AVA Pro or Fast Electronic GmbH's Screen Machine for PC or Mac, RadiusTV converts raw television signals into sounds and moving images on your computer's screen.

Connect a television antenna, CATV cable, VCR, camcorder, video camera or laser-disc player to RadiusTV, and you can have television in a window on the Macintosh screen, accompanied by a soundtrack on the Mac's speaker.

Radius TV differs from its competitors in a few significant ways. The one that first piqued our curiosity was RadiusTV's ability to decode closed-caption broadcasts and capture the closed-caption transcript to a file! The possibilities for researchers are thought-provoking. Imagine setting up a system that would scour news broadcasts for a topic of interest (up to three keywords may be searched for). Once found, the system can turn on the transcript feature and/or beep to alert you of the event. Also notable is the fact that RadiusTV, unlike the PC-based products, actually digitizes the TV audio signal and passes it through to the Mac's audio speaker.

Multimedia TV
RadiusTV is also a platform for the development of multimedia applications, and Radius makes a programmer's toolkit and documentation available separately at no cost to Apple-certified developers. The kit includes HyperCard external commands (XCMDs) as well as Pascal and C support.

MacroMedia Inc. (formerly MacroMind/Paracomp) has announced support for RadiusTV in its Director software (via Xobjects extensions), and Radius also is working with other companies to develop systems based on the hardware. Currently, EduDisc's Full Mentor software and Authorware's Professional software directly support RadiusTV.

Hardware and Installation
The RadiusTV system comprises a NuBus card (the "video engine"), a large-but-attractive external box called the audio-video input processor (AVIP), various files on a disk and cables for joining the AVIP to the NuBus card. A Macintosh display card and monitor are also required. RadiusTV is designed to work with Radius display systems or with the Radius DirectColor/GX board driving an Apple 13" color monitor.

We tested RadiusTV on a Mac IIfx with 8 megabytes of RAM and a Radius DirectColor/GX card driving an Apple 13-inch color monitor. Installation was straightforward and well-documented in the 108-page user's manual.
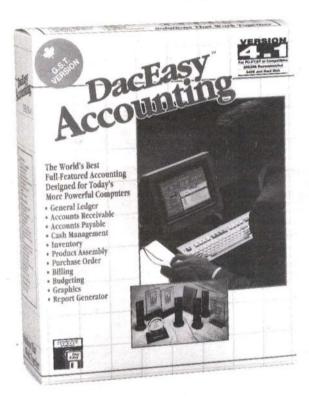
Software
The included image-processing application, Theatrics, is a gimmicky (and fun) special-effects toolbox that can perform many of the same sort of image extrapolations as can Photoshop or Aldus Gallery Effects, including color palette optimization (useful for 8-bit displays), sharpening/softening, edge-tracing, solarization, posterize, tile, mosaic, and emboss effects, plus a dozen others. Several more radical image distortions are available, too, including ones that

Laser printers have finally come of age. They are smaller and cheaper than ever. These days the lowest-priced laser printers sell for around the same price you used to pay for dot matrix printers. Meanwhile, the cost of "consumables" such as toner cartridges—traditionally the biggest operating expense for laser printers—has also fallen dramatically.

Choosing the Right Laser Printer

by *Geof Wheelwright*

Canon LBP-4 Plus

Hewlett-Packard
LaserJet IIIP

One of the consequences of all these events has been that the market for laser printers has broken into a number of distinct market sectors: "small footprint" printers based around the Canon LBP-4 design (and using the Canon LX printer engine) and running at four pages per minute; low-cost HP LaserJet-compatible systems which sell for as little as $1,000; a new range of affordable PostScript systems which sell for less than $2,500; and a growing number of "leading edge" lasers with higher resolution, lots of memory, PostScript Level 2 compatibility and support for TrueType fonts.

Given the increasing likelihood that you may soon want to buy a laser printer, it is worth briefly reviewing the key factors involved in choosing a laser printer—no matter which category you are looking in. To start with, you will want to consider the quality of output.

Printer Resolution

Resolution determines the sharpness of a printed image. For anyone familiar with how screen display resolution is determined, you might call this "addressability"—due to the number of individual picture elements (pixels) that affect resolution. Most laser printers these days offer a resolution of 300 x 300 dots per inch (DPI) —meaning that each square inch of drum surface is made up of 90,000 separate pixels that can be individually addressed by the laser or other light source (such as an LED).

Don't be fooled into thinking that because most printers offer the same resolution, they will offer images equally as sharp. Laser-printer designers seeking better resolution and achieving smoother sloping edges (avoiding what many call "the jaggies') are often limited in what they can do by the memory available to hold the bit map of the image.

Decreasing the size of the dots which make up the image is therefore only part of the solution—but the most effective part. For example, a move from 300 dots per inch to 400 dots per inch gives a 35 per cent improvement in edge smoothness. But a 78 per cent increase in RAM memory is needed to achieve this better definition.

However, the increase from 300 dpi to 400 dpi gives little improvement in image quality except along sloping character edges. The exception to this is in reproduction of scanned halftone pictures, where there is a recognizable improvement.

Font Scaling

The key advantage of using page-description languages such as PostScript and PCL has been the ability to select an appropriate type style and use it in any point size. A number of printer manufacturers—including Apple, Canon, Epson and Hewlett-Packard have recognized this need and offer this facility as part of their built-in font scaling systems.

You would be well advised to get samples of actual pages printed using scalable fonts from any printer you are considering buying. The main issue here is whether or not the font scaling system is supported by your software—as is HP's LaserJet III, Epson's EPL-7000 and Canon's PSL in popular applications such as Microsoft Windows 3.1.

Memory

Most printers do not come with more than the very minimum RAM, as this contributes significantly to the cost of the machine. This abstemious approach means that manufacturers can make a great deal of money selling you RAM add-on kits. A number of the printers in this test, for example, did not have enough RAM to print more than one page of our test document at once. The print buffer became full after being sent the first page of our test document and could not handle the other nine copies of it which we tried to send.

RAM holds a variety of different kinds of information—to start with, the information needed to put a page together. It is generally in the form of a "page bit-map"—which uses around 1 MB of RAM for each page printed at maximum resolution.

Secondly, memory is employed to store down-loadable "soft fonts." These are particularly important on HP LaserJet-compatible printers—which do not come with the same huge selection of fonts (commonly 35 outline fonts) as are provided on PostScript systems.

A Few Examples

To give you a brief idea of just how these criteria can be applied in looking for a laser printer, we offer our comments on a few recent laser-printer launches.

Hewlett-Packard LaserJet IIIP

When HP entered the small-footprint laser-printer market last year with its HP LaserJet IIP, it brought down the cost of laser printing by as much as 40 percent—and reduced by around the same amount the desk space area

Continued from page 25

that most entry-level laser systems take up. But with the huge success of the eight-page-per-minute HP LaserJet III—with its built-in resolution enhancement system—even those enjoying low-cost printing have started demanding the higher print quality offered by the bigger machine.

HP has obliged with the LaserJet IIIP. It has been designed to produce very quick first-page delivery speeds. While there are lots of small-footprint lasers around which emulate HP LaserJet II (and even IIP) systems, they generally use PCL 4 and don't have the resolution enhancement system offered on the LaserJet III.

Not surprisingly, the IIIP offers both these facilities. Resolution enhancement works by taking the mixture of dots which normally make up a 300-dot-per-inch image or character and using a "smoothing" algorithm to adjust the size of those dots so they provide smooth curves and arcs.

Of course, not all is rosy in the HP garden. The paper tray—offering room for only 70 sheets (and that's pushing it)—could be larger, and having it stick out the side of the machine does add to the overall footprint of what is supposed to be a small machine. To be fair, however, HP does offer an optional lower cassette which will hold 250 sheets—although the IIIP will not be such a bargain if you have to buy this.

Overall, however, all the quality you would expect in an HP LaserJet is evident in the design of the IIIP—despite the fact that the price is definitely entry level.

Sharp JX-9500PS

Sharp's natty little JX-9500 is not the newest small-footprint laser on the market, but it is still one of the most elegantly designed and versatile. This PostScript version of the machine offers the full 35 fonts provided by more conventional (and much larger) Canon-based PostScript systems—yet also offers both parallel and serial interfaces, as well as AppleTalk as an option.

Unlike most of the Canon LX-based systems, the Sharp JX-9500 (and lookalike Texas Instruments MicroLaser) features a paper tray underneath the inner workings of the printer, rather than at the side of the machine. The Sharp machine is also fast—rated at 6 pages per minute by the manufacturer.

All in all, however, this is an exceptional printer—despite the fact that the design is starting to grow a little long in the tooth. Only one small detail counts against it in any way. It uses a non-standard engine (i.e., Sharp's own proprietary one) and therefore consumables cannot be as readily purchased at the aggressive prices you might be able to count on when buying toner cartridges for, say, a machine with a Canon engine.

Canon LBP-4 Plus

Despite being the world's leading supplier of laser printer engines, Canon has always been a bit of an "also-ran" when it comes to actually selling complete laser printers to end-users. At the heart of this difficulty has been the company's inability to build-in HP LaserJet emulation as part of the base machine. This has always been understood to be the result of a tacit agreement between Canon and HP (one of Canon's largest customers for laser printer engines) not to compete with one another directly in the LaserJet arena.

To get around this difficulty, Canon has developed its own page description language—known as CaPSL III (Canon Printing System Language III)—which is supposed to provide a halfway house between the rudimentary quality of HP's PCL 4 and Adobe's PostScript. The only problem is that HP has since introduced PCL 5—which makes it a much more direct competitor to PostScript in and of itself.

At any rate, suffice it to say that one of the first things you would have to ensure in

Laser Printers:
Smaller, faster, higher resolution seem to be the order of the day

considering the Canon LBP-4 Plus is that either your package offered support for CaPSL III or that you were willing to spend the extra money needed to buy an emulation package for it. Canon itself lists IBM Proprinter, the Epson FX85, PostScript and HP's earlier LaserJet and LaserJet Plus standards as optional emulation modes.
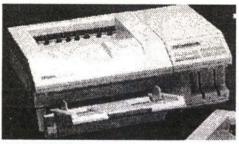
So what's the LBP-4 Plus? It is basically a standard four-page-per-minute small-foot-print laser based on the Canon LX engine—with a few extras thrown in. To start with, it comes with all the basic fonts you would expect (Courier, plus scalable versions of Times and Helvetica in their Swiss and Dutch incarnations), parallel and serial interfaces, plus a 12-month on-site service agreement and a toner cartridge (that's one cartridge, not free cartridges for 12 months).

The LBP-4 Plus is a well-built and cleanly designed alternative to printers conforming to the PostScript and HP LaserJet III standards.

Epson EPL-7500

Epson has had an interesting history in the laser printer market, but with the arrival of the EPL-7500 it is fair to say that the company finally appears to have it all figured out. Gone are the incompatibilities of yesteryear; replacing them is a keen awareness of the importance of both performance and standards.

Epson EPL-7500

The EPL-7500 is driven by a powerful 20 MHz RISC processor, and includes a full-blown version of PostScript with the requisite 35 fonts, 2 MB of RAM—as well as parallel, serial and AppleTalk interfaces. Epson claims that this RISC processor allows the printer to process data about six to eight times faster than a conventional 68000 microprocessor.

The 7500 uses a Minolta print engine rated at 6 pages per minute. Although Minolta is not the world's leading print-engine manufacturer—and we might have been concerned about the use of its print engine in a machine from a smaller company—the buying power and popularity of the Epson name mean that getting consumables for this machine should not be a problem.

If there were any concerns at all about this otherwise excellent PostScript laser, they would only be that it is a little larger than most four-page-per-minute systems—the machines it is priced to sell against—and you'll therefore have to give over just a bit more desk space to make room for it.

Apple Laserwriter IIF

Apple LaserWriter IIf and IIg

Ever since the launch of its first LaserWriter in late 1985, Apple has been at the forefront of developing PostScript-based laser printers suitable for high-end desktop and professional publishing applications. Even today, when a flood of cheap PostScript printers have made the market far more competitive, Apple's "Rolls Royce" LaserWriter range keeps selling.

But last October Apple announced a substantial revamp of its laser printer range—its two most expensive lasers (the LaserWriter II and IINT) were discontinued and replaced by two even higher-specified machines: the LaserWriter IIf and IIg. While based on the same Canon engines as the machines they are replacing, Apple has built a great deal more power and "intelligence" into the new machines.

To start with, both machines use one of the fastest computer processors you are likely to see in a laser printer: the Motorola 68030. In the IIf it runs at 20 MHz and in the top-of-the-line IIg it ramps up to an impressive 25 MHz.

The IIf complements this processing power with 2 MB of RAM (upgradable to 32 MB), along with built-in AppleTalk and RS-232 connectors (the latter being because Apple expects to be able to sell a fair number of these machines to users of IBM-compatible PCs). Despite Apple's involvement in the development of the TrueType/TrueImage alternative to Adobe's PostScript, Apple has chosen to use the latest implementation of PostScript—PostScript Level 2—as its page-description language for both new machines. All TrueType fonts (including the TrueType screen fonts in Apple's System 7 operating system for the Macintosh) are, however, supported on the new machines.

Apple has also felt the need to offer an alternative to HP's enhanced resolution system. Known as FinePrint, it is designed to smooth the jagged edges of printed text. Apple has also developed a system known as PhotoGrade to do the same for photos. It is an option on the IIf, but comes standard on the IIg.

In short, these new Apple printers represent a major evolution of laser printing technology and, if they point the way to the path the rest of the industry will be taking, there are going to be some very nice lasers around soon.

Conclusion

Smaller, faster and with higher resolution seem to be the order of the day. A growing number of manufacturers (Apple, HP and Epson & IBM/Lexmark among them) have seen the value of providing resolution enhancement systems, all manufacturers have dropped their prices and the competition between PCL and PostScript seems keener than ever. It all bodes well for the future and, in the meantime, proves there are real laser-printer bargains to be had here and now. ∎

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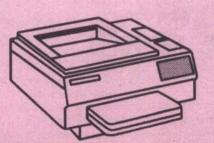
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Legend Plus 14" non-int. VGA monitor 1024x768,.28 dp	$419.00
NEC 3FGx 15" Multi-sync VGA monitor 1024x768,.28 dp	$849.00
NEC 4FG 15" Multi-sync VGA monitor 1024x768,.28 dp, 70Hz	$999.00
IDEK M5217 17" non-int. monitor 1024x768, .28 mm dp, 70Hz	$1169.00

Video Graphics Adaptor

Trident 9000 SVGA adaptor 256K exp.to 512K	$ 55.00
Trident 9000 SVGA adaptor 512K	$ 65.00
Trident 8900 SVGA adaptor 1MB	$99.00
ATI VGAWonder XL adaptor 1MB (OEM)	$179.00
ATI VGAWonder XL adapter 1MB w/ Bus Mouse	$205.00
ATI Graphics Ultra Plus1MB VRAM w/ Mouse	$579.00
ATI Graphics Ultra Plus 1MB VRAM w/ mouse (OEM)	$489.00
ATI Vantage Graphics 1MB VRAM w/ mouse	$385.00
ATI Vantage Graphics 1MB VRAM w/ mouse	$365.00
Cyclone XG S-3 Window Accelerator 1MB	$299.00

Mouse & Scanner

Microsoft Hi-res Bus or Serial Mouse	$105.00
Microsoft Hi-res Bus or Serial Mouse w/ Windows 3.1	$189.00
Logitech serial or bus Mouse Man	$79.00
Logitech serial Mouse Man w/ Windows 3.1	$129.00
Legend 3-button serial mouse (400 dpi)	$25.00
Logitech Scanman 256	$319.00
Prolab 256 Grayscale Hand Scanner w/ OCR Software	$259.00

Floppy & Hard Drive (Bare)

Panasonic 5.25" 1.2MB floppy drive	$69.00
Panasonic 3.5" 1.44MB floppy drive	$65.00
Micro Science 52MB (17 ms) V.C. IDE w/ 32K cache	$265.00
Western Digital 82 MB (17ms) V.C. IDE w/ 64K cache	$349.00
Quantum 105 MB (17ms) V.C. IDE w/ 64K cache	$415.00
Teac 105 MB (19ms) V.C. IDE w/64K cache	$369.00
Maxtor 125 MB (15ms) V.C. IDE w/ 64K cache	$435.00
Quantum Pro 125MB (15ms) V.C. IDE w/256K cache	$469.00
Quantum Pro 240MB (15ms) V.C. IDE w/256K cache	$799.00
Western Digital 212 MB (15ms) V.C. IDE w/ 64K cache	$749.00
All other brands, SCSI and ESDI hard drives please Call.	
(All hard drives have a minimum 2yr warranty.)	

HD/FD Controller

16-bit IDE HD/FD controller	$15.00
16-bit IDE HD/FD controller w/ I/O (2S,1P,1G)	$25.00
16-bit Intelligent IDE HD/FD controller	$49.00
16-bit IDE HD/FD Cache controller w/512K exp. to 8.5MB	$225.00
All other brands and types of controller Please Call.	

Tape Drive

(All Tape Cartridges Sold Seperately)

Colorado DJ-10, 40/120MB capacity	$265.00
Colorado DJ-20, 80/250MB capacity	$349.00
Colorado AB-11 external tape adaptor kit for DJ-10 (2.2MB/min)	$42.00
Colorado FC-10 tape adaptor (4.4MB/min) for DJ20	$109.00
cable for connecting Colorado tape B/U for 2-floppy system	$19.00
Colorado External Kit w/ FC-10 for DJ-20	$195.00
Colorado External Kit w/ AB-10 for DJ-10 & DJ-20	$139.00
Backpack QIC-40 (40/120MB capacity)	$499.00
Backpack QIC-80 (80/240MB capacity)	$589.00
3M DC2120 Tape Cartridge	$27.50
3M DC2000 Tape Cartidge	$20.00

Miscellaneous

AT Multi I/O card (2S, 1P, 1G)	$15.00

Sound Blaster	$145.00
Sound Blaster Professional	$259.00
Gravis Joystick	$39.00
Y-cable for game port	$9.95

Memory Chip & Module

256K Video memory (8pcs 4464-80ns)	$18.00
256K Video memory (2pcs 44256-80ns)	$13.00
512K Video memory (4pcs 44256-80ns)	$26.00
4MB 70ns SIMM	$180.00
4MB 60ns SIMM	$210.00
1MB 70ns SIMM	$42.00
1MB 60ns SIMM	$42.00
256K 70ns SIMM	$59.00

Modem

ATI 9600bps external modemv.42bis w/cable	$459.00
Cardinal (OEM) 2400 baud internal Modem w/ Bitcom	$65.00
Cardinal 2400 baud internal modem w/ Flashlink	$89.00
Cardinal 2400 baud external modem w/ Flashlink & Cable	$135.00
Cardinal 9600 Send/recieve Int. Fax-Modem w/ Bitfax	$99.00
ATI 9600 bps external modem V.42 Bis w/ cable	$459.00
Supra 14,400bps S/R Ext. Fax-Modem v.32bis & v.42bis	$399.00
Zoom 9600 S/R Fax-Modem w/ Winfax 2.0	$159.00

Math Co-proccessor

Intel 80287XL	$115.00
Intel 80387SX-16	$165.00
Intel 80387SX-20	$169.00
Intel 80387-33	$285.00
Cyrix 83S87-16	$127.00
Cyrix 83S87-20	$145.00
Cyrix 83S87-25	$159.00
Cyrix 83D87-25	$199.00
Cyrix 83D87-33	$219.00
Cyrix 83D87-40	$269.00

Keyboard

Tangent Enhanced Keyboard	$39.00
Focus 2001 Enhanced Keyboard	$55.00
Focus 2000 Plus Enhanced Keyboard	$59.00
Focus 5001 Enhanced Keyboard	$115.00
Fujitsu 4700 tactile Enhanced Keyboard	$59.00
Northgate Omnikey 101	$129.00
Northgate Omnikey 102	$129.00
Northgate Omnikey Ultra	$189.00

Computer Case

Desktop Case w/ 200W CSA Power Supply & LED	$99.00
13" Mini Tower Case w/ 200W Power Supply & LED	$89.00
19" Tower Case w/ 200W Power Supply & LED Display	$115.00
25" Tower Case w/ 250W Power Supply & LED Display	$159.00

Dot Matrix Printer

(6ft cable included,2 year Canadian Warranty)

Citizen GSX130 24-pin printer	$339.00
Citizen GSX140 24-pin printer	$339.00
Citizen GSX140 Plus 24-pin printer	$399.00
Citizen GSX130/140 colour kit	$60.00
Epson LQ-570 24-pin printer	$359.00
Fujitsu DL1100 24-pin printer	$345.00
Fujitsu DL1100 24-pin color printer	$399.00
Fujitsu DL1100 or DL1200 color kit	$65.00
Fujitsu DL3450 wide carriage printer	$539.00
Fujitsu DL3450 color kit	$109.00
Raven 9102 9-pin printer	$199.00
Raven 9105 9-pin printer (color upgradable)	$239.00
Raven 2406 24-pin printer (color upgradable)	$339.00
Color Kit for Raven 9105 & 2406	$60.00

Raven 2416 24-pin printer	$295.00
Raven 2418 24-pin printer	$345.00
Raven 2465 24-pin wide carriage printer	$499.00

Laser Printer

(6' cable and toner included, Canadian Warranty)

Hewlett Packard DeskJet 500, 3 PPM, 300 dpi	$539.00
Hewlett Packard Deskjet 500 color, 3 PPM, 300 dpi	$999.00
Hewlett Packard LaserJet IIIP Laser w/ scalablefonts	$1439.00
Hewlett Packard LaserJet III Laser w/ scalable fonts	$2099.00
NEC Silent Writer II Model 95 Post Script 8PPM	**$1869.00**
Jet Ram Memory card w/ 1MB for HP IIP/IIIP/IID/IIID	$99.00
Jet Ram Memory card w/ 2MB	$149.00
Pacific Data 4 Memory for HP LJIIP/IIIP/III/IIID w/ 1 MB	$149.00
Pacific Data 4 Memory for HP LJIIP/IIIP/III/IIID w/ 2 MB	$199.00
Okidata OL400 Laser w/ 512K,4 PPM	$799.00
Raven LP-510 5 PPM, HP II-P compatible	$989.00
Raven LP-530 5 PPM, HP III-P compatible	$1199.0

Software

Accpac Simply Accounting for DOS or Windows	$129.00
Adobe Type Manager v2.0 for Windows	$85.00
Aldus Pagemaker 4.0	$589.00
Borland C++	$419.00
Borland Turbo C++	$86.00
Borland Turbo C++ for Windows	$129.00
Corel Draw 2.0	$469.00
dBase IV 1.1	$649.00
dBase IV 1.5	$649.00
Digital Research DR DOS 6.0	$95.00
Harvard Graphics for Windows	$429.00
Lotus 123 V2.3	$429.00
Lotus 123 V3.1 Plus	$499.00
Lotus 123 for Windows	$499.00
Microsoft DOS v5.0	$85.00
Microsoft Office v2.0 for Windows	$569.00
Microsoft Windows Version 3.1	$119.00
Microsoft Windows Version 3.1 Upgrade	$69.00
Microsoft Word 5.5	$279.00
Microsoft Word for Windows	$375.00
Microsoft Works 2.0	$125.00
Microsoft Works for Windows	$159.00
Microsoft Excel for Windows	$369.00
Norton Utilities V6.01	$139.00
PC-Tools Deluxe Version 7.1	$139.00
Quarterdeck Desqview 386 v2.4	$169.00
Quarterdeck QEMM 386 v6.0	$79.00
WinFax Pro v2.0	$95.00
Word Perfect Version 5.1	$339.00
Word Perfect for Windows	$339.00

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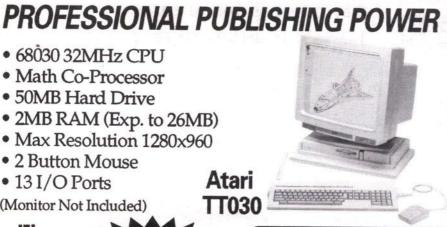
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Printer Engines

Canon engines are used in by far the largest number of laser printers.

By Geof Wheelwright

No matter which laser printer you buy, you are likely to find it using one of only a few different laser printer engine types. Engines basically handle all the mechanical work of taking paper into the printer, transferring text and images onto paper using toner and then transporting the paper back out of the printer again.

Laser printers are not largely about electronics. The electronics of the printer's control panel, memory handling, interfacing, page description languages (PDLs) and font handling are generally supplied by third parties or the manufacturers themselves.

Third parties such as Adobe and Hewlett-Packard license PDLs and font systems such as PostScript and PCL while manufacturers or their OEMs supply the electronics to interface this software with the laser printer engine. And there is no manufacturer with a higher profile in the laser printer engine market than Canon—whose engines are used in printers from the likes of Apple and Hewlett-Packard.

Canon started producing engines back in 1975 and licensed them to Hewlett-Packard, Fujitsu, Hitachi and Oki. But it was the production of the Canon SX—used in the HP LaserJet III and the Apple LaserWriter NT range—that proved the turning point for Canon. Canon claimed that it had three times the life of prior engines, and much improved paper-handling capabilities. The imaging technology behind the Canon SX offered a recommended monthly throughput of 5,000 pages and a speed of 8ppm.

Shortly after that—in an attempt to lower the cost of its engines with a lower print speed and offer a smaller "footprint"—Canon developed another engine: the Canon LX. This engine was again based on a diode laser, used reversal imaging and offered a speed of 4ppm. The first printer to be based on it—the Canon LB4—was launched in October 1989.

One noteworthy competitor to Canon is Ricoh, which has been in the laser printer business since the early 1980s. Among its early customers for print engines were the likes of IBM, HP (pre-LaserJet), GCC Technologies, Mannesmann Tally and Epson. Epson used the engine in its ill-fated GQ3500—one of the company's early entries into the laser printer market.

Unfortunately, the Ricoh engine—at 6ppm—was not as fast as its 8 ppm Canon counterparts and offered a non-standard consumables replacement system. Epson compounded the problem by not bothering to include either PCL or PostScript emulation modes on the machine and thus sales never built to the levels which would have made it a success for Epson or Ricoh.
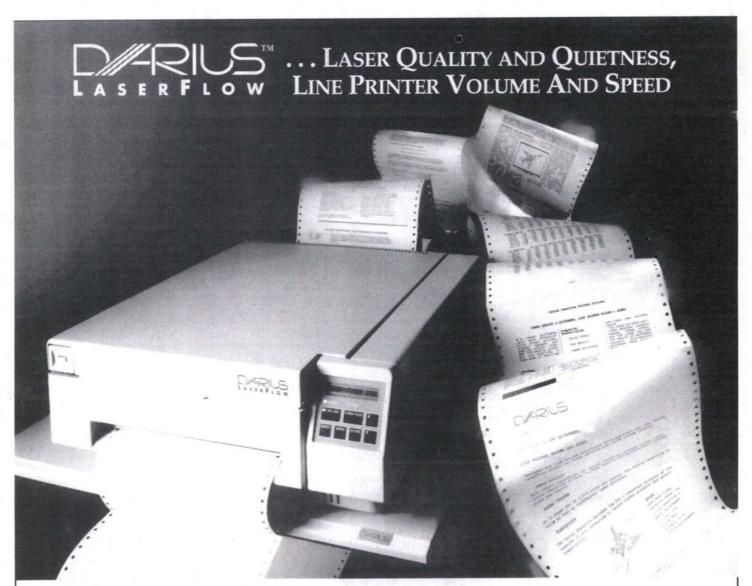
Similar problems dogged the early Ricoh-based IBM laser printer offerings and IBM eventually switched to an engine of its own design for its current range of low-cost lasers.

While Canon and Ricoh have been two of the more intriguing players in the laser printer engine market over the past decade, they are by no means the only ones. Major Japanese firms such as Kyocera, Fuji, Sharp, Fujitsu, Matsushita (the parent company of Panasonic) and Toshiba are all key players, while U.S. office-equipment giant Xerox also keeps a hand in the market.

There is no denying, however, Canon's complete and overall dominance of the laser printer engine market. Canon engines are used in by far the largest number of laser printers sold in both the US and Europe and they have really set the standards for laser printer development worldwide. When Canon went for a self-contained single toner cartridge on its 8-page-per-minute printers, so did the rest of the industry. When Canon reduced the size of its engines (and thus its overall footprint) in the design of the LBP-4, so did HP with the LaserJet IIP and Apple with the Personal LaserWriter range. Where Canon leads, everyone else follows.... ∎

Ink Jet Printers

By Geof Wheelwright

Ink jet printers have come a long way in the past three years—largely thanks to two companies: Hewlett-Packard and Canon. HP started the ball rolling years ago with its small but perfectly formed ThinkJet ink jet printer—an interesting little machine which produced mediocre quality output, but did so quietly and without taking up much desk space.

Over the past three years, the inkjet technology HP pioneered in the ThinkJet has grown up—and products such as the DeskJet, DeskJet 500 and PaintJet are the result. These all use ink jet technology to produce laser-quality output at a very low cost with laser-style control and paper handling.

These printers typically can use the PCL page description language employed by HP's LaserJet range of laser printers, will operate with Bitstream font families and, in general, fulfill the role of a being a poor man's laser. There is a certain irony here, as it is also HP which has by far the largest market share of the laser printer sector.
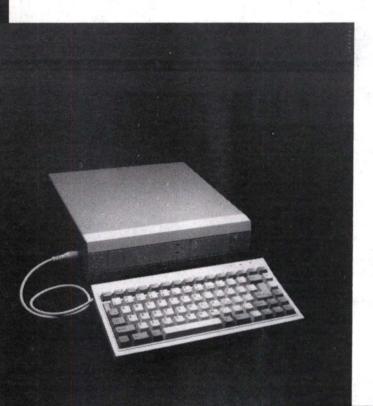
Meanwhile, Canon—also a leading laser printer manufacturer and supplier of all the engines for HP's LaserJet printers—entered the ink jet market last year with its diminutive and portable BJ-10e BubbleJet printer. It weighs only four pounds, takes up little more deskspace than a typical notebook computer and will emulate either an IBM ProPrinter or Canon's own BJ-130e.

The success of this machine recently spurred Canon to announce plans to expand BubbleJet ink jet printer production to up to 300,000 units per month within a year from its current 90,000 units. Canon has concluded a number of OEM (original equipment manufacturer) deals with other computer makers—such as Apple—to produce BubbleJet printers for them. Canon reportedly controls over 70 percent of the world's laser printer market and its major OEM partners for the BubbleJet printers are Brother Industries, Fujitsu, and Apple (which uses this technology in its StyleWriter printer).

Canon is not the only producer of portable ink jet systems. Kodak has for a number of years marketed the Diconix portable ink jet printer and this year announced a 300-dpi, four-pound DeskJet-compatible ink jet model which runs on batteries. Kodak has said that it has already sold more 500,000 of the machines—made for them by Far East manufacturer Chinon.

■

Page Description Languages

By Geof Wheelwright

Laser printers did not become popular merely because they allowed paper to be easily fed a sheet at a time—or because they offered better quality output than the average dot matrix system. The real key to the success of laser printer technology lies in the huge advances which have taken place in the development of page description languages (PDLs).

It is PDLs which have allowed laser printers to produce near-typeset quality output and subsequently sell in huge numbers. In fact, those laser printers which have not provided proper page description languages (such as Epson's original GQ-3500 and Citizen's Overture) were not particularly successful. These manufacturers found out the hard way that the idea of a laser printer is not to emulate a daisywheel or dot matrix system, but to give users complete control over both the text and images to appear on the printed page. And for that you need a proper page description language.

There are two major page description languages: PCL—the Page Control Language developed by Hewlett-Packard for use in its LaserJet range, and PostScript—Adobe's premier PDL for desktop publishing work, with its fine control of font and image scaling. For a number of years, these two page description languages existed happily alongside one another. PCL was the low-cost language licensed by HP to dozens of OEM manufacturers who needed their laser printers to do little more than print in the Courier typeface and handle the odd bit of line drawing, while PostScript devices were left to handle the high-end DTP and professional publishing applications.

In the past two years, however, Adobe has significantly lowered the price of a PostScript license while HP has been consistently adding to the power of PCL. For many jobs, there is now little to choose between a PCL-compatible printer and a PostScript model—both will print graphics, both will handle scalable fonts and both are well-supported by printer drivers in all major applications.

And the developers of both standards have been busy trying to satisfy the high and low ends of the market. At the same time as Adobe, for example, was lowering the cost of PostScript licenses it was busy developing PostScript Level 2—a new, high-end version of PostScript which claims the ability to build raw type characters four to five times faster and vastly improves the readability of small type sizes.

This was partially in response to HP's decision to build scalable versions of the Times and Helvetica font families into its HP LaserJet III machines—along with resolution enhancement technology which largely eliminates the jagged edges you often see in laser-printed graphics. ■

Color Printer Engines

Color printers don't generally use the same print engines as standard black-and-white laser printers. One of the more interesting to come to light in recent days is the thermal transfer printing engine used by Shinko in color offerings such as the OcéColor printer. It requires three elements: a thermal print head, an ink sheet, and paper or transparent film.

The thermal print head consists of individually addressable styli that correspond to a single pixel on each raster line. The ink sheet features an ink coating on one side. When the ink sheet is heated from behind by the thermal print head, the ink melts and is transferred to the paper or film. The paper has no chemical coating, although it is altered to create a smooth finish.

To function with the color printer, the ink sheet is made up of different panels where each section is coated with a single color. For a three-color ink sheet, there are three sections: cyan, magenta, yellow. Each color on the ink sheet is used to render the color separations generated by the internal PostScript interpreter. These three separations are combined on a page to produce the final color image. The ink sheet must maintain uniform contact with the paper or transparent film during the heating process to ensure that the ink is uniformly transferred. The paper must be accurately positioned for each pass over the thermal print head to ensure correct alignment of the color separations. The alignment is known as registration. Halftoning techniques used by OcéColor are supposed to ensure that registration and paper stretching problems are minimized.

To obtain a full-color image, the ink sheet is advanced to the first color section of the ink sheet roll. The complete information for that color separation is then printed for the entire page. Then, the ink sheet is advanced to the next color, and the paper is backed up. New color information is then printed over the entire page.

This process continues for a total of one, three, or four times depending on the number of colors on the installed ink sheet roll. When using a three-color ink sheet roll, black is printed by overlaying all three colors, which in general produces impressive quality black. With a four-color ink sheet roll, the range of darker colors is extended in the CMY(K) color palette and excess ink buildup is minimized. ∎

HP Intros New PaintJet XL300 Color Ink Jet Printer

SINGAPORE, MAY 7 (NB)—Hewlett-Packard has released a new plain-paper color printer for the business office. The HP PaintJet XL300 with HP's color implementation of PCL 5C printer language carries a list price of C\$4,332.

The printer produces 300 dots-per-inch (dpi) resolution on a variety of media types and sizes and features automatic input/output switching for simultaneous connection to PC, Macintosh, and networked environments. Options include an Adobe PostScript Level 2 upgrade kit and HP Jet-direct cards. It also supports automatic language switching between PCL 5C and PostScript. PostScript users can purchase the PostScript version (listed at C\$6,265) or a user-installable PostScript upgrade.

The printer enables business, as well as creative and technical professionals, to bring color printing capabilities in-house for presentation of graphics, spreadsheets, color proofing, desktop publishing, computer-aided design, and project scheduling.

As the HP PaintJet XL300 printers are the first color printers compatible with the HP LaserJet III family of printers, they provide a transition to color printing for business users who currently use the latter.

HP PaintJet family printers use HP-developed ink jet technology that creates text and graphics by laying fine ink droplets on the page. HP claims to have shipped more than four million ink jet printers since 1984, more than all other ink jet manufacturers combined.

The printer is horizontal with brick-like angles—rather like an earlier model of a Sharp portable stereo music system extended by speakers on both sides. "It must be an engineer's (technical) design," quipped a press wag at a pre-release demo held during HP's annual Asia Pacific Press Symposium on Peripherals Technologies held at Singapore early April.

HP's marketing presentations held forth on their strategies to "make electronic color pervasive" and on how "HP will take color hardcopy from an important specialty niche to an essential part of everyday printing" through its ink jet technology, because "color is persuasive." ∎

Contact: Hewlett-Packard Canada Ltd., 6877 Goreway Drive, Mississauga, ON L4V 1M8 (416) 678-9430.

Kansai Introduces Printer Sharing Solutions

Kansai Electric has introduced a new series of ultra-high-speed printer buffers which allow multiple users to share printers and plotters. Designed to optimize the output efficiency of personal computer and workstation environments, the EDB-30, EDB-40 and EDB-50 can be configured in a variety of ways depending on users' needs.

Each of the buffers features Dynamic Memory Access (DMA) architecture on all input and output ports, enabling them to achieve buffering throughput of up to 300 Kbytes per second, which is about 30 times faster than any buffer on the market today.

The EDB series printer buffers also offer printer sharing capabilities through multiple, configurable input and output parallel ports. The EDB-30 offers three ports, which can be configured as a maximum of two input ports and one output port. The EDB-40 offers four ports which can be configured as either three input ports and one output port, or two input ports and two output ports. The EDB-50 offers five ports for a maximum of four input ports and one output port or three input ports and two output ports. Other configurations are possible.
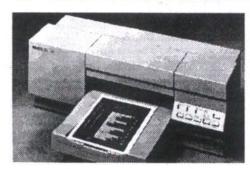
Kansai also offers the option to connect the EDB buffer to output devices which require serial interfaces, such as some plotters.

The EDB buffers come standard with 1MB of memory and three standard SIMM sockets which can each accept memory modules in 1MB and 4MB increments. The EDB buffer's memory can be expanded by as little as 1MB and a maximum of 121MBs.

The EDB-30 is priced at US\$1,200, the EDB-40 at \$1,500 and the EDB-50 at \$1,700.

Contact: Kansai Electric, 800-733-3374 or 408-377-7062.

User Service Tips for Laser Printers

by Christopher Small

Most laser printers are very reliable machines requiring minimal maintenance, however there are some things that you the operator (or your in-house service tech), can do to keep the machine in optimum working condition and minimize service calls. There are many laser printer engines on the market today with just as many different service specifications; so rather than offer a generic article that could not be specific, I have chosen to focus on the most widely used engine in the world—the Canon SX. Approximately 75% of all laser printers use a Canon engine, and the SX engine is by far the dominant one. In fact, Hewlett-Packard claims that its

LaserJet II is the world's most popular laser printer (and they don't even make it any more, having replaced it with the improved LaserJet III). Some of the printers that employ the eight-page-per-minute Canon SX engine are: Apple LaserWriter II series, Hewlett-Packard LaserJet series II and III, QMS 800 series, Brother HL-8 series, Canon LBP 8 series and many more. All laser printers will have similar features, so this article will still have some useful information for everybody. However, if your printer does not use the Canon SX engine, I would strongly encourage you to study your operator's manual and/or even better (funds permitting) obtain a service contract for your equipment.

There are seven main areas in your laser printer that should receive attention from the operator. They are:

1. Registration Assembly/Transfer Guide
2. Transfer Corona Assembly
3. Feed Guide Assembly
4. Fusing Assembly
5. Beam to Drum Mirror
6. Primary Corona
7. Ozone Filter

If these names look like they came out of a service technician's manual... that's because they did. Don't worry, though. I'll explain each one so that you will know where to find them in your SX printer, what their purpose is, and how to clean and maintain them properly. Always, make sure that you turn the printer off before attempting to clean it.

1. Registration Assembly

Open your printer (by depressing the top cover release button) and gently push the hinged top cover back until it is at a 90-degree angle to the rest of the printer. Now look straight down inside the body from the front. You should see a lime-green handle-like piece in the middle of an assembly that contains a silver roller and a black rubber roller. This is the transfer area where the paper is registered so that the print will be even on the page. The flat silver strip is the transfer guide. Since paper passes through the rollers and under the transfer guide, they need to be cleaned. Use a damp cloth to wipe them (water should be sufficient). Be sure to lift up the green handle and wipe the backside of it also. If you have a vacuum handy it will prove to be very effective for lifting off dust, toner and paper particles before wiping. As an aside note: "laser paper" leaves far less paper dust (which is abrasive and will cause excessive wear after a higher page count) and produces a slightly sharper image.

2. Transfer Corona Assembly

Right after the transfer guide you will notice a long narrow recessed box with diagonal monofilament lines on top of it. This is the transfer corona assembly. As the page passes over it the corona wire—a hair-thin, conductive wire found inside the assembly—releases an electric charge onto the page that is stronger than the charge on the photoconductive drum, which at this point is carrying the printed message. This stronger charge attracts the toner off of the drum and onto the page. The corona wire does not actually come into physical contact with the page, just the electrical charge from the wire does. Therefore it is very important that the transfer corona assembly be kept clean and free of anything that may reduce the amount of charge onto the page. The wire itself must be clean, but so should the inner walls of the assembly... as they reflect the charge and focus it towards the page.

Carefully wipe the corona wire and the inner walls with a Q-tip. You will find one attached to the fuser cleaning wand that comes with your toner cartridge. Wetting the Q-tip with isopropyl alcohol will greatly help to remove the built-up toner and dirt. With the brush end of the green cleaning brush, found in the printer beside the feed guide assembly, wipe the static teeth. They are the sharp metal jags found in a row on the far side of the transfer corona assembly. Their function is to remove enough static charge left on the page to prevent it from wrapping around the photoelectric drum.
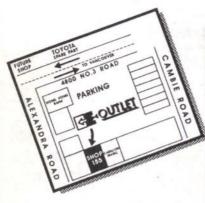
3. Feed Guide Assembly

Following the corona assembly, toward the back of the printer, you will find a black, rounded, almost-flat ribbed piece that ends at the fuser assembly. The feed guide assembly, as the name suggests, guides the printed page to the fuser assembly without disturbing the unfused toner now clinging

to the page. Dirt and toner accumulations on the feed guide or its rollers can become fused to the back of the page. To clean, simply wipe it with a damp cloth.

4. Fusing Assembly

The fusing assembly is a large, rectangular-shaped unit with a green felt-covered top door. It sits inside at the back of the laser printer. **Make certain that the fusing unit has had a chance to cool down (at least 10 minutes) before handling.** Within the fusing assembly are two rollers. The upper roller is a hollow tube that is coated with teflon on the outside; this is to prevent toner from sticking to it (just like your frying pan). Inside the upper roller is a heat lamp that is regulated by a thermistor and a thermoprotector. These two sensors ride on the upper roller at the front end and are actually in physical contact with it. They often are the culprits for scratches and eventual tearing of the teflon coating.

A little trick that I use to clean them, when I'm not actually disassembling the unit, is to take a clean sheet of paper and carefully push it down from the top along the upper roller (front side) and between the sensors and the roller. Ensure that the paper is flat, not wrinkled, and move it around so as to rub against these sensors. When you pull the paper out, examine how much dirt is on it. If there appears to be a lot, repeat this process.

The other culprits for scratches are the four separation pawls, or claws. They can be located by pushing the back hinged section open, toward the back of the printer. These claws ride along the roller and guide the paper out to the exit rollers. Dirt and toner accumulations tend to build up on the end of the claws, because of the heat from the fuser, and can dig into the roller. Clean them with your damp cloth. You should be cleaning the upper roller every time that you change the EP-S cartridge.

The fuser cleaning wand has a felt tip on one end of the wand. Place this tip on the teflon roller and stroke it back and forth a couple of times. This not only cleans the roller, but oils present in the felt tip lubricate the roller too.

5. Beam to Drum Mirror

Remove the EP-S cartridge from the top cover assembly. Near the top of the cover you will notice a black metal assembly with a long, narrow, rectangular window. This is the mirror shutter. Carefully grasp it and move it to the right and upward. Behind the shutter you can now see the mirror. This polished mirror reflects the laser beam from the laser scanner assembly to the photoelectric drum. Unless there is condensation, smoke, fingerprints or some other accumulations, do not touch or mar the mirror in any way. It may be carefully wiped with a clean lint-free wipe, dampened only with a fluid approved for a camera lens.

6. Primary Corona

The primary corona (in the EP-S cartridge) conditions the photoelectric drum by applying a uniform negative charge across the surface of the drum. Hold the cartridge in one hand and notice two long shutters on the top side of the cartridge. Between the two shutters you will see a long black soft plastic flap. The primary corona wire is just underneath this flap. Take the green cleaning brush, found in the printer beside the transfer guide, and insert the felt end through the flap. Slide the brush back and forth a few times to clean the corona wire. **Be careful not to break the wire.** If you have ever seen a 1/4" thick black streak running down the right side of your page (referred to as Right Side Streak, or RSS), this is caused by a weakness in the primary corona attracting excess toner onto itself which interferes with the negative charge. Now here is a plug for recharging your toner cartridges: when your cartridge is recharged the technician inserts a magnetic strip that eliminates this problem (if your recharger doesn't do this, find another one).

7. Ozone Filter

The ozone filter is found in the housing on the right side near the back, just before the fan. It is contained in a black plastic case with a pull-latch door. Just pull the top tab with a finger or fingernail. The door should flip down, exposing a clear plastic tab that is attached to a black foam-wrapped filter. Pull it out. Note: if your laser printer was manufactured prior to 1989, the ozone filter will not be accessible without removing the main body cover. Call a qualified technician! Ozone gas is generated during the printing process and must be filtered through carbon before entering your breathing space (it can be toxic and in high concentrations can cause things like headaches, nausea, coughing, chest pain, and even premature aging of the skin) The Hewlett-Packard service technician's manual recommends replacement every 50,000 pages under normal operating conditions. The following conditions may necessitate changing the ozone filter more often:

- multiple laser printers and/or copiers in a confined area
- a very dusty operating environment
- printer exhaust port directed at the face of personnel
- poor room ventilation
- persons with asthma or bronchial problems working in same area
- extremely low relative humidity
- Long continuous printing combined with any of the above.

In addition to health concerns, you should be aware that excess ozone trapped in the printer (from not changing the filter) can break down the delicate photoactive layers on the OPC drum in the EP-S cartridge, resulting in blurred images. It is a good idea to vacuum the filter when you clean the rest of the printer, but cleaning should not be done instead of replacement. A clean filter can still be worn out! Ozone filters may be purchased from most toner cartridge suppliers or service companies.

There are two types of replacement ozone filters available. The OEM type, manufactured by Canon, which is what was shipped with the printer when it was purchased. They have a honeycomb-like look with straight-through air flow. The alternative is what looks like a square foam impregnated

The Ultimate View through More Windows

T560i

You've been searching for the ultimate view through Windows, but find yourself disappointed by what the market has to offer. Now with NANAO's new 17-inch **FLEXSCAN T560i** and **F550i**, you have everything you wished for. **More Windows** for a greater edge-to-edge view area—55% more than a 14-inch. **Flicker-free 1280 x 1024** ultra-high resolution. **Small-yet-readable** text characters—even in the corners. **The brightest pictures** with **the least reflection** achieved through NANAO-designed anti-reflection technologies. And compliance with the world's **toughest radiation emission standards**—the Swedish MPRII and TCO*. Whether you choose the **Trinitron-tube T560i** or the **Flat-Square F550i**, you'll agree with the experts - the ultimate view through more Windows is with NANAO.

F550i

1991 **BYTE** AWARD OF DISTINCTION

1992 **W 100** WINDOWS MAGAZINE ANNUAL WIN AWARD

Distributed in Canada by **STD**
1-604-278-2893

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P R O D U C T   R E V I E W
Accel-a-Writer

by Graeme Bennett

Product: Accel-a-Writer LaserWriter Upgrade board
From: Xante Corporation, 1-800-926-8839; Distributed in Canada by Mike Watson & Associates Ltd., 604-925-1141
Price: C$1567 and up
Summary: Upgrade provides PostScript, PCL4, AppleTalk, SCSI and improved speed and resolution to a variety of printers.

Figure 1. 600-dpi output from Accel-a-Writer (PhoenixPage).

D*id you know that is possible to upgrade an old LaserWriter to a printer that's faster and has higher resolution? You could buy one of Apple's upgrades, such as the one that soups up a IINT to a IINTX. Another possibility is the Accel-a-Writer LaserWriter Upgrade, manufactured by Xante Corporation. The Accel-a-Writer is a LaserWriter upgrade board that has a RISC chip on it that promises a four to 20 times performance increase over Motorola 68020- and 68000-based printers. and PostScript compatibility at up to four times the resolution.*

At $1429 list ($1278 street), the Personal LaserWriter LS is Apple's lowest-cost laser printer, including neither AppleTalk network connectors nor PostScript capabilities—both features added by the Accel-a-Writer upgrade.

Several memory configurations and models for various LaserWriters are available, at prices ranging from C$1567 (for a 300 x 300 model that can be fully upgraded to 600 dpi later) to C$3261 (for a 600 x 600 model with 16MB RAM). It is also possible to upgrade a Hewlett-Packard LaserJet II, IIp, III or IIIp, although the flash ROM option (mentioned below) is not available on the IIp and IIIp printers.

Boards shipping since mid-March are the only ones that can accept a new flash ROM option.

Figure 2. 300-dpi output from QMS PS-2200 (Adobe PostScript).

Flash ROM is a type of electrically reprogrammable memory (so, in effect, it's not really ROM at all) that acts like ROM in that it holds its programming when the computer is powered off. (See Newsbytes, this issue, for details on Microsoft's new support for Intel's flash chips—*Ed*.)

A half-meg of flash ROM costs C$121 at the time of purchase, or twice the price if ordered later. A one meg flash ROM configuration is C$242, or C$363 if ordered later. Clearly, it is a better value to purchase it up front.

Installation
The particular unit tested by *The Computer Paper* was called the Accel-a-Writer IX, and is specifically for the LaserWriter LS. It had 12MB of RAM and 1MB of flash ROM and would retail for $3018 ($2776 without the flash ROM). Physically, it is a 13.5" x 15" x 2" metal box with the same footprint and color as the LaserWriter. It plugs in easily and requires little time and virtually no technical prowess to set up. Other models, such as those for the IINT and LaserWriter

Plus, are internal upgrade boards, but even so, are very easy to install, with just a few plugs. These internal boards just snap in and out. Xante gives you the few tools you need, plus instructions that lead you by the hand.

If you make it a habit to never go "under the hood" of your computer equipment, it shouldn't be difficult to find a Mac dealer or user club member to help you install it in your printer. Believe me, it's easy. The company includes a video tape showing you how to do it, an antistatic wrist band—even a screwdriver.

Improved Speed and Resolution
Reports on CompuServe from users who have had an Accel-a-Writer installed in their LaserWriters indicate that they are generally quite pleased with the upgrade. What does the Accel-a-Writer do for them? One benefit is speed—a result of the unit's AMD 29000 RISC processor. One user with a LaserWriter Plus reported that a two-page PageMaker document with eight downloaded fonts and three TIFF images on the

front and six on the back used to take over 11 minutes to print. With the Accel-a-Writer upgrade with 6MB of RAM (the Accel-a-Writer accepts up to 16MB of RAM), it takes just over two minutes to print—at four times the resolution!

Another benefit of the upgrade is improved halftone quality. Xante claims that it is possible to produce 197 gray levels instead of the 25 obtained with 300 dpi at an equivalent 60-line screen. This is, according to the company, the equivalent of 850-dpi gray scales provided by the Accel-a-Writer board. Indeed, the output from it looks great (see Figures 1 and 2 for a comparison of unenhanced 300-dpi output and Accel-A-Writer's 600-dpi print).

Advanced Memory

According to Xante's Verne Royster, an 8.5-by 11-inch page takes 6 MB of memory to image at the unit's 600-dpi resolution. The unit increases the amount of addressable dots per inch from 90,000 to 360,000. Royster claims the 8MB board is the most popular one, for two reasons: unlike the 6MB version, you do not have to discard low-density RAM when you upgrade an 8MB model to 12 or 16 megabytes. Most importantly, the 8MB (or greater) configurations allow you to use the extra RAM as virtual memory (practically a necessity for complex pages) or a font cache, where downloaded fonts are made temporarily resident, greatly speeding up printing. The latest boards have an option for flash ROM, which means that you can now download fonts to the printer and have them stay there when the printer is turned off. When a new font that is not resident in the flash ROM is used, it is downloaded to the flash ROM and the least-used common font is flushed and replaced.

A SCSI port for connecting a font storage hard disk is also standard. All models except the LaserWriter Plus upgrade also include a parallel port.

Another great feature of the Accel-a-Writer is its ability to support simultaneous printing from a PC and a Mac through AppleTalk, serial and Centronics parallel ports, without switching or extra hookups. This could be a boon to an office hoping to share a LaserWriter between two or three machines.

Few Hassles

We found that the unit was not compatible with Adobe's SmartArt. This is not a flaw of the Accel-a-Writer, but rather a dubious "feature" of SmartArt that expects to find a 680x0-series microprocessor in the printer, not the Accel-a-Writer's RISC processor.

A "Read Me" file on the Mac utilities disk (the Accel-a-Writer ships with both Mac and PC utility disks) describes a conflict between SuperLaserSpool and PageMaker that it claims will be resolved in the next version of the print spooler. PostScript Level 1 compatibility appears to be excellent—the best we've seen from a clone.

The company's upgrade policy is admirable. Xante promises that future revisions of the printer's EPROMs will be made available at no charge to anyone who requests them. Owners of older models of Accel-A-Writers can thus obtain the current EPROMs that support the new virtual memory and (optional, extra-charge) flash ROM features. The only other problem we had was an inability to print using the older Apple LaserWriter 7.0 driver (which Apple has acknowledged having some problems with). We had no difficulties once we upgraded to the newest 7.1.1 driver (included on Apple's System 7 Tune Up 1.1.1 disk).

Some users on CompuServe have reported occasional problems with manual printing, although we had no such difficulties in our tests. Users of the 6MB version report some PostScript "Limit Check" errors when printing multiple pages with scanned TIFF images, claiming error messages if the TIFF file is somewhere after the first page, yet the page would print okay when it was first in line.

Apparently, the new EPROMs' virtual memory support solves this problem. We did not experience any memory-related difficulties on our review unit.

Conclusion

The troubles noted above are extremely minor, and may be easily worked around. We would recommend an 8MB model (with 1MB flash ROM if you can afford it) over the 6MB one, in order to take advantage of the virtual memory and font-caching opportunities it presents.

Xante's technical support is excellent, and the Mobile, Alabama-based company's toll-free number is accessible from Canada. The Accel-a-Writer has far better print quality than the standard LaserWriter and will cost you less than a new printer. ∎

Thanks to Infomax Computers (604-688-0696) for the loan of the LaserWriter LS used in this review.

P R O D U C T   R E V I E W

Star Micronics NX-2430 Printer

Product: Star Micronics NX-2430 Printer
From: Star Micronics America, Inc.,
Phone 800-447-4700 or 212-986-6770. Distributed in Canada by Beamscope, 1-800-268-5535
Price: US$399 (list)
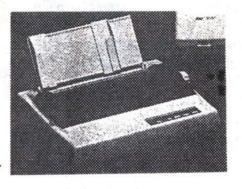
Rating: 4 on a scale 1=lowest to 4=highest
Reviewed for Newsbytes by:
John McCormick
Summary: An excellent example of a low- to mid-range 24-pin dot-matrix printer with lots of built-in features.

Have you ever had software stubbornly keep resetting your printer? Here's how the NX-2430 eliminates that problem....

The Star NX-2430 dot matrix printer is the latest member of the Star Micronix printer line and shows, if nothing else, that the 24-pin dot matrix printer is far from dead, even with today's sub-$1,000 laser printers.

A great many business applications require the dot matrix or even daisy wheel printer's form-feed capabilities, making it common to have or at least need both an impact and laser printer in the same office (including home offices).

For non-business users, the dot matrix printer can meet most needs, but the low-end DM printer is popular even in larger offices because with the ubiquitous laser printer available for "quality" printing, there is less need for a high-end daisy wheel printer.

The number of fonts and character sizes available on this dot matrix printer surpasses the capabilities of low-end lasers, and the cost per page is less since you need only feed this printer new ribbons, not toner cartridges and drums.

Something you might never have thought about is the power question. Laser printers draw a lot of power just sitting there idling, enough that I have seen networks brought down by the combined power surges of several laser printers. This isn't a common problem, but it does point out that new technologies are not without the potential for exciting new problems.

Unpacking and setup of the NX-2430 took less than five minutes, although admittedly I am an expert at that sort of thing.

Continuous fanfold paper can be run over the back or up from the bottom, or you can insert single pages of typing paper for those high-quality letters.

A serial port is optional but the evaluation unit came with the standard Centronics parallel port which, along with everything but the power cord, is located toward the front of the printer, on the right side instead of the back panel.

Operator controls are found on the front of the printer, with status indicator lights and a complex LCD readout.

The NX-2430 is about as small as a continuous-form printer can get, weighing 14 pounds and measuring only 17 by 13 by 6 inches.

Included in the printer's non-volatile memory are two draft- and nine letter-quality fonts: draft, high-speed draft, Roman, Roman Proportional, Sanserif, Sanserif Proportional, Courier, Courier Proportional, Prestige, Prestige Proportional, and Script.

Print sizes include Pica (10 characters per inch), elite (12 cpi), semi-condensed (15 cpi), condensed pica (17.1 cpi), condensed elite (20 cpi), super-condensed (24 dpi), and proportional spaced print with its variable cpi count.

Maximum print speed is rated as being 240 characters per second using semi-condensed size at draft quality, but the printer will crank out even large pica in high-speed draft quality at a shade over 200 cps.

Epson and IBM printer commands and character sets are supported.

ANO VATION

Computer Paper Edition   *JUNE 1992*

Hot New Product!

NEW ZENITH NOTEBOOK TOP OF CLASS

Zenith Data Systems (ZDS) captured the BYTE magazine's **Best of Show** at COMDEX/Spring and Windows World shows for its Z-Note series of notebooks. The product provides a breakthrough for notebooks by incorporating network capabilities, high performance and features plus low price. Some of the series of notebooks had active matrix colour as well. The notebook was also selected by BYTE editors as **Best System,** indicating a trend from desktops to notebooks as the personal computer of the 90's.

The new Z-Note professional notebook series expands the portable computing horizons as never before. The Z-Note is the first notebook family to incorporate Intel i386 SL technology, upgradeability, and integrated LAN connectivity, all in a sophisticated new ergonomic design.

The Z-Note models are built around Intel's energy saving i386 SL microprocessor, the first designed specifically for notebook PCs. ZDS is the industry leader in i386 SL technology, having co-developed the specification for this highly power-efficient chip with Intel. The Z-Note series marks ZDS' third generation of i386 SL-based products.
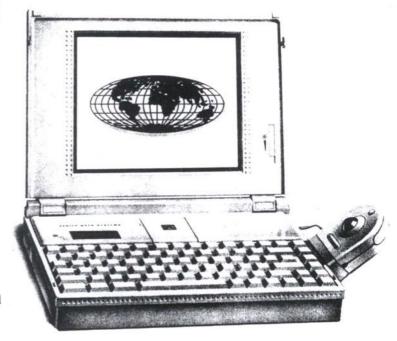
All Z-Note models come Operator-Ready, with MS-DOS 5.0 and Windows 3.1 factory installed on the hard drive. In addition, the Z-Note comes with a Logitech Trackman Portable Mouse, with cursor enhancements, to assure an easy-to-use, easy-to-learn, notebook.

The 5.9-pound notebook computer uses the exclusive "Premier Power Management System" - introduced a year ago when ZDS announced the first computer to use the i386 SL chip. This power saving system is enhanced in the Z-Note series with a new Lid Rest mode which allows work in progress to be maintained simply by closing the lid. The next time the lid is open, work proceeds as if there had been no interruption. The rest/resume feature extends the maximum battery life to 10 hours.

The Z-Note's marriage of notebook computing and networking is a union of two of the hottest trends in the market today. These four new notebooks have a built-in, ZDS-developed, high-speed communications port that's Ethernet compatible. Additionally, Z-Note comes with factory-installed client shells for the leading network operating systems (Microsoft Lan Manager, Novell Netware, Banyan VINES).

With the introduction of the Z-Note family, ZDS is also introducing its proprietary READYDESK port replicator. This optional device provides a streamlined interface to office peripherals. This approach to "plug-and-play" is available at a fraction of the cost or size of a traditional docking station.

The Z-Note series offers a choice of two i386 SL processing speeds. The Z-Note 320L utilizes a 20MHz i386 SL microprocessor switchable to 5MHz or 0Mhz. The Z-Note 325L and 325Lc use a 25MHz microprocessor adjustable to 6.25MHz or)MHz. The performance of the 325 models is furhter enhanced with 64K of cached memory, supported directly from the i386 SL chip.

Both Z-Note platforms provide support for an optional 80387SX numeric math coprocessor which offloads large calculations from the main processor. The user can install a coprocessor without any tools and boost overall system performance for math-intensive applications.

Product obsolescence is a real concern for today's notebook computer purchaser. The Z-Note protects the investment by anticipating future requirements. The Z-Note computers can be expanded by installing additional data storage, adding a breathtaking 256 colour display or by updating the bios which is stored in Intel FLASH memory.

The Z-Note family offers a choice of three levels of standard 2.5" hard disk storage, 60MB, 85MB, and 120MB (the greatest capacity available in a notebook design). All models of Z-Note come with a 1.44MB 3.5" floppy drive which can be upgraded to a 2.88MB platform, thus doubling removable storage capacity.

Z-Note's new VGA edgelit screen provides high quality black-on-white display of text and graphical data. Both 320L and 325L models can be upgraded to an active-matrix VGA monitor which displays up to 256 colours.

Zenith Data Systems was the first to offer BIOS stored in Intel FLASH memory. The availability of this feature on all Z-Note computers means that they can be updated periodically to extend their performance, compatibility and functionality over time.

The Z-Note sets new standards of excellence in the Notebook computer arena. and Zenith continues to lead the pack in pioneering the way we look at Personal Computing.

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Business Class Series II
Enterprise II 33/50 MHz EISA Cache Systems

The ANO Engineers built a dreadnought. The ANO 486 EISA systems are the fastest and most powerful members of the new Business Class Series II computer line. The EISA system follows the ANO design integrity of providing the very best technology for stable platform designs: AMI 33MHz and 50MHz 486 EISA motherboards, Intel 486 CPU, AMI Hi-Flex Bios, AMI ECU, up to 6MB of RAM, 128K cache internal, 128K cache external, Canon Dual Floppy Drive, optional AMI FastDisk SCSI Cache Controller, optional Intel Double Clock CPU, and optional AMI Fast view EISA SVGA Colour Adapter. The system is fully compatible with DOS, Windows, Novell Netware, Banyan Vines, Unix, Xenix, and OS/2 beta v.2.0. The 486 EISA system is a no-nonsense platform designed specifically for high perform-ance multitasking and multiuser environments.

SERIES II PROVEN PERFORMER

intel inside

486 INTEL Double Clock Processing Support

Package Configuration

486 DXE/33MHz INTEL CPU
Business Class Desktop Case
4MB Ram
1.2MB & 1.44MB Dual Drive
105MB Hard Drive
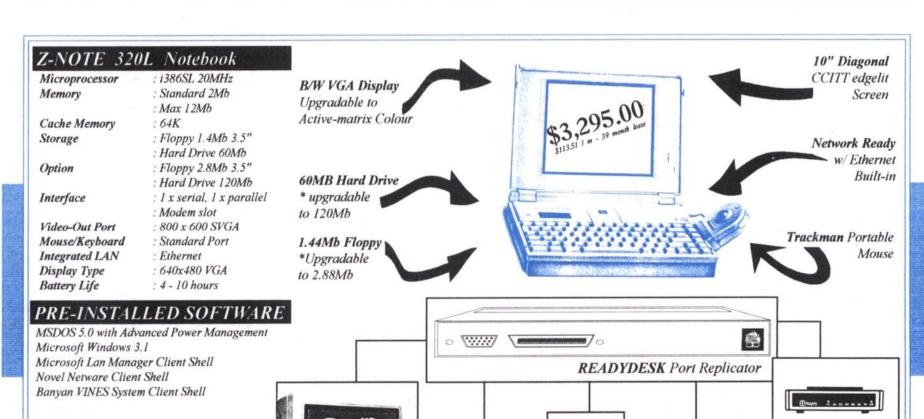16-Bit VGA Adapter w/ 512K
14" SuperVGA Monitor (.28)
101 Key Enhanced Keyboard

Warranty:
2 Years Parts & 2 Years Labour

$3,395.00
$116.96 / m - 39 Month Lease

QUALITY VALUE SERVICE
Best
Business Class

Specifications:

Processor	Intel 80486 EISA	Co-processor	80496 Internal FPU
Clock Speed	33MHz		Intel Double Clock CPU
Main Memory	Max. on Board 32MB	Floppy Interface	Intel 82077 Controller
	Max. supported 96MB	BIOS	AMi 486 EISA BIOS
	Mem. Speed/Type 70ns/SIMMS		Diagnostics, HD Preparation
	Configuration 4/8/12/16/20/24/32		Memory Size Detect
	36/48/60/64/72/80/84/96 MB		PS/2 Mouse Support
Cache Memory	Internal 8K (128K for 50MHz)		EGA/VGA Shadow
	External 128K	EISA Slots	(7) 32-bit EISA Slots
	Direct Mapped. Write Through, One Level		Burst Capability
	Write Buffer, Zero Wait State		AMI Eisa Configuration Utility
		ISA Slots	(1) 32/8-bit Memory Slot

Z-NOTE 320L Notebook

Microprocessor	: i386SL 20MHz
Memory	: Standard 2Mb
	: Max 12Mb
Cache Memory	: 64K
Storage	: Floppy 1.4Mb 3.5"
	: Hard Drive 60Mb
Option	: Floppy 2.8Mb 3.5"
	: Hard Drive 120Mb
Interface	: 1 x serial, 1 x parallel
	: Modem slot
Video-Out Port	: 800 x 600 SVGA
Mouse/Keyboard	: Standard Port
Integrated LAN	: Ethernet
Display Type	: 640x480 VGA
Battery Life	: 4 - 10 hours

PRE-INSTALLED SOFTWARE

MSDOS 5.0 with Advanced Power Management
Microsoft Windows 3.1
Microsoft Lan Manager Client Shell
Novel Netware Client Shell
Banyan VINES System Client Shell

OPTIONS AND UPGRADES:

2Mb and 8Mb memory modules
2.88Mb Floppy upgrade
120Mb Hard Disk upgrade
Active-matrix Colour Display upgrade
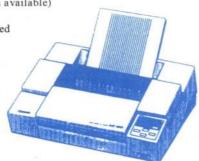Twisted pair and Thin Ethernet Lan Adapters

READYDESK port replicator

B/W VGA Display
Upgradable to Active-matrix Colour

60MB Hard Drive
* upgradable to 120Mb

1.44Mb Floppy
*Upgradable to 2.88Mb

$3,295.00
$113.51 / m - 39 month lease

10" Diagonal
CCITT edgelit
Screen

Network Ready
w/ Ethernet
Built-in

Trackman Portable
Mouse

READYDESK Port Replicator
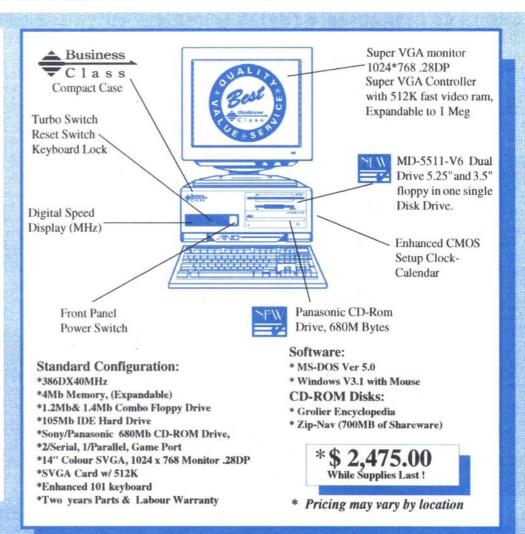
MARKETPLACE

ENTER THE AGE OF COLOUR!

Canon can now give you hard copy to match the quality you see on the screen, for a lot less than you'd expect. That's because the new BJC-800/820 prints in brilliant full colour up to 360 dpi. Using four snap-in ink cartridges - black, cyan, magenta, and yellow - you get true black and richer shades. And the cost per page is remarkably low when compared to most other colour Printers.

$2700.00

BJC-800 Specifications:
- 170 cps text/standard speed mode
- 300 cps text/high speed mode
- 360 x 360 max dpi
- Coated paper, transparency, bond, envelopes
- maximum size output on 11x17
- parallel interface (SCSI option available)
- Epson LQ compatible
- Windows printer driver included

Business Class
Compact Case

Turbo Switch
Reset Switch
Keyboard Lock

Digital Speed Display (MHz)

Front Panel Power Switch

Super VGA monitor 1024*768 .28DP
Super VGA Controller with 512K fast video ram, Expandable to 1 Meg

NEW MD-5511-V6 Dual Drive 5.25" and 3.5" floppy in one single Disk Drive.

Enhanced CMOS Setup Clock-Calendar

Panasonic CD-Rom Drive, 680M Bytes

Standard Configuration:
- *386DX40MHz
- *4Mb Memory, (Expandable)
- *1.2Mb & 1.4Mb Combo Floppy Drive
- *105Mb IDE Hard Drive
- *Sony/Panasonic 680Mb CD-ROM Drive,
- *2/Serial, 1/Parallel, Game Port
- *14" Colour SVGA, 1024 x 768 Monitor .28DP
- *SVGA Card w/ 512K
- *Enhanced 101 keyboard
- *Two years Parts & Labour Warranty

Software:
- * MS-DOS Ver 5.0
- * Windows V3.1 with Mouse

CD-ROM Disks:
- * Grolier Encyclopedia
- * Zip-Nav (700MB of Shareware)

*$ 2,475.00
While Supplies Last !

* *Pricing may vary by location*

UNBEATABLE BUBBLEJET!

Canon's award winning **BJ-10ex** Personal Printer Portable, Silent, very Affordable!

360x360 DPI
83 cps Letter Quality
Emulations:
　　IBM X24E
　　Epson LQ
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Parallel interface
80 column print width
Sheet Feeder optional

$395.00

Canon LBP4 Plus $1295.00

4 Page per minute Laser
300x300 DPI standard output
(1200x300 DPI enhanced output)
1.5MB Ram
Parallel, Serial, & Video interface
26 Internal fonts　　- 16 bitmapped
　　　　　　　　　　- 10 scalable

2 Font card slots
CaPSL Command level
Emulations:　　- Diablo, Epson
　　　　　　　　- IBM XL24E
200 sheet feeder tray (included)

Canon LBP8 Plus $1,795.00

8 Page per minute Laser
300x300 DPI standard output
(1200x300 DPI enhanced output)
1.5MB Standard Ram (Exp. to 4.5MB)
Parallel, Serial, & Video interface
26 Internal fonts　　- 16 bitmapped
　　　　　　　　　　- 10 scalable

2 Font card slots
CaPSL Command level
Emulations:　　- Diablo, Epson LQ
　　　　　　　　- IBM XL24E
200 sheet feeder bin (Standard)

ANO

NATIONAL SERVICE & SUPPORT NETWORK

P4PS
Printing Utility For PostScript Printers

Reviewed for Newsbytes by Paul Zucker

Runs on: Industry standard PCs
From: ECONO-SOFT, P.O. Box 181030, Austin, TX 78718-1030, 512-832-1675, 800-367-7590
Price: Shareware US$49.95 (includes printed manual); Postage $10 on international orders (free in U.S.). MasterCard and Visa accepted, include expiration date.
Rating: 3.25 (on a scale of 1=lowest to 4=highest)

Summary: P4PS is a utility that lets you do some fancy things on your PostScript printer, using plain ASCII text files, like printing double-sided booklets with four pages per sheet.

One of the annoying features of a PostScript printer is that it needs to have even the simplest ASCII text file wrapped up in a lump of PostScript before it can print the text. That's OK if you're using your favorite word processor, but quite often you're just working at the DOS prompt, and simply want to print a copy of your AUTOEXEC.BAT file or similar.

At its simplest, P4PS can be used for this, but it really shines by converting longer text files to some fancy PostScript commands that produce multiple pages per sheet of paper, arrange pages so you can put the paper back to do the other side, and so on.

To quote the documentation:
- Prints multiple pure ASCII or PostScript files to a PostScript printer with an attractive (optional) drop shadow.
- Automatic Booklet Generation! 2-up (side-by-side), properly collated, 1 or 2 sided output ready to staple/bind into booklets.
- Prints anywhere from one to 64 virtual pages per physical sheet of paper in Landscape or Portrait orientation.
- Handles up to 255 columns per line—great for spreadsheets.
- Control physical and virtual page headers using macros to determine exactly what information is printed; determine the exact format of date displays.
- Output to any DOS device or file specification.
- Print multiple copies of each file.
- Select a range of pages instead of the entire document.
- Select continuous or manual, one- or two-pass printing.
- Layout virtual pages across or down the physical page; fill pages or start new physical pages for each file.
- Specify physical page margins and the spread between virtual pages.
- Specify what to do when a file is interlocked on a network—including waiting for it to become available.
- With ASCII files, you can truncate instead of wrap long lines, print optional line numbers to the left of each line, select tab sizes, and select which font to use.
- Self-cloning—allows you to write default options directly into P4PS.EXE—creating any number of customized versions.

I haven't tried every option, but those I have work as claimed. The hardest part is working out which way to rotate the paper before you put it back into the printer for double-siding. It's available from GEnie and many bulletin boards, and it's worth a look.

Rating
PERFORMANCE: 3.5. It works well, and in an uncomplicated way providing you can work from the command line and don't need a foolproof menu system.
USEFULNESS: 4. If you need it, it's indispensable. It doesn't take up much room on the disk but it sure saves a lot of word processor use.
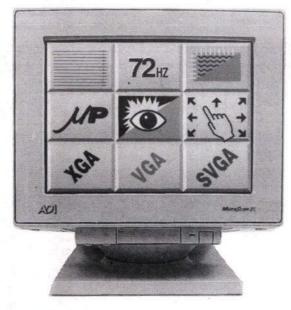MANUAL: 3. The best part of the manual is that it's a text file, so you get to try the program out by printing the manual as a booklet.
AVAILABILITY: 2.5. By mail (above) or from bulletin boards and similar. ■

The Evolving Meaning of "Network Printer"

by Didier Gombert

UNTIL RECENTLY, the term "network printer" referred simply to a printer which is used on a network, where the printer is attached to a print or file server and all print jobs are routed through the print or file server. These were typically fast, sturdy laser printers, but similar in functionality to simple workgroup or single-user laser printers.

In the last 12 months, more and more laser printer vendors have introduced printers or printer add-on devices which attach directly to networks, seemingly making direct network attachment the defining characteristic of a network printer. In actuality, direct attachment is a key feature of a true network printer, but it alone falls short of addressing the real-world user concerns about network printing. A true network printer should be designed from the ground up as a network printer.

The promise of network printers is enticing. First, these printers can lower the printing cost per user because a single, true network printer is often able to serve many more users than a combination of desktop laser printers with a similar total cost. For users more concerned about performance than cost, these printers offer much faster throughput than their desktop counterparts. Second, these printers can be placed anywhere along the network, close to users, rather than remotely located adjacent to a file or print server. Third, these printers can offer a range of features normally found only in expensive specialty printers, such as duplexing, 11"x17" or high resolution output, offset stacking and collation. A network printer provides these capabilities to all connected users.

In order to reap the full range of benefits from the printers, users should carefully evaluate their computing environment and printing needs, and then be thorough in their examination of print solutions. Following are some issues to consider:

What kind of network topologies are installed?
Network printers typically offer either Ethernet or Token Ring physical connections. If the user has an Ethernet network, the printer interface should match the user's network cabling (thick, thin or 10baseT).

What kind of network protocol(s) are used?
The printer's network interface should be compatible with the user's specific network protocol. This allows the printer to communicate directly with the network and also allows the printer to be placed anywhere along the network backbone as a node on the network. The most popular network protocols (NetWare, TCP/IP, EtherTalk

and DECnet) are becoming widely available on network printers.

Internal vs. external network connections?

Several vendors offer external boxes which convert an Ethernet or Token Ring connection to a parallel or serial connection. Some of these add-on devices also allow for some degree of compatibility with the network protocol, allowing an attached printer to be placed anywhere along the network. Many printer manufacturers bundle these external boxes with their printers in order to attain the status of "network printer."

These external devices are useful to connect an installed base of non-network printers to a network. However, they do not offer the performance and functionality of a printer that has been designed at the outset as a network printer. Print data transmission (I/O) is one of the most severe yet most overlooked bottlenecks in both printer and network/host performance. With external adapters, the advantage of the network's high bandwidth is defeated since all print data must pass through the parallel or serial connection bottleneck. A true network printer establishes a direct connection between the Ethernet or Token Ring port and the printer's controller. This produces much faster print times and less network/host down time by allowing hosts to transmit print data directly to the printer at true network speeds.

Should the printer act as a file server?

Network printers are launching a revolution of sorts in that they can replace the traditional print/file server arrangement with an intelligent printer that is its own print server. This special breed of network printer actively polls the network itself for print jobs, rather than waiting passively for a print server to send it a job. These printers manage print queues and provide status information back to hosts and the network. This approach improves network and host performance by offloading print server duties from the file server and eliminates the extra costs of a dedicated print server and/or print server software on the file server.

Are there other computers in need of a print solution but not on the LAN?

A large and growing number of computing environments currently have or plan to have a mix of dissimilar computers—PCs, Macintosh, UNIX workstations, some on networks and some not. Traditionally, a separate printer would be purchased for each type of computer or network. However, printer interface technologies have advanced in the last 2 years such that several manufacturers now offer print solutions which allow different computers to be connected to different printer ports simultaneously.

There are substantial differences between two methods of achieving simultaneous connectivity. The most common technology is "port switching" where the printer monitors ports to see which is receiving data. Once the printer determines that an interface is receiving data, all other ports are rendered inactive while the active port receives data. This may be appropriate for very limited printer sharing across computing platforms where print requests from different hosts will not overlap. This scheme is impractical, however, as a full print solution across dissimilar platforms since host computers sending to an inactive port will be tied up while the active port is being used.

A more versatile solution is one in which all ports are active at the same time, not switched. But for this scheme to allow different hosts to send print jobs simultaneously without host computer delays, each interface must be equipped with its own large input buffer. This allows a host or network to offload its print data to the printer even though the printer is receiving a print job over another port.

Another important interface issue to be aware of is that many network printers attach to networks by replacing standard ports on the printer. This renders the printer incapable of connecting to computers not on the main network.

What kind of processing speed will be required?

The increased use of graphics in computing has necessitated faster processors for the rasterization of images from raw print data. Adding multiple users to the equation further increased the need for fast processing. Most network printers offer RISC processing, but the user should keep in mind that not all RISC processors are equally fast just because they are RISC.

Would multiple emulations be used on the same printer?

Some form of emulation switching is essential in multiuser printing environments where multiple emulations are used (the most common are PostScript or compatible language, PCL and HPGL). There are several ways in which printer manufacturers can offer emulation switching, with varying degrees of functionality and flexibility. Assigning an emulation to a port is a common method of emulation management, but this will be ineffective if multiple emulations will be used over that port (as they often are over a network port). Some printer manufacturers include software with the printer which loads onto the host and which must be configured to match each application with a specific emulation. The most flexible emulation management system, however, is one which is printer-resident, independent of ports and hosts, and which does not require host configuration or additional software.

What kinds of paper handling and duty cycle are required?

Traditional printer considerations such as duty cycles and input/output capacities become much more important in network printing environments simply because of the greater number of users. Network printer duty cycles range from 30,000 to over 70,000 pages per month, and input capacities range from 250 sheets to 1500 sheets. The number of users and the volume of documents produced by each user should be taken into account.
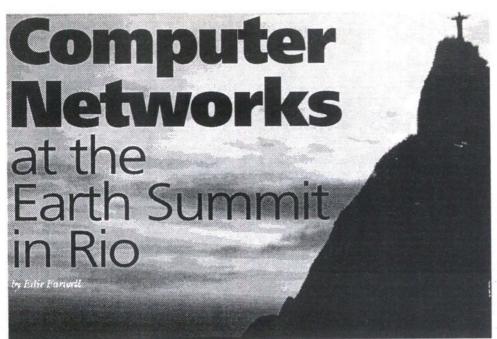
Many network printers offer special paper-handling features to make shared printing easier. Some features to look for include automatic error recovery, offset stacking, input bin selection from the host, and collation.

As the number of users in a printing environment grows, so does the range of print demands made on a printer. Special capabilities such as duplexing, 600 dpi or 11"x17" output are typically found only in expensive, specialty printers. However, several printer vendors have begun to offer combinations of these capabilities, allowing one networked printer to be all things to all users.

How many users should the print solution serve?

There is no one variable which can determine how many users a printer will serve. Users should not be misled by simple specifications such as engine speeds (pages per minute). Data throughput, processing speed, emulation and font management, interface management, paper handling and duty cycle should all work in tandem to match the user's specific computing environment. ■

Didier Gombert is the National Product Manager of QMS Canada.

Computer Networks at the Earth Summit in Rio

by Edie Farwell

The international Association for Progressive Communications (APC), is playing a major role in providing computer communications services for environmentalists, non-governmental organizations and citizen activists before, during and after UNCED, otherwise known as the Earth Summit.

APC is a worldwide association of ten regional computer networks which provide low-cost electronic mail and conferencing services so communication and information-sharing can happen quickly and easily. It is the only global computer communications network dedicated specifically to individuals and organizations working for the environment, sustainable development, human rights and peace.

UNCED is the United Nations Conference on Environment and Development that is taking place in Rio de Janeiro, Brazil, from June 1-12, 1992. This is the largest United Nations conference in history and will be the first global gathering specifically for the environment since the Stockholm conference in 1972.

Dubbed the Earth Summit, UNCED will announce a Rio Declaration that will outline how the countries of the world will balance environmental concerns with development interests for a sustainable future. Leaders from over 100 nations will attend UNCED to "consider the very survival of the planet," UNCED Secretary-General Maurice Strong told journalists at a meeting in Brussels January 17.

Joining the world's leaders will be thousands of citizens from every nation participating in both the formal summit process as well as informal parallel events. These citizens and non-governmental organizations will help develop joint international strategies to assure that sustainable development policies result from this environment/development debate. Many feel that this is the last opportunity for peoples of the Earth to affect and change governmental policy in the areas of environment and development to turn around mistakes of the past.

People working effectively together across borders is imperative to successful change. Already, active environmental and other citizens' groups have created an astonishingly extensive global communications network to keep one another informed of each others' activities, as well as the activities of their governments.

APC has been instrumental in making UNCED information easily and cheaply available to over 13,000 people in 94 countries. The ten APC member networks (in Brazil, Uruguay, Germany, Russia, USA, England, Nicaragua, Sweden, Australia and Canada) keep over 30 online conferences, dedicated specifically to UNCED documents and agendas, updated with the latest developments and reports, as well as provide facilitated forums for discussion and debate.

This information-sharing service is invaluable as it allows the official United Nations documents to be accessible to citizens around the world, thus providing broader citizen participation in a heads-of-state summit than has ever been possible before. By participating in these UNCED conferences on the APC networks, citizens can be active in and influence worldwide discussions on the most vital issues of our time. APC uses computer networking as a powerful tool to foster true global partnership, information exchange and international decision-making.

APC's Brazilian member network AlterNex has been selected to spearhead communications services for non-governmental organizations at UNCED itself. With its electronic mail and conferencing services, APC will link environmentalists and others around the world with key deci-

sion-makers attending the conference.

AlterNex is planning to provide workstations at several easily accessible locations throughout Rio so up-to-the-minute information can be received and transmitted continuously throughout the conference. The APC technical staff will ensue that the system is running smoothly for those needing to send faxes and telexes, read electronic conferences, send electronic mail to home offices and colleagues around the world, and give input to reports and documents issued from Rio Centre where the UN delegations are formalizing the Rio Declaration. The technical staff will also provide on-site training for those new to the APC system as well as give workshops to show how electronic mail and conferencing services can play a vital role in connecting environmentalists and other activists all over the world.

By strategic information gathering and sharing, which computer technology such as the APC networks allow, UNCED can truly be an Earth Summit for all environmentalists both present and far away.

Canadians who wish to participate in UNCED discussions, or any of the other hundreds of topics, can obtain an account on Web, the APC network serving Canada. Over twelve hundred activists and organizations across the country have accounts on Web, and are actively using the network to promote social and environmental improvements. The cost to a typical user is about $30 per month. ∎

Contact: Web c/o Nirv Centre, 201 Richmond St. West, Suite 104, Toronto, Ontario M5V 3A8, Tel (416) 596-0212, Fax (416) 596-1374, e-mail support @web.apc.org.

Edie Farwell is the Liaison Director for APC.

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INCREDIBLY PRICED COMPUTERS

A highly useful feature is the ability to record a macro of your control panel button programming. There are 13 built-in print styles, including emphasized, sub- and super-script, underlining, italics, and shadow.

What can you say about a printer?

Well, you can say a lot if it doesn't work right, but when it runs as smoothly as this Star Micronix product, about all you can do is admire it.

Print quality is quite good, certainly good enough for producing average quality business correspondence or to fill in if the laser is down, and even the draft quality is good enough for most uses. The selection of font styles and sizes is quite good and the noise level is acceptable. I found the script font (simulates handwriting) to be surprisingly good, but it is best used in moderation for special emphasis.

Have you ever had software that argued with you about font selection? By that, I mean the problem that sometimes occurs when you are trying to print some text in one mode but the particular program stubbornly keeps resetting your printer. The NX-2430 eliminates that problem with a simple press of the Font button during power up. Locking out software control leaves you free to print in script or whatever font and size you wish, regardless of what your software wants to do.

If you hold down three buttons (Font, Pitch, and Eject/Park) while you turn the printer on, you can modify the default settings of everything ranging from whether you have a print buffer or use memory to hold downloaded characters, to the font and character size that will be set each time you turn the printer on.

A one-page "User's Guide" printed on glossy card stock provides a quick reference to the major features. This mostly deals with the complex options available via the front control panel.

An optional 50-sheet automatic sheet feeder is available. I didn't test this option or the optional power tractor but I have found that power tractors are a good option to have with most printers.

Optional font cartridges and extra memory are also available.

Rating

PERFORMANCE: 4. Fast and relatively quiet (54db)–no problems during two-month test period.

USEFULNESS: 4. Font and typeface lock and other features make it very useful.

MANUAL: 4. Documentation is a well-designed spiral-bound notebook that includes detailed set-up instructions as well as more advanced topics.

AVAILABILITY: 4. This is a major brand that is widely available.

Contact: Jay Winter, Star Micronics, 212-986-6770 or fax 212-286-9063.

Upgrading your PC

by Roedy Green

THE COMPUTER you bought three years ago runs just as fast today as the day you took it home from the store. Yet, like Circe of mythology, modern software, such as Windows 3.1, turns your machine into a pig. The problem is the complexity and overhead of the new GUIs (graphical user interfaces.) This month I will tell you many ways to speed up your old machine.

Windows 3.1 heralded "multimedia." If you want your computer to make decent-quality sound and music, you need special hardware. I will be talking about that, too.

Finally, OS/2 2.0 has arrived. Though end users are all agog over Windows 3.1, computer programmers are hotly discussing how to use OS/2 for the upcoming generation of applications. Windows is a waystation on the road to the promised land of OS/2. No one knows when the mass migration will occur or if it ever will, but for the program developers the move has already started. If OS/2 is in your future, you will need heavy-duty hardware. Later, I will tell you how to prepare your computer for the OS/2 contingency.

Speeding Up Windows 3.1
What can you do to speed up Windows 3.1?
1. Windows is a very large program. Throw RAM at it. Microsoft likes to demonstrate Windows in a machine with 21 MB of RAM (not disk space, RAM!) I would consider 4 MB the smallest practical size for running Windows, and 8 MB comfortable. More won't hurt.
2. Windows does an enormous amount of behind-the-scenes housekeeping to track all those windows and clickable controls. Throw CPU power at it. Upgrade to a 33 MHz 486 CPU.
3. Windows exercises the hard disk mercilessly. Get a fast hard disk that is compatible with the new 32-bit Windows Fastdisk access methods.
4. Get more RAM and hand it over to a disk cacher to spare the hard disk so much hard work. Use a defragger such as ORG or Norton SD that can move the Windows files to the prime real estate near the edge of the disk next to the root directory.
5. Windows spends most of its time painting dots. When you hit the "A" key, Windows has to paint 112 individual dots

on the screen. DOS programs, by contrast, can paint the "A" in a single stroke. For speed, you need an auxiliary computer especially for painting dots (i.e., a video card with a "graphics accelerator"). Then Windows can hand the graphics accelerator a whole sentence to paint, and leave it to work away while the main CPU gets on with something more important. Because you have two computers instead of one working for you, and because the processor in the graphics accelerator doing the dot painting, the screen displays at least five times more quickly.
6. There is a very inexpensive upgrade that prevents losing characters coming in on a modem. You replace the 16450 UART chips on your multi-I/O card with 16550 chips. The 16550s have a 16-character buffer to store incoming characters when Windows is too busy to deal with them.

So, to make your computer really sing under Windows, you might want to upgrade your CPU, add more RAM, get a faster hard disk and, most of all, get a graphics accelerator board. I will tell you more about how to do all this later.

Preparing Windows for Multimedia
The new part of multimedia is about making noise. There are four basic methods of making sound:
1. Use the PC speaker, pulling the cone in and out with software. The results sound like Edison's phonograph.
2. Waveforms. You take digital samplings of real-world sound (e.g., speech, singing, water splashing) and then play them back. This is much the way audio CDs work. 8-bit models sound like a $5 AM transistor radio complete with static. Top-of-the-line 16-bit quality can sound like a $3000 stereo system. Karen Kenworthy, the Windows moderator on

the BIX electronic conference, taught Windows to say "Ouch" whenever she makes an error.
3. FM Synthesizer. You can stick a tiny music synthesizer inside your computer to play music. These produce jaunty electronic sounds—usually not the natural sounds of expensive studio synthesizers.
4. MIDI. If you are a musician, you might already own a set of musical instruments and keyboards that use the MIDI computer-control interface. The computer acts like a glorified player piano by playing all your MIDI instruments for you. The computer can record your finger motions as you play the instruments, then play them back faster, in a different key or with different timbre settings. The computer also allows you to edit your work and build up multi-track compositions.

The Catch
A standard audio CD holds about 45 minutes of music. To store the digital waveforms for 45 minutes of music requires about 600 MB of hard disk space. A 600 MB hard disk would cost about $1750. We would like thousands of hours of recordings on tap. The hard disks to hold this would cost millions of dollars!

Here are several ways out of this bind.
1. Just record short snippets of sound.
2. Use the other two methods — FM synthesis and MIDI, which require very little storage space even for a long piece.
3. Buy special hardware that can compress and decompress the waveforms on the fly to squeeze the same information into a smaller space — like Stacker, but for sound.
4. If you are willing to put up with less than CD-audio quality—say telephone quality, then you can drastically compress the waveforms. You don't need nearly as

much space to store them. But even then a few words of speech will take up about 64K.
5. Don't even attempt to store sounds on a hard disk. Store them on gigantic optical disks, or on CD-ROMs. CD-ROMs must come pre-recorded from the factory. You cannot record your own sounds onto them.

Sound Card Possibilities
So to prepare for sound, you will likely want to add a sound card, get a CD-ROM, a bigger hard disk, and possibly indulge in some MIDI musical instruments.

You can buy cards such as the 8-bit SoundBlaster Pro that have all three methods of making sound on a single card. If you want higher quality 16-bit sound you need to buy a more expensive card such as the Pro Audio Spectrum or Turtle Beach cards.

The Roland LAPC-I is a full-blown 24-voice MIDI synthesizer on a card that fits inside your computer. It simulates over 300 different "instruments" and 35 sound effects. However, it cannot handle waveforms (e.g., speech). If you want to control external MIDI instruments as well, you need the extra-cost MCB-1 attachment. The Roland knocked my socks off, but listen with your own ears before you make your choice.

Microsoft has proposed a standard for multimedia computers called MPC. Compliant systems have 8-bit sampling, a music synthesizer, MIDI and a CD-ROM drive that can play audio CDs.

Without fully debugged software drivers, the sound cards are useless. Make sure you hear the hardware working under Windows, with the programs/games you plan to use. Stand-alone demos don't count.

Preparing For OS/2

OS/2 benefits mainly power users. It offers:

1. The ability to copy, format and use floppy disks in the background without slowing down your foreground work.
2. Faster disk access, especially for large files. OS/2 can find files more quickly than DOS or Windows can.
3. Long filenames, like the Macintosh.
4. The ability to smoothly run several programs at once without them interfering with each other and crashing the system. DESQview and Windows both attempt this, but neither has the hardware support that OS/2 has to control the interactions.
5. The ability to use the full 32-bit power of the 386/486 CPU. DOS and Windows programs usually waste half of each 32-bit register. Under OS/2 it is much easier to write huge programs. Under DOS or Windows, programs and data must be broken into chunks of 64K or less.

The Catch

If OS/2 is so wonderful, why isn't everyone using it?

1. It is more complex to install and use.
2. For practical use, it needs at least 8 MB of RAM, and 16 MB for comfort.
3. OS/2 itself comes on 21 diskettes and fluffs up to about 30 MB on your hard disk. By the time you install extra fonts,

> **Sometimes you can do upgrades easily and safely. It depends partly if you planned for upgrades when you first bought your computer, and also on just how old your computer is. The newer it is, the more likely upgrading will go smoothly.**

and create a swapfile, it has taken over about 60 MB of your disk.

4. It is less forgiving of non-standard hardware.
5. Though you can run your old DOS programs under OS/2, you are not really cooking until you buy new OS/2-aware programs.
6. It can run your Windows programs. So OS/2 is even more resource-hungry than Windows.

Chances are, then, you will first need to add more RAM and a bigger hard disk before you can move up to OS/2. Just as with Windows, you will also want a graphics accelerator card. Don't even think about trying to run OS/2 on anything slower than a full 80386 DX 25 MHz.

Upgrade or Start Over?

Sometimes it is best to add equipment to your existing machine, or replace a few parts. Other times it is best to sell your machine as it is, and use the money toward a complete new machine.

Upgrading may appeal to the recycler in your soul, but if you replace a part, the old part will likely have little value. You probably will end up throwing it away. If you sell your old machine, and buy new, all the old parts will find a good home. If you plan extensive upgrades, it is usually more eco-

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nomical to sell your old machine and buy afresh. However, price it out for yourself.

Nightmare on Upgrade Street

Upgrading can be perilous, especially replacing the motherboard. Here is an almost worst-case scenario of what can happen to you. You replace your old 12 MHz 80286 motherboard with a brand new 33 MHz 486 motherboard.

Then you discover your cheap multi-I/O card cannot quite keep up with the new CPU, so you end up replacing it, too. Then your new machine is cranky. It occasionally freezes up, refuses to start on cold mornings, makes small errors in arithmetic and spontaneously reboots all by itself. You wonder if an exorcist might be in order.

You suspect the problem might be your power supply. Experiments confirm your cheap power supply cannot provide smooth enough power for the sensitive 33 MHz operation. So you have to replace it with a higher quality one. They you find there is no available model of power supply that will fit your case, so you have to replace the case as well.

Now you finally get all the hardware working, only to discover that 10% of your software no longer works. Programmers wrote that software long before anyone conceived of a CPU as fast as your new 486. You have to buy software upgrades.

Then you discover that software of different vintages does not mix well. You now have to buy upgrades for most of the rest of your software, to avoid conflicts with the new software.

Beside your new machine is a pile of old parts: a motherboard, multi-I/O card, power supply, case and software that nobody wants. A short time ago, they were part of a desirable, perfectly functioning computer.

If the computer fails in future, with yet another chapter in the nightmare, there is no guarantee to protect you. Only all-new computers come with guarantees. The best you can hope for is an individual component warranty.

Upgrading your XT to an AT

Attempting to upgrade an XT to an AT is an even worse nightmare. The power-supply leads and speaker leads probably will not fit. The new AT cards may be too tall to fit in the case. If you keep your old XT disk controller, it will run three to five times slower than a new AT controller would. You are much better off selling your old XT intact.

On the Other Hand

Sometimes you *can* do upgrades easily and safely. It depends partly if you planned for upgrades when you first bought your computer, and also on just how old your computer is. The newer it is, the more likely upgrading will go smoothly.

For example, adding RAM or replacing a new video card rarely causes complications. There is no need to buy a new computer to add a second hard disk.

Ask a few knowledgeable people what they think of your upgrade/replacement plan before you decide either way.

Adding RAM

RAM is now retailing for under $65 per megabyte (1,048,576 characters). Adding RAM is the simplest and cheapest method of putting some oomph back into an old machine.

However, there are things to watch out for. Adding raw RAM does little good. Very few programs know how to use it. It must be "predigested" to turn it into palatable XMS (extended) or EMS/LIM (expanded) RAM before ordinary programs can make any use of it.

DOS comes with a pair of memory-management programs called HIMEM.SYS and

EMM386.SYS to do this. There are faster, smaller, more capable memory managers you buy separately, such as QEMM and 386MAX. Installing a memory manager is a black art. They can make it appear as if you have 720,000 bytes or more of free conventional memory, even when you cram your RAM with mouse drivers, etc.

RAM comes in three main forms:

SIMMs–miniature cards holding 256 KB, 1 MB or 4 MB that fit into slanted racks on the motherboard. These are the easiest to install.

SIPPs–miniature cards holding 256 KB, 1 MB or 4 MB with pins sticking out the bottom that fit into rows of holes on the motherboard. These are tricky to install without bending the pins.

DRAMs–individual chips holding 256K bits (32K bytes), 1 Megabit (131K bytes) or 4 megabits (524K bytes). Each chip coughs out either 1 or 4 bits at a time when addressed.

It is best to let your retailer install the RAM for you. He will make sure you have the right type and speed. He will take the proper static precautions and will clean and treat the contacts. He will need to read your motherboard manual to set any motherboard switches to configure the new RAM.

Do not handle RAM unless you first ground yourself with a wrist strap and work on a static mat. Even taking RAM out of the bag to look at it can be enough to destroy it.

Further, each motherboard only accepts certain magic combinations of types, speeds and sizes of RAM. For example, some machines will not allow 6 MB total RAM, only 4 or 8. You need the motherboard manual to find out what the magic combinations are.

Disposing of old RAM

Upgrading RAM can be distressing because you must discard perfectly good RAM. For example, on some machines to go from 2 MB to 4 MB, you don't simply add 2 MB. You have to remove all 2 MB of your old RAM and replace it with 4 MB of a different type that allows you to grow eventually to 8 MB.

Similarly, when you grow from 8 to 16 MB, again you have to throw out all 8 MB of your old RAM and replace it with 16 MB of a different type.

Unfortunately you cannot just start off with the larger type. The computer likes to have at least four banks of RAM to interleave. If you used the larger type right off, you would not have enough banks. With four banks, three banks can be "recuperating" while one is working. If you only had one bank, the CPU would have to wait while the bank recuperated after each memory operation. The full truth is even more complicated.

Keep your old RAM in a static bag. You may be able to sell it to someone upgrading or building a smaller computer. RAM does not deteriorate with age, so consider getting used RAM when you upgrade.

How Much RAM?

It never hurts to have a little extra RAM. You can always hand over any spare RAM to your disk caching program to speed up hard disk operations.

For word processing, one to two megabytes should suffice. For DESQview, four megabytes is comfortable. For Windows 3.1 four to eight megabytes would be about right for the average user. For OS/2, 8 to 16 megabytes would be a comfortable starting point.

How Fast?

60-nanosecond RAM is faster than 80-nanosecond RAM. It does not hurt to use RAM that is a little faster than you need. However, it does not help, either. Putting in 60 ns RAM when the motherboard manual specifies 80 ns will not speed your machine up. The advantage of using 60 ns RAM comes when you later recycle the RAM. If your future machine calls for 60 ns RAM, you could reuse your old RAM, where you could not reuse old 80 ns RAM. For motherboards that give you the option of configuring different speeds of RAM, use the fastest supported type.

Disk Caching

Giving 512 KB to 2 MB of RAM to a disk-caching program is your first priority in speeding up a machine. Caching programs monitor your use of the hard disk, and attempt to keep the data on hard disk you use most often in their private "cache" (stash). Then when you go to get data off the hard disk, the caching program intervenes, and hands it to you hundreds of times faster, from its cache.

The most reliable caching program is Super PC Kwik. Norton Utilities comes with a fast but touchy cacher called NCACHE. DOS comes with a fat, slow cacher called SMARTDRIV.SYS. Windows 3.1 comes with an improved version called SMARTDRIV.EXE.

If you don't have a cacher, you are wasting the money you spend on your RAM. Get expert help to install your cacher. If you don't tune it properly, you could be wasting the lion's share of your computer's power.

Upgrading to a 486 33MHz

To upgrade your CPU, you must usually replace your whole motherboard, though you can often recycle your RAM, providing it is fast enough.

I already warned you of the nightmares you can expect if the other components of your computer are not up to snuff.

Replacing a motherboard is quite easy if you have a tower case where you can access both sides of the board. Smaller cases are much more difficult since you have to align all the spacers without being able to see them.

25 MHz machines are more robust. They are not as fussy about power. They don't put quite so much "strain" on the other components and software. If you are considering upgrading a machine of unknown quality, I suggest going just to 25 MHz. Unfortunately, it is much harder to find 25 MHz motherboards than 33.

If you have premium components, such as the Turbo Cool power supplies, Everex multi-I/O, etc., then you will be quite safe in upgrading to 33 MHz.
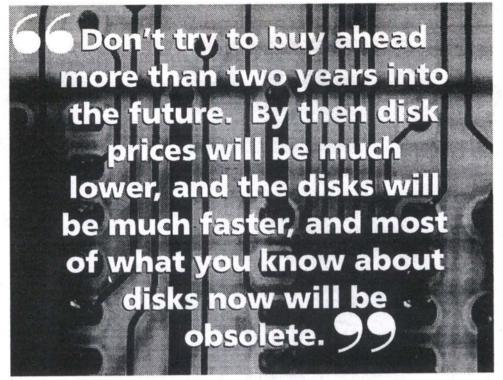
I personally would not recommend going beyond 33 MHz to 40 MHz. Every time you double the clock speed you increase the radio emissions inside the case by four times. The higher the clock speeds, the tighter the tolerances, and the fussier and more ill-tempered the machines.

There are, of course, safe, beautifully designed and shielded 40 MHz machines. However, you probably won't find these for bargain-basement prices.

Clock Doublers

So rarely can you have your cake and eat it, too, but just this once, you can. Intel has just announced a new kind of 486 chip. To the rest of the computer it looks like a plodding, easy-going 25 MHz 486 CPU chip. However, secretly, inside it is a speed demon, cranking along at 50 MHz. You get the best of both worlds.

There are now a sprinkling of motherboards that use this new chip. Eventually there will be kits to upgrade older motherboards.

What are the catches?

1. These chips are much more expensive than ordinary 33 MHz chips.
2. They give off a lot of heat. Best to use these in tower cases with lots of room so cables don't block the air flow, and so convection helps cool the vertically mounted chip. Choose a premium power supply with a powerful fan.
3. There is no low-cost 386 version of the doubler chip. This is because the 486 has 8K of SRAM cache right inside the CPU chip, but the 386 does not. The 486 can do quite a bit of work at double 50 MHz speed just using its registers and the SRAM cache before having to consult the "outside world" off the chip at 25 MHz.

Strangely, these clock-doubler machines at 50 MHz are safer and more reliable than ordinary 486s at 40 MHz.

A Bigger, Faster Hard Disk

Since you already have a hard disk, the natural thing to do is get a second one, bigger than your first, faster that your first, but keep them both. Unfortunately there are several nasty surprises awaiting you here.

How Big a Disk?

Since you already have a computer, you have a good idea of how fast your storage needs are increasing. You have seen how each new version of each program gets fatter and fatter. You have seen how you accumulate program after must-have program. You may have already installed an on-the-fly compressor like Stacker, and know how well it works for your mix of files. So, make an estimate of what you need, and temper that with what you can afford.

Don't try to buy ahead more than two years into the future. By then disk prices will be much lower, and the disks will be much faster, and most of what you know about disks now will be obsolete.

Measuring Disk Size

1 megabyte of RAM is 1,048,576 characters (2 to the 20th power bytes). Hard disk capacities are also measured in megabytes. To me, it seems obvious that RAM and hard disks should be measured the same way. However, strange as it may seem, only a few disk manufacturers agree.

There is no legal standard way to measure the size of a hard disk. Manufacturers have invented various misleading ways of measuring the space.

Most disk vendors quote capacity in megabytes, but use the "short" megabyte of only 1,000,000 characters. This inflates the stated capacity by about 5%.

Still other vendors quote the unformatted capacity, or include unusable areas of the disk to inflate the stated capacity by 10 to 25% the way floppy disk vendors do.

The computer industry has made no attempts to set standard measures. Technicians vehemently defend each measuring scheme, and explain why each is perfectly honest. It is of lesser importance which scheme we settle on, yet we need to legislate *some* common measure so we can comparison shop.

Meanwhile, here is one way to defend yourself. Before you buy a drive, ask the vendor for the disk's geometry:

c=cyls
h=heads
s=sectors/track

Then calculate the capacity in megabytes with this formula:

$$(c * h * s) / 2048$$

E.g.: The Maxtor XT-8760E drive has 1,632 cylinders, 15 heads, and 54 sectors per track. The capacity in megabytes is $(1,632 * 15 * 54) / 2048 = 645.5$ MB. Maxtor bills the drive as having 676.8 MB. This is because Maxtor is quoting in short megabytes.

Disk Speed

The most important measure of disk speed is the average access time. A fast disk might be 15 milliseconds. A slow disk would be 25 milliseconds. Note: the smaller the number the better.

Average access time measures how long the read heads take to hop from one part of the disk to another.

Another important number is transfer rate — how fast the disk can shovel data into the computer once the heads get to the right place. The only way to find this out is to install the disk in your machine and try it. Specifications are overly optimistic. As a rough guide, drives with more sectors per track will have faster transfer rates.

MFM

If you already have an MFM disk, you will have trouble finding a new second disk. About the largest one you can still buy is 80 MB. You might have to switch to another type of disk. That will mean replacing your controller. It also means you won't be able to use your old hard disk. RLL has suffered the same fate as MFM.

IDE

There is a standard for IDE, called ATA. However, until recently few manufacturers paid any attention to it except Maxtor. Most older IDE drives are non-standard. When it comes time to add a second drive, you *may* have trouble. For best chance of success, your second drive should be the same brand and family as your first one. It does not need to be the same model, but it should have the same electronics, just a different number of heads.

In one infamous case, the owner bought a second drive with the exact same model number; it would not work because the vendor changed the design of the interface for that model part way through its life cycle.

The advantage of sticking with the ATA standard is it allows you to mix and match drives from any vendors. Sometimes, by trying several different paddleboard adapters, you can persuade a mismatched non-standard pair to co-exist. Often mismatched pairs work just fine with no special tweaking.

You may find OS/2 does not support your particular IDE drive. If OS/2 is a big part of your future, stick with the ATA standard or another type of disk entirely, such as ESDI or SCSI.

ESDI

ESDI is fast and it works with so special tweaking or device drivers, both in Windows and OS/2. Installing a second drive is very simple. There's very little that can go wrong. Because ESDI has a strong standard, you can mix and match drives from different vendors.

Now that it works, vendors consider ESDI old-fashioned. There is still a reasonable selection of ESDI drives for sale, but the numbers are dwindling. There are no longer drives available below 200 MB.

For now, ESDI is the most hassle-free route, but you might not be able to upgrade in a few years — much the way the owners of MFM drives are stuck now. So, you might want to consider switching to SCSI now.

SCSI

For years SCSI boosters have been saying, "It isn't quite working yet, but just wait, in a little while, it will be fantastic."

Guess what. It finally *is* working.

SCSI had a big problem. There was a standard for how hard disks attached to the SCSI bus, but no software standard for how the host adapter hooked into the PC. Adaptec and Corel have taken the bull by the horns and created a standard called ASPI. It allows software drivers written by different companies to work together.

Now, after a ten-year wait, it is finally possible to attach hard disks, tapes, CD-ROMS, optical disks, WORM drives, printers — all from different manufacturers-to the same SCSI bus. What is even more remarkable is all the devices and all the ASPI software that drives them runs simultaneously, co-existing peacefully. Without SCSI you would need a slot and controller for each of these devices. Now with a single slot and a single SCSI host adapter you can handle all those devices.

Getting your first SCSI drive working is daunting. For example, the Adaptec SCSI host adapter has 35 esoteric jumpers to set (or more precisely to leave alone). You must understand terminators, SCIDS, LUNS, BIOS extensions, and ASPI controller drivers, ASPI device drivers. SCSI is not that much more difficult than the other drive types, just different. However, you can add a *second* drive very easily, mix and matching any SCSI drives from different vendors.

DOS and OS/2 do not directly support SCSI the way they do MFM and ESDI. This implies the ongoing problem of finding and installing up-to-date drivers to keep SCSI working in future.
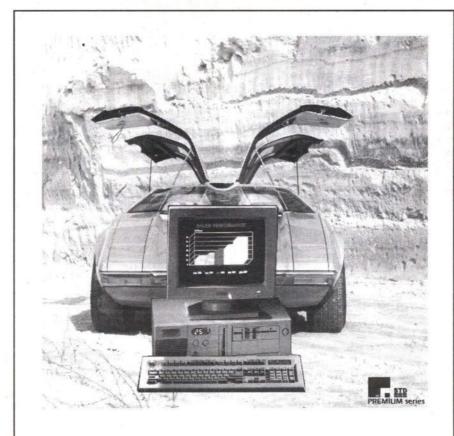
SCSI is like a race car—expensive, somewhat fussy, but very fast and impressive after you fine-tune it. ASPI marks a big leap forward. It will only be a matter of time until vendors file smooth SCSI's remaining rough edges.

CD-ROM

The May '92 issue of *The Computer Paper* covered CD-ROM extensively. There are two kinds of CD-ROM—those that fit on a standard SCSI bus, and those that fit on some low-cost proprietary interface.

If you go for the premium SCSI type, make sure the vendor offers an ASPI driver so that it can share the SCSI bus with your other SCSI devices such as hard disk.

Graphics Accelerator Boards

There are several kinds of graphics accelerator boards. The most elaborate (and most expensive) are the TIGA boards that use the TI TMS34010 or 34020 chip. These use a true auxiliary graphics co-processor that runs its own programs to draw the screen.

The ATI Vantage and Ultra emulate the IBM 8514 graphics accelerator, only they do it much faster. The Mach-8 processor in the ATI is not quite as bright as a TIGA co-processor, but it is specialized for the bull work of handling Windows and OS/2, so it sometimes even beats the TIGA cards. The ATI cards have a few extra tricks up their sleeves that the 8514 does not. The

> ## SCSI is like a race car—expensive, somewhat fussy, but very fast and impressive after you fine-tune it.

Vantage and Ultra are identical, except that the Ultra has dual-ported VRAM, which makes it even faster.

OS/2 and many DOS application programs directly support the IBM 8514, which means they automatically support the ATI cards, even if ATI were to fail to provide specific Mach-8 drivers.

The S3 cards emulate only *some* of the features of the 8514. This makes such cards cheaper than the ATI, and almost as fast. However, you cannot make them work using standard 8514 drivers. Thus for example, Diamond Stealth owners cannot get by with 8514 drivers under Windows, while they wait for the new Win 3.1 Stealth drivers to be debugged.
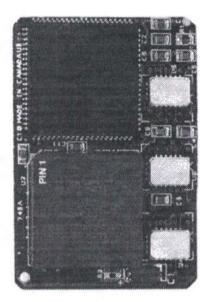
Learning More

I will be holding a free, day-long course Saturday, June 20 and again on Saturday, June 27 on upgrading your PC. Usually such courses are fully booked a few hours after *The Computer Paper* hits the streets. Phone 684-6529 to reserve your spot. For 90% of the course time I answer questions from the floor. ∎

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

NEW FOR PCs:
All Computers
486
Upgrade

TORONTO, ONTARIO, MAY 8 (NB) — Owners of PCs based on 80286 and 80386 processors can now upgrade to 80486 technology with two upgrade products from All Computers. The All SX 486 and All DX 486 both use the Cyrix Cx486 microprocessor.

The All SX 486 replaces the 286 microprocessor with the Cx486. The All DX 486 is designed to replace a 386 chip. Both devices are circuit cards smaller than a credit card. They plug into the microprocessor socket on the computer's system board. Installing either of them is a matter of popping out the original processor and plugging in the upgrade, which any user can do, said James MacFarlane, a spokesman for the company.

Such an upgrade will increase chip performance, but critics of processor upgrades argue that the procedure creates a mismatch between the faster chip and slower peripherals such as the hard disk, which were meant to work with the old, slower processor.

That may be true, MacFarlane said, but devices such as hard disks can also be upgraded. "The cost of upgrading a computer piece by piece is still cheaper than buying a new one," he maintains.

All expects many of its upgrade cards will sell to business users whose PCs are connected to networks, so that their local hard disks are used very little. In that case, the speed of the processor is much more important than that of the hard disk, MacFarlane said.

The All SX 486 is available now, and the All DX 486 was to be available before the end of May. Both have a suggested list price of $499, with an optional math coprocessor available for $100 more. Both also come with the company's All Charge 386 memory management software.

The company is gaining a strong European presence, MacFarlane noted, particularly in Eastern Europe where newer PCs were very hard to get until recently. ∎

Contact: James MacFarlane, All Computers, 416-960-0111, fax 416-960-5426.

Nantucket/CA Combo
Lights Fire Under Xbase

LOS ANGELES, CALIFORNIA, MAY 8 (NB) — While the big boys like Borland and Microsoft were saying the Xbase standard isn't an issue, Computer Associates' purchase of Nantucket seems to have tilted the table. Now the Xbase standard is the new bandwagon and the big boys—including the workstation world—are forced to admit what was always true anyway: Xbase is here to stay.

Basically, the database market seems to be moving in two directions. One is toward the adoption of an Xbase standard, fueled by Computer Associates' purchase of Nantucket, which is providing a threat to the other database vendors and widening the Xbase market. The other direction is client/server architecture which is of paramount interest to the corporate community.

Client/server is of interest because it is more secure and maintains the integrity of the data in the database. But client/server is too expensive for small businesses.

When Ashton-Tate was alive, there was a movement to define an Xbase standard but Ashton-Tate was trying to say that file format was its own creation. Ashton-Tate was seen as a bully threatening verbally and through the courts other companies who were making headway in the market using the format, like Fox Software. Ashton-Tate was even trying to say the term "dBASE" was a trademark and threatening no one else could use it. That was the reason database industry leader Adam Greene introduced the unlovely term "xBase" with different capitalization and gave it to the database community. Toward the end, Ashton-Tate did say it would make a "gift" of the .DBF file format to the world but it was late enough to inhibit any serious work on a standard.

Nantucket's claim to fame was it was one of the first to take Ashton-Tate's stranglehold off the business market. It introduced Clipper, a database compiler. Clipper could take dBASE language programs and turn them into stand-alone programs that didn't need the dBASE product to run and that could be distributed royalty-free.

Lately, however, the estimation was that Nantucket was out of the game altogether. Struggling financially and behind on its bills, it was predicted to go under any minute.

But the bounce-back Nantucket has taken with the Computer Associates' announcement just re-emphasizes the business community's commitment to Xbase. And it has forced other companies to make public commitments to Xbase as well.

Microsoft, Borland, Fox Software, WordTech, Emerald Bay Group, Recital, and Dvorak Development have all announced they will support the new Xbase standard formulated by Mark Schnap and submitted to the X3/Standards Planning and Requirement Committee (X3/SPARC) of the American National Standards Institute (ANSI).

Borland's President Philippe Kahn was right when he said that users in the future won't have to worry what format their data is in. But that's because it will be in Xbase format. ■

Nantucket To Play Key Role
In CA Database Strategy

ISLANDIA, NEW YORK, MAY 7 (NB) — Top officials of Computer Associates International pledged to continue development of Nantucket Corp.'s products, and said the company will play an important role in CA's growth in the personal computer market.

CA Chairman and Chief Executive Charles Wang, and Sanjay Kumar, senior vice-president for planning, made the comments in an audio teleconference held just hours after their company announced plans to acquire Nantucket, the Los Angeles firm that makes Clipper, a dBASE-compatible database management package for PCs.

Computer Associates "will definitely continue with Clipper development," Wang said. He said the company will also continue the Aspen project, a Nantucket effort to develop object-oriented database technology for Microsoft's Windows environment.

Computer Associates already sells a dBASE-compatible Windows database product called dBFast. The company will probably use the best of dBFast and the Aspen project in future Windows database software, Wang said.

Kumar said Computer Associates hopes to give Clipper better connections to CA's mainframe database software. Computer Associates sells several mainframe database management products, the result of acquisitions in the past few years.

Nantucket will disappear as a separate company, but its developers are "an integral part of the acquisition" and will come to work for Computer Associates, Wang said. Nantucket's Los Angeles location — close to a CA office in that city — will be maintained, the officials said.

Commenting on the recent rash of acquisitions in the personal computer market — Microsoft announced plans to buy Fox Software just weeks ago, and late last year Borland International took over dBase maker Ashton-Tate — Wang said major software vendors are coming to see the importance of the dBase standard, or the Xbase standard as it is often called.

He said the consolidation could benefit users by putting the resources of larger companies behind the Xbase products originally developed by small firms.

Computer Associates hopes to close its purchase of the privately held Nantucket within a month. The terms of the agreement are not being disclosed.

Contact: Bob Gordon, Computer Associates, 516-342-2391; Deborah Coughlin, Computer Associates, 516-342-2173.

"You wouldn't be hearing squeaks and squawks if you'd just stop dialing modem numbers for phone numbers."
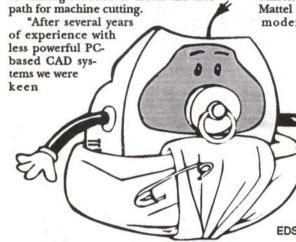
Newsbytes

Toymaker Turns To CAD/CAM Software

KWUN TONG, HONG KONG, APR 23 (NB)—Precision Moulds Limited (PML), a subsidiary of U.S. toy manufacturer Mattel, has turned to Unigraphics software from EDS (Electronic Data Systems) to upgrade its computer-aided design and manufacturing (CAD/CAM) systems from a PC-based to workstation-based environment.

The Unigraphics systems, running on three Sun Sparc 2GX workstations, will extend PML's capabilities to solid modeling, surfacing, analysis, three-dimensional drafting and machining. One workstation will employ Unigraphics' Graphics Machining Products to create the tool-path for machine cutting.

"After several years of experience with less powerful PC-based CAD systems we were keen

to speed up our design process," said M.K. Chan, director of PML. "Unigraphics is not only much faster but also provides a CAM toolpath that is directly linked to our CNC cutting machines. By automating these tasks, we expect the whole design process, from initial drafting to manufacturing, to be at least 15 percent more efficient than before, with a comparable rise in the consistency of our manufacturing procedures."

PML manufactures moulds for Mattel's full range of toys, including Hot Wheel Cars and Barbie Doll, at its plant in Kwun Tong. The design process begins with three-dimensional part drawings prepared by Mattel in the U.S. These are transferred by modem to PML's workstations where Unigraphics is used to create 3-D tool drawings and the tool-path.

Later, design details on the 3-D model can be enlarged, rotated and shaded to enable easy viewing. In addition, the toolpath can be modified at any time, or when design changes are necessary.

Contact: Donald E. Davidson, EDS, +852 735 3886.

AT&T To Manufacture In Canada
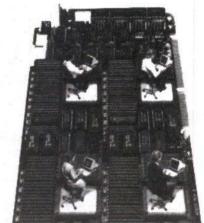
WATERLOO, ONTARIO, APR 24 (NB)—Eight years after the Canadian subsidiary was created, AT&T Canada has announced plans for its first manufacturing in Canada. A plant belonging to NCR Canada in Waterloo will make circuit packs for AT&T's FT-2000 Lightwave System, which transmits data and voice signals over optical fiber.

AT&T acquired NCR last year. The NCR plant in Waterloo will continue making circuits for NCR while adding two shifts on a circuit production line to produce the parts for AT&T. Production is to start late this year.

The move will add about 50 jobs to the existing staff of roughly 600 at the Waterloo plant, AT&T Canada spokeswoman Suzanne Berman told Newsbytes. Production of the surface-mount technology circuit packs in Waterloo will supplement existing production of the parts at an AT&T factory in Massachusetts, Berman added. The parts will be distributed globally.

AT&T said its purchasing of materials from local vendors will also benefit the local economy.

Within a year, AT&T plans to begin manufacturing circuit packs for two other transmission products, the DACS II Digital Access and Cross-Connect System and the DDM-2000 Network Multiplexer, at the plant. AT&T also expects to begin research

and development activities in Canada on Synchronous Optical Network (SONET) transmission.

AT&T Network Systems, based in Morristown, N.J., sells these and other transmission systems in Canada, the United States, and around the world to telephone companies and other service providers.

By the end of 1993, the company said, the Canadian operation will produce more than 30,000 circuit packs, valued at $20 million, each year.

Contact: Suzanne Berman, AT&T Canada, 416-756-5034; Rich Meyer, AT&T Network Systems, 201-606-2453.

Versatile New Color Copier Introduced By Canon

TOKYO, JAPAN, APR 22 (NB)—Canon has developed a low-cost (about US$6,000) but powerful color copier which it claims is the smallest and most lightweight color copier in the world. It's also designed to connect to PCs to print out documents, be a scanner, and a printer of photographs.

Canon's latest copier is designed for the desktop and prints pages in full color. Called the BJ copier Pixel JET, it supports 400 dots-per-inch resolution and 256 colors which Canon claims are "natural."

Canon's BJ copier is based on the company's "bubble-jet" technology, an advanced ink jet printing method. This bubble-jet technology is already employed in Canon printers for personal computers, such as those for Apple's Macintosh and the NEC PC-9801.

Canon's BJ copier can also be connected directly with the Macintosh and the PC-9801 through a special interface called "Intelligent Processing Unit" (IPU). This interface allows the copier to be used as a full-color printer for the Macintosh and the PC-9801. Snapshots of the screen can also be printed on this copier. The unit is further designed to be a scanner to input color picture data into the personal computers. Canon says negative or positive photographic films can be used to print photos.

The size of this copier is 54 x 47.6 x 21.7 cm, and it weighs 20 kg. It can print postcards to A4-size paper. The copying time is about 96 seconds per paper.

Contact: Canon, 604-278-1431.

Boston Computer Museum Hosts Virtual Reality Display

BOSTON, MASSACHUSETTS, APR 23 (NB)—The Computer Museum is offering visitors a chance to explore virtual reality. In what the museum says is the first public demonstration of virtual reality using networked personal computers, two people at a time will be able to meet in an imaginary 3-D universe and build an imaginary house.

The demonstration will use personal computers built around Intel 486 microprocessors—two per person—an Ethernet local area network connection, joysticks, control wands, and specially designed helmets that track head movement.

Anna Laurita, a spokeswoman for Intel, told Newsbytes the system costs about $25,000 per person. That, she said, is considerably cheaper than a dedicated virtual reality workstation, which would be more like $100,000.

Visitors to the exhibit will put on helmets and earphones that create the illusion of stepping into an artificial world. They will use wands to pick up objects and joysticks to move themselves and the object around. A variety of parts for building imaginary houses—such as walls, different roof shapes, and so on—will be supplied, and two people will be able to work together in the virtual universe to build a house.
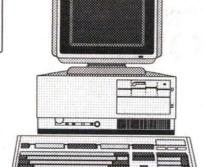
Liz Armbruster, a spokeswoman for the museum, said a permanent exhibit will open this summer, entitled "Tools and Toys: The Amazing Personal Computer."

Intel and Sense8 Corporation created the exhibit for the Computer Museum.
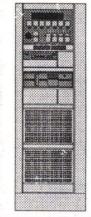
Contact: Liz Armbruster, The Computer Museum, tel 617-426-2800, fax 617-426-2943.

ALR Intros Line Of Multimedia Machines

IRVINE, CALIFORNIA, APR 24 (NB)— With the considerable cost of multimedia personal computer systems these days, many users are attempting to add multimedia capability to their existing systems. Advanced Logic Research (ALR), however, says it will be offering MPC machines to its Flyer line of computer systems and plans to price the new computers significantly lower than the competition.

MPC systems are IBM or compatible computers equipped with advanced sound capability and compact disc read-only memory drives geared toward the use of video, animation, and sound. ALR says the average MPC retails for around US$4,500 but it is offering its MPC systems starting at US$2,795.

The company is offering two new MPC systems, the Powerflex Flyer 3SX/25 MPC for US$2,795 and the Flyer 32DT 4SX/25 MPC for US$3,295. Both computers offer Super Video Graphics Array (SVGA) monitors, with 1024 X 768 resolution, ALR said.

The 3SX/25 has an Intel 386SX microprocessor running at 25 megahertz (MHz) with 4 megabytes (MB) of random access memory (RAM) on the motherboard which can be upgraded to 16 MB of RAM, and an 80 MB hard disk. The 4SX/25 offers an Intel 486SX microprocessor running at 25 megahertz in an 80 MB hard disk model and a 200 MB hard disk model.

Both systems come with a Pro Audio Spectrum Plus sound board from Media Vision and an internal Sony CDU-31 ACD CD-ROM drive with a fast 340 millisecond (ms) access time. Both also include a flash read-only memory (ROM) basic input/output (BIOS) system so the hardware peripherals which the system can support are easily upgraded via software in the future, ALR said.

The software included with the systems is ALR's version of MS-DOS 5.0; Microsoft Windows 3.1; and Microsoft Multimedia Works, an integrated software package including a talking tutorial, word processor, spreadsheet and charting database, drawing and telecommunications capability; Microsoft Bookshelf, a dictionary, encyclopedia and atlas; CD-ROM discs containing education, reference, business and entertainment software; and Multimedia Beethoven, offering music compositions.

Compared to similar MPC units from Tandy, ALR says its 486SX-based computer is faster and thousands less than a less powerful Tandy unit. The Tandy 4033LX, based on a 386DX chip with an 80 MB hard disk is retail priced at US$5,500 while the ALR 486SX unit with an 80 MB hard disk is only US$3,195, Kevin Roberts of ALR told Newsbytes. A 200 MB hard disk brings the 4SX/25 up to US$3,795, which is still significantly less than the Tandy computer, Roberts said.

Also, the SVGA offered with the ALR computers is much better for the viewing of video, Roberts said. While Tandy and Compuadd do offer SVGA MPC systems, those systems can only display 16 colors as opposed to the 256 colors offered by the ALR SVGA display. Roberts added that the ALR systems offer 1 MB of integrated video random access memory (RAM) while the Tandy systems only offer half that.

The ALR MPC computers come with a 1-year limited warranty. The company says optional on-site and extended warranties are available. ALR says it expects to ship its first MPC models beginning in June of this year.

Contact: Kevin Roberts, Advanced Logic Research, 714-581-6770 ext. 495.

Russian-US Venture Develops Handwriting Recognition

MOSCOW, RUSSIA/BOULDER, COLORADO, APR 13 (NB)— Paragraph International, a Russian-American business venture, has announced that it will join with GO Corporation to develop Calligrapher, a cursive handwriting product, for GO's pen-based PenPoint operating system.

Under terms of the agreement GO will be a non-exclusive worldwide distributor and publisher, marketing Calligrapher in addition to its own GOWrite. GOWrite is a replaceable printed-character recognition engine.

Paragraph International said it would demonstrate an early version of Calligrapher for PenPoint on April 16th. The two companies said that the product would probably be available for commercial release later in the year.

According to the Paragraph International announcement the two companies are working with independent software vendors (ISVs) and key customer accounts to ensure effective integration of the technology into PenPoint.

The ability of computer operating systems to recognize cursive handwriting is essential to the success of pen-based applications. Pen computers allow users to write directly onto a tablet or the screen instead of using a keyboard. Cursive refers to the writing where the letters are joined together, as when we sign our names. The first pen-based systems recognized block, or printed characters. Paragraph says Calligrapher is the first writer-independent handwriting recognition system to support other cursive and printed characters.

Boulder, Colorado-based Paragraph International has the exclusive marketing rights for all products developed by Paragraph JV, a Russian/American joint venture formed in 1989. Paragraph JV is headquartered in Moscow.

In October Paragraph International announced that it had signed a non-exclusive agreement with Apple Computer which calls for the two companies to jointly develop Paragraph's handwriting recognition technology. The agreement also sets forth licensing and royalty details.

Contact: Michael Reimer, Paragraph International, 303-443-8777, fax 303-449-2773; Marcia Mason, GO Corporation, 415-345-7400.

PC NEWS

Microsoft Announces Flash File System

REDMOND, WASHINGTON, APR 23 (NB)—Microsoft has announced that this summer it will introduce its Flash File system, which uses flash memory to function as an ordinary disk in a PC.

The company said the Flash File system also makes it easy to develop custom MS-DOS and Windows applications for embedded systems and consumer electronic devices by allowing developers access to a wide range of existing DOS and Windows development tools.

Flash memory is non-volatile, so any data in memory is not lost when the computer is turned off. Flash memory saves and retrieves data much more quickly than read-and-writes to a hard or floppy disk.

Microsoft said it has released the specifications for the system's media control structures, which will allow other companies to develop systems for reading and writing data. Flash memory cards can be removed and inserted in computers much like floppy disks are, and will work with any PC that supports the Microsoft Flash File system. Flash cards will be especially useful in palmtop, pen-based and other sub-compact computer systems where space in the case is at a premium. Using flash memory chips, small computers can utilize as much data storage space as larger units.

Microsoft said it will use Intel's flash cards, which presently can store up to 20 megabytes (MB) of data. Like floppy and hard disks, data stored on flash cards can be erased by the user. Intel claims that by the year 2000 it would be probable that flash cards would be able to store as much as half

Presently in beta testing, the Flash File system saves and retrieves data much more quickly than read-and-writes to a hard or floppy disk.

a gigabyte of data, or 50 times as much information.

Intel announced this week that it had cut the price of its flash chips, which it said until recently had cost more than twice the price of conventional memories and many times the cost of hard disks.

Martin Middlewood told Newsbytes that the flash cards currently come in eight and 20 MB versions, which can be easily inserted and removed by the user. The number of erasures that can be done on a flash chip are limited, although the number is in the hundreds of thousands. That will limit the life of the present flash cards to several years, said Middlewood. Flash cards require special slots in the PC, so they cannot be retro-fitted to your existing system. However, the computer can have several slots for flash cards.

Flash cards will also help lengthen battery time before recharge, since the flash chips draw considerably less power than a hard drive. The Flash File system is presently in beta testing.

Do not look for flash cards to replace hard disks yet. Depending on the application, desktop computers used for tasks such as graphics, computer-aided design (CAD) and other data intensive tasks still require considerably more storage capacity than today's flash cards can provide.

Contact: Collins Hemingway, Microsoft, 206-882-8080.

IBM Sets Out To Spur Pen Development

WHITE PLAINS, NEW YORK, APR 20 (NB)—Joining in a wave of activity surrounding pen-based computing, IBM has announced the IBM Pen Developer Assistance Program and the limited availability of its pen-based ThinkPad computer. The developers' program is meant to help IBM customers and independent software vendors begin developing pen-based applications, IBM said.

The program will give developers access to information about IBM's pen-based computing plans and to training courses, company spokeswoman Tara Sexton told Newsbytes. There will be a fee for participating in the program, Sexton said, but it has been deferred until the fourth quarter of this year. The amount of the fee was not available.

IBM also announced a special bid version of its ThinkPad pen-based computer for customers and developers who want to start work now on applications to run on future IBM pen-based computers. The ThinkPad is scheduled for general availability in the fourth quarter of this year.

The ThinkPad comes with the PenPoint operating system, licensed from GO Corp., and handwriting recognition technology developed at IBM's Thomas J. Watson Research facility in Yorktown Heights, New York and in its Boca Raton, Florida, facility.

The special-bid ThinkPad (Model 2521) comes with a 20-megahertz 386SX microprocessor, either four or eight megabytes of memory, an integrated data/fax modem, an AC/DC adapter, a nickel-cadmium battery, serial and parallel ports, a connection for an optional external 3.5-inch diskette drive, and an external keyboard port.

The ThinkPad that becomes generally available late this year may be slightly different from the current version, Sexton said, depending on customer input in the meantime.

IBM customers and application developers can order the new system directly from IBM through the special bid process, a program for obtaining computers from IBM that are not generally available through traditional purchasing channels. The first systems will be delivered in July, the company said.

IBM said it has already provided selected independent software vendors and customers with an early version of the ThinkPad for evaluation.

Contact: W. Dean Kline, IBM, 914-642-5408; Tara Sexton, IBM, 914-642-4662.

New For PC: Intel Fax Software for Windows, Modems and Boards

HILLSBORO, OREGON, APR 20 (NB)—Intel has announced two software programs for Windows: Faxability Plus and Faxability Plus OCR. The company says both applications are designed to run on any industry standard fax modem.

The company said Faxability Plus offers WYPIWYF (what you print is what you fax), allowing the user to transmit faxes from within a Microsoft Windows application by using the application's print command to obtain laser-quality fax printing. Intel's enhancements business unit manager, Dick Gough, said Intel fine-tuned the Faxability software to more than 20 fax modems. "This is the way faxing from a PC was meant to be," proclaimed Gough.

Faxability Plus can send and receive faxes, and allows incoming faxes to be viewed, printed, forwarded or saved. Faxes can be saved in PCX, DCX and TIFF formats. The program also includes zooming and sizing, rotation, and copying to and pasting from a clipboard. Faxes can be printed to any Windows-supported printer.

Faxability Plus also includes a manual Send feature, useful for users who travel and use notebook or laptop computers. The manual Send option allows the initial connection to be made using a telephone handset, then transfer of control to the fax software by pressing a "hot key." The program also provides prefix and suffix support, allowing users to post charges to an AT&T or Sprint credit card. A reverse video option provides easier viewing of incoming faxes on the monochrome displays of many laptop/notebook computers.

Intel said Faxability Plus/OCR is the first fax application that has built-in support for both optical character recognition (OCR) and the TWAIN application programming interface (API) for image-capturing scanners. TWAIN, Intel's Audrey Whitfield told Newsbytes, is a scanner driver developed jointly by HP, Kodak, Logitech and several other companies.

Faxability Plus has a suggested list price of $119, while Faxability Plus/OCR is priced at $249. Intel said both would be available in May of this year.

Intel would prefer if you also run this software with its new fax/modem boards which are priced as low as $129 and work under MS-DOS or MS-Windows.

The new SatisFAXtion products include the Modem/400, which runs at up to 14,400 bits/second for $499, and the Modem/400e, which goes inside your computer and lists for $549. The Modem/200, a 9,600 baud product, is $369, and the Modem/100, an entry-level product with a data speed of 2,400 baud, a fax reception speed of 4,800 baud, and a fax sending speed of 9,600 baud, costs $129. All of the new products support the Communicating Applications Specification, or CAS, standard, first offered by Intel and DCA.

Contact: Dan Wagner, Intel, 503-629-7565; Audrey Whitfield, Intel Software, 503-629-7285.

GENERAL

CPA Awards Honor Journalists, Including *Newsbytes*

NEW YORK, NEW YORK, APR 22 (NB)—Newsbytes News Network has been honored by the Computer Press Association, winning first runner up in "Best Online Publication." This is the second time Newsbytes has received runner-up status in this annual event. Twice before, Newsbytes received the top award, Best Online Publication.

The best online publication category had 22 entries, the largest number in the CPA awards' 7-year history. Best Online Publication went this year to Prodigy's Computer Club. Macworld Online also won runners-up.

Judging this category, Pauline Ores, editor-in-chief of *PC Publishing and Presentation*, and Tom Farre, editor of *Reseller Management*, said of Newsbytes, "This online computer service is focussed, to the point ... just what an online news service should be. The content is timely, articles well written, and the reporters and editors have a real nose for news."

There were an average of 20-40 submissions for each of the Computer Press Association's 21 categories, the largest number ever submitted for the awards. The ceremony also hosted the largest number of attendees in its history—140 guests. The awards, honoring outstanding work by high-technology journalists in 1991, were held at New York City's Tavern-on-the-Green Restaurant.

Judges for the 1991 awards included Bill Machrone, publishing director, *PC Magazine*; Jerry Borrell, editor-in-chief, *MacWorld*; William Bulkeley, staff reporter, *The Wall Street Journal*; Esther Dyson, editor and publisher, *Release1.0*; Geoff Lewis, senior editor, *Business Week*; Stewart Cheifet, executive producer, *Computer Chronicles*; and columnist John C. Dvorak.

CPA President Galen Gruman and Robert Adam of Citizen America Corp., the co-sponsor of the awards and luncheon, and Hal Glatzer, CPA Awards Chairman, presented the awards to the winners and runners up.

Deborah Branscum was honored as best computer columnist for her monthly columns in *MacWorld*, finishing ahead of runners-up Henry Bortman, also of *MacWorld*, and Chris O'Malley of *PC Sources*. Preston Gralla received the award for authoring the best feature in a computer publication. His "Online Suicide," appearing in the May 1991 issue of *PC/Computing*, detailed the suicide of 43-year-old Blair Newman, a PC industry figure who, until shortly before his death, had been a prolific contributor to the WELL (Whole Earth 'Lectronic Link). Shortly before his suicide, Newman erased hundreds of messages he had posted on the WELL.

MacWorld was judged the best computer magazine, circulation more than 50,000, while *Computers In Accounting* received the award for best computer magazine, circulation less than 50,000. *Computer Retail Week* won the award for best computer newspaper, circulation less than 50,000; *PC Week* for best computer publication, circulation more than 50,000, and *Windows Watcher* newsletter for best computer newsletter.

In the various book categories, the awards went to *Computers and Society: Impact!* by David O. Arnold (Best Non-fiction Computer Book), *Getting Started With the Apple Macintosh including System 7* by Neil Salkind (Best Introductory How-To Book—Systems), *Microsoft Excel Step by Step* (no named author) (Best Introductory How-To Book—Software), *The Art of Computer Systems Performance Analysis* by Raj Jain (Best Advanced How-To Book—Systems), and *Real World PageMaker 4: Industrial Strength Techniques, Windows Edition* by Jesse Berst (Best Advanced How-To Book—Software). It was a big day for Berst, whose publication, *Windows Watcher*, also won best newsletter.

British science fiction author Douglas Adams received the Best Opinion or Editorial in Computer Publication award for his "Under The-Desktop Publishing," which appeared in *MacUser*. In the review categories, "Introducing: The PowerBooks" by Russell Ito in *MacUser* received the Best Hardware Product Review award while Craig Stinson's *PC Magazine* piece "Spreadsheets Begin to Put the User First" was the winner of Best Software Product Review.

In the categories relating to general-interest publications, G. Pascal Zachery & Stephen Kreider Voder of *The Wall Street Journal* received the award Best News Story in General Interest Publication for their "Apple, IBM Discuss Swap of Technology." Elizabeth Corcoran's *Scientific American* article "Calculating Reality" won the Best Feature in General Interest Publication award. The Best News Story in Computer Publication award went to Peter Kraus of *Information Week* for his "Akers Memo: Backlash."

The Business Radio Network's "Computing Success!" was the winner of the Best Radio Program award and "ABC News, PC Tenth Anniversary Show" was judged Best Television Program.

Entries for consideration for the 1992 awards will be accepted by the Computer Press Association in November, 1992.

The winners will be announced in the *Columbia Journalism Review* magazine in the July-August issue.

Contact: Holly Padove, Horizon Communications, 805-466-5955.

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PenPoint OS Shipping; Products Introduced

PenMagic's Numero is a cross between a spreadsheet and a word processor that allows users to write, erase, highlight, and write on top of their work to correct it. Handwritten letters can be translated to computer characters as though they had been typed, or translation can be deferred. Handwriting and translated type can also be mixed and printed together.

SAN FRANCISCO, CALIFORNIA, APR 17 (NB)—Several new pen-based computing products were introduced at GO Technology's PenPoint Premiere show in San Francisco.

GO said it is shipping the commercial version of PenPoint for the first time. PenPoint is a 32-bit operating system for 386 or higher microprocessor-based pen computers and reduced instruction set computing (RISC)-based machines.

GO says PenPoint is designed for mobile computing with the inclusion of pre-emptive multitasking. Pre-emptive multitasking allows the user immediate access to information as the user's pen takes priority. Other tasks the computer might be working on in the background such as handwriting processing or communications are pre-empted until the user's demand is accomplished. GO says mobile computing users need instant access to information and the pre-emptive multitasking allows them that access.

Virtual memory is available to users as well. Defined as designating a portion of the hard disk as an extension to the random access memory (RAM) physically available on the computer, virtual memory allows the user the ability to do more with less. GO says users can use virtual memory instead of adding more RAM and can open more documents simultaneously or use larger documents than their available RAM would normally allow.

GO says users don't have to understand or even see applications, files, or directories but can simply move from one page to another (which moves them transparently from one application to another) in the same way they would use pen and paper in a notebook.

IBM introduced the ThinkPad and says the new pen-based computer will ship in July. It also announced the IBM Pen Developer Assistance Program for providing assistance to customers and independent software vendors (ISVs) to encourage development of pen-based applications.

The ThinkPad will ship with IBM's version of the PenPoint OS, IBM said. IBM customers and application developers who want a ThinkPad for headstart can get one through a special bid process. IBM says the special bid version of the ThinkPad (Model 2521) is durable and comes standard with a 20 megahertz (MHz) 386SX microprocessor, either four or eight megabytes (MB) of random access memory (RAM), an integrated data/fax modem (U.S.-compatible), an AC/DC adapter, a nickel cadmium battery, serial and parallel ports, a diskette drive port for connecting the optional external 3 1/2-inch, 1.44/2.88 MB diskette drive, and an external keyboard port.

Numero, a "financial work processor" was announced by PenMagic for the PenPoint OS. Numero starts a new category of software for pen computers, says PenMagic, because it's a mix between a spreadsheet and a word processor that allows users to do tasks on pieces of "work paper" that look and act much like real paper in a common sense way. For example, users can write, erase, highlight, and write on top of their work to correct it. Handwritten letters can be translated to computer characters as though they had been typed, or translation can be deferred. Handwriting and translated type can also be mixed and printed together.

Pagemap, a feature of Numero, allows the user to magnify the paper, scale it to fit on any size screen, or "fold" it so one portion of a page can be compared to another, PenMagic said.

The software is "smart" as well, PenMagic said, as the user can write the letter "T" on the date line and the software will fill in today's date. Drawing an underline at the bottom of a column of numbers will cause Numero to add them, highlighting a group of numbers and dragging the highlighted portion to a piece of graph paper will cause Numero to create a graph using those numbers. More than 70 built-in financial, statistical, and mathematical functions are included, PenMagic said.

The "work paper" can be designed by the user or a choice can be made from over 40 already available pieces of paper. Choices for the design of the paper include how many columnar grids per page, selecting from eight data types, specifying page lay-out including lines, fonts, and graphics.

PenMagic also announced a training program on Numero for consultants, systems integrators and value-added-resellers (VARs) with copies of software, reference materials, and in-depth information for designers. PenMagic hopes the training program will help its partners to train new users. The company is charging $800 for the course and says more information is available from the Canadian firm by telephone at 604-988-9982 or by facsimile at 604-988-0035.

In addition, Slate Corporation announced a suite of applications for PenPoint. The company says it has developed Slate Penapps, an applications development environment; Slate Penbook, electronic book software package; Slate Laplink Pro for PenPoint, a file transfer utility; Slate At-Hand, a "pencentric" spreadsheet; Slate Safetypen Utilities, which provide backup and password security; and the Slate Day-Timer Pen Scheduler software, a daily planner and notetaker based on the Day-Timer standard.

Slate says it has an agreement with GO under which GO will resell Slate's Penapps development product. The agreement was made under a new program called the PenPoint Custom Solutions Alliance. The Custom Solutions Alliance is to encourage development for the PenPoint OS. Slate says more than 400 companies are developing with the Slate Penapps Developer's Release, which has been available since March 1991. However, the commercial release of Penapps 1.0 won't be until July and at that time will be available from Slate's Scottsdale, Arizona headquarters.

Oracle, a well-known supplier of database software said it will provide a developer's toolkit for the building of interfaces between PenPoint and Oracle and IBM databases. Oracle says the toolkit will offer support for its programmatic interfaces as well as a version of Structured Query Language (SQL) Net, Oracle's client/server networking software. Oracle says its products for the PenPoint operating system are scheduled for release in the fourth quarter of this year.

Contact: Miller Communications for Photonics, tel 415-962-9550; GO, tel 415-358-2075; IBM, 914-642-5408; PenMagic, 604-988-9982; Slate, 602-443-7322; Oracle, 415-506-3117.

IBM Offers OS/2 2.0 To Windows Users For $79

Newsbytes has learned that IBM is offering its latest version of OS/2 2.0 to owners of any version of Windows for C$79.

IBM has set up a toll-free number for order and information at 1-800-465-1234 (or local software dealers) and reports are calls to the number have been brisk. The company is allowing users of the previous release (1.3) of OS/2 to upgrade for $1, and DOS users can have the product for C$159, IBM said.

The new version of OS/2 2.0 is a graphical user interface (GUI) that meets the common user access (CUA) guidelines, and breaks the 640 kilobyte barrier of DOS, IBM said. The product will run Windows 3.0 applications.

Between 15 and 30 megabytes (MB) of hard disk space are required for the OS/2 2.0, IBM support personnel told Newsbytes. Hardware requirements include 4 MB of random access memory, and a minimum of a 386SX-based IBM or compatible computer recommended. Allowing OS/2 2.0 a full 30 MB of hard disk space is the best option

as it improves performance, IBM representatives said.

Paul Duncanson, president of the Los Angeles OS/2 Users Group told Newsbytes he has seen both Windows 3.1 and Deskview run under OS/2 2.0. Duncanson said IBM reported over 10,000 defects were identified and corrected in version 2.0.

Duncanson said there is an estimated 1.9 million lines of additional code in C and assembly language in the new OS/2. While there are problems with the product, such as incompatibility with some video drivers, Duncanson says he is excited about the product and thinks it will take off in the user community.

One tidbit: Duncanson says pressing the Ctrl+Alt+Shift+O keys (O not zero) brings to the screen the names of all the IBM programmers who worked on OS/2 2.0.

Contact: IBM, 1-800-465-1234; Paul Duncanson, Los Angeles OS/2 Users Group, tel 805-584-8732.

New For PC: Lotus 1-2-3 For Home

CAMBRIDGE, MASSACHUSETTS, APR 21 (NB)—Lotus Development Corp. has announced the immediate availability of 1-2-3 for Home, a product it describes as "the first Lotus spreadsheet specifically designed to meet the needs of home computer users." 1-2-3 for Home has a suggested retail price of $149.

1-2-3 for Home contains a version of 1-2-3 tailored for home use and SmartSheets, a set of 50 customized application templates. They include "Statement of Net Worth," which provides users with a snapshot of their present financial condition; "Refinancing a Mortgage," which analyzes the opportunity of refinancing a mortgage; "Year End Tax Plan" which helps calculate quarterly tax payments and year-end tax planning; and "College Costs," which calculates the estimated total cost of sending children to college and the required yearly investment to attain that goal.

Lotus spokesperson Karen Schiff told Newsbytes that the version of 1-2-3 included with the new product, while retaining the functionality of 1-2-3, has been modified so it will run on minimal hardware configurations while providing the power considered appropriate to the home user. She said, "The size of the spreadsheet has been narrowed to 512 columns and 256 rows and the File Viewer and Auditor features of other 1-2-3 MS-DOS versions have not been included. They were features not considered needed for the average home user, particularly at the expense of larger equipment."

1-2-3 for Home requires an IBM PC or Lotus-certified compatible with a minimum of 512K of RAM, a hard disk and DOS 2.1 or higher.
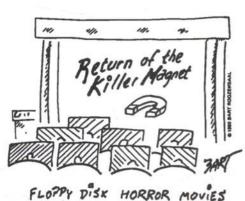
Contact: Karen Schiff, McGlincey & Paul; 617-862-4514.

Japan: IBM-compatible Pen-input Computer Debuts

TOKYO, JAPAN, APR 15 (NB)—Japan's Wacom has developed a pen-input computer which is compatible with an IBM PC/AT, called the Pen-top model V.

Wacom's latest pen-computer will be released this July. It will be sold for 558,000 yen, slightly less than NCR's pen computer.

Wacom's Pen-top computer consists of

an electric pen, a tablet, and a main computer. The tablet is A4-sized and 1.5 centimeters (cm) thick. It weighs one kilogram (kg). The tablet is equipped with a TSTN LCD (liquid crystal display). It supports 16 color gradations and IBM's VGA (video graphics array).

The main computer box is also A4-sized, and is 2.5 cm thick. It weighs 1.5 kg. A 25 megahertz (MHz) 80386SL processor is used in the system. It also includes four megabytes (MB) of RAM, with a maximum of eight MB. It also comes with a 3.5-inch floppy disk and a 120 MB 2.5-inch hard disk.

The computer supports both DOS/V and Windows 3.0. Interestingly, an Ethernet board and a fax board can also be equipped as an option.

Wacom's Pen-top computer is based on a computer which was jointly developed with Integrated Technologies in the U.S..

Wacom is a major tablet maker and has been manufacturing tablets for IBM and Apple on an OEM (original equipment manufacturer) basis.

Contact: Wacom, +81-480-58-1118.

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TRENDS

Delrina Says Forms/Pens/OCR/Fax To Change Office

TORONTO, ONTARIO, APR 16 (NB)—A combination of electronic forms processing, optical character recognition, pen computing, and computer fax modems will change the way offices work over the next few years, according to Mark Skapinker, president of Toronto-based Delrina Technologies. Skapinker said the four technologies will allow the vast bulk of office information now handled on paper to be dealt with electronically.

Skapinker's company sells two of the four technologies he discussed: forms processing software and facsimile send-receive software. The company came close to acquiring an American firm that makes optical character recognition software last fall, but the deal was called off. He spoke at Software World, an exhibition and conference sponsored by Digital Consulting of Andover, Massachusetts, at the Metropolitan Toronto Convention Centre.

Today, business in the United States creates 2,200 million documents each year, Skapinker said, and 95 percent of these are in paper form. Of those, the majority are business forms of one kind or another.
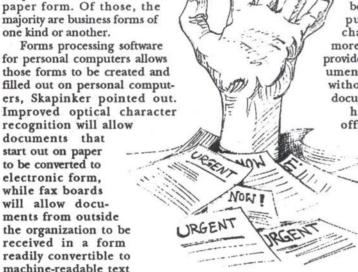
Forms processing software for personal computers allows those forms to be created and filled out on personal computers, Skapinker pointed out. Improved optical character recognition will allow documents that start out on paper to be converted to electronic form, while fax boards will allow documents from outside the organization to be received in a form readily convertible to machine-readable text

using OCR software.

Finally, pen-based computers will make it more practical to use electronic forms on notebook computers in place of paper ones. Using a computer keyboard is not easy in the field, where there may not be a surface on which to set the machine. A machine that accepts input from a pen is more easily held with one hand while writing with the other.

Skapinker expressed doubts about the usefulness of pen-based computing for mainstream applications. Handwriting recognition technology just is not good enough yet, he said. But he went on to say that standard forms make the job much easier, because they are full of "hints." For instance, there may be a limited number of possible entries in a given space on a form. So, if software can recognize only three letters of a word, it can search a database of possible entries to find one that matches.

Skapinker added that the wide acceptance of stand-alone fax machines and of fax boards for personal computers makes optical character recognition more accessible because it provides a way of getting document images into the PC without buying a separate document scanner. "We all have a scanner in our office," he said. "It's called a fax machine."

Contact:
Josef Zancowicz,
Delrina Technologies,
tel 416-441-3676,
fax 416-441-0333.

Delrina, WordStar Call It Off

TORONTO, ONTARIO, APR 13 (NB)— Forms and fax software maker Delrina and the venerable word processor vendor WordStar, of Novato, California, have cancelled plans to merge. The companies cited management issues, accounting problems, and legal issues in backing off from a letter of intent they announced in late March.

Josef Zancowicz, a spokesman for Delrina, said one of the problems was that many of Delrina's shareholders are Canadian institutions that own the company's shares within pension funds and other such investment funds. The rules governing these funds often specify the percentages of Canadian and foreign stocks to be held, he said, and Delrina's merger with WordStar would have turned the company's stock into a U.S. stock. That would have forced many shareholders to sell suddenly, causing them to face capital gains taxes on the increase in the stock's value, he said.

There were also some legal complications arising from merging a Canadian and an American company listed on different stock exchanges, Zancowicz added.

Finally, there were "philosophical differences" between the

companies on management and control issues. "Who had control in terms of how this organization would run was difficult to resolve," Zancowicz said. He explained that Delrina is a strong technology company while WordStar is largely a sales and marketing organization.

The companies had presented the deal as a merger of equals, despite WordStar's larger size and the fact that the technical structure of the deal made WordStar the surviving company. Delrina officials said earlier that they expected the Delrina name to survive at least as part of the merged firm's new name.

Zancowicz said the roles of both companies' executives in the merged organization had largely been resolved. They had not announced the planned executive slate, except to say that Ron Posner, current chief executive of WordStar, was to get the top job.

Contact: Josef Zancowicz, Delrina Technologies, 416-441-3676, fax 416-441-0333; Kristin Keyes, WordStar, 415-382-4955.

GM Canada To Put Parts Catalog On CD-ROM

TORONTO, ONTARIO, APR 13 (NB)— General Motors Canada will stop sending out parts catalogs in 1993—on paper, at least. The automaker is telling its 1,100 dealers across Canada they will have to accept the information on compact disk read-only memory (CD-ROM) or on micro-fiche.

The new CD-ROM version of the catalog will save dealers quite a bit of shelf space, and it is also expected to make it easier to look up parts. Patti Knight, a spokeswoman for Bull HN Information Systems, which will convert the parts catalog to CD-ROM format for GM Canada, said the old paper catalog consists of eight to 10 volumes that can take up about eight feet of shelf space.

Besides that, Knight said, finding the desired part in the paper catalog is something of a black art. "The ability to reference that information quickly and accurately is a skill that takes quite a lot of time to develop," she said. With the CD-ROM version, dealers will be able to search for parts by car model, year, and the part of the car (as in front end, rear end, passenger compartment, and so on). When they think they've found what they're looking for, they will also be able to see picture of the part on the computer screen.

The compact disk hardware will work with powerful personal computers based on Intel 486 processors. While Bull has been chosen to put the catalog into CD-ROM form, GM will be able to rely on three suppliers—Bull, ADP, and Reynolds & Reynolds—for equipment.

The 1994 model year catalog, to be available in September of 1993, will be the first to be issued in CD-ROM form. Knight said GM Canada's move is part of a worldwide GM initiative to replace paper catalogs with electronic systems.

Contact: Patti Knight, Bull HN, 416-479-2855.

Lasermaster Intros 1,000 DPI Printing For Mac, IBM

MINNEAPOLIS, MINNESOTA, APR 14 (NB)— Lasermaster Technologies has introduced Unity 1000, a multiplatform plain-paper typesetter designed to provide fast, high-resolution PostScript printing from Macintosh and IBM-compatible PCs, as well as minicomputers and mainframes.

Unity 1000 connects to the user's computer through LocalTalk, Centronics parallel, or RS-232C serial interfaces. The typesetter includes an internal hard disk with 135 Type 1 typefaces already installed, 1,000 by 1,000 dots-per-inch (dpi) TurboRes quality, SmartSense automatic emulation sensing, an Ethernet expansion port, automatic port switching, and TurboGray halftone enhancement technology.

Lasermaster's announcement said the Unity 1000 supports Type 1, Type 3, TrueType, and Hewlett-Packard soft font formats, and is fully compatible with Apple's System 6.0 or 7.0, DOS, Microsoft Windows, Unix, OS/2, and other operating systems.

Lasermaster first introduced 1,000 dpi typesetting for PCs in 1989. "The Unity 1000 will follow in our tradition of high speed, high resolution and more fonts, and marks a whole new generation of printing technology for Lasermaster," said CEO Mel Masters.

The TurboGray technology included with the Unity 1000 is also a new product from Lasermaster. Lasermaster said TurboGray improves the appearance of halftone images by providing increased gray levels at higher screen frequencies. Users have both high image resolution to show fine detail and smooth gray-level control to achieve contour-free transitions on images with gradually changing densities.

Contact: Karen Neset, Lasermaster, 612-941-8687.

Eco-conscious LED Printer

CHICAGO, ILLINOIS, APR 14 (NB)— Kyocera has introduced the Ecosys aSi, a light emitting diode (LED) printer it says is ecology-conscious.

Kyocera representative Harry Savage told Newsbytes the company does not like to say the print quality of the aSi rivals laser printers. However, the new Ecosys aSi printer doesn't require cartridge changes (it requires only toner refills) and as a result can print for one-fourth the operating cost of laser printers, cutting the operation cost to less than a penny a printed page compared to the 3.2 cents per page of typical laser cartridge printers, Kyocera said.

The Ecosys aSi model FS-1500A uses a drum composed of amorphous silicon (aSi). Savage said the printer's users can refill the toner themselves using toner refills from Kyocera. The refills will come in small, biodegradable containers made of Kalp, a material that when burned only releases water vapor and carbon dioxide, Kyocera representative Steve Petix told Newsbytes.

Print resolution is 300 by 1200 dots-per-inch (dpi) and the printer can print up to 10 pages per minute (ppm).

The printer offers optional plug-in compatibility with Ethernet, AppleTalk, and Token Ring as well as other networks.

Hewlett-Packard III, PCL-5, HPGL, Diablo 630, IBM Proprinter X24E, and Epson LQ-850 are some examples of the printer emulations built into the Kyocera. The printer also incorporates Kyocera's own PostScript-compatible interpreter (KPDL) and page description language (Prescribe II).

Kyocera also says the printer offers duplex printing, can handle as many as 1,250 sheets of paper at once with the addition of two optional 500-sheet drawers, has a 15-bin sorter/electronic mailbox, a power envelope feeder, up to 50 scalable and 87 bit mapped fonts, two slots for up to four megabytes capacity, IC cards, and compatibility with PC, Macintosh, and Unix workstations.

List price for the FS-1500A is US$2,395 and it is expected to ship in the second quarter of this year. Kyocera is planning other printers for introduction in 1992 and 1993 geared more toward the home and small business market, company representatives said.

Kyocera says it will offer a three-year or 300,000-copy warranty on the drum and print head only. A one-year or 300,000-copy warranty is offered on the printer itself.

Contact: Harry Savage, for Kyocera, tel 908-974-0643; Steve Petix, Kyocera, tel 908-560-3400, fax 908-560-8380.

Hotter Hardware, Huge Databases in Forecast

TORONTO, ONTARIO, APR 16 (NB)— The good news for those who have to manage large database applications is that hardware is going to get a lot faster. The bad news is that databases are going to get a lot bigger.

"the only thing that keeps the University of California from digitizing its entire undergraduate library collection is copyright law."

That was the message from Michael Stonebraker, a professor of computer science at the University of California and a consultant on database software, at the Software World conference in Toronto.

Stonebraker said Joy's Law, a forecast made by Bill Joy of Sun Microsystems in the mid-1980s, has turned out to be more or less right. Joy said the power of the fastest single-chip microprocessor in any year in the future, in millions of instructions-per-second, could be predicted by subtracting 1984 from the year and raising two to the power of the difference. Thus the fastest chip in 1991 should run at two to the seventh power, or 128, MIPS. In fact, he said, the figure was about 70 MIPS, but the order of magnitude is right.

That is good news for those whose database applications are stretching the power of current hardware, Stonebraker said. So is the arrival of RAID (redundant array of inexpensive disks) technology, which makes possible very fast and highly reliable mass storage of data.
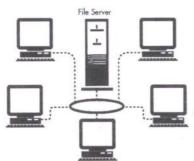
For those reasons, Stonebraker said, anyone whose computing power requirements exceed what is currently available by only one or two orders of magnitude can simply wait for the technology to catch up in the next couple of years.

A third factor is the disappearance of dumb terminals, he said. Desktop workstations and personal computers are now cheap enough that there is no reason to settle for a dumb terminal, according to Stonebraker, and that means much of the processing involved in an application can be moved to the desktop in a client-server setup.

But the other side of the coin is that over the coming decade databases will become much bigger than they are today. The reason, Stonebraker said, will be a trend to incorporate images, audio, and other new types of data. These will require vastly more storage than the simple text and numeric fields used today. And even text will be stored in computer databases in much larger quantities. For example, Stonebraker said, "the only thing that keeps the University of California from digitizing its entire undergraduate library collection is copyright law."

Stonebraker said organizations will have to decentralize their databases, making use of networks of machines rather than relying on one central system. He said features of object-oriented database technology will be needed to handle future applications. Those organizations with aging database systems must some day soon bite the bullet and update them, he concluded, or they will not be able to cope with future needs.

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New For PCs: CA Launches Cricket Paint

ISLANDIA, NEW YORK, APR 20 (NB)—Computer Associates has announced CA-Cricket Paint, 24-bit painting software for personal computers running Microsoft Windows. The software is designed to create images for use in presentations, desktop publishing, and multimedia, the company said.

The software is the latest in CA's Cricket line of graphics software, which includes Cricket Graph, Cricket Draw, Cricket Presents, and Cricket Image. It works with Cricket Image, which is designed for image-processing work.

Computer Associates said CA-Cricket Paint may be used for creating images on a personal computer, or for retouching images brought in from other sources.

The software supports 24-bit color and eight-bit gray-scale processing on any Windows display with Super VGA resolution, the company said.

Among the features of the new package are what CA calls modeless tools—whatever graphics tool is in use, such as a brush, air-brush, or pen, the same options are useable in the same way. Users can open any dialog box and leave it open as long as they like. Anti-aliasing guards against "jaggies" and makes lines as smooth as possible. Advanced painting features include the ability to choose any line weight, to custom-blend colors, and to control the translucency of the "paint" using the Wacom pressure-sensitive tablet.

A variety of brush shapes are available, CA said, as are techniques such as masking and "unpainting," which allows users to remove one or more layers of paint.

CA-Cricket Paint is now in beta testing, a company spokesman said, and it is scheduled to ship in the second quarter of this year. The suggested retail price has been set at $595 (C$675 in Canada). Cricket Image costs $295 (C$349 in Canada), and a bundle of the two packages will be available for $695 ($795 in Canada).

Contact: Bob Gordon, Computer Associates, 516-342-2391, fax 516-342-5329.

"Until I started getting the newsletter, I never knew what our company did."

WINDOWS WORLD

Polaroid Intros Photo Scanner For Windows

CHICAGO, ILLINOIS, APR 21 (NB)—Polaroid Corporation, famous for its instant cameras, introduced a Windows version of its high-speed CS-500 Digital Color Photo Scanner at the Windows World trade show in Chicago recently.

The new scanner, dubbed the CS-500i, allows Windows users to integrate 24-bit color photographs and other artwork into Windows graphics and text programs such as desktop publishing, slide presentations, and multimedia shows. The rapidly emerging multimedia field combines text, sound, animation and video. The scanner can handle images up to four inches by six inches in size.

Like Polaroid's Macintosh II-compatible CS-500 Photo Scanner, the CS-500i for Windows incorporates proprietary Polaroid sensor technology and built-in image manipulation software, allowing full-color images to be scanned in as little as three seconds.

"The Photo Scanner makes it possible for computer users to regard an image, whether a computer-generated graphic or a photograph, as another source of information," said Richard Leslie, director of marketing for Polaroid Electronic Imaging.

The CS-500i Digital Photo Scanner has a suggested list price of $4,495 and includes a SCSI (Small Computer System Interface) interface kit, and Polaroid SprintScan software.

Contact: Phyllis Laorenza, Polaroid Corp., 617-577-2000, or 800-225-1618.

New For PC: *Imara Lite* Document Management Software

TORONTO, ONTARIO, APR 14 (NB)—Imara Research has announced a scaled-down version of its work-group image processing system. Imara Lite is a single-user package intended mainly as an "electronic filing cabinet" for personal computer users on the move.

Company spokeswoman Erin Hintz told Newsbytes that Imara expects a large portion of the sales of Imara Lite will be to portable computer users. The software allows users to organize files, whether created electronically on the computer, scanned in, or received by fax, into a structure of electronic "file folders" the company contends is easier to use than the DOS operating system's structure of eight-character file names and directories.

Imara Lite includes fax send and receive software as well as image processing and document management capabilities, Hintz said.

Files created using other personal computer applications, such as spreadsheets, word processors, and the like, can be stored in the same folder with document images and received faxes. Users can name documents with descriptions of up to 32 characters in length, the company said.

Imara Lite runs under Microsoft Windows and, unlike the full Imara package, does not require a network or file server. It can work with an optical disk drive, the company said. The Kofax image board is also supported, along with various scanners, fax modems, and laser printers.

Due to be available in May, Imara Lite carries a suggested retail price of US$295 or C$350.

Contact: Erin Hintz, Imara Research, tel 416-581-1740, fax 416-581-1605.

MULTIMEDIA NEWS

Sun Ships A Microphone With SPARCstations

MOUNTAIN VIEW, CALIFORNIA, APR 8 (NB)—Sun Microsystems Computer Corporation (SMCC), a subsidiary of Sun Microsystems, says it is committed to offering multimedia capabilities as standard in its workstations and to prove it, is shipping a microphone with every SPARCstation.

SMCC says the desktop workstation can play, record, and receive audio and can send the audio anywhere on a network at no extra cost to the user, thanks to the microphone, built-in speaker, and bundled software that comes with the SPARCstation.

Sun said its first workstation had a speaker, but last September the company introduced Multimedia Mail and Audio Tool, both of which will run in a Solaris-distributed computing environment. Bob Pearson, director of interactive media marketing at SMCC, said: "We call our approach collabo-rative multimedia, since it utilizes the various media, such as audio, video, graphics and text, to enhance communication and productivity, not just for individuals but for all users on the network in the entire company."

Sun describes Multimedia Mail as an electronic mail application capable of audio as well. Audio Tool allows the user to rewind, play, and record electronic mail for use in Multimedia Mail and other applications as well. Sun says more than 30 third-party software applications are available for the SPARCstation that utilize audio.

The custom-designed, diamond-shaped, miniaturized microphone included with the SPARCstation is integrated with the Audio Tool software via ToolTalk, object-based technology for transparent interapplication communication, Sun added.

ToolTalk automatically invokes Audio Tool to allow a user to edit and attach an audio message as an electronic mail attachment. Sun said third-party developers can also use Audio Tool and ToolTalk and by doing so they can save the time it takes to incorporate audio within their applications.

Mountain View, California-based Sun Microsystems manufactures and distributes workstation computers and software in conjunction with a group of subsidiaries it spun off to handle specific areas of computing and software development. SMCC is one such subsidiary.

Contact: Leiann Lee, Sun Microsystems Computer Corporation, tel 415-336-0597.

Micrografx Ships Picture Publisher 3.0 with Color Scanner

Micrografx has shipped release 3.0 of its Windows-based Picture Publisher.

Picture Publisher is a graphics program designed for the high-end demands of photo designers and business users who want to add visual impact to proposals, newsletters, documents and presentations.

Picture Publisher 3.0 allows users to scan color or black-and-white photographic prints, slides and line art using flatbed or hand-held scanners. It will also accept images from still-camera video capture devices.

Micrografx says that, as a special promotion good through June 30th, it will include a hand-held color scanner, the ColorArtist from Mustek, at no extra cost. ColorArtist usually sells as a stand-alone product for US$699.

Picture Publisher 3.0 has a suggested list price of US$795. Existing owners can upgrade to release 3.0 without the scanner for US$99.95. Picture Publisher 3.0 and the scanner are available for $499.95.

Micrografx says that new features in the upgrade include enhanced masking, an added text tool, new drawing tools, a color shield, textures, and a selection of special effects. You also get special filters such as 3-D, emboss, crystallize, and a graphics pen. Supported file formats include TIFF, PCX, TARGA, BMP, GIF, and export of EPS and DCS.

The additional tools include an airbrush, texture, paint, and smear. The enhanced masking capability allows you to rotate, skew, tilt, and distort masks.

Another new feature, Color Shield, allows the user to select or protect up to eight separate areas of an image based on the color selected. The program can also improve poor-quality photographs, using the Quartertone feature.

If you want to run Picture Publisher 3.0, you will need at least a 386-based system, 4MB of RAM, a 40MB hard drive, Windows 3.0, a mouse or other pointing device and a VGA display. Micrografx recommends a SuperVGA display. For professional photo design, you will need more memory, a larger hard drive, and a 16-bit or 24-bit video card.

Contact: Katrina Krebs, Micrografx, 214-497-6247.

New desktop stand introduced for BallPoint mouse

Microsoft may have introduced its BallPoint mouse last year primarily for use with portable computers, but it appears that the portable pointing device has also been popular with desktop computer users.

The company claims that it has been so popular with desktop PC users that it felt compelled to introduce a new "desktop stand." It is supposed to allow users to adjust the height and angle of BallPoint to their personal preference.

Microsoft says that in developing the stand it looked at how to make the positioning of BallPoint more flexible, to suit a variety of hand sizes and preferences in position.

The result is an ergonomically designed stand consisting of a solid, flat base and an arm that rotates on two axes and swivels along a third axis. The BallPoint mouse slides onto a clip at the end of the flexible arm and locks into place. The stand is entirely user adjustable, allowing you to position the BallPoint mouse at almost any angle and height for greater comfort.

The product has apparently already been commended for its design, having recently won an honorable mention from the Northwest Chapter of the Industrial Designers Society of America (IDSA). The IDSA awarded an honorable mention to 10 products out of 62 entries in its recent Biennial Design Competition.

Microsoft claims that the BallPoint mouse is one of the first devices of its kind to incorporate a desktop stand that offers complete positioning flexibility.

The Microsoft BallPoint mouse with Desktop Stand will be available at major retail outlets beginning May 25, 1992, with a suggested retail price of $165.

For users who already own a BallPoint mouse, the desktop stand will be available separately by late June, 1992. The stand alone will sell for $20 through a coupon offer.

Also new for users of BallPoint, and included in the BallPoint mouse with Desktop Stand package, is the Microsoft Mouse software version 8.2. The new software retains the features of the 8.1 version —such as the ability to change cursor size and color—as well as several new benefits.

For portable computer users whose machines have a "sleep" mode, the 8.2 software offers a utility that tells BallPoint to reset itself when the computer resumes operation. Users of the Microsoft Windows operating system version 3.1 can now install both the mouse driver and additional utilities from within Windows. The 8.2 software also supports a mouse pointer in DOS-based applications running under Windows.

While you were out...

Running a good, internal electronic mail service has long been considered to be a chore well beyond the means of most small companies. It was complicated, time-consuming and offered only limited benefit unless you have hundreds of employees.

A Windows-based messaging system is hoping to change all that. Known simply as 'While You Were Out!', it is designed to let users on a network simply send, receive, read, print and forward messages to other users. A full-screen interactive graphic display is used to show how many messages are waiting for you.

It further includes the ability to group recipients by department, read documentation on-line, get context-sensitive help, sort and search messages by key fields.

If you need to find out more, call Andrew Levine at (604) 290-1411.

OS/2 meets object-oriented voice mail

Voice mail has become one of the great technology success stories of the 1990s—yet many users still find it inflexible, impersonal, unhelpful and unwieldy. Far too often, a company installs a voice mail system and lets the voice mail system change the way that company communicates with the public—rather than the other way around.

Enter a new OS/2-based product from U.S.-based Information Gateways Corporation. It is known as PhoneOne and is designed to allow voice mail systems to be easily customized.

It allows anyone running a call management system to reconfigure the system using an object-oriented script language, a database management system for managing scripts, an audio manager to allow OS/2 to handle the flow of voice information over the network and a form manager for handling messages.

Given this range of capabilities, PhoneOne is more flexible and more powerful than conventional voice mail systems. It is already in use for a wide variety of applications—including hotels that wish to automate much of their concierge service, telephone companies that are improving directory assistance services.

For further information, contact Vancouver distributor Af Khan and Associates at (604) 732-8626.

Another Salvo In the IBM-Microsoft War

REDMOND, WASHINGTON, MAY 15 (NB)—Microsoft has fired another salvo in the war with IBM, announcing a combined DOS-Windows package for IBM's PS/2 personal computers.

Saying they were responding to customer demand, Microsoft announced the specially prepared package which runs only on PS/2 machines will run Windows applications "two to five times faster" than OS/2, IBM's operating system challenge to Windows.

The new package is Microsoft's second major challenge to OS/2. A few weeks ago Newsbytes reported that more than 80 PC manufacturers, including eight of the top ten, had agreed to pre-install Windows on their machines.

IBM recently announced that it was pre-installing OS/2 version 2.0 on PS/2 Model 56 and 57 machines. Microsoft said its new package, which will be available May 31st, is designed so computer resellers can pre-install Windows and MS-DOS on PS/2s, or so that customers themselves can "upgrade" their machines from OS/2 to MS-DOS and Windows. Microsoft said the installation process is a "simple, integrated set-up process."

According to Brad Silverberg, Microsoft's VP of personal systems, "The overwhelming majority of customers are asking us to provide an alternative (to OS/2)." Silverberg said that the majority of customers buying PS/2s are using MS-DOS, or MS-DOS and Windows. "They don't want to be forced to switch to a system (OS/2) that is slower and less compatible," said Silverberg.

Windows requires about 10 MB (megabytes) of hard disk space for the program files, while OS/2 takes about three times that amount. While PC makers are factory equipping their systems with 80 MB, 120 MB and larger hard drives, the smaller space requirement of Windows could be especially attractive to home and small business buyers, who are frequently motivated by cost considerations.

Microsoft said that for customers who want to run applications written for OS/2, and also want to run Windows programs, they can install the DOS-Windows package on the same hard disk with OS/2. However, to do that and still have adequate storage space for data files will require even larger hard disks.

Microsoft said the combined package, which doesn't have a unique name, has a suggested list price of $199.95, but is being offered for $149 until the end of 1992. As an added bonus, Microsoft is bundling a discount coupon for Qualitas BlueMax version 6, the PS/2-specific version of 386max, a memory management program. 386max provides up to 623K of convention memory for use by DOS-based applications by loading as much as 244K of memory-resident programs into the upper memory area. Memory resident programs run faster, since the entire program loads into the computer's memory, eliminating the need for disk access while the program is being used.

Microsoft spokesperson Martin Middlewood told Newsbytes that present owners of PS/2 systems who elect to install the new Microsoft package are offered an installation option of replacing the existing OS/2, or having both systems. "You would probably want at least a 100MB hard disk if you wanted both systems," said Middlewood.

IBM scoffed at the Microsoft announcement. IBM spokesperson Scott Brooks reportedly said, "It sounds like a desperate move because they're getting wind of demand for OS/2 and the success that OS/2 is having in the marketplace." Brooks said he couldn't understand why anybody would pay $150 for the Microsoft package, since OS/2 already contains the DOS and Windows programs.

Contact: Collins Hemingway, Microsoft, 206-882-8080.

CorelDRAW 3.0 Adds Many Functions

OTTAWA, ONTARIO, MAY 13 (NB) — Corel Systems has announced a new release of its CorelDRAW graphics software that extends the package with business chart creation, image editing, and a presentation capability. CorelDRAW 3.0 will also add new features to the software's original vector-based drawing module.

"We've taken the approach that you can do everything in graphics in one package," said Michael Cowpland, Corel's president and chief executive, in an interview with Newsbytes.

In addition to the drawing module that gave the package its name, CorelDRAW 3.0 includes three new modules: CorelChart, CorelPhoto-Paint, and CorelShow.

CorelChart is a data-driven charting module for creating business graphs. The vendor said it can handle true three-dimensional charting and pictographs.

CorelPhoto-Paint is actually Z-Soft's PhotoFinish software, incorporated into CorelDRAW through an agreement with Z-Soft. Its capabilities including retouching of images, flexible color control, and the application of automatic retouching filters to scanned images, according to Corel.

Corel has also added a presentation module called CorelShow, which allows users to put together desktop presentations of images created in CorelDRAW or imported from other software.

CorelDRAW also includes the Mosaic visual file manager, which allows users to preview graphic files in several formats, and CorelTrace, a tool for converting black-and-white bit-mapped images into vector graphics.

The new release supports object linking and embedding (OLE), a Windows feature that makes it easier to exchange files among applications. Besides allowing interaction with other applications, Cowpland said, OLE provides the means for the different modules of CorelDRAW to operate on their own but with easy exchange of data among them.

Capabilities added to the flagship CorelDRAW module include the ability to edit graphics in preview form as well as in wire-frame mode, unlimited layers, improved precision, and on-screen text editing, the company said. Other new features in the draw module include "roll-up windows" meant to give quicker access to frequently used features, as well as a variety of new special effects.

With this release, Corel will begin shipping the CD-ROM version of CorelDRAW in every package. While each package will contain all of the software's functions on standard diskettes, Cowpland said, the CD-ROM will provide a clip-art library of more than 14,000 images, more than 100 animations in Autodesk flic format, and Corel's complete library of Type 1 fonts, as well as a set of tutorials.

Cowpland said about 10 percent of shipments of CorelDRAW are now ordered in CD-ROM format, and he expects that within 12 months a number of major software vendors will be shipping software on CD-ROM. "We're convinced that CDs are the next standard," he said, "and it's actually beginning to happen at an exponential rate even as we speak."

CorelDRAW version 3.0 is due to begin shipping in June, with a suggested retail price of US$595 or C$695. Registered users of any previous version will be able to upgrade for US$149 or C$169.

Contact: Corel, 613-728-8200.

Time isn't what it used to be

Back in the Middle Ages, few people had clocks. The only formal division of time came in hourly gongs from distant church bells. The Industrial Revolution changed all that. People began chronicling days in hours, minutes and seconds.

Time management isn't what it used to be, either. A consulting field since the 1970s, it dreamed up all sorts of time-saving devices in the 1980s: faxes, voice mail, car phones. The result? People worked harder under even greater stress and lost their leisure time.

Just what are people doing with their time today?

According to recent studies, they are spending five years of their lives waiting in lines, four years shifting priorities, three years sitting in meetings, two years playing telephone tag and one year searching through clutter.

> "There's no such thing as time management, it's management of details"

On average, they are interrupted 73 times a day, suffer one hour of negative stress, take one hour of work home, converse with spouse four minutes, exercise less than three minutes, play with child two minutes, consider goals one minute.

By age 4, children have spent more time watching television than talking to their parents, by age 6 enough time to have completed a master's degree.

Where has all the "quality time" that technology was supposed to give us gone?

Enter "lifestyle management," a term in the '90s for using technology to help balance family and personal needs with work, says Michael Fortino, a frequent lecturer and consultant to corporate America on time-management issues.

As Fortino points out, time can't be managed very well. It tends to march on, steadily, with or without us.

"There's no such thing as time management, it's management of details" that counts, he says. "What do we do? We try to get ahead, we try to take shortcuts. We walk past something, we figure we'll take care of tomorrow, and those things begin to come back to haunt us."

But, he adds, "If we do something right once, and change the way we run our day, then ultimately what we end up with is more detail finished with less time."

As a young man, Fortino noticed while working at a Pittsburgh clothing manufacturer that the factory floor had a sense of harmony, of piecework in time and motion, but the business office was "disastrous"— disorganized, confusing and inefficient.

His work to improve that operation led to a career in time management. But, by the late 1980s, something wasn't clicking.

"I didn't believe in my own trade," Fortino, 32, said in a recent interview. "Their workload was simply increasing. No matter how much more they became organized, they just added more work."

The divorce rate climbed to 61 percent. Even 28-year-olds had heart attacks.

"We talk to our spouses every day but we talk about business and small talk, we don't talk about goals, dreams or to our children," Fortino said.

Fortino's Center for Lifestyle Management in San Francisco is trying to advise business executives who have the time to listen that happy, well-adjusted employees are more productive.

The Japanese proved that in reverse, Fortino says. For decades their productivity kept increasing until people were working an average 52 hours a week. Finally, productivity reached a threshold in Japan and started to decline, with higher rates of stress, job-related illness and divorce.

To find out what people are actually doing, the center conducted research and sponsored studies at the University of Pittsburgh. Students counted the hours people stand in line, how long they sit at traffic lights, how often they walk to the copy machine, etc. For information on personal time, diaries were kept and analyzed.

"Time Flies When You're Not Having Fun" is the title of Fortino's talk on how to apply time-saving technology—rather than letting it run one's life—to better manage stress, our health, family, social life and recreation as well as spiritual, intellectual, financial, career and other personal pursuits.

Fortino is a walking example of his talk, carrying with him an unassuming but very high-tech briefcase containing a laptop computer, a modem for sending and receiving data electronically, a printer, a built-in fax, plus a cellular telephone and pager that are tied into the computer.

People will always be busy. But Fortino distinguishes between "positive stress" and "negative stress." Positive stress can be stimulating, productive and rewarding. But there can be too much of a good thing, and without organization we eventually reach the threshold and pass into negative stress.

For example, a pager can be misused so that people we don't need to talk to can interrupt us with a squeal in the shower, amid rush-hour traffic or at the movies. Or they can be used to vibrate quietly in our pocket or leave a message in our computer for all but high-priority matters—thereby reducing interruptions while providing the peace that we'll be reached if needed.

Fortino notes pagers aren't just for doctors anymore. Among the 11 million Americans using them are those awaiting donor organs, pregnant women, families with ill or infirm relatives and latch-key children. A Carnation, WA, dairy farmer used one to signal his lead cow to head to the barn at feeding time.

A business venture of Fortino's makes a portable personal planner that is complex and compact: complete with a 31-day advance "to do" list; daily appointment pages divided into people, places and things; an A-to-Z file for people and subject contacts; detailed one-page "goals" and "projects" sections; plus room for notes, credit cards, financial and personal information and a calculator.

Precious minutes for the "life" we're all supposed to get start adding up "when you start to combine all of these tips, saving a few minutes here, a few there," Fortino said. "You don't need to use all of them, but even a few would help."

That's because quality time doesn't have to take long. Twenty minutes a day talking with one's spouse about goals and dreams can work wonders. Spending an hour one night a week reading to one's child can enrich an entire lifetime.

Second *PC Magazine* Reliability Survey Published

WASHINGTON, DC, MAY 15 (NB)—The May 26 issue of *PC Magazine* contains the results of the magazine's second massive survey of user satisfaction for 35 well-known brands of personal computers. Perhaps the most surprising item in the survey is the general high overall reliability ratings. Zeos International and Dell scored highest for notebook computers.

Gateway, Zeos, CompuAdd, Dell, Northgate, and Dell all ranked as highly reliable among the mail-order direct sellers. Compaq may be slipping in profits, but customers still find that high-quality line holding up well in the reliability ratings, along with IBM, Hewlett-Packard, AST, and Toshiba.

Satisfaction with the newest models of high-performance PCs using fast 386 and 486 microprocessors is significantly higher across the board than for the models based on older 8088/86 and 286 technology.

The top mail order firms, which were mentioned above as receiving high reliability ratings, were also high in the number of customers who said they would purchase from the same company again, with Gateway scoring highest in this category.

> **Satisfaction with the newest models of high-performance PCs using fast 386 and 486 microprocessors is significantly higher across the board than for the models based on older 8088/86 and 286 technology**

The older high-quality, high-price companies such as IBM and Compaq did significantly less well in this "buy again" rating.
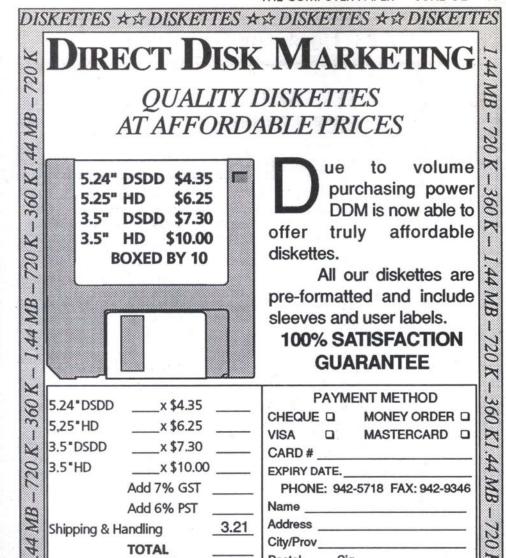
Top ratings for technical support, a category with a wider range of scores than most others, went to Dell, Northgate, Swan, and Zeos International.

In the important notebook category, only Zeos International scored significantly better than average in all four categories of reliability, buy again, tech support, and repairs. Dell scored very well, almost as high as Zeos, except in the area of overall reliability, where it still scored average or above.

Toshiba also did well in the notebook area, but Zenith Data Systems (Group Bull), ranked lowest in notebook reliability and users were generally not at all satisfied with quality or service from ZDS either in the notebook or PC line. ZDS came in significantly lower than average in the "buy again" category.

The entire *PC Magazine* survey as printed in this issue is very extensive and goes into a lot of detail about each vendor's ratings, including differences between various microprocessor types and how each ranked.

Computer Game Helps Urban Planners

CHICAGO, ILLINOIS, MAY 6 (NB)— Scientists at the University of Chicago are using computer games to test the abilities of new artificial intelligence software. The AI software will sit in for the human player and use SimCity, a computer-simulation game from California-based Maxis, to see how well it can perform as a human urban planner in building and operating a city.

In an experiment that will last two years, AI software developed by the University of Chicago will play the SimCity game on a Macintosh IIfx computer, while scientists observe the AI software's ability to learn and adapt from its successes and failures as it performs the role of an urban planner.

Dr. Kristian Hammond, professor of computer sciences at the University of Chicago, said the school selected SimCity because it is the closest thing we could find to real life for testing artificial intelligence on a personal computer. Hammond said traditional computerized games such as chess have narrowly defined rules and a limited number of endings. "In SimCity, there are no right or wrong answers, but an unending series of decisions that can lead to a wide variety of results."

An artificial intelligence program builds a base of information from data provided to it, and operates from a set of rules. The program learns as it operates, adding additional information, which in turn allows it to make more informed decisions. So far, artificial intelligence is the closest thing a computer can offer to the human mind.

Maxis spokesperson Sally Vandershaf told Newsbytes that the computer displays a portion of the city somewhat like a map, showing buildings, roads, and other features. Other details include items such as police stations, power lines, parks and sports stadiums. The buildings can "grow," depending on what decisions are made by the player. "You can even set fires and see their result," said Vandershaf.

The player acts as the mayor of the city, fighting crime, unemployment, pollution, and other problems faced by municipalities. Perhaps hardest, the "mayor" must balance the budget. The objective is to attract enough "Sims" (simulated citizens) for the city to grow and prosper.

Two sets of graphics are available— Ancient Cities and Future Cities. Players can also design their own city using any of six different sets of architecture, and the program includes a Terrain Editor to design maps.

Dr. Charles Martin, co-creator of the AI software to be used in the experiment, said he looks forward to seeing just how skilled a SimCity player his software will be. "It's one thing for a computer to solve a math problem," said Martin. "It's quite another for it to decide how to put out a fire in a high-rise building without losing countless lives, or how to solve traffic problems without running a city government into debt."

SimCity, one of several simulation games offered by Maxis, is available for IBM compatible, Amiga, Atari, Commodore, Nintendo platforms, and Vandershaf said the company has just released a Microsoft Windows version. The Windows version, said Vandershaf, has a command bar with five buttons, each able to place a "bookmark" at a particular part of the city for quick return to that part of the game. SimCity for Windows supports VGA graphics and multitasking.

Contact: Sally Vandershaf, Maxis, tel 510-253-3705, fax 510-253-3736; Dr. Kristian Hammond, University of Chicago, 312-702-1570.

Sale Of IBM Canada's ROLM Business Completed

TORONTO, ONTARIO, MAY 14 (NB) — Norstan Canada, a subsidiary of the communications services company Norstan Inc, of Maple Grove, Minnesota, has completed the acquisition of IBM Canada's ROLM marketing and service business.

The business sells and services telecommunications products from ROLM, in which IBM recently sold its half interest to the German firm Siemens, its partner in ROLM for several years.

The sale was announced in January and was originally due to be completed by March. Terms have not been released. IBM Canada spokesman Stan Didzbalis told Newsbytes the sale is "consistent with the restructuring we're going through." About 140 IBM Canada employees —virtually all who worked with the ROLM products— have moved to Norstan Canada.

Norstan said the purchase adds an additional 350 customers, with 1,000 installation sites and 250,000 ports, to its North American customer base.

Norstan Canada, which officially began operations April 1, currently has 160 employees and offices in 11 cities across Canada.

Under a separate agreement, Norstan and IBM Canada have agreed to cooperate in the marketing of ROLM products throughout Canada. Norstan is working with IBM Canada to become an IBM business partner for the marketing of certain IBM voice/data products.

Contact: IBM Canada, 416-474-3900

New For PC: Bible Concordance Software For Windows

HIAWATHA, IOWA, MAY 14 (NB) — Parsons Technology has announced it will introduce a Windows version of its QuickVerse Bible concordance software this summer.

The company said QuickVerse for Windows will ship in July. Parsons spokesperson Anne Rawland said the price for QuickVerse had not been set, but most of Parsons' biblical software programs sell for $69, and the company said users could expect QuickVerse to be priced "consistent with Parson's history of providing high-performance software at affordable prices."

QuickVerse is a concordance, or a listing of the words in the Bible which, according to Rawland, is ideal for such purposes as sermon or Sunday school lesson preparation, as well as for Bible scholars.

The user types the desired word, and QuickVerse returns the verses where that word can be found in the Bible. Like its older sibling QuickVerse 2.0 for DOS, the program can scan for partial words, combinations of words, or phrases. QuickVerse can use Boolean logic for "and" or "or" searches, and supports wildcard scans.

A wildcard is a character, such as an asterisk or a question mark, that represents a character or a string of characters. DOS uses the asterisk for a string of characters, and the question mark for a single character. For example, "Qui*" would search for all words that started with the letters "Qui." "SM?TH" would search for all five letter words that started with SM and ended with TH. Any character, such as "I" or "Y" in the middle position, would result in a successful search. Rawland said QuickVerse supports asterisk wildcards, but not the question mark.

Parsons said it plans to demonstrate a pre-release version of QuickVerse for Windows at the Christian Booksellers Association beginning June 28 in Dallas, Texas.

Contact: Anne Rawland, Parsons Technology, 319-395-9626.

Lotus Unveils 1-2-3 For DOS Release 2.4

CAMBRIDGE, MASSACHUSETTS, MAY 14 (NB) —Lotus Development has updated its two-dimensional spreadsheet package for DOS. 1-2-3 for DOS release 2.4 adds a handful of features previously found only in Lotus' higher-powered spreadsheet packages.

Lotus also said an update to its three-dimensional DOS spreadsheet, Lotus 1-2-3 for DOS Release 3.4, will be available this fall.

Among the new features in Release 2.4 are SmartIcons, which provide one-click access to frequently used commands. These first appeared in 1-2-3 for Windows. Backsolver, a single- or multi-variable goal-

seeking tool, has also been added to Release 2.4 —it was already available in some other versions of 1-2-3. Finally, the new version sports expanded support for popular printers.

While the new release adds some features found in the Windows version of 1-2-3, Larry Roshfeld, the product manager, said it remains a subset of the Windows version and of Release 3.3 for DOS. Features found in those versions that are not in 2.4 include three-dimensional spreadsheet capability, the ability to query and update external database files, and improved memory management, he said.

Roshfeld said Release 2.4 is: "the small

one, the fast one; it's graphical, and it runs on all PCs."

Lotus said the software is now shipping and will be widely available during the week of May 25. International English, French, and German versions have also begun shipping. Spanish, Swedish, Italian, Dutch, Danish, Norwegian, and Portuguese versions will be available in 30 to 60 days, Lotus officials said.

The suite of more than 70 SmartIcons that ship with the product provides quick access to worksheet and graphing commands, Lotus said. Examples are: the ability to put text into bold face or italics, or underline it; the ability to sum a row, column, or range of numbers; and one-step printing and graphing. Users can also cre-

ate their own SmartIcons to run macros, or set up their own SmartIcon palettes of frequently used spreadsheet commands.

1-2-3 for DOS Release 2.4 runs on any DOS-based personal computer and does not require extended or expanded memory. It requires an IBM PC or compatible with an 8088 or higher microprocessor, at least 384 kilobytes (KB) of memory, a hard disk and DOS 2.1 or higher. WYSIWYG (what-you-see-is-what-you-get, meaning the ability to see documents exactly as they will be printed) demands 512 KB of memory.

The suggested retail prices for 1-2-3 Release 2.4 Standard, Network Server and Network Node Editions are $495, $795, and $495, respectively. Customers who bought a version of 1-2-3 on or between November 1, 1991, and May 31, 1992, can upgrade for a suggested retail price of $49. The upgrade is available to all other licensed 1-2-3, Microsoft Excel and Quattro Pro users for a suggested retail price of $150. (Prices in US$.)

Lotus said it will also offer a combined "Double Up for DOS" upgrade to 1-2-3 for DOS Release 2.4 with Freelance Graphics for DOS 4.0 in June for a suggested retail price of $229.

Lotus 1-2-3 for DOS Release 3.4, to ship this fall, will have SmartIcons, additional memory management capabilities, performance enhancements, and new and improved printer drivers, including landscape printing on dot-matrix printers.

Contact: Lotus, 617-693-1580.

DEC Says New PCs Are 586-Ready

MAYNARD, MASSACHUSETTS, MAY 13 (NB) —Digital Equipment said a new line of personal computers it announced recently are the first that can be upgraded to Intel's P5 or 586 microprocessor when the new chip appears later this year. The new DECpc 400ST models use Intel's Xpress architecture, an upgradeable design with snap-in processor, memory, video, disk, and other components.

For now, Digital will sell three models in the 400ST line, using 486 processors running at 25, 33, and 50 megahertz (MHz). However, the company said, once Intel releases the new 586 chip, buyers of the 400ST machines will be able to upgrade their computers themselves.

All three models are shipping now, said Digital spokesman Edward Canty. Canty would not say how soon after the formal introduction of the 586 chip—expected this fall—Digital plans to offer an upgrade.

Users will also be able to upgrade memory and other components—everything that affects the over-all speed of the system, according to DEC—by swapping plug-in boards.

Digital said it is the first company to use Intel's Xpress upgradeable architecture in a PC.

All of the 400ST models come in a deskside tower cabinet with six EISA (Extended Industry Standard Architecture) expansion slots, four megabytes (MB) of memory expandable to 192 MB, five half-height bays for storage devices such as disk and tape drives providing for a maximum of 3.4 gigabytes of disk storage, and a 254-watt power supply.
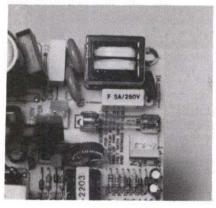
Base configurations of the initial three models, without hard disks, display adapters, or monitors, are priced at $3,000 for the 25 MHz model, $3,300 for the 33 MHz model, and $4,500 for the 50 MHz model. An assortment of hard disk options are available, said Product Manager Mike Joyce, ranging in price from $200 to $2,500. Price tags for the various display options range from $200 to $2,300. (Prices in US$.)
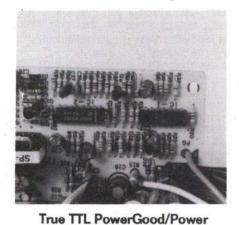
Contact: Digital Equipment, 508-486-6397.
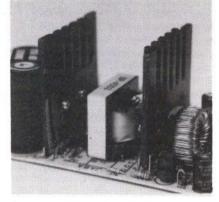
Apple says New Quadra 950 Is Faster Than 486/50 PC

CUPERTINO, CALIFORNIA, MAY 18 (NB)—Apple says it has introduced a newer, faster Quadra, the 950, built around the Motorola 68040 33 megahertz (MHz) chip. Apple is comparing the new 950 to IBM compatible 486-based personal computers at 33 and 50 MHz and says the 950 is faster.

The Macintosh Quadra product line was first introduced last fall as Apple's line of power computers. The product is geared toward more complex applications such as large document management, complex graphics, video, animation, architectural and engineering 3D modeling, rendering, and graphics simulation, Apple said.

The Quadra 950 is a floor-standing model with on-board 24-bit color, high-speed Ethernet networking, sound input and output, microprocessor-based caching and floating point processing. Apple says the 950 outperformed 33MHz and 50MHz 486-based machines in benchmark tests

done by Ingram Laboratory. Jim Reinhart, manager for Apple of M68000 marketing and applications, said the tests compared cross-platform applications on the Macintosh Quadra 950 and on 486 PCs running Microsoft Windows. Reinhart said the Macintosh Quadra 950 ran the applications up to 20 percent faster than an Advanced Logic Research (ALR) Business Visa 486/50 PC.

The Motorola 68040 33 MHz chip has 1.2 million transistors and can operate at 29 million instructions per second (MIPS) and 4.6 million floating operations per second (MFLOPS) at 33 MHz, Apple said.

Motorola said that using the power of the 68040 the Quadra 950 scored a 9.7 on benchmark tests conducted by Ingram Labs. According to Ingram, the 9.7 score indicated that the Quadra 950 runs 9.7

times as fast than the slowest machine tested. Motorola's Hausman told Newsbytes the slowest machine was the IBM PS/1.
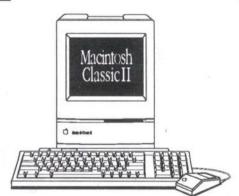
The 950 comes with 8 megabytes of RAM which can be expanded to 64 MB. The unit boasts 10 built-in ports for peripherals, five Nubus expansion slots, and support for up to four storage devices such as hard disk drives. The storage devices are not included, Apple said.

Like the other Quadras, the 950 offers Ethernet and Localtalk connections. The Quadra 950 is available now for C$10,879 with 8MB and a 230 MB hard drive. The 950 model is a replacement for the 900, which Apple expects to phase out, Apple sources told Newsbytes.

Contact: Apple Canada, 1-416-513-5787.

New For Mac: Adaptec Personal Laserwriter NTR Controller

BRUSSELS, BELGIUM, APR 23 (NB)—Adaptec has contracted with Apple Computer to design and manufacture the next-generation laser printer controller for the Apple Personal Laserwriter NTR printer.

Plans call for the controller to use Advanced Micro Devices' (AMD's) reduced instruction-set computing (RISC) microprocessor. The controller will also incorporate Adobe's Postscript Level 2 page description language with auto-sensing and switching technology.

According to Adaptec, the inclusion of Postscript technology will enable the printer to intelligently process print files from Apple Mac and other host systems.

"We've worked closely with Apple to design and manufacture a product consistent with Apple's reputation for offering the highest quality printers," explained Tom Stobier, Adaptec's imaging products' general manager. "Our technical expertise in the controller arena helps Apple achieve price/performance leadership in today's laser printer marketplace."

Adaptec is not placing any timescale on the new controller. The company's deal with Apple is open-ended, however, sources close to Apple suggest that the new controller will be released within the next few months. Pricing on the unit has not yet been decided.

Stobier said that, while the controller will be sold by Adaptec, a considerable degree of liaison between the company and Apple is necessary to produce such a product. "We work with companies in the early stages of product development to design and manufacture controllers that help them efficiently bring to market leading price/performance products," he said.

Contact: Adaptec Europe, +32-2-675-2930.

New For Macintosh: Artisoft LANtastic

TUCSON, ARIZONA, APR 17 (NB)—Making its first foray outside of the MS-DOS realm, Artisoft has announced a new product that will allow Macintosh users to hook up to their LANtastic-equipped officemates. LANtastic for Macintosh v1.0 is the new product that accomplishes this task.

LANtastic for Macintosh is an MS-DOS based program. It allows for a PC that is equipped with Ethernet and LocalTalk cards to act as a gateway between the Macintosh network world and the LANtastic world. This PC must be dedicated to this function. Artisoft does provide the Appletalk Interface board that would be required as a part of the overall package that it sells.

Once installed, Macintoshes can use standard Appleshare or System 7 procedures to log into the dedicated PC's hard disk. As that PC is also logged into the LANtastic network, all of the other PC's hard disks are available to the Macintosh user. File sharing then becomes a simple matter of determining compatible file formats and reading those files back and forth. Due to System 7, having a Macintosh read a PC file is easy. For PC users trying to read Macintosh files there is an additional required step. They must first copy the file from the Macintosh to the gateway PC and only then does it become visible to them.

Printer sharing is more integrated. Macintosh users can access any printer that is anywhere on the network. PC users can do the same.

LANtastic for Macintosh is slated to begin shipping in the second quarter of 1992. It is projected to be priced at $799.

Contact: Joe Stunkard, Artisoft, 602-690-3231.

Radius Introduces Low-Cost Color Pivot/LE Display

SAN JOSE, CALIFORNIA, APR 21 (NB)—Hoping to capture more of the lower-end display market, Radius Inc. has introduced the Color Pivot/LE, a cheaper version of the original Radius Color Pivot for the Macintosh.

The Color Pivot/LE is a 15-inch 256-color dual orientation display which rotates to display a color document in either portrait or landscape orientation. The LE version provides 78 dots-per-inch and features 624 by 832 resolution, the same as Apple's 16-inch color display.

Larry Herman, spokesman for the company, told Newsbytes that the company felt there was a definite market for the lower-cost Pivot.
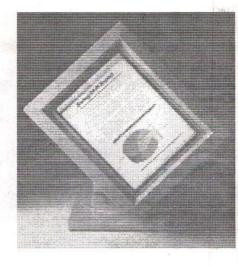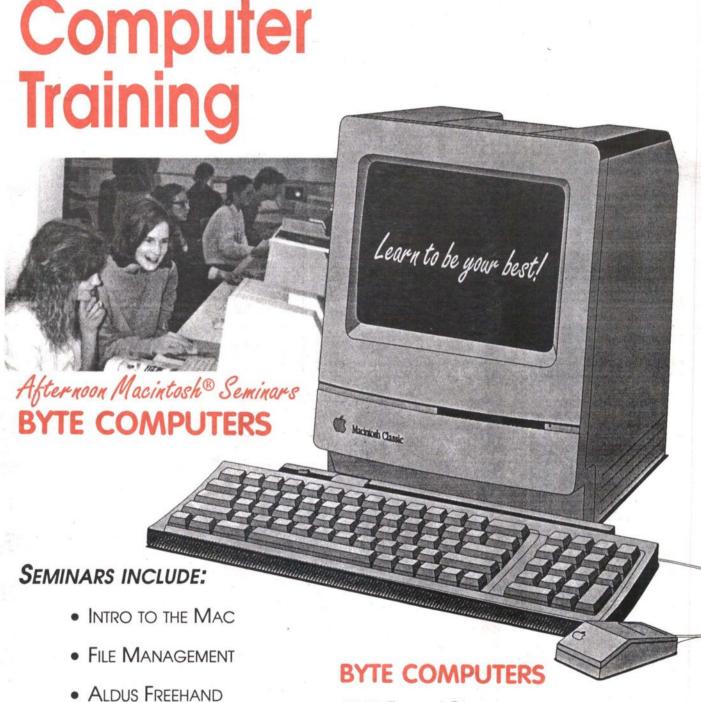
The company maintains that, priced at $1,199, the Pivot/LE represents a considerable cost saving over the $1,549 for the original Color Pivot (and $1,699 for Apple's 16-inch).

Herman told Newsbytes that the "electronics are different" between the original Color Pivot and the Color Pivot/LE. "We basically attempted cost-reducing" the product, he said.

Ed Colligan, Radius general manager,

Macintosh products, said: "For Macintosh users who want to connect to their system's built-in video, get four bits of resolution and eliminate the need for an interface card, the original Color Pivot is the ideal choice." However, he added: "For those who want eight-bit resolution at 256 colors, the Color Pivot/LE is the logical answer. The Color Pivot/LE provides dual orientation at a lower price than the original Color Pivot and the same 624 by 832 resolution as Apple's Macintosh 16-inch Color Display for $500 less."

Unlike the original Color Pivot, the Color Pivot/LE must always be used with a Radius Color Pivot Interface card. The company maintains that Radius Color Pivot Interfaces are available for all NuBus Macintoshes, the Macintosh LC and LC II, and the Macintosh SE/30, for a suggested retail price of $599.

According to Herman, the original Color Pivot was a "native portrait" display, while the Color Pivot/LE is a "native land-

scape" display. Consequently, The Pivot/LE "doesn't support Mac built-in video," he told Newsbytes.

Just last week, Newsbytes reported that Radius, in an effort to gain increased market penetration within the United States, particularly for its Macintosh products, had expanded its distribution relationship with Ingram Micro to include Radius' full line of Macintosh products. Additionally, the company also extended its distribution agreement with Merisel Inc., to allow that company to distribute all Radius Macintosh and PC products to its U.S. resellers. Previously, Merisel carried just Radius Macintosh-based products in Canada and Australia.

In February, Newsbytes reported that Radius had licensed some of Apple's technology for use in its own Macintosh Nubus-based accelerator "Rocket" products, developed in a project labeled Saturn V.

Contact: Larry Herman, Radius Inc., 408-434-1010.

Apple Backs Mac-To-PowerPC Conversion Software From Echo Logic

HOLMDEL, NEW JERSEY, MAY 11 (NB)—Apple and IBM's proposed PowerPC architecture may still be on the drawing board, but Apple has already signed a cooperative deal with Echo Logic to develop porting software that will allow the translation of current binary shrink-wrapped Macintosh applications to run on the new platform.

Binary versions of applications that run on PowerPC-based Macintosh platform will be possible in a matter of days, using Echo Logic's FlashPort, so say the companies.

Echo Logic's President Brad Burnham: "This first use of FlashPort will accelerate the availability of current Macintosh applications so that the future PowerPC-based Macintosh will have a full suite of software available at product introduction."

According to Echo Logic, recent advances in data flow analysis and compiler technology allowed for the development of FlashPort. The translation tool will require "minimal human intervention," claimed the company in a press release, and "will generate an identical application for the

PowerPC-based Macintosh that is competitive with hand-ported code in performance and size."
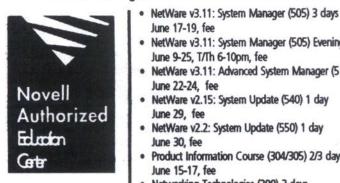
Chris Macey, Echo Logic's chief scientist, said: "FlashPort can translate any Macintosh program written in any language, from assembler to C, so developers can continue to work with their current software development tools."

According to Echo Logic, FlashPort allows an "experienced" software to translate the executable or relocatable object code version of an application. It is the translation of the object code which allows for the translation of any application written in any language, or combination of languages, from assembler to C. According to the company, source code is not required.

Echo Logic Inc., based in Holmdel, New Jersey, is an AT&T venture company. Its technology is based on advanced compiler research conducted at AT&T Bell Laboratories. The company intends to license its translation tools to computer manufacturers and software developers.

Syquest Distributes Free Utility SCSI Probe

SAN JOSE, CALIFORNIA, MAY 15 (NB)—Syquest has signed a licensing agreement with shareware author Robert Polic under which it has the right to distribute his SCSI Probe utility bearing the Syquest name.

SCSI Probe has gained fame in the Macintosh market as a handy utility to have in conjunction with a Syquest removable hard drive. Syquest officials explained the situation to Newsbytes in the following manner: Syquest sells the product to many integrators in the Macintosh market. These integrators get the hardware from Syquest but they are then responsible for putting together their own driver software. Each cartridge contains a copy of the proper driver for that particular format on its boot sectors.

A problem exists when a Macintosh has been started with a particular manufacturer's software driver installed. Apple's system software only looks at the SCSI driver once, on start-up. If you have a removable drive—outside of floppy disks—and change the cartridge to one that was formatted with a different driver, there is a likelihood that your Macintosh will not recognize the new cartridge. One way around this is to restart your Macintosh with the new cartridge installed in the drive. This will cause Apple's system software to load the driver that is present on the cartridge, rather than the one that is on its hard disk.

However, restarting a computer like that is not an acceptable solution. SCSI Probe's advantage is that it can force the system software to close down the old driver and install the driver that is on the cartridge, thereby alleviating the need to restart the computer.

Previous versions of SCSI Probe have been distributed as shareware on the national bulletin boards like GEnie and CompuServe. After this licensing agreement went into effect, the author made significant improvements to its functionality and usability and it is now being offered free of charge by Syquest. The new version, 3.4, is also being made available on GEnie, America Online, and Syquest's own bulletin board. In addition, Syquest will ship out a copy of the utility on diskette to anyone who requests it from them. Syquest officers have told Newsbytes that they have shipped over 300 copies since the new version came out in late April. Additionally, they know that over 1000 people have downloaded the software from the various bulletin boards.

Contact: Syquest, 415-328-5555.

Apple Canada Gets New President

MARKHAM, ONTARIO, APR 22 (NB)—Peter Jones, formerly vice-president of sales, has been appointed president of Apple Canada. He succeeds David Rae, who after seven years at the helm of Apple's Canadian subsidiary is moving to Colorado to work for a non-profit Christian organization.

Jones, who has worked for Apple Canada for 11 years, will take over the job of president immediately, said John Elias, a spokesman for the company. Rae has "a couple of commitments remaining," but will be moving to Colorado by the end of June, Elias told Newsbytes.

Jones has been involved in Apple Canada's sales and marketing functions as national sales manager, national marketing manager, and vice-president of sales.

Rae is to become head of international operations for the Navigators, a business and professional Christian ministry organization.

A reorganization to focus the company on four categories of customers will be the first priority for Jones.

The restructuring is part of a worldwide Apple move that creates business units for the institutional (large business and government), education, consumer, and small-to-medium business markets.
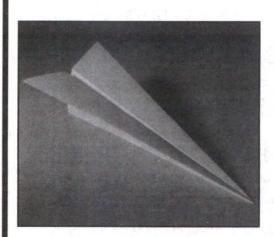
Jones' old job at Apple Canada—vice-president of sales—will disappear, to be replaced by four divisional managers. Apple Canada's field sales and marketing force will be divided among the four business units rather than geographically as before.

Jones said he is pleased with Apple's progress in the large business market, and with the company's drive to build market share. Apple captured 20 percent of the personal computer market in Canada in 1991 by unit sales, he said, making it the number-one vendor in the country. Jones also quoted figures from AC Neilsen, a market-research firm, giving Apple's Powerbook notebook computers 35 percent of laptop and notebook computer sales in Canada in the last two quarters.

Contact: Apple Canada Customer Relations, 1-416-513-5787; John Elias, National Public Relations for Apple Canada, tel 416-860-0180, fax 416-860-1094.
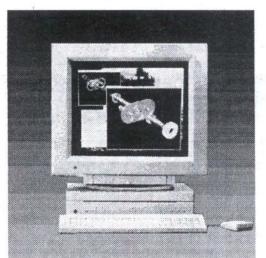
Sun Announces Low-priced Systems

MOUNTAIN VIEW, CALIFORNIA, APR 27 (NB)—Sun Microsystems has announced a new color, reduced instruction set chip (RISC) workstation in its SPARCstation IPC line that the company says is the first priced under C$8,000 from a major vendor and priced thousands of dollars lower than similar workstations from IBM or Hewlett-Packard (HP).

Sun compares the new C$7,950 IPC workstation with IBM's entry level workstation, the RS/6000 220, which fully configured retails for US$9,995, and the HP 9000/710, which retails for US$14,065. Sun claims the new IPC is nearly one-third the price of a similarly equipped 486/33 IBM compatible personal computer (PC) from Compaq.

Sun says the IPC is compact like the existing SPARCstation IPC and comes standard with a mid-range 16-inch Sony monitor with 1152 x 900 resolution, 8 megabytes (MBs) of random access memory (RAM), and a 207 MB internal hard disk drive. The system runs the Solaris 1.0 operating system; Sun says Solaris 2.0 will be available later this year.

Sun says it expects the workstation to be popular with those who run AutoCAD, Orcad, dBASE IV, Lotus 1-2-3 and WordPerfect, all of which are available for the Unix operating system. Sun says those users can get PC-level prices with workstation performance with the new IPC.

Sun says it is reducing other prices as well, including lowering the price of its SPARCstation ELC entry-level workstation by $1,200 on its entry level workstation, now priced at C$5,300 and offering price reductions it claims are as high as 28 percent on its other desktop computing products.

Sun says the new $7,950 IPC workstation is available now with another IPX SPARCengine system expected to be available in June of this year for C$8,650.

While Sun is the market leader according to Dataquest, a market research firm, the company is still lowering prices. Compaq, one of the companies Sun mentioned that it is competing with, announced it is abandoning plans to produce a RISC-based computer system and is instead planning to continue building Intel-based IBM compatible systems.

This announcement from Compaq is especially significant with Intel's announcement earlier this year that the 586 chip is on the horizon and is expected in the first half of this year. The 586 is expected to give RISC chips serious competition as it is projected by Intel to be capable of 100 million instructions per second (MIPS).

Contact: Sun Microsystems, tel 415-336-3564.

Sunsoft Releases Development Tools For Solaris 2.0
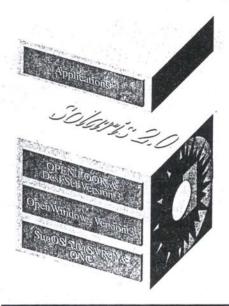
MOUNTAIN VIEW, CALIFORNIA, APR 15 (NB)—Sunsoft, the software division of Sun Microsystems, is focusing on the next generation of graphical user interface (GUI) products for SPARC stations and Intel-based computers, and says the introduction of its Solaris 2.0 Master Developer Series is a step in that direction.

The Solaris 2.0 Master Developer Series is a collection of third-party tools designed to help speed the software development process. Sunsoft said it wants developers to get a head start so applications will be ready to run on the Solaris 2.0 operating system when it ships this summer.

Solaris 2.0 is a 32-bit operating system that is planned to operate on Intel 386, 486, and higher-based computers as well as on SPARC workstations. Sunsoft has a program for application developers it calls the Solaris 2.0 Migration program and the company says over 550 developers have enrolled. Autodesk, Cadence Design Systems, and Gain Technology have all endorsed the new tools and have enrolled in the Migration program, Sunsoft said.

The Master Series Sunsoft is introducing includes compilers for assembly, debugging and code analysis capabilities for a range of languages; object-oriented database management tools that allow developers to scale performance for distributed applications; and Graphical User Environment (GUE) software for developers to visually design and test user interfaces.

Sun has already said it plans to give Intel and Microsoft a run for their money by moving into the IBM and compatible market. The company has reduced prices on Sparcstations and hired developers away from Apple to work on its next-generation GUI systems. Sunsoft representative Amal Abed said the SPARC version of the Solaris 2.0 system is expected in June of this year, with the Intel-based version following 90 days later.

Computer **Calendar**

USER GROUPS

AMIGA USER GROUP (PaNorAmA), BCIT, Rm 129-1A. Gen. Meeting 2nd Wed 7:30; Programmers 4th Wed 7:30. Bill Wagstaff, 597-1746.

APPLES B.C. COMPUTER SOCIETY. A User Group for Macintosh, Apple II's and Lisas. Macintosh meetings are the last Tuesday in each month at the Unitarian Church in Vancouver. Novice meetings and special interest meetings are held mid-month. Call Beth Gibson 261-8682 for information. Apple II meetings first Monday of each month. Call Al Crout 521-8618 or Kiyoshi Masuda 437-9935 for information.

ARCHITECT USER GROUP (Macintosh). Call Glen Schiller or Kal Gill, Byte Computers, 738-2181.

ASTUTE—ATARI ST. Meets 1st Tues., 7:30 Hastings Comm. Ctr. Dennis 420-8710.

ATARI USERS! Vantari, P.O. Box 3614 Main Post Office, Van., B.C., V6B 3Y6. Bill Sutherland 988-1450, Don Hatch 433-8055. Meets 2nd Wed., 7:30, Hastings Comm. Ctr., 3096 E. Hastings.

BEAVER VALLEY COMMODORE CLUB, 1st Tues., Montrose School Library. Call John Vink 367-6426.

B.C. INTERGRAPH USERS GROUP (BCIUG) Quarterly Meeting, B.C. Hydro Auditorium, 970 Burrard St., Vancouver, Contact Mike Barnes @ 663-3662 for information.

B.C. REGIONAL USERS GROUP SOCIETY of Hewlett-Packard Users. Contact Randy Cliff for information 661-8048.

B.C. UNIX USERS GROUP Dinner Meetings. 681-4473.

B.C. VAX/VMS Local Users Group (BCVAXLUG) meets on the second Wednesday of each month (except January, August and October) usually at Digital Education Services, 13110 Cambie Road, Richmond, B.C. at 7:30. p.m. Contact Lenore Wemyss 663-3995.

DATA PROCESSING MANAGEMENT ASSOCIATION, DPMA International joint dinner meeting. Contact Brooker Allen 688-3902 to register.

FORTH-BC meets 7:30, 1st Thurs/month, Rm 1A-324, BCIT main bldg. Discussions, demos and information for programming/applying FORTH (hardware and software).

GREATER VICTORIA PERSONAL COMPUTER USERS' ASSOC., PO Box 5309, Station B, Victoria V8R 6S4. General meeting last Wed. Also, special interest group meetings 382-3934.

INDEPENDENT COMPUTER CONSULTANTS ASSOCIATION, Box 820, Station A, Van., B.C. 682-2747. Fax 925-1336.

ITAC-BC Dinner Meeting, #500-1190 Melville St., Van., B.C. V6E 3W1. Ph. 682-2034; fax 888-0330. Meetings at Stanley Park Pavilion; doors open at 5:30 pm; buffet dinner at 6:15 pm; guest speakers at 7:00 pm. $25 for members, $40 for non-members. June 18 Multimedia: an overview and panel discussion on industry opportunities. Place: Benedict's Pender Side Cafe, 5:30 pm, Contact: Shirley Friesen-Nicol, 682-2034.

WANT TO SHARE YOUR LASER?

It **can** be as easy as plugging in a telephone to a wall jack, with the latest in printer sharing technology! **No additional software is required!**

It works with all of the DOS and Windows applications that you are currently using. Up to 34 computers, over a distance of 4,000 feet, can now share one printer (DMP or Laser) by using the MultiPort Express™ system, and with the additional benefit of 1 Meg of RAM for fast buffering! 3 "local" computers can plug directly into the MultiPort Express "box", and an additional 31 computers can be added, one at a time, by daisy-chaining Print Express™ transmitters into the MultiPort Express. Use standard 6 conductor telephone-type cable in any combination of star or bus topology that you wish. Communications over the bus is fast (375K bps) and efficient, with no loss of data! Why wait? Call Key Individual Computing Solutions today for more complete information!

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- graduates of BCIT's 2-year diploma program in Computer Systems
- computer professionals wishing to acquire recognized formal qualifications
- people who hold degrees in other related disciplines

It combines an Advanced Diploma Program (ADP) in Software Development from BCIT with additional university-level course and credit requirements in general education and administrative studies, taken through the Open Learning Agency. Both the Advanced Diploma Program and university courses are offered on a part-time, course-by-course basis.

Admission is strictly selective and competitive.

For more information, contact: BCIT, 3700 Willingdon Avenue, Burnaby, B.C., Tel. (604) 434-3304

OPEN LEARNING AGENCY

BCIT
BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

Computer **Classifieds**

POCO COMPUTER USER GROUP, 322-6198, 1379 Laurier, Hyele Creek Centre.

NeXT USER GROUP Meeting, last Wed. every month, 7:00 pm at Science World, B.C.Bob Bajwa 590-1020.

ORACLE USERS GROUP, 1055 W. Hastings. Lawrence Clark 275-5902. Every 3rd Wed. of each alt. month.

PACIFIC INFORMATION EXCHANGE, P.O. Box 67366, Station O, Vancouver V5W 3T1.

PORT COQ. COMPUTER CLUB—Commodore, Amiga & IBM, 1st & 3rd Tues 7:30, Rm. 104, George Pearkes Jr. Sec. School, 1390 Laurier Ave., Port Coquitlam, Mike Evans 942-4286.

REVELATION TECHNICAL USER GROUP (RTUG), 1st Wednesday of every month, c/o InfoTech Management, 360-885 Dunsmuir St., Vancouver, B.C. V6C 1N5. 684-4998

SMART USER GROUP, Brian Wiebe 588-8065.

T.J. 99/4A COMPUTER B.C. 99er Users Group, Every Thurs 7-10 pm, for information call Ron: 522-2598. 1st Thurs. Tutorials, 2nd Thurs. General, 3rd Thurs. Tutorials, 4th Thurs. Library night. Or call our T1 BBS 'Dial A TI' 522-9830.

TARGA/3DS USER GROUP, First Image, #112-1020 Mainland St. Vancouver, 2nd Thurs. 7:30 p.m., 684-9588 or BBS 264-8101.

TRACE (Richmond Atari Club), Thompson Comm. Ctr., 272-5789 1st & 3rd Mon. 7:30-9:30.

VANCOUVER ENTERPRISE FORUM, June 25, wrap-up dinner will feature high-profile, high tech industry speakers, including George Fuerheller, CEO of Cantel, and Peter Van der Gracht, president of Nexus. As well, there will be a special presentation by the Science Council of BC on the growth of the information technology industry in the province. 6 pm Four Seasons Hotel, 688-8464.

VANCOUVER ACM/SIGGRAPH Computer Graphics, 1st Wed. Call Susan Mair, 228-3938.

VANCOUVER ACCPAC USERS GROUP, 3rd Tues. Stanley Park Pavilion. For Info: phone or fax 325-0353.

VANCOUVER AUTOCAD USERS SOCIETY, BCIT, Bldg. 3A, Room 110, 1st Wed of the month, 7:30 pm. Contact Robert Cheek, 684-9311 for info.

VANCOUVER CLIPPER DEVELOPERS ASSOC., 1st Tues., 7 pm, 800-1190 Hornby St., Van, 667-4100.

VANCOUVER COLOR COMPUTER CLUB, 3rd Tuesday, 7:30 PM, Century House—Moody Park Recreation Centre, 620-8th St., New Westminster. Contacts: Jordan Dobrikin 420-6081; Steven La Favor 467-0923.

VANCOUVER dBASE USERS GROUP, 2nd Wed., 7 pm. 800-1190 Hornby St., Van. 667-4100.

VANCOUVER ELECTRONIC PUBL. ASSOC., 1115 W. 11th, Vancouver V6H 1K4 (mail). For info, call 733-9080 (leave msg).

VANCOUVER FOXPRO USERS GROUP (VFUG). 2nd Tues., 1900 hours; 200-1177 W. Broadway. Info Dave 688-4142.

VANCOUVER NETWARE USERS GROUP, meets first Monday of the month, Stanley Park Pavilion, Information 733-0055.

VANCOUVER NeXT USERS SOCIETY (VNUS), last Wed. 7 pm at Science World. Lawrence Clark 275-5902.

VANCOUVER PORTABLE COMPUTER CLUB (VPCC), AMO 17, Jay Siegel, 4251 Lancelot Dr, Richmond, B.C., V7C 4S4, 271-1519.

VANCOUVER PC USER'S SOCIETY Educational Seminars, OS/2: Wed June 10, 7:30-9:30 Vancouver Community College, Langara Campus, Student Union Building 100 W 49th Ave, Vancouver. $5 for VPCUS members, $15 for non-members. Contact: Kathy Woolverton at Synergy Computer Consulting 681-0516. Project Management: On Target and Timeline from Symantec, SuperProject by Computer Associates etc., Monday June 15, 7:30-9:30 Vancouver Community College, Langara Campus, Student Union Building 100 W 49th Ave, Vancouver. $5 for VPCUS members, $15 for non-members. Contact: Kathy Woolverton at Synergy Computer Consulting 681-0516.

VANCOUVER PC USER'S SOCIETY Monthly Meeting: second Thursday of each month, 6:30 -9:30 pm at Science World, 1455 Quebec St., Vancouver, Science Theatre. There are usually two presentations of computer related products or software, based broadly on serious and business computing needs. Meetings cost for non-members is $5. Membership is $30/year. Information line 734-0060.

VAN. SINCLAIR USERS GROUP, Timex-Sinclair, 2nd Fri, Killarney Comm. Ctr., Gerd Breunung 931-5509.

VANTARI, Box 3614, Main Post Office, Van., BC V6B 3Y6. Judy Harcus 873-1941; Don Hatch 433-8055; 2nd Wed., Hastings Comm. Ctr., 3096 E. Hastings.

VERSACAD USER GROUP, 2nd Tues. Call CADD Solutions Inc., 681-4686 for info.

WANG SYSTEM USERS, Karen Turner 643-7902.

TRAINING

APPLIED INFORMATION TECHNOLOGY PROGRAM at Capilano College will be holding an information evening to present their two new certificate programmes to the public. These evening mini programmes in Applied Multi Media, and Electronic Research and Communications, can be completed in one school year (2 semesters) Call Cathy at 984-1727, or show up at Capilano College G Building Room G117 at 7 pm on June 3.

EXECUTIVE PROGRAMMES SPRING 1992, Faculty of Commerce and Business Administration, UBC

Essential Management Skills,	Jun. 8-12,	$1,375
Personal Communication Skills for Managers,	June 15-16,	Call
Employment Law for Managers,	June 1-2,	$550
Performance Management,	June 1-2,	$595
New Venture Creation,	June 8-10,	$1,450
The Management Achievement Program	June 15-19,	$2,150
Management Strategies for the Multicultural Workplace,	July 6-7,	$795

Contact Executive Programmes, Faculty of Commerce and Business Administration, 2053 Main Mall, The University of British Columbia, Vancouver, B.C. V6T 1Z2, Tel. 822-8400, Fax. 822-8496

DISTRIBUTED SYSTEM PROGRAMMING FOR OPEN SYSTEMS, Instructor: Vincent Manis, Sat, June 6, 9 am-4:30 pm, $185, Computer Science Bldg, UBC, 222-5251.

SECURITY AND RELIABILITY IN OPEN SYSTEMS, Instructor: Vincent Manis, Sat, June 13, $185, Computer Science Bldg, UBC, 222-5251.

EVENTS

June 1-3—PAGEMAKER CONFERENCE & EXHIBITION, Seattle Sheraton. Registration 1-800-221-3806, or 206-633-0153, 4021 Aurora Ave. N., Seattle, WA 98103, U.S.A.

June 1-4—PEN EXPO, Santa Clara, CA. Contact: Boston Univ. Corp. Education Center, 800-733-3593 ext 255 or 508-649-6926, 72 Tyng road, Tyngsboro, MA 01879.

June 1-4—SIIM '92 Place Bonaventure, Montreal, Quebec, Computer and office exhibition. Tel (416) 274-0060.

Laser Tips *cont. from page 37*

with carbon. The airflow is not straight through, therefore, in my opinion this filter is much more susceptible to plugging. On the positive side, it is cheaper to purchase.

To sum up, with common sense and regular maintenance you can extend the life of your printer and prevent unnecessary problems from occurring. These cleaning steps are not to be done in place of regular service but as a complement to it. Without regular cleaning you may need a service call by a trained technician as often as every 40,000 to 50,000 pages. With regular cleaning you should easily be able to extend service calls to every 100,000 pages.

Chris Small is a principal with Superior Laser Supply and may be reached at 604/942-5512.

RadiusTV *cont. from page 24*

produce fisheye and caricature effects, rain smears and more. There's even one that wraps the image around the faces of a cube.

There are also options to align the "fields" of the video frame, which helps to compensate for the misalignment that may occur due to the interlaced nature of a standard NTSC video.

The actual TV display may be viewed and controlled from Theatrics or by a simpler desk accessory that allows you to set the various display options, including size, position, and of course, the channel and volume.

Price/Performance
The most unfortunate aspect of RadiusTV is its price. At a list price of C$2199 (and requiring a NuBus-equipped Mac II-series computer), the product is considerably more expensive than roughly comparable PC-based products, which tend to cost in the neighborhood of $1000. Fortunately, the image quality produced by the product is superb, and the software INIT that controls the display is compatible with a wide range of other common Macintosh System Extensions, although we noted an incompatibilty with Salient Software's DiskDoubler INIT.

Overall, though, we were very impressed with RadiusTV. It's a shame that so few dealers keep demonstration stock on hand. It's worth checking out. ■

June 1-4—VOICE POWER '92, Metro Toronto Convention Centre, Toronto, Ont. Voice processing trade show. (416) 449-7229.

June 2-3—LAP & PALMTOP 92, Los Angeles, CA. Contact Laptop Exhibitions, 212-682-7968, 104 East 40th St. #802, NY, NY 10016-1801.

June 3-4—ELECTROTECH WEST, Western Canada's largest professional Electronics Show, Forum Building, Pacific National Exhibition. Electronic components, semiconductors, test equipment, systems, production equipment, tools, hardware and more. Sponsored by Electronic Products and Technology Magazine. 416-624-8100.

June 3-6—MULTIMEDIA '92, Metro Toronto Convention Centre, Toronto, Ont. VICOM, Electronic Design Show and Showcase on Production, $15, Tel (416) 660-2491.

June 8-10—NEW VENTURE CREATION: Entrepreneurship in Independent and Corporate Settings, Vancouver. Contact: Executive Programmes, The University of British Columbia, Vancouver, BC V6T 1Z2, 604-822-8400.

June 9-11—MACWORLD EXPO, Toronto. Contact: Mitch Hall Assoc., 617-361-8000, 260 Milton Street, Dedham, MA 02026

June 17-18—VARDEX, Toronto International Centre, value Added Resellers show for dealers and corporate VARs, 479-3939.

June 21-26—OBJECT WORLD, San Francisco, CA. Contact: World Expo Corp., 508-879-6700, 111 Speen St., PO Box 9107, Framingham, MA 01701-9107.

June 22-26—IMAGE WORLD, Chicago. Contact: Knowledge Industry Publications, Inc, 800-248-5474 or 914-328-9157, 701 Westchester Ave., White Plains, NY 10604.

June 23-25—PC EXPO, New York. Contact: Bruno Blenheim, Inc. 201-346-1400 or 800-829-3976, Fort Lee Executive Park, 1 Executive Dr., Fort Lee, NJ 07024.

JUNE 23-25—SEYBOLD DIGITAL WORLD, Beverly Hills, CA. Contact: Seybold Seminars, 213-457-5850, 6922 Wildlife Road, PO Box 578, Malibu, CA 90265.

JULY 28-30—PC CANADA, Canada's new desktop computing exposition and conference, 1992 Metro Convention Centre, Toronto, Ontario, Contact PC Canada 416-283-3334.

AUGUST 3-5—GROUPWARE 92, San Jose, CA. Contact: The Conference Group, 800-247-0262 or 602-661-0449, 9875 111th Place, Scottsdale, AZ 85259.

SEPTEMBER 15-17—MACWORLD EXPO '92, Metro Toronto Convention Centre, Toronto, Ont. Tel (817) 361-8000.

SEPTEMBER 21-24—COMPUEXPO, 1992 Las Vegas Convention Centre, Las Vegas, Nevada. tel. 800-822-1229, fax 510-657-3499, UNSC Investment Group, 39899 Balentine Drive, Suite 305, Newark, CA 94560, USA.

JUNE 29-JULY 3—DATABASE WORLD CONF & EXPO, Boston, MA. Contact: Digital Consulting, Inc., 508-470-3880, 204 Andover St, Andover, MA 01810.

ABOUT THE COVER

Techniques
by Graeme Bennett

This issue's cover illustration was created primarily in Adobe Photoshop, using tools and techniques also available in PC-based image-retouching programs such as Micrografx Picture Publisher, Aldus PhotoStyler and several other titles.

The *Computer Paper* logo at the top of the page was originally created as an object-oriented graphic in Aldus FreeHand. For this issue, I decided that it would be visually interesting to float it as a 3-D object over the background. I exported the EPS artwork in Adobe Illustrator format using Altsys' EPS Exchange. This Illustrator-format EPS file was then imported into Photoshop 2.01, which converted it into an anti-aliased bitmap.

This bitmap was then given a 3-D "bevelled" look by selecting various regions and lightening or darkening them according to their position (e.g., the upper-right side of the logo has the brightest highlights; the lower-left the darkest shadows.)

I selected these regions with the pen tool, which is an object-oriented drawing tool virtually identical to that found in Adobe Illustrator. It allows rounded corners or diagonal lines to be selected and manipulated without the "jaggies" that would have occurred had I used a raster-oriented tool such as the lasso.

I also pasted a marble texture into the border of the logo for visual interest. Once the logo was colored and enhanced to my satisfaction, I selected a segment of its background (which I had previously filled with black) and used Photoshop's Select Similar command to highlight all of the background area. I then used the Invert command to select all those areas that were not the background (this selected the logo), and copied it to the clipboard.

The circuit board image was obtained from a CD-ROM entitled People In Business, published by Gazelle Technologies (619/693-4030). I opened it as a separate file. First, I sized and cropped the image of the circuit board so that it was the right size. I then pasted the logo onto the circuit board image and positioned it.
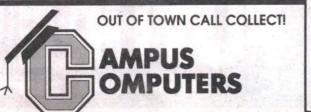
The diffused shadow behind the logo was simple to create. I exploited Photoshop's ability to move the selected area(s) without moving the floating image. (This obscure trick is accomplished by holding down the Command and Option keys while dragging the selected area to a new destination.) I dragged this selected area (in the shape of the logo) to a destination about half an inch down and to the left (different distances would produce different depth effects). I then used the Feather command with a value of 20 to heavily diffuse the selected area and then used the Adjust Brightness command to darken the area by about 80 percent. This produced a diffused shadow effect, but also darkened portions of the logo, which was now no longer floating nor selected. I simply pasted another copy of the logo and positioned it exactly over the first one.

The laser printers and NEC multimedia images were scanned, selected and pasted in a similar fashion.

Once the circuit board, logo, laser printers and multimedia images had all been assembled in Photoshop (by this time, the files-in-progress amounted to nearly 60 megabytes of disk space!), I saved the final image as a TIFF.

I imported the TIFF into Aldus FreeHand and added the small type (news, reviews, titles, etc.) as PostScript type using Adobe fonts. The final image was color-separated directly from FreeHand and output at 1270 dpi to a Linotronic imagesetter. ∎