

CANADA'S COMPUTER INFORMATION SOURCE

The COMPUTER PAPER™

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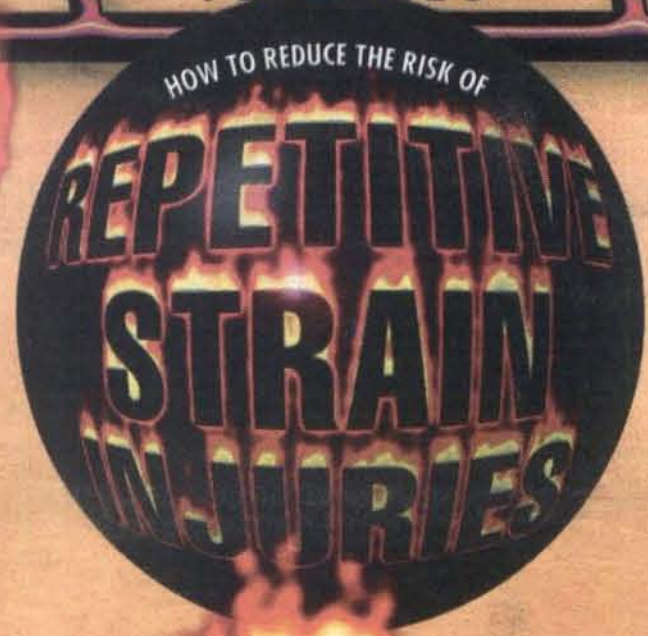
**EASY
TO
USE
PCs**

**HANDS-ON
TESTS OF:**

Compaq Presario
Dell OptiPlex 486
Macintosh LC575

REVIEWS:

PC Game Controllers
A-Max IV for Amiga
RAM Doubler for Mac



FREE

INSIDE:

A GUIDE TO ERGONOMICS for COMPUTER USERS

Health & Safety Guidelines

HOW TO ACCESS THE INTERNET FOR FREE

A Guide to
FreeNets across Canada

Using OS/2

Achiever Slimline
486 SLC2/50 BMD2B07E
Ambra 486 SLC2/50

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486DX-33 PVT: \$2401 (AMD) \$83/MTH
\$2441 (INTEL) \$90/MTH
486DX/2-66 PVT: \$2632 (AMD) \$97/MTH
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\$1516 (INTEL) \$56/MTH
486DX/2-66: \$1664 (AMD) \$62/MTH
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ULTINET PVT NOTEBOOKS									
Model (4 mb RAM)	80 mb HD		120 mb HD		210 mb HD		340 mb HD		Lndmrk Speed
	AMD	Intel	AMD	Intel	AMD	Intel	AMD	Intel	
486SX-25	N/A	\$2060	N/A	\$2166	N/A	\$2324	N/A	\$2720	83MHz
486SX-33	N/A	\$2126	N/A	\$2232	N/A	\$2390	N/A	\$2786	110 MHz
486DX-33	\$2316	\$2355	\$2421	\$2461	\$2580	\$2619	\$2976	\$3015	110 MHz
486DX/2-50	\$2340	\$2396	\$2445	\$2502	\$2604	\$2660	\$3000	\$3056	162 MHz
486DX/2-66	\$2547	\$2660	\$2652	\$2766	\$2811	\$2924	\$3207	\$3320	220 MHz
PVT NOTEBOOK UPGRADES									
Upgrade mono to dual scan passive matrix colour									\$928
Upgrade mono to active matrix colour									\$2049
Upgrade 340 to 520 mb hard drive									\$330
Upgrade each mb of RAM									\$88
PVT DOCKING STATION									
Adapted SCSI controller on main board 2 serial, 2 parallel, 1 external keyboard 1 15-pin external video port 2 internal speakers for built-in sound 14.5" (W) x 14.4" (D) x 4.9" (H)					4 ISA 16-bit slots support full length card 1 accessible 5.25" drive bay for CD or SCSI 1 internal 3.5" HDD bay Full range auto-switching 150W AC adaptor				
\$715									

ULTINET MINITOWER COMPUTERS					
Model	RAM	H.D.	AMD	Intel	Lease to Own
486SX-25	4 MB	250 hd	N/A	\$1269	N/A
486DX-33	4 mb	250 hd	\$1500	\$1536	\$56/mth
486-50	4 mb	250 hd	\$1173 (Cyrix)		N/A
486DX/2-50	4 mb	250 hd	\$1531	\$1582	\$58/mth
486-66	4 mb	250 hd	\$1393 (Cyrix)		N/A
486DX/2-66	4 mb	250 hd	\$1684	\$1787	\$64/mth
Pentium DX-60	4 mb	250 hd	N/A	\$2837	\$105/mth
Pentium DX-66	4 mb	250 hd	N/A	\$3137	\$116/mth

WHY SHOP ULTINET?

EXPERIENCE

Canada's first DX Notebook supplier also has ten years' experience in desktop/minitower computers. Our installed base currently exceeds 27,000 systems.

LOCAL ASSEMBLY & SERVICE

All assembly and service is done by Ultinet's own technicians at our Toronto facilities, minimizing turnaround time. Our upcoming move to larger facilities will allow us to serve you even more efficiently.

UPGRADABILITY

Ultinet systems are designed for today's budget and tomorrow's software demands. Our minitower/desktop systems are upgradeable to dual 486/586/Pentium motherboard. All our PVT Notebooks are upgradeable to 486DX/2-66.

EASY LEASE TO OWN

Leasing rates are based upon a rate of \$37/\$1000 for a 3 year period. Application of a down payment enhances credit approval process and decreases monthly payment amounts. A 5% buyback after 36 monthly payments transfers the ownership to you.

LEASING EXAMPLE	
System Price =	\$2060
Mthly Payment (\$2050 x .037) =	\$76/mth
\$69 + 15% (GST & PST) =	\$87/mth

ULTINET MINITOWER COMPUTER UPGRADES

Upg. 250 to 340 mb Seagate hdd 12 ms, 128k cache	\$96
Upg. 250 to 440 mb Seagate hdd 12 ms, 256k cache	\$189
Upg. 250 to 770 mb Quantum SCSI hd, 10 ms	\$670
Upgrade to mid/full tower case	\$49/80
MS Windows 3.1/3.11 OEM package with system	\$65/\$115
Microsoft DOS 6.2 package with disks & manual	\$65
Panasonic double speed CD-ROM with controller	\$229
Toshiba SCSI 3401B double speed fast CD-ROM	\$475
Soundblaster 16/16 MCD/16 SCSI	\$179/238/319
Upg. 14/15" non-interlaced 72 Hz monitor	\$87/170
Upg. 17" .28 dpi flat screen monitor 1024x768	\$700
Upg. to Mitsubishi Diamond Scan 17" .28 dpi	\$1095
Internal fax/modem 9600/2400 with software	\$55
Internal fax/modem 9600/14,400 with software	\$149
Upg. to 8/16 mb RAM	\$224/710
Upg. DX2/66 to 60 MHz PENTIUM with 512k cache	\$1050
Canon BJ10SX c/w ASF/BJ200/BJC600	\$339/379/798
Panasonic 24 pin Prnt 2023/HP4L/HP4	\$260/989/1999
Multimedia kit Panasonic 562/Mediavision 16/4 titles	\$540
Multimedia kit Panasonic 562/Soundblaster 16/4 titles	\$590

VESA LOCAL BUS UPGRADES

Dual-CPU 64-bit mthbd. with 256k cache (mthbd. only)	\$349
Dual-CPU 64-bit mthbd. with 512k cache (mthbd. only)	\$399
Cirrus Logic 1 mb VLB video card (15M Winmark speed)	\$35
WD Western Digital 90C33 1 mb video card (18M)	\$55
ATI Ultra MACH 32 2 mb DRAM (18M Winmark spd)	\$279
Diamond Viper 2 mb VRAM (49M Winmark speed)	\$450
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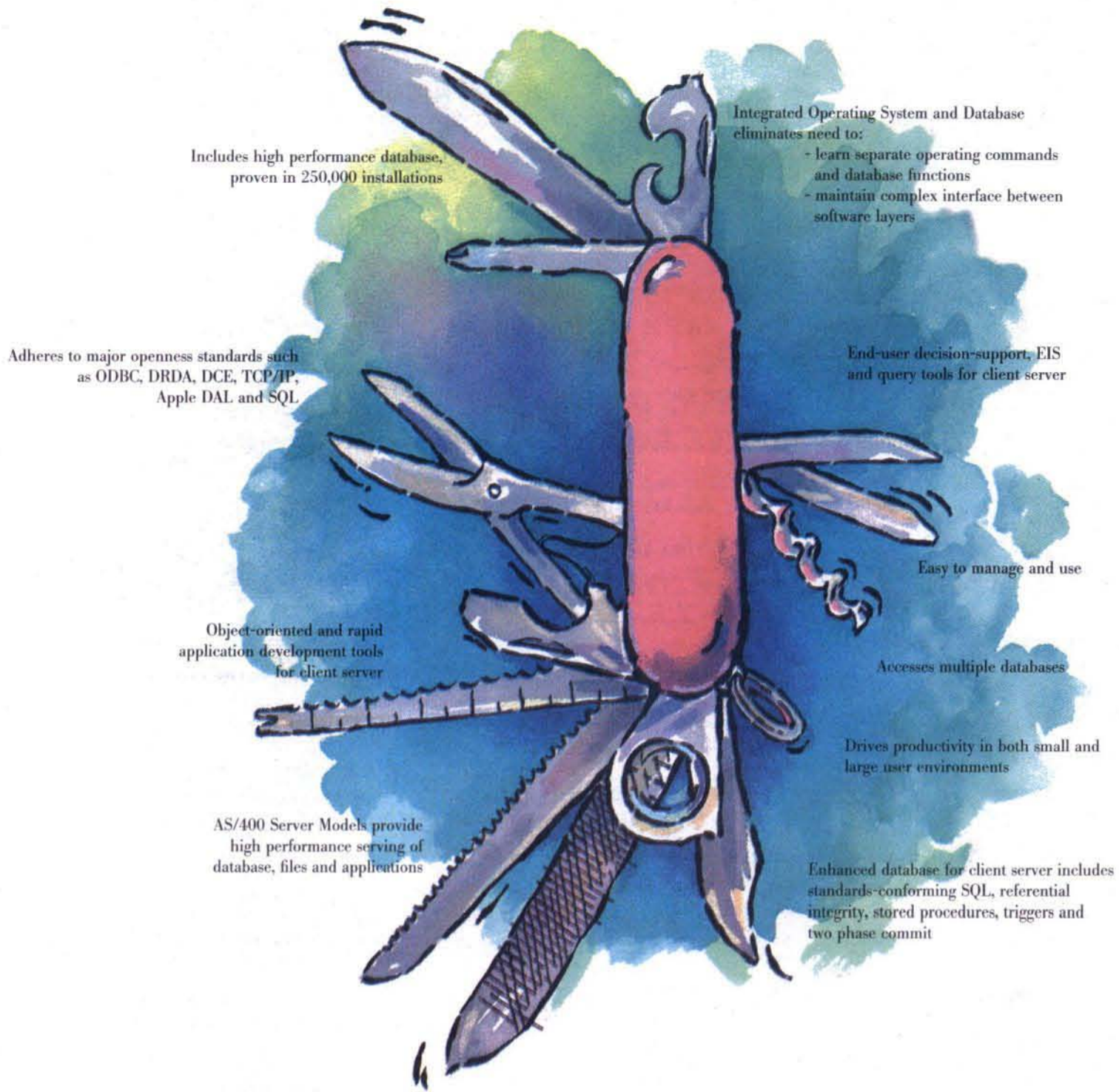
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Consider the marvellous piece of engineering pictured above. It's consummately flexible. Elegant in its simplicity. Fully integrated. And it works! How else could it earn the description "survival tool"?

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Our customers are equally effusive in their praise of the AS/400's client server capabilities. In their pursuit of client server solutions, they say it's fast, handles the job, and really does work happily with Apple PCs, Sun and HP Workstations, PC LANs and mainframes. Of course, the accolade we treasure most is the 4,000 customers a month, worldwide, who



AS/400

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COMING UP IN ONTARIO EDITION

JUNE		JULY		AUGUST	
Portable Computers		Multimedia		CD-ROMs, GIS, Optical Drives	
Classifieds	Mon., May 2	Classifieds	Mon., May 30	Classifieds	Fri., June 24
Ad deadline	Wed., May 4	Ad deadline	Wed., June 1	Ad deadline	Tue., June 28
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Distribution	Fri., May 20	Distribution	Fri., June 17	Distribution	Fri., July 15

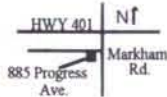
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Basic Configuration	486 VLB Systems	Upgrades *
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386DX-40 \$1,089		

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An Ode to an Unsung Hero

He stays up late. Not to have fun, but to make sure that tomorrow, other people will be able to work on their computers. He is always late arriving because his other clients have problems as unpredictable as yours are. He will stay late until the job is done, or he is too tired to see straight. His girl friend is always annoyed at him and wonders what kind of a marriage might be in store.

It is a lonely life. Human contact is sometimes limited to telephone calls from panic stricken managers. He lets himself in late at night. He often leaves, having done his job, with no thanks having seen no one.

Answers sometimes elude him at night because tech support at the software companies has shut down for the day. Sometimes, he gets help from bulletin boards that are available 24 hours a day.



From the Editor

He didn't start out to do this work, but arrived at it by default. He was always better at trouble shooting than anyone else, and machines seem to light up and start working normally again when he sits down in front of them. He is methodical and magical in his ability to get things running again.

He only hires untrained people, because the ones with any training at all expect too much money per hour. He is disappointed when the untrained don't stick with it, or complain that it is too hard to learn it all after a month or so. They often don't last and he is back working on his own again.

He lives and breathes Novell, dBase, C++ and still finds time to read his copies of Byte magazine. He wants to know what you think of Bill Gates.

Who is he?

He is your network installer and his job is impossible. He has to keep a bizarre collection of PC clones with ancient or non-existent hard drives creaking along talking to the network server. Some of the machines are newer and not so bad, but they bring new problems with them. VL-BUS, SCSI hard drives, and new versions of Windows for WorkGroups make his life a constant battle to keep up with the technology and fend off managers who want to try out all the latest

gizmos at his expense.

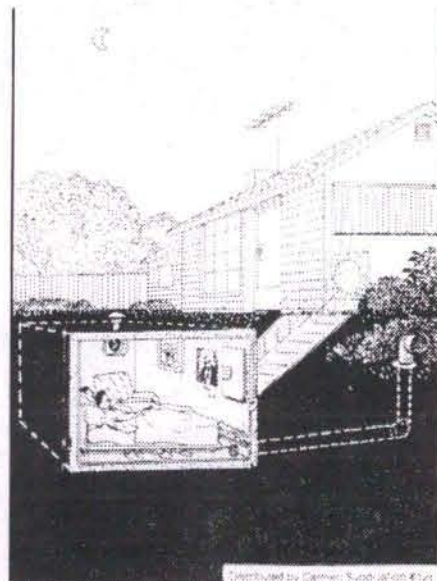
The reason his job is impossible is because there are too many variables. Combine computers made up from components from 20 different vendors with software from another 20 and you have an almost infinite capacity for problems. Throw in aging electronics, inadequate wiring and radio interference, and chaos rules.

A few decades ago, scientists thought they could predict weather systems via computer. They found that small changes in the initial conditions could result in vastly different outcomes. Taking something as complex as a computer network in an average office and trying to get it to run reliably is a bit like trying to predict the weather accurately. So far, no one has done it.

And so, we have the network consultant — the midnight magician and weather man. He works in voodoo and science, magic and methodology, prayer and pop cans to get things going again. He works long and hard, often into the night with no food and little hope. Most of the time they are able to patch things together well enough that the system is up and running again the next day. Sometimes it is not. Then they get cursed by unknown users. It is an impossible job. Say thanks to these guys once in a while when you pass them on your way out the door at the end of your day.

Enjoy the issue.

Sightings Steven M. Johnson



Each model home in a new Prescott, Arizona subdivision includes an "underground hide-away," approachable through a different secret entry door. One style requires crawling into a fake washing machine.

Mailbox

That's BPS, Not Baud!

One one of the little things that irritates me is the common misuse of the word "BAUD" instead of Bits per second. A Bit is a bit, a one or a zero. A baud is, loosely, a change of state. One baud may represent one, two, three, four, five, or even six (so far) bits.

The following chart helps explain the difference when related to modems:

Standard	Bit Rate	Baud Rate
V.33 14400	14400	2400
V.33 12000	12000	2400
V.32bis 14400	14400	2400
V.32bis 12000	12000	2400
V.32bis	7200	2400
V.32 9600	9600	2400

V.32 9600 uncoded	9600	2400
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Thanks for *The Computer Paper*. Generally it is a good publication.
 Brian R. Williams,
 Ottawa

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GB replies: You are, of course, correct. We have mentioned this fact numerous times over the years. Thanks for noticing this oversight in the latest list, which was supplied by a third party. And thanks for reading!

Caveat Emptor, Again

I observe computer advertisements with chagrin. I plan to purchase a new system shortly and I am overwhelmed with the available options. But alas, after many inquiries, I am distressed to discover that with all the "free software" that is included to tempt the nescient, no manuals or original diskettes are provided. Of all the announcements only one company offered the necessary dossiers and diskettes for DOS. As far as I am concerned, the public is being hoodwinked and short-changed. I charge the retailers to advertise accurately and supply all documents and diskettes.

J. D. Round,
Brooks, AB

DT replies: Many dealers now sell IBM-compatible computer systems with software pre-installed on the hard drive. This is of great convenience to customers, and is a legitimate practice. However, if you buy such a system, make sure you receive the original diskettes, manuals and licensing agreement for commercial programs like MS-DOS or WordPerfect. Otherwise, there's a good chance the software you receive is being illegally copied and distributed.

Sometimes you will see ads offering "tons" of free software. This might be referring to shareware. Shareware isn't free, although you can get it for free, or at a nominal cost. Shareware is based on an honor system. Usually you can use the software for a specified period — two weeks or a month, for example. At the end of that time, you have to decide if you want to keep using it. If the answer is yes, you are morally obliged to send in the registration card and pay for the software.

If you don't find it to your liking, you are supposed to remove the software from your computer.

Amiga is more than the Video Toaster

I just picked up my April, 1994 edition of *The Computer Paper* and have a few comments. These comments revolve around the recognition that the Amiga is more than the Video Toaster. Its applications include word processing, desktop publishing, 3-D animation as well as video.

1) It's great to see your continuing Amiga support. The article High-end Graphics Cards Enhance Amiga by Mark Rickan was well done and helped expose the Amiga's incredible graphics ability. More of these types of articles would be appreciated by all Amiga users as well as those looking at the Amiga as their next platform.

2) Almost every other article in the paper completely ignores the fact that the Amiga exists. For example, most articles that deal with peripherals, like printers, scanners, CD-ROM, etc., make note of the available software and drivers for the IBM and Mac but never mention that the device operates well on the Amiga.

An example of this is the article "Primera Color Printer" by Graeme Bennett. Mr. Bennett may be surprised to discover that the Primera printer had its Canadian debut at the World of Commodore Show in December, being promoted as "the printer your Amiga has been waiting for." As a matter of fact, a premier Amiga graphics program, Art Department Professional version 2.5, has built-in and direct support for the Primera including the dye-sublimation modes.

3) It would have been nice to see Amiga coverage in Desktop Publisher's Hit List by

Graeme Bennett on such programs as ProPage and ProDraw by Gold Disk as well as the complete DTP package from Soft Logik including Page Stream, Art Expression and the incredible Hot Links software and links it all together.

Thomas Mills

GB replies: Obviously, you missed our Feb. '94 review of the World of Commodore show (ON edition, pp. 12-15), in which we discussed the Primera and dozens of other Amiga products. We also ran Amiga coverage in Dec. '93. Perhaps you missed our mention of SoftLogik's new Amiga DTP products in the Apr. '94 issue, as

well? Look for reviews of A-Max IV in this issue and of the Amiga 4000 in an upcoming issue.

Reader Lauds Position Against Violent Games

I am writing to offer my thanks and support for the strong position you have taken on violence in video games. Such violence has become so commonplace that it is difficult to persuade even some conservative parents that there might be some harm in playing these types of games. I particularly liked your comment that it may take social scientists years to find the link between video violence and violence in real life.

This argument is always put forth. And then we hear that the two boys who killed year old James Bulger watched the movie *Child's Play 3* just a few days before and that the harm done to James Bulger was in many ways similar to what took place in that movie.

I am a parent of two video game playing boys. I am involved in this struggle every day. Most parents don't seem to understand what their children are involved in when playing these games. Thank you for your strong stand and for trying to alert parents to nature of these games.

Lorie Battershill, MB

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Corrections

Return to sender

Several readers have noted that the Internet address for Babylon 5 info (b5-request@ias-tate.edu) mentioned in the March 1994 issue of TCP (ON, page 71-72), and stated in the Babylon 5 FAQ available in other areas of the Internet, is not currently functional. Also, the FTP site (ftp@coe.montana.edu) that allegedly has a Babylon 5 files area in /ftp/pub/TV/Guides/babylon-5, is not available to users signing on as "anonymous" or "guest" users.



Here are some addresses with Babylon 5 files that are known to work at press time. These addresses were obtained with the help of "Archie," the Internet archive searching utility.

Host etext.archive.umich.edu
Location: /pub/Quartz/tv+movies/tv-misc
File Size Date File Name
9013 Mar 6 1993 babylon5-faq.gz

Host ftp.wustl.edu
Location: /multimedia/images/gif/unindexed/930416

File Size	Date	File Name
89910	Feb 23 1993	babylon5.gif
674790	Feb 21 1993	Babylon5.lha
45	Feb 21 1993	Babylon5.readme
116713	Mar 23 1993	babylon-5.hqx
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Host quartz.rutgers.edu
Location: /pub/tv+movies/tv-misc
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9013 Mar 6 1993 babylon5-faq.gz

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Location: /info-mac/grf
File Size Date File Name
116713 Mar 23 1993 babylon-5.hqx

Research by Graeme Bennett, managing editor, *The Computer Paper*.

Wrong Company, Wrong Number
The article "Text in Another Tongue" (P. 45 in April issue) incorrectly listed the Toronto distributor for TwinBridge. The correct contact is Luminar Multi-Media, 416-490-6516. *The Computer Paper* apologizes to Lumina (the company incorrectly listed) and Luminar for the inconvenience caused by this error. ■

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Computer Terminology Invades English

BY LINDA RICHARDS

Computing, like any popular pursuit, has its own language — the jargon that set enthusiasts apart. What's special about the language of computing is that words and phrases coined in the infant computer industry over the last 20 to 40 years have been creeping steadily — and in some cases stealthily — into our centuries-old English.

Many of the following words and phrases are already in popular useage at some level of non-hackish English. And I'm betting that the balance will be in a short time.

I leaned heavily on "The Jargon File" as a research resource. The Jargon File is a public domain document available by FTP at mit.edu. Two years ago, the file was published in book form by MIT Press. Called the *New Hacker's Dictionary* and published under ISBN #0-262-68079-3, the book is essentially The Jargon File in book form. Editor of both the book and the file is Eric Raymond. "I consider myself the keeper of the trust of The Jargon File," says Raymond. "Really, there were about 400 authors." Excerpts from the file are produced here with Raymond's permission.

As you read, please keep in mind that — as with much that originates with true hackers — the tongue must never fully leave the cheek. It is this spirit of playfulness that has lent such animation to the industry they have grown.

automagically — Automatically: but in a way that is either too trivial or complicated to be easily explained.

back door — A hole in the security of a system deliberately left in place by designers or maintainers.

Bad Thing — Something that can't possibly result in an improvement of the subject. Bad Thing is always capitalized.

bandwidth — The volume of information per unit time that a computer, person, or transmission medium can handle. Can also refer to attention span or, on usenet it is a somewhat hypothetical measure of network capacity.

barf — From mainstream slang, meaning "vomit." In hackish circles it's a term of maximum disgust. In hackish, you might hear someone say, "I loaded the newest version and the

system barfed," meaning it didn't run properly. Or, a more mainstream useage in the same vein would be, "The microwave barfed when I input the timing sequence."

beam — A transfer of a file by some electronic medium. Classically, you might, "beam that over to his site," via E-mail. Increasingly, you can hear "Beam me a copy of that on the fax."

beta — Officially, the second stage of software testing. But increasingly, anything new and experimental. "The soup was great, but I think the salad was still in beta." Since beta software is really pre-release software, it is notoriously buggy and unpredictable. Thus, the beta-stage is — in whatever context — likely to surprise, and not always pleasantly.

bletcherous — Disgusting in design or function; esthetically unappealing. This word is seldom used of people. "This keyboard is bletcherous!"

boat anchor — Implies that the offending hardware is irreversibly dead or useless. In post-hackish useage, this can be a car, camera or computer: anything that is essentially obsolete. Also, a person who just takes up space.

bogon — The elementary particle of bogosity. For instance, "the system is emitting bogons again" means that it is broken or acting in an erratic or bogus fashion. Also used to refer to any bogus thing, as in "I'd like to go to lunch with you but I've got to go to the weekly staff bogon". A person who is bogus or who says bogus things.

From the Jargon File: The bogon has become the type case for a whole bestiary of nonce particle names, including the 'clutron' or 'cluton' (indivisible particle of cluefulness, obviously the antiparticle of the bogon) and the futon (elementary particle of [randomness], or sometimes of lameness). These are not so much live usages in themselves as examples of a live meta-useage: that is, it has become a standard joke or linguistic maneuver to "explain" otherwise mysterious circumstances by inventing nonce particle names. And these imply nonce particle theories, with all their dignity or lack thereof (we might note parenthetically that this is a generalization from "(bogus particle) theories" to "bogus (particle theories)!"). Perhaps such particles are the modern-day equivalents of trolls and wood-nymphs as standard starting-points around which to construct explanatory myths. Of course, playing on an existing word (as in the 'futon') yields additional flavor.

bogon filter — Any device, software or hardware, that limits or suppresses the flow and/or emission of bogons.

bogon flux — A measure of a supposed field of bogosity emitted by a speaker, measured by a bogometer; as a speaker starts to wander into increasing bogosity a listener might say "Warning, warning, bogon flux is rising".

bogosity — The degree to which something is bogus.

bogosity
— The degree to which something is bogus

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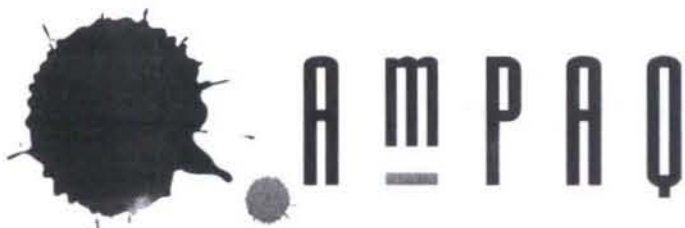
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Parsing Hackish

Continued from page 10

bomb — In hackish, a general synonym for crash.

bug — From the Jargon File: An unwanted and unintended property of a program or piece of hardware, esp. one that causes it to malfunction. Increasingly, a bug can also be found in a person or thing not related to computers. "I love that car, but the transmission is a bit buggy." In any of these cases, the word doesn't relate to insects.

cracker — Someone who breaks security on a computer system. The phrase was coined around 1985 to add nuance to the often misused hacker. Though most crackers like to describe themselves as hackers, most true hackers consider the cracker to be a lower life form.

cyberpunk — William Gibson's 1982 novel Neuromancer launched the Science Fiction subgenre known as cyberpunk. Vancouver resident Gibson is known to be something of a technophobe and the prose resulting from his lack of knowledge of modern computers and computing is considered both naive and stimulating. Gibson's work has inspired imitation in film and literary forms as well as a fashion movement that calls itself "cyberpunk," and is associated with the rave and techno subcultures.

cyberspace — Gibsonian cyberspace is tied closely to virtual reality. Oddly, Gibson's naive plan has been the model for several virtual reality experiments. Increasingly, cyberspace is the place you are when you're online, as opposed to the place you are where you are actually taking up space. If the Infobahn is a cyberhighway, then it's definitely located in cyberspace.

defenestration — From the Jargon file: 1. Proper karmic retribution for an incorrigible punster. "Oh, ghod, that was awful!" "Quick! Defenestrate him!" 2. The act of exiting a window system in order to get better response time from a full-screen program. This comes from the dictionary meaning of 'defenestrate', which is to throw something out a window. 3. The act of discarding something under the assumption that it will improve matters. "I don't have any disk space left." "Well, why don't you defenestrate that 100 megs worth of old core dumps?" 4. [proposed] The requirement to support a command-line interface. "It has to run on a VT100." "Curses! I've been defenestrated!"

dongle — A piece of hardware that must

be connected to an I/O port that serves no purpose besides one of copy protection. The software to be protected checks for the dongle before running properly. By extension, and not in hacker parlance, a dongle can be any piece of essentially useless hardware added with no obvious intent besides irritating the final user.

down — Not operating or functional. "The system will be down," in hackish. Now in mainstream, "I'm so tired. If I don't go down for half an hour, I'm gonna crash."

droid — A low-level bureaucrat or service-business employee with little or no interest in doing anything above or beyond the call of duty. "It's not my job, man" attitude.

From the Jargon File: Typical droid positions include supermarket checkout assistant and bank clerk; the syndrome is also endemic in low-level government employees. The implication is that the rules and official procedures constitute software that the droid is executing; problems arise when the software has not been properly debugged.

emoticon — An ASCII glyph used to indicate an emotional state in E-mail or news. There are lists of 100s of emoticons available. Here are some of the more common ones:

- :) or :-)'smiley face' (for humor, laughter, friendliness, occasionally sarcasm).
- :(or :-('frowney face' (for sadness, anger, or upset).
- ;-)'half-smiley' ((ha ha only serious)); also known as 'semi-smiley' or 'winkey face'.
- :-)'wry face'.

At present, emoticons are popular on local boards, but use them with caution on Usenet. Some discussion boards frown on them and others (alt.folklore.urban is one) actively discourage their use. To use one is to invite flamage.

The best idea is to treat emoticons like spices and use them with caution and at your own risk.

FAQ — On usenet, a Frequently Asked Question. These FAQs are usually compiled into some sort of file and made available through FTP at various storage sites.

feature shock — Originally a user or programmer's confusion when confronted with a package that has too many features and poor introductory material. Increasingly, what happens when we unpack a new VCR or toaster oven.

flame — Classically, posting an E-mail message intended to insult and provoke.

Continued on page 48



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Broadcasters Taste Digital Samples

BY PETER MCLENNAN

LAS VEGAS, NV — Half a million square feet of display space! Hundreds of millions of dollars worth of shiny new hardware and the latest software offered by nearly 1,000 manufacturers and distributors! Some 71,000 visitors drawn from all over the world to see and buy the latest in video, film and multimedia production equipment. This is the National Association of Broadcasters Convention, NAB, held in this desert city March 20-24.

In the past, the convention was dominated by names like RCA and AMEX, Zenith and General Electric, and, more recently, by names like Sony and Panasonic, Toshiba and JVC. Now, however, new names are beginning to appear on the banners that hang over the convention floor. Computer companies have invaded the world of film and television production, and names like Aaos and Xinigit, Alias and Avid, signal a new way of creating and distributing the images we see at home, at work, and soon — everywhere.

Avid Technology Inc, for instance, was one of the first companies to implement a system of editing video programs on a hard disk, instead of with a group of video tape recorders. Its new Newscutter system further extends that process to allow television stations to air programs directly from the hard disk. No more frantic hallway dashes to get the tape from editing to Master Control.

Now it proposes to integrate the process even further with a computer system that controls storage, management, and creation of video programming for an entire TV station from a single server. The system it demonstrated was huge, incorporating operators at multiple workstations and several large cabinets full of gear. Imagine what happens if the hard drive crashes!

Matrox video products, of Dorval, Quebec, was showing new versions of its "Matrox Studio" hardware and software. Incorporating both the ease and speed of non linear, hard disk editing and the high image quality and flexibility of the mature analog tape based systems, the company's demonstrations played to huge audiences throughout the show.

The EISA turnkey system uses a board set which includes the high end Illuminator Pro video graphics board, and the 64 bit MGA VGA display card. The MGA demonstrated absolutely scorching Windows performance, and the Illuminator Pro performed amazing video tricks, appearing to do most of the work of a million dollar video post production facility.

3D studios users will be delighted with the new MAX animation recorder, also by Matrox. Certainly Autodesk seemed pleased with it; MAX was the only animation

recorder on display at their booth.

The Amiga World was well represented by the Video Toaster people. They introduced the Toaster Flyer, a \$4,000 tapeless editor system for the Toaster. New Tek claims D2 performance, which means that it will perform as well as a \$60,000 video tape machine. It demonstrated drag and drop video editing software that was extremely easy to use, although it appeared lacking in some of the control features important to serious editing.

Computer companies have invaded the world of film and television production.

No mention was made of audio editing in its demonstration; however, the company did point out that since the Flyer was a Toaster product, all the special effects in the video switcher were available in real time.

Also introduced at the Toaster booth was a dedicated lightwave 3D rendering peripheral called Raptor. Unlike the much ballyhooed Screamer, which never saw the dealer's shelves, Raptor is real, and shipping now. It uses two R4400 RISC processors, and 128MB of RAM to provide a 10 times increase in rendering performance over a stock Toaster. Its rendering horsepower is roughly equivalent to ten 66 MHz 486's.

Also hidden inside is a small hard disk which holds a stripped down copy of Windows NT, used as a software interface between the Toaster and the R4400 system. Raptor might prove useful to other software requiring rendering assistance, provided it can be persuaded to talk NT. Are you listening, Autodesk? Raptor sells for about \$20,000; just add your Toaster and an Ethernet card.

Be aware, though, that Raptor is huge, nearly as big as a dishwasher. It's going to look really impressive in the den, alongside the 56-inch projector TV.

Micropolis Corp., the hard disk manufacturers, demonstrated a system aimed at the video-on-demand market. Its US\$100,000 AV 100 video server consists of an array of 21 drives and associated controller hardware which holds 20 full length movies in just under 63 gigabytes (GB) of drive space. Intended for use in hotels, cruise ships, even aircraft, the system stores the data in MPEG format and outputs up to 32 simultaneous audio/video data streams to



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viewers in PAL or NTSC format, each with full VCR-like control.

It's amazing to think what happens behind the scenes if, for example, one viewer pauses her movie while she visits her fridge. What happens to the other current viewers of the same show? The marketing people explained that the data is striped over the whole drive array, and is managed by a controller mounted on the 1.75-metre high rack. Easy to say.

Tunebuilder is just another example of Canadian success at the forefront of the rapidly changing world of digital media.

Twenty-one 2GB drives all talking to each other as they copied data back and forth to accommodate the random demands of the viewers was a sight to see. Of course the drives are smart enough to rebuild lost data automatically, should one of their brothers die on the job. Fault tolerant arrays like this allow drives to be "hot swapped" in the event that one of the drives were to fail before its time.

MPEG is maturing quickly. The MPEG data from the Micropolis video server is sent internally at about 0.4 MB per second, a rate they jokingly term MPEG 1.5. It produces video that looks and sounds as good as regular broadcast TV. MPEG 1, which enables the holy grail of digital video — full screen 30 frames per second video from a CD ROM — is only about 130 KB per second, and it looks like poor quality VHS. We might as well get used to it, because it's a standard, and it's going to be everywhere soon. MPEG Decoder boards are available now for your PC or MAC at about \$300-\$400, and are included in game machines like CDI, Commodore CD-32, Atari Jaguar, 300, etc., thanks to a format called White Book Video CD, agreed to by a consortium of Sony, Phillips, JVC, Mitsubishi, and others.

MPEG 2, by the way, is about a year or so out, but it's worth waiting for. At a data rate of about 1 MB per second, 30 to 1 compression, MPEG 2 images are beautiful, but expensive. Whereas MPEG 1 compression happens in real time, and costs currently about \$20,000 for the compression hardware, MPEG 2 compression takes about one day per minute of compressed video, and you don't want to know how much the level of hardware costs.

A more affordable product was offered by Airworks Media, of Edmonton. They amazed the conventioners with Tune Builder, a self-editing musical library. Let me run that past you again.... a self editing music library.

Selecting appropriate music for a finished video segment can take hours, but since it must often fit an exact time slot — like 17 seconds, for example — the chosen selection must be further edited, faded early, sometimes even reassembled to fit. The results are not always perfect, and usually very time consuming.

Tune Builder stores a wide variety of

music on CD in short modules, each of which can be automatically assembled by the software to fit the time available and the user's demands. We watched in amazement as the product produced a seemingly endless variety of songs, all from the "Jazz/ Corporate/ Medium Speed" category, each one of them 17 seconds long! Clever. Imagine immediately offering a client a choice of several edited music selections, instead of just one.

Of course, full mixing and fading is per-

formed by the software, and if you don't like the automated assembly, you can do your own "semi-automatic" music editing. The current 10 volume CD library called "Arpeggio" provides a huge choice of music styles - Country, Blues, Jazz, Rock, etc., with more on the way. Tunebuilder sells for about \$6,000, which includes a CD ROM and Sound Blaster 16 compatible sound card.

Tunebuilder is just another example of Canadian success at the forefront of the rapidly changing world of digital media.

Other Canadians wowing global audiences at the show included frontline software producers like Softimage, Alias, and Vertigo, all of whom are shaping the future of what we see and hear. In the words of an Alias ad, "Wake up and smell the plasma!"

Peter McLennan is a Vancouver-based film maker and multimedia consultant.

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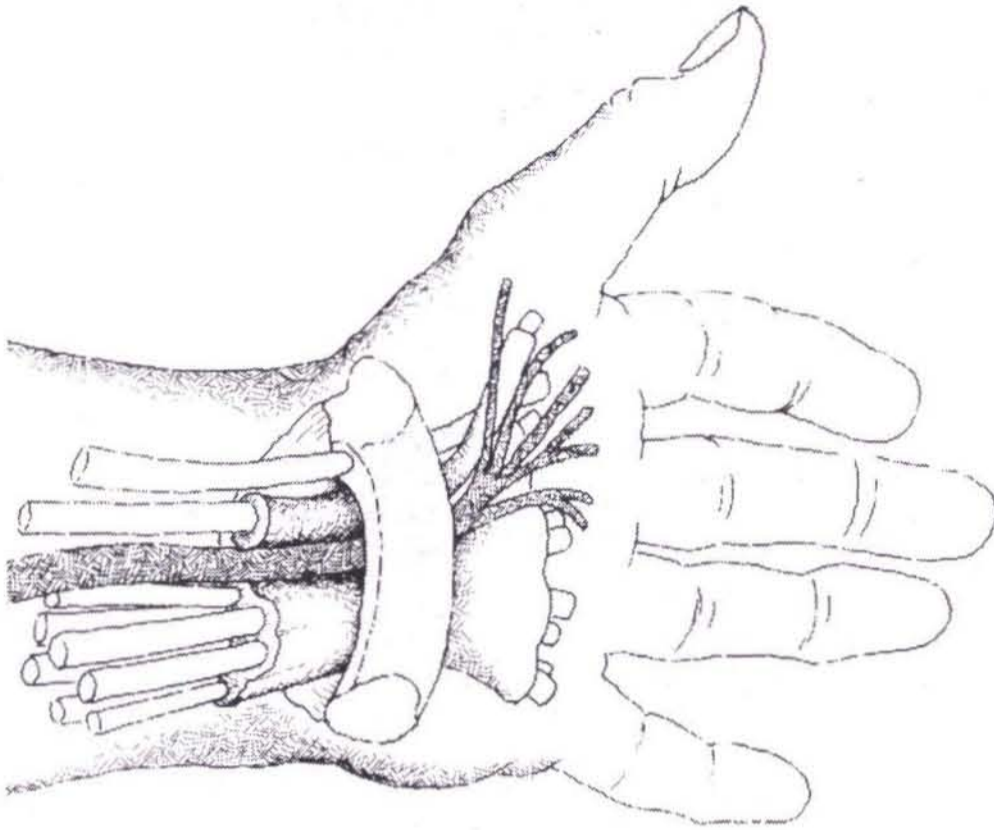
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Before the advent of computers, office workers had to perform a range of movements to get their work done. Even typing a letter required a number of varied motions: inserting the paper, typing, hitting the carriage return, removing the paper, stuffing the envelope, locating files, and filing a copy of the letter. Today a typical letter involves just sitting down at a computer and entering keystrokes. Most of the other activities have been eliminated. While this can make office workers more efficient, the lack of varied movement may contribute to physical discomfort and mental stress.

Ergonomics is a science that studies people's physical and mental capacities and limitations, including issues of mobility and work-related stress. The purposes of ergonomics include promoting physical comfort, productivity, and efficiency; reducing risk of physical injury, stress, and fatigue; and increasing satisfaction with the work and workplace. To achieve these goals, ergonomists design or adapt jobs, work spaces, tools, and equipment.

This article is excerpted from a manual by Ergo Tech Incorporated, entitled *An Ergonomics Guidebook For Computer Users*. It focuses on ergonomic issues common to computer users. It offers guidelines on how

to adjust your furniture, computer equipment, work aids, organize your work area and tasks, and incorporate change and movement into your daily routine.

These can all make a difference in how you feel at the end of the work day. The guidelines are not hard and fast rules; you may need to adapt them to fit your needs and your situation. The more time of the work day you spend on the computer, the more likely you are to benefit from the ideas presented.

Keep in mind that changes may feel uncomfortable or awkward at first. It may take a week or two before they feel natural.

Your Chair

Your chair is the most used piece of equipment in your office. How comfortable it feels depends on its design and how well it is adjusted or adapted to fit your size and shape.

Adjusting your chair can increase your overall stability, enhance your general comfort, improve leg circulation, reduce stress on your back, and help minimize fatigue.

Seat Height

Are your feet either flat on the floor or supported by a foot rest?

If not, Lower your chair if it is adjustable. If it cannot be lowered, put something under your feet for support. If this improves your comfort, you may want to talk with your supervisor about obtaining a foot rest.

Is the angle between your thigh and lower leg 90° or slightly more?

If not, Raise your chair seat or get a footrest which will enhance blood circulation to your legs.

Do you have space between the back of your knees and the front edge of your chair?

If not, Try lowering your chair, raising your feet with a footrest, or using a lumbar support to sit further forward. A lumbar support is a cushion designed to support the lower back, or the lumbar area. Lumbar supports are available through office supply, orthopedic catalogs and supply stores. They

ERGONOMICS

An Ergonomics Guide For Computer Users

BY NANCY LARSON, MS; DAN MACLEOD, MA, MPH;
ERIC KENNEDY, MS; WAYNE ADAMS, BME;
CHRISTINE MEIER, PH.D.

come in a wide variety of styles and a wide range of prices.

If these suggestions do not give you adequate foot support and space, behind your knees, you might need a shallower chair.

Quick Fix Ideas

Temporary footrests can be old phone books, a box or a shelf.

Backrest Position

Run your hand up and down the back of your chair. The area with the greatest forward curve is the lumbar support area.

Does your backrest physically match the lumbar (lower back) area of your back?

If not, Move the backrest up or down if it is adjustable. If not, try one of the Quick Fix Ideas below, or see if a lumbar support can be provided.

Does the back of your chair support your back?

If not, Adjust the forward tension until it gives you good back support. If your chair doesn't have this adjustment, a lumbar support may help minimize back strain.

If your chair has other adjustments (seat tilt, variable lumbar pressure, etc.), experiment to find the most comfortable settings. Different tasks often require different settings.

Change your posture frequently. Minor chair adjustments during the day can also relieve some muscle stress and stiffness.

Quick Fix Ideas

Temporary Lumbar supports include rolled up bubble wrap from packaging, a small pillow or cushion or a rolled up towel

*** Remember:** Adjust your chair height for overall stability, foot and leg support, and improved leg circulation for better comfort. Adjust your backrest and change your posture to achieve better comfort.

Your Keyboard

The height of your keyboard affects your posture. You will be most comfortable with

your keyboard at about seated elbow height. At this height, your wrists tend to be straighter and your shoulders more relaxed. This posture may also reduce the risk of wrist problems and neck or shoulder pain.

Is your keyboard at about seated elbow height?

If your keyboard is too high:

Raise your chair seat. (Get a foot rest if this lifts your feet off the floor.)

Lower your keyboard.

Some ways to do this are:

- Move the keyboard to a typing return.
- Put the keyboard on your center drawer. (For tips on how to cushion your hand from the edge of the drawer, read the section on wrist rests.)

- See if it is possible to obtain an adjustable keyboard holder, a device which adjusts the height of your keyboard. Various models and prices are available through office and computer supply stores.

- Replace your center drawer with a slide out shelf and place your keyboard on it.

- Request an "articulating arm," a keyboard holder which adjusts both height and angle. It also slides under the work surface when not in use.

- Talk with your supervisor about providing you with a special computer table.

- Find other ideas by looking around to see where co-workers keep their keyboards.

If your keyboard is too low, put something underneath it or lower your chair.

Your Mouse

If you use a mouse, it should be positioned as close to your keyboard as possible and at a matching height. A preferred solution is to use a keyboard holder wide enough to place the mouse adjacent to the keyboard.

*** Remember:** Position your keyboard at elbow height to key with straight wrists, relaxed shoulders, and greater comfort.

Your Monitor

Repeatedly tilting your head up, down, or to the side to look at the monitor can contribute to neck strain and stiffness, back discomfort, and other aches from awkward posture.

- Is the top of your computer monitor at eye level when you are seated? (You might want to ask a co-worker to help you check this.)

If your monitor is too low, See if one of the following computer aids can be obtained for you:

- A height-adjustable monitor holder. Styles and prices vary.
- A computer support arm, which allows you to raise the monitor and adjust it horizontally.

Seldom is a monitor positioned too high. However, if yours is, you can usually remove some or all of the computer equipment such as the keyboard holder, CPU (central processing unit), or other monitor holder.

A few cautions about moving your monitor:

- Ask someone to help you if the monitor is heavy or difficult to reach.
- Make sure that whatever you use to support the monitor is sturdy and stable.
- Never place your monitor where any of the ventilation openings are restricted. This can damage it.

***Remember:** Place your monitor at seated eye level to reduce neck strain and improve overall posture.

Quick Fix Ideas

- Inexpensive monitor platforms can be:
- An old phone book, or a few taped together.
 - Computer printouts taped together.
 - A wooden shelf.
 - Use your imagination, but make sure the platform is stable.

Copy Holders & Wrist Rests

These work aids can make your job easier, improve how you feel at the end of the work day, and possibly make you more efficient.

Copy Holders

Are your documents located at eye level and near the monitor?

If not, Use a copy holder. You will find that this inexpensive aid can help prevent neck strain from looking up and down between your monitor and documents. It can also reduce eye fatigue from excessive visual refocusing at different distances. Place the copy holder the same distance from your eyes as the monitor, and fairly close to it.

The best location for it depends on what type of computer work you do, such as data entry, data retrieval, word processing, etc. You will find more information about this in the section "Arranging Your Computer Equipment."

***Remember:** Position your copy holder at eye level and near the monitor to minimize neck and eye strain.

Wrist Rests

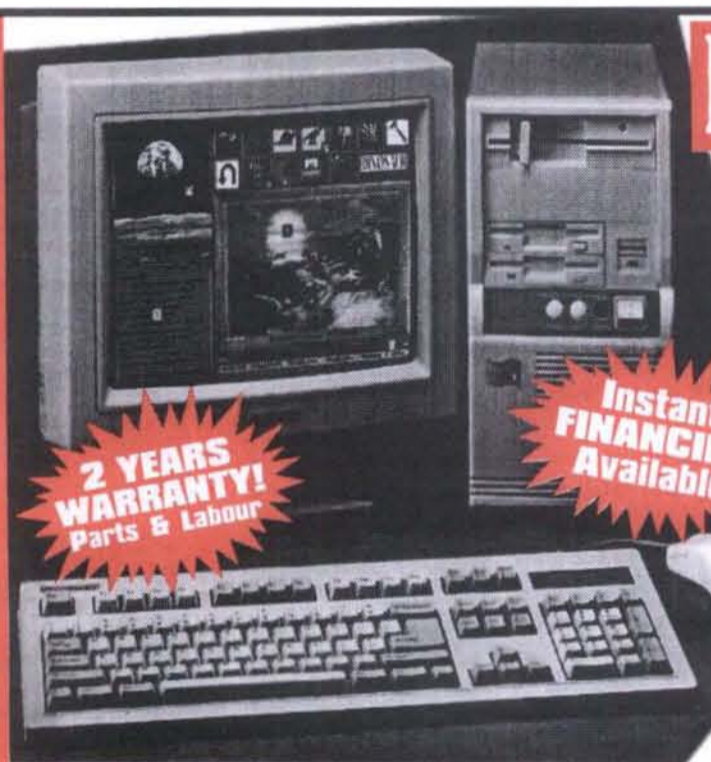
Do your wrists bend downward when you key?

Does your wrist rest on a hard or sharp surface (such as a desk or sharp edge)

If so, you are possibly working in a posture that stresses your hands and wrists and may increase pressure on tendons and nerves. Over time this can contribute to wrist disorders.

A wrist rest can help. Wrist rests are sold by office and computer supply stores. You can also fashion one temporarily by trying the Quick Fix Ideas. The wrist rest should be cushioned, with the front edge slightly curved. It should be at least as high as the front of your keyboard, but not higher than the "home" row of keys.

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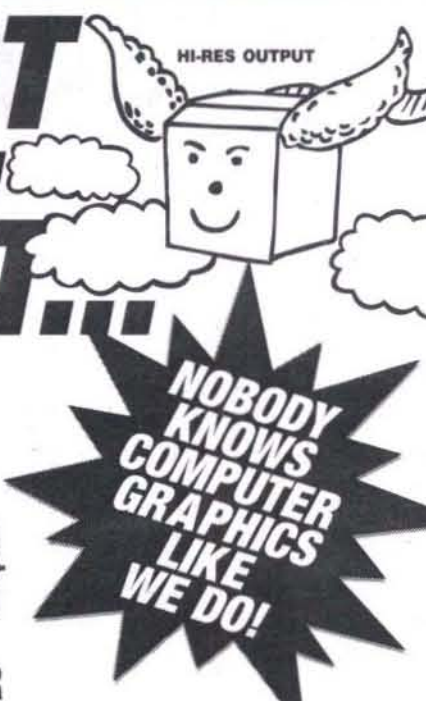
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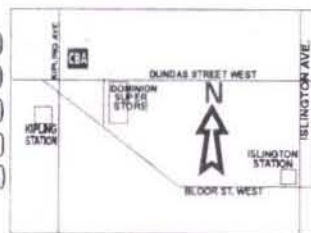
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Ergonomics Guide

Continued from page 17

Quick Fix Ideas

For a temporary wrist support:

- Roll up a small towel
- Cut a strip of high-density foam
- Roll up shipping bubble wrap and cover it with fabric.

***Remember:** Use a wrist rest to reduce pressure and improve wrist posture and comfort.

Put it All Together

Position a hard copy holder close to the monitor to improve neck posture and reduce eye fatigue

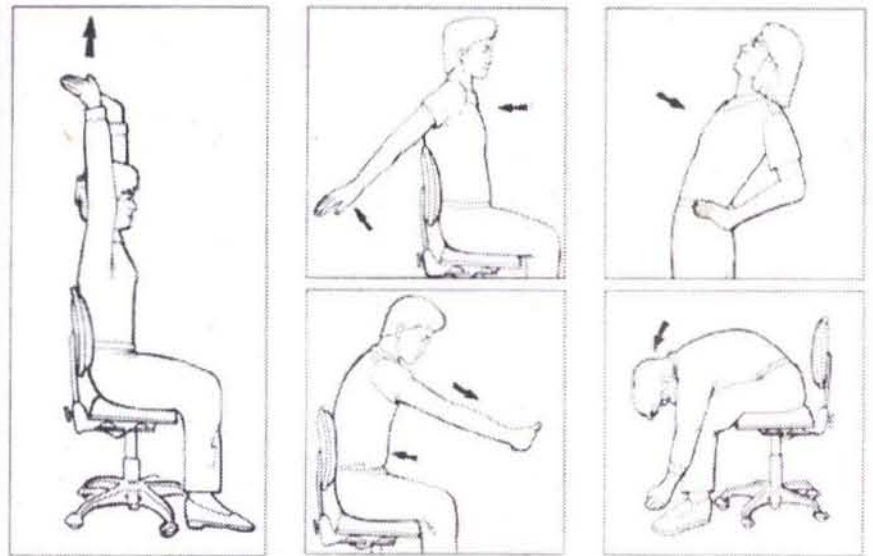
Place the top of monitor at seated eye level to improve head and neck posture

Incline the keyboard slightly and place it at seated elbow height to encourage keying with straight wrists and relaxed shoulders

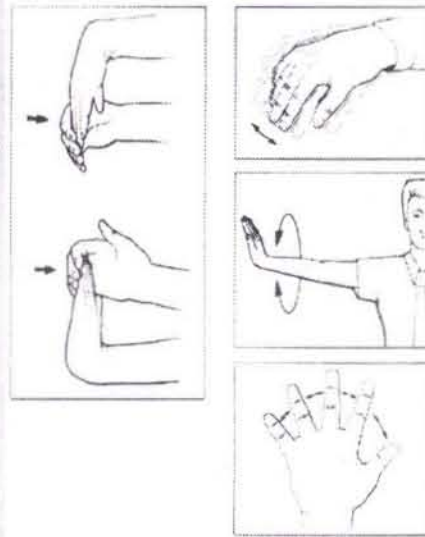
Position seat back to provide lower back support

Movement, Exercise, Task Variety and Stress

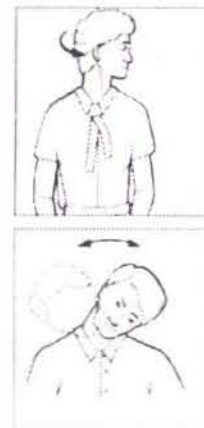
Upper Body Stretches



Shoulder, Arm and Hand Stretches



Neck Stretches



Relax



Variety and movement keep you physically and mentally alert.

The most interesting task can get boring if you do it for long periods of time, and the most comfortable chair isn't comfortable if you sit in it for hours. Another issue is working under pressure which can contribute to fatigue, physical discomfort and stress.

To reduce boredom, soreness, fatigue, and stress, and to increase your productivity

- Take some type of break from the computer every two hours.
- Alternate with non computer tasks such as phone calls, filing, meetings, etc.
- Time your computer tasks to end when coffee or meal breaks start.
- Change your posture frequently. Even readjusting your chair slightly changes your posture.
- Stretch periodically. This is particularly important when you work intensively or extensively at the computer.

Remember: Break up your computer work with breaks, non-computer tasks, and movement.

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Use padded and slightly curved wrist rest to keep wrists straight and reduce stress on shoulders and upper back

Allow space behind knees to improve sitting stability

Place feet securely on floor or footrest to improve leg circulation

Allow 90 percent or more angle between lower leg and thigh to improve leg circulation

Take It Easy On Your Eyes

Lighting
The appropriateness of illumination depends on its quality and brightness, the requirements of your tasks, and your own needs and preferences. Typically, computer work areas require less overall illumination than other office work areas. Excessive or inappropriate illumination contributes to eye discomfort and headaches.

Do you have mirror images (reflected light rays) or white spots on your computer screen?

Even if reflected light doesn't seem to bother you, it may still contribute to eye fatigue and soreness by making characters less crisp, clear, and easy to read. Light rays shining directly into your eyes can also make them sore.

To reduce glare:

- Reflect light away from your eyes.
- Glare becomes a problem only when light bouncing off your monitor strikes your eyes.
- Tilt your monitor slightly if it is reflecting overhead light.
 - Swivel your monitor slightly to either side.

Focus task lights directly onto documents, not onto the screen or into co-workers' eyes.

Turn off task lights when not in use.

Ask about getting a glare guard on your screen. It reduces glare by reducing light reflected off your monitor from reaching your eyes. There are dozens of good glare guards at computer and office supply stores..

Mesh guards are NOT recommended, however, since they are hard to keep clean and tend to make the characters appear fuzzy.

Minimize the amount of highly reflective surfaces in your work area, such as white paper and white or light-colored clothing.

Reduce the background light level by using lower wattage bulbs, removing some bulbs, relocating or eliminating lighting fixtures, or adjusting the blinds or curtains.

tures, or adjusting the blinds or curtains.

***Remember:** Reduce glare by changing the position of your monitor and reducing area illumination. Reduce contrast by adjusting background illumination.

Excessive or inappropriate illumination contributes to eye discomfort and headaches.

Contrast
Too much contrast between the amount of light at your monitor and the area surrounding it can contribute to eye soreness and fatigue. There are no guidelines as to how much contrast is ideal; it depends on your own comfort level and the amount of time you spend at the computer.

To reduce contrast:

- Move computer monitors away from windows or other sources of bright light.
- Avoid positioning monitors parallel to windows.
- Adjust window coverings.
- Adjust the contrast and brightness levels on your monitor to find the setting that gives you the best clarity.

Eye Discomfort
Do you get sore or dry eyes, or blurry vision by the end of the work day?

Even after you have controlled your glare problems, you may still experience eye discomfort..

Part of the problem is related to how people's eyes work when using the computer.

Sore Eyes
Spending long periods of time staring at the monitor fatigues the eye muscles.

- After every hour of computer work, exercise your eye muscles to relieve some of their stiffness.
- Close your eyes for a few minutes.
- Keep your monitor screen and glare guard clean. A dirty screen is harder to read, and thus contributes to eye strain.



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Dry Eyes

When you concentrate on the monitor, you tend to blink infrequently, so your eyes are more likely to become dry. This is especially true if you wear contact lenses.

- Keep a bottle of eye drops at your work area and use them frequently during intensive computer tasks.
- Try to remember to blink more often.
- Deflect air flow from vents or fans away from your eyes.

Blurred Vision

Constant staring at the monitor can stress the focusing muscles of your eye.

- Periodically look at objects far away from your work area.
- Look off to the far corners of your work area or, if you have a window, look off into the horizon.

***Remember:** Reduce eye soreness by doing eye exercises, closing your eyes, preventing dryness, and looking off into the distance.

Visual Demands

To date there is no evidence that using a computer causes visual problems. However, visually demanding tasks such as computer work can make an existing problem more noticeable. It is important to have periodic eye exams and accurate visual correction.

Contact lenses

Because people blink infrequently during

computer work, your eyes are more likely to become dry and uncomfortable. This is particularly true for contact lens wearers.

Here are some suggestions:

- Clean your lenses regularly.
- Use eye drops.
- Wear your glasses when working on the computer.

Bifocals

Some people who use the computer intensively have a pair of bifocals with a correction just for computer use. It is possible, for

example, to have the focal point set for computer monitor distance rather than for reading distance. Talk with your eye doctor about other available options.

If you wear bifocals or trifocals, the easiest way to avoid the change of visual fields is to lower the computer monitor until your bifocal correction works comfortably. However, keep the monitor high enough to maintain a comfortable neck posture.

***Remember:** Maintain good eye care and appropriate visual correction to

increase eye health and comfort. ■

An Ergonomics Guidebook for Computer Users is available from Ergonomic Solutions, 111 Palis Way S.W., Calgary, Alberta T2V 3V5
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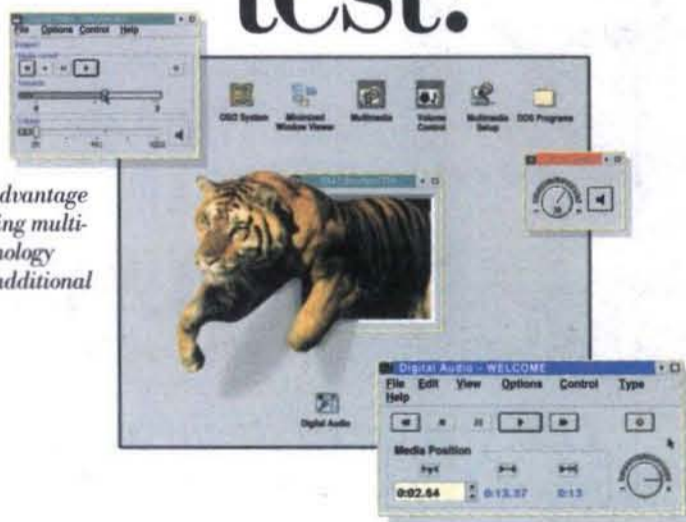
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Summing It Up

Arranging Your Computer Equipment

- Feet flat on floor or stable on footrest.
- Ninety degree angle or more between upper and lower legs.
- Space behind knees.
- Back support.
- Top of monitor at eye level.
- Documents at eye level and near monitor.
- Keyboard at elbow height.
- Wrist support.
- Equipment arranged appropriately.

Movement, Exercise & Task Variety

- Varied tasks.
- Posture changes.
- Stretches.
- Minimal glare.
- Clean monitor screen.
- Comfortable contrast.
- Visual breaks and eye exercises.
- Regular eye exams.
- Appropriate visual correction.
- Appropriate distance from monitor.

Environmental Issues

- Equipment noise dampened.
- Conversation level controlled.
- Social exchanges away from the work area.

SOHO

In Search of the Easiest Computer

A special feature on easy-to-use computers for the home and office

BY GRAEME BENNETT

...in which several computers are reviewed, with an eye for ease of use in setup and operation. The price, performance and features of the various machines differ, due to the fact that, when we ordered the machines, we asked each company, "What machine would you recommend for an absolute beginner?" When given a choice, we stated that raw speed was not as important as "user-friendliness."

We stressed ease of use as our number one concern.

Systems Tested:

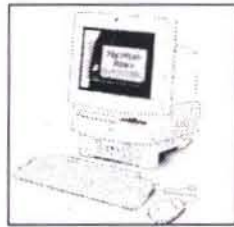
Apple Macintosh LC 575
Dell OptiPlex 486/LV
Compaq Presario Series 400

Apple Macintosh LC575

Summary: The LC575 is Apple's most powerful "all-in-one" Macintosh. Sporting a 33MHz 68LC040 processor, stereo sound, razor-sharp Trinitron color monitor and an integrated double-speed CD-ROM drive, this computer is ideal for home and educational users, and can handle all but the most demanding computational

tasks. Its lack of an FPU (floating point unit) — also known as a math chip — makes the LC575 unsuitable for mathematically intensive applications.

Hardware setup and configuration



Adding an expansion card •• The LC575 has two internal expansion connectors: one supports cards that plug into a "Processor direct slot;" the other can accept network or modem cards. Configuration is automatic — no switches or other options need to be set. In theory, this is great, but we called several dealers and none had any LC575-compatible expansion cards in stock. Some said that they had no information at all on how to order any. Presumably, this problem will diminish in the future.

Adding RAM •• only one slot available; expansion is limited to 36MB using expensive single-board SIMM upgrades. Slot is clearly visible by removing an access panel; drawer slides out easily. Configuration is automatic. No switches or other options

need to be set. Manual recommends that an authorized Apple service centre perform the installation.

Using a modem •• (requires a 9-pin DIN serial cable. We found the high-speed cables required for high-speed telecommunications difficult to find and the ones we did find are often not clearly marked as such).

Using a printer •••• (requires a printer with a 9-pin DIN serial or AppleTalk connector, or a parallel-to-serial interface). Apple StyleWriter, LaserWriter and Hewlett-Packard DeskWriter printers were particularly convenient to configure.

Using Sound ••••• (Audio in/out is built in).

Adding another hard drive ••• (a standard SCSI connector is built in). SCSI drives are more expensive than the IDE type popular on PCs, but readily available. It is worth noting that Apple's supplied formatting software does not support third-party hard drives.

Using a CD-ROM ••••• (built in). Apple's CD-ROM software is very good. Our test unit shipped with version 5.0 of Apple's CD-ROM software, which simplifies and enhances audio disc access somewhat over earlier releases. (This new CD-ROM software release is available from Apple's ftp site: ftp.apple.com.)

Our only quibble is the strange interface convention that requires a floppy or CD to be dragged into the Trash before it can be ejected. Isn't the Mac's user interface supposed to be logical?

Connecting to a network •••• (networking software and hardware is built in). The built-in network hardware is slow. EtherTalk is faster, but requires an additional (US\$84) Ethernet card. Connecting a Mac to an existing PC network can be tricky. We found Farallon's PhoneNet (included with Timbuktu for Windows) to be the easiest way to network Macs and PCs.

Re-installing System software •••• system software is supplied on a relatively fool-proof CD-ROM. Apple has a confusing set of system software "enablers" and system updates that can be troublesome for users who choose not to use the "Easy Install" option, or who want to use a third-party disk repair program.

Replacing system battery •••• easy, although the part number is not documented in the manual.

Keyboard: (The LC575, like many Apple Macintosh models, is shipped sans keyboard. We reviewed several Apple and third-party keyboards during our evaluation.)

Standard • Poor cursor key layout; no function keys. Relatively inexpensive.

Enhanced •••• Standard "AT" design; slightly stiff keys. Variable height adjustment. Expensive.

OmniKey •••• Third-party replacement for Apple keyboard. Standard "AT" design, good tactile "click," no height adjustment. Good value.

Adjustable •• Innovative "split" design reduces ulnar deviation. Awkward function key/numeric pad design; below-average feel.

Apple Desktop Bus Mouse II

Tracking: ••••• excellent. Adjustable speed and double-click rate.

Feel: •••• good — much better than Apple's now-discontinued ADB Mouse. Suitable for both right- and left-handed users, small to large hands.

Apple Monitor and video display

Monitor type: 14-inch Trinitron, built in. Monitor height and angle are not adjustable.

Video display system: Apple built-in video. Display resolution was the lowest of all systems tested (640x480-pixel bitmapped display) and is not adjustable.

The standard unit supports up to 256 colors. Our test unit had an optional video RAM upgrade allowing the display of 16-bit color (thousands of colors).

Clarity and sharpness: ••••• excellent. Brightness and sound level controls on the front panel of the LC575 may be disabled via software — a desirable feature in an educational setting.

Audio fidelity: •••• The LC575 records (in mono) and plays back (in stereo) 11 or 22KHz digitized audio. Stereo speakers and a microphone are built in. Headphone and external microphone jacks are supplied and clearly labeled. Audio CDs may also be played on the built-in CD-ROM drive with supplied software. Using Macintosh Easy Open software (currently optional, but expected to be bundled with upcoming Macintosh system software releases), music from audio discs can be digitized and stored as a QuickTime sound track.

Misc. Apple Hardware notes

Our test group of beginners found Apple's choice of iconic labels for the various ports on the back of the computer to be less obvious than those on the Dell or Compaq PCs. We find this somewhat ironic, given Apple's reputation for ease of use. Although the LC's processor direct slot and single RAM slot provides limited expansion options, it's worth considering that the LC already has most of the expansion options built in (network, sound, SCSI, video, etc.) that are available for a PC. Nevertheless, we'd rate the LC575 less expandable than any of the PCs tested here. The unit is both CSA and UL approved.

Manuals

Illustrations •••••. The manuals were the easiest to understand of any of the systems tested, although technical information, as noted below, was lacking.

Presentation of info ••• Certain operations, such as what happens when (to quote the manual) the "reset and interrupt switches on the front or side of your Macintosh are pressed" are either wrong, or very poorly explained. The LC575 has no such switches, but instead uses a combination of key presses to perform these actions. Control-Command-Power On resets the computer while Command-Power On invokes the interrupt function. As far as we can tell, these com-

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mands are not documented in any of the manuals supplied with the LC575.

Health and safety info ***** An entire chapter is devoted to health-related information, including musculoskeletal discomfort, eye fatigue and other concerns. Tips are provided on arranging your office and avoiding fatigue.

Technical info ** A four-page pamphlet provides brief technical details about the computer, but lacks illustrations and detailed information. For example, the procedure for upgrading video RAM is not described, nor are part numbers supplied.

Overall clarity ****

Other notes: Extensive glossary of acronyms provided. Technical support numbers(s) provided. System software can be set up to operate in English, French or Spanish.

Tutorial

Beginner skills *****

Intermediate Skills ****

Advanced Skills **

An interactive, easy to follow tutorial leads new users through the most important procedures and operations required to effectively use a computer. The tutorial is similar to that provided with Microsoft Windows, except, of course, it teaches basic Macintosh skills.

Apple's "Balloon Help" is decidedly inferior to the interactive Help system provided by PCs running Microsoft Windows and its applications.

Technical support ** One year, toll-free, Mon.-Fri., 8:00 am - 8:00 pm EST.

Apple technical support failed to correctly answer several relatively simple questions involving Apple-brand hardware.

Diagnostic disk not supplied.

Warranty: *** 1 year standard. Additional coverage available at extra cost.

Misc. Apple Software Notes

The standard CD-ROM that ships with the LC575 contains a tutorial, the Macintosh System 7.1 software, a run-time HyperCard Player, and a few disk utilities, including Apple File Exchange, which allows the Mac's floppy drive to read and write MS-DOS-formatted disks, enabling the exchange of data files with an IBM-compatible PC.

Utilities are provided that cater to disabled users. One, named CloseView, caters to the visually impaired by enlarging on-screen images. Another, called Easy Access, makes it easy to press key combinations by pressing one key at a time.

A software utility called At Ease is also included. This program simplifies the process of selecting and launching Macintosh programs, while allowing certain "dangerous" items such as the trash can (used for deleting files) to be hidden. At Ease helps make the Mac the most appropriate computer for young children.

Backing up disks ***** The procedure for creating a set of backup floppy disks is described in clear detail.

Dell OptiPlex 486/LV

From: Dell, 1-800-387-5752
Summary: equipped with a 33 megahertz Intel 486 processor, this made-in-Europe IBM-compatible PC offers moderate expandability, plenty of upgrade potential and excellent support from the company, including pre-installation of a wide variety of hardware and software options.

Dell Monitor and video display
Monitor type: Dell 14"



Display type: Dell's built-in VGA subsystem is compatible with Tseng ET4000 W32i VGA products. A wide variety of video modes are supported, at resolutions of up to 1024x768 pixels. With an optional video RAM upgrade, high-color displays with up to 65,535 hues are possible, as are resolutions

of up to 1280x1024 with 256 colors.
Tilt and swivel: adjustable.
Clarity and sharpness: very good.

Dell Keyboard:

Enhanced **** Standard "AT" design; slightly rubbery feel when keys are pressed. Good tactile response. Very quiet. One-step height adjustment.

(Dell) Microsoft Mouse 2

Tracking: ***** Excellent. The best PC mouse we've ever tested. Adjustable speed, double-click rate, orientation, button setup,

pointer size, etc.

Feel: **** Excellent — much better than Microsoft's original mouse. Better suited for right-handed users, due to its asymmetrical design. Suitable for users with average to large hands. Mousepad included — a nice touch.

Dell Manuals

Illustrations ***** All important procedures are clearly illustrated.

Presentation of info **** Amazingly good, given the complexity of much of the



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info. A separate technical addendum lists a few hardware features that have changed since the manual was printed. This could potentially cause some confusion.

Health and safety info ***** Presented on the first page of the manual — where it should be.

Technical info ***** All upgrade options are explained in detail. Even the jobs most users would consider leaving to their dealer, such as replacing the CPU, are fully illustrated.

Overall clarity ***** Aside from our

minor quibble with the addendum, we have no complaints.

Other notes: some configuration options require typing codes in hexadecimal (base 16). Quick reference cards are supplied.

Technical support ***** Dell's support services were the best of those we tested. Tech support is available, toll-free, seven days a week, 24 hours a day — for life! On-site service is available in some areas. For critical systems, a special network system hotline is available at additional cost that features certified Netware engineers standing

by, 24 hours a day. This service charges only for problems solved, not by the hour.

Warranty: *** 1 year standard. Additional coverage available at extra cost.

Dell provides leasing.

Dell Tutorial

The standard Windows tutorial (available on all PCs running Microsoft Windows by selecting "Windows Tutorial" from the Help menu) is the only disk-based tutelage supplied with the Dell PC, but it is adequate for most users. The company also provides a

substantial "Diagnostics and Troubleshooting Guide" in book form.

Backing up disks ***** The second time the computer is turned on, it provides a list of options, one of which allows you to run a supplied backup program. A 24-page manual details the backup procedure.

Hardware installation ***** Two Quick Reference cards describes the basics ("why won't my modem work?", etc.); the manuals provides additional details.

Software

The company preinstalls and configures software ordered with its PCs. Dell says it will do this for any of the products from its 97-page catalog of software and hardware options. We ordered Microsoft Office (Word processor, spreadsheet and presentation package) with our test unit, and were ready to run as soon as we unpacked the machine.

All manuals and original floppy disks are supplied for DOS 6.2, Windows 3.1, and any third-party applications ordered.

A 97-page, full-color catalog shows many third-party software and hardware options available from Dell.

Hardware setup and configuration

Adding an expansion card **** Supports a total of three full-length 8- or 16-bit ISA cards designed for standard PC expansion bus; a VESA/cache card adapter is optional. If the optional VL-Bus riser card is installed, one VL-Bus and a cache card can be added to the system, but access to ISA connectors ISA2 and ISA3 is compromised.

The on-board VGA graphics adapter lacks "feature connector" required by some third-party video hardware (Sigma Designs Reel-Magic, etc.) Multiple cards require manual configuration (e.g., switches or other options on cards may need to be set). The system's cover removes easily and provides ready access to the expansion slot areas.

Adding RAM ***** The process for adding RAM is clearly explained in the manual. The system can be expanded to a maximum of 64 megabytes of RAM using standard SIMMs (single in-line memory modules). Slots are clearly visible by removing the cover. Configuration is automatic and RAM may be tested using the supplied diagnostic utilities.

Using a modem ***** (Two serial ports feature AT-standard 9-pin "D" connectors.) The Quick Reference cards supplied with the unit specifically address common modem problems. Dell can supply and preinstall over two dozen fax/modems.

Using a printer **** (standard parallel port included). Our test unit lacked the EPP (enhanced parallel port) found on some PCs. The Quick Reference cards supplied with the unit specifically address common printing problems. Dell can supply and pre-configure over four dozen models of printers.

Using sound *** Dell's catalog does not mention many sound boards. The popular Microsoft Sound System is available, though. As with other third-party hardware (scanners, network cards, etc.), it may be pre-installed at the Dell factory.

Adding another hard drive **** All hard drive upgrades supplied by Dell are physically formatted before they are shipped. A half-height bay is available. The manual clearly describes the installation procedure for both IDE and SCSI drives, and includes info on non-DOS operating sys-

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Continued on page 82

PC SOFTWARE REVIEW

Works For Windows 3.0

For a Lighter Office Load

BY GEOFF WHEELWRIGHT

I must declare a bias from the start of this review. I have long been a user of Microsoft Works and have been a fan since the first version of the product came out for the Apple Macintosh more than eight years ago.

In recent years, however, I have to admit to having fallen out of the habit of using Microsoft Works - in either its Mac, DOS or Windows versions - and instead switching to Microsoft Word for Windows and Excel. Word and Excel just had so many more features.

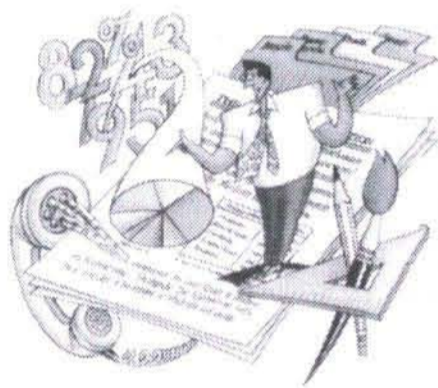
Works is much easier to use than Windows Terminal, and actually includes a Toolbar to help you quickly make connections and log on. It also includes the all-important ZMODEM file transfer protocol (a sad omission in

Windows Terminal).

I was also delighted to find a whole range of new Wizards in Works for Windows 3.0 that simplify many of the tasks which were tough in previous versions. If, for example,

you need to find a file but are not sure of its name, a file finding Wizard will help you to quickly search your whole hard disk for that

Continued on page 30



Despite all their features, however, I always found myself slightly resenting the amount of hard disk space I had to give up in order to use them, especially on notebook computers, where space is often at a premium. But whenever I tried running Word and Excel on my desktop machine and Works for Windows 2.0 on my notebook, I always found myself frustrated by the fact that Excel spreadsheets could not be read in their native format and that Word offered so many more features for editing than Works.

It was in this frame of mind that I approached Microsoft Works for Windows 3.0 almost two months ago. By this time, I was using Microsoft Office Professional on my desktop system, but was really unhappy about the idea of setting aside 62 Mb for a full installation of the same kind of package on my portable.

Imagine my joy when I loaded up Works for Windows 3.0 and found that it would quite happily read and write files in both Word for Windows 6.0 and Excel 5.0 formats (which, at the time, was quite a feat given that Excel 5.0 was still beta software). This meant that I could stay with my full-blown, full-powered applications on my desktop system, but have a slimmer, and yet fully file-compatible, package on my notebook machine.

The result is an arrangement I am really happy with. And I get happier the more I work with Works, because Microsoft has really tried to redefine how people use integrated applications with the release of this product.

To start with, the company has finally added a communications module into the Windows version of the product. This has always been a part of the DOS and Macintosh versions, but was left out of previous Windows versions on the assumption that most users were happy to work with Microsoft Terminal instead.

The communications module within



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Game Pack 3 features *Shadow Caster*, the exciting graphic role-playing game and *Privateer*, a challenging space adventure in the Wing Commander Series.

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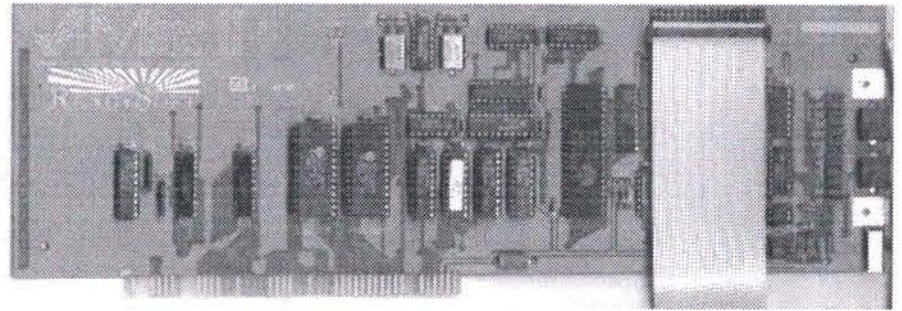
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EMULATION

Amiga to the Max

ReadySoft's A-Max IV —
a color Macintosh emulator for the Amiga

BY GRAEME BENNETT



Product: A-MaxIV (4.07)
From: ReadySoft Inc., 905-731-4175
Summary: A-Max IV is the latest release of a Macintosh emulator for the Amiga from Ontario-based ReadySoft.
Price: C\$609.95; (A-Max II+ owners may order upgrade ROMs for \$144.95; A-Max cartridge owners can upgrade for \$419.95, less a rebate of \$120 when they return their old cartridge. The company also offers a C\$329.95 "sidegrade" for Emplant owners). A set of Mac 128K ROMs is required. A C\$24.95 MIDI option is available for connecting use with Macintosh MIDI software.

access to enhanced color modes using either an Amiga video card or an AGA equipped Amiga, such as the Amiga 4000, large screen monitors, and smooth panning virtual screens larger than the monitor's physical display.

Requirements

A-Max IV requires a 68020 or greater processor (not for its speed, but for its instruction set — the Macintosh operating system routines that handle colors require at least an 020), version 2.1 of the AmigaDOS operating system, and version 7.0 or newer of the Mac operating system. Although earlier A-Max releases supported System 6.0x, the new release requires at least System 7.

For Amiga owners not familiar with the AmigaDOS 2.1 upgrade: the primary differences between 2.04 and 2.1 are the built-in file requester and a free copy of CrossDOS. A-Max uses CrossDOS during its emulation.

Manual

Some users on GENie and CompuServe have voiced complaints that the A-Max manual lacks troubleshooting information, but most A-Max users report that the manual looks good, and is quite straightforward. A table of contents and detailed index are included.

Although it lacks a troubleshooting section, most users report that the product installs with a minimum of hassles. The manual reflects this assumption that things will go smoothly. Nevertheless, as with all hardware products, you should read the manual front to back before you plunge in. What? — you don't read hardware manuals? Well, this one's a lot better — and easier to understand — than most of them.

As the manual says, learning to use the Mac is not the purpose of the A-Max documentation. Once A-Max is up and running, a book called the Macintosh Bible will get new users started in the Mac world.

Installing A-Max

A-Max is definitely not as easy to set up as a real Macintosh. If you are buying A-Max from a dealer, we recommend that you have

Introduction

A-Max IV is a hardware and software system that allows you to use Macintosh software, in color, on any Amiga model equipped with a 68020, 68030, or 68040 processor and an expansion slot for the addition of the A-Max hardware card.

A-Max IV makes use of all of the Amiga's resources, including RAM, hard and floppy drives, serial and parallel ports, mouse and keyboard, during Macintosh emulation. However, unlike previous versions of A-Max, A-Max IV does not shut down the normal AmigaDOS operating system. Therefore, it is now possible to multitask Amiga programs with A-Max IV.

Since A-Max IV runs original, unaltered Macintosh applications directly on an Amiga, most software runs as fast or faster on the Amiga as on a similarly equipped Macintosh. An Amiga 4000 with a 68040 processor, for example, yields performance comparable to that of a similarly equipped Macintosh, such as the Quadra 950.

One sticky point is the fact that the A-Max requires a set of genuine Macintosh ROMs in order to function. Fortunately, A-Max IV requires only the less expensive 128K Mac Plus ROMs, and includes extensions to these ROMs to support faster processors, memory management units, floating point math coprocessors, and large RAM sizes. A-Max IV also provides easy

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Emulating other computers

The Amiga's not the only one in the emulation game. We've heard of, but have never actually seen, a shareware product for the PC that allow it to emulate a Macintosh.

We have seen and tested an Atari ST emulator called GEMulator from Branch Always Software (distributed by Bellevue WA-based Purple Mountain Software). It allows a PC to run many of the programs designed for Atari's now-discontinued line of computers. Unfortunately, MIDI software (the Atari's strongest suit) is not supported.

It's a bit of a stretch to call it emulation, but OS/2's ability to run programs designed for DOS and Windows is impressive. Windows NT can run the majority of programs designed for DOS and/or Windows, as well.

Unix

Most Unix computers can run Windows applications using a Windows applications emulator such as Sunsoft's Wabi (Windows Applications Binary Interface) or Insignia Solutions' SoftWindows.

The emulators are aimed at letting Windows applications run unchanged on Unix platforms. Wabi, the best known of the emulators, works by intercepting Windows API calls and remapping them into X Windows APIs.

Wabi, SoftWindows, and other new Windows emulation products belong to a new generation of "superemulators" that go one step beyond earlier emulators. Earlier emulators emulated both the Windows code and the application code. Wabi and SoftWindows emulate only the application code. The Windows code is native.

Macintosh

The new PowerPC-equipped Power Macintosh series from Apple, as described in our Mar. '94 issue, ships with a demo copy of SoftWindows that runs DOS and Windows software at 486 speeds.

Older Macs and NeXT computers can run other Insignia products (SoftPC, SoftPC with Windows), but emulation performance on 680x0-based computers is rather poor. Orange Micro and Apple market hardware cards that allow certain Mac models to emulate a PC without the slowdown of software emulation.

Old-timers might remember a product called II in a Mac that allowed the Mac to run software designed for an Apple II.

Even older-timers might remember when Jimmy Pattison bought a Victoria, BC-based company that produced an Apple II emulator for the Commodore 64. Yikes! My age is showing.

— Graeme Bennett

Contact:
 Purple Mountain Software, 206-747-1519
 IBM Customer Services 1-800-465-6600
 Microsoft Canada, 416-568-0434
 Sun Microsystems, 604-684-4120 or 416-477-6745.
 Insignia Solutions, tel 415-694-7600
 Apple Canada, 1-800-263-3394
 Orange Micro, 714-779-2772

him or her set it up for you.

Since Amigas lack the Mac's ability to automatically eject disks, users familiar with a real Mac may be confused when A-Max presents only a flashing symbol to indicate that a disk is safe to remove from the floppy drive. And because, after all, an Amiga is not a genuine Macintosh, incompatibilities may occur with games, copy-protected software or titles that directly address Macintosh hardware features. Nevertheless, compatibility is extremely good. We doubt whether any of the top 50 selling titles for the Mac would fail under A-Max's emulation.

Here are a few of the caveats we encountered.

A-Max makes changes to the Amiga's Startup-sequence file in the S: directory and installs several files in a DEVS: directory labeled A-MaxConfig. Fortunately, it makes a backup of the Startup-sequence that existed prior to installing A-Max, in case a problem is encountered. A file called A-MaxInit goes in the c: directory.

From the main A-Max program, you can specify your video and memory settings, set up devices, (printers, boot drives, etc.) and save your system configuration.

The first time you set up A-Max, you must partition your hard drive to add a Macintosh partition, set up a separate Mac boot drive, or, if you have enough room on your hard drive, you can create a file on your Amiga drive that simulates a Mac HFS (hierarchical file system) hard drive, using an option Readysoft calls a "hard file." This acts like a virtual drive and it will give you a place to install System 7 to. Although A-Max can use this file to simulate a Mac hard drive, this is quite slow — too slow, in fact, for anything but emergency use. Serious users



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will want to reformat a hard drive and devote one or more partitions to A-Max. There is no way around it...a partition, or an external dedicated Mac drive, is the only way to fly.

A-Max requires that Mac partitions be given certain names and, if you do not use Commodore's own video output and SCSI controllers, you may run into other hassles or incompatibilities.

Using one of these "drives," you must install a copy of the Macintosh System 7 (or newer) operating system, which ReadySoft does not supply. To accomplish this, you first must make sure you have CrossDOS' PC0: enabled and start A-Max with the first Install disk for System 7 in the floppy drive. One little snag is the fact that the latest version of Apple's Macintosh System software comes on high-density disks. If your floppy drive isn't a high-density drive, you'll have to order the install disks on low-density diskettes and jump through a hoop or two first. (You have to use A-Max's disk transfer utility to copy each 800K disk to a file. A-Max recognizes these files as a "file device" consisting of a file image of a bootable Mac floppy disk.) It's a little complicated. Most users will probably be much happier in the long run with a high-density floppy.

Users with a Benoulli or SyQuest removable hard drive connected to their Amiga may find that the easiest thing to do is to take the unit and a spare disk over to a friend's house, connect the drive and format a disk on his or her Mac, and then install the System 7.x software on this disk (making sure that you choose the "For All Macs" selection). They're all SCSI, and the only

thing that makes a Bernoulli or SyQuest disk a Mac disk or an Amiga disk is the formatting. Just remember, when you format it, to name it AMAX0 or something similar.

Since A-Max IV runs original, unaltered Macintosh applications directly on an Amiga, most software runs as fast or faster on the Amiga as on a similarly equipped Macintosh.

When this is done, the Mac operating system comes up normally and will prompt you through the necessary steps to install the Mac OS on the hard disk. Once this is done, you are in business. The next time you run the A-Max program from AmigaDOS, after a brief pause (during which the system is presumably checking and patching the code in the Mac ROMs), the Mac OS boots from the hard disk, and the next thing you know, you're looking at a full-color Mac desktop.

Features

Users report success in connecting a wide variety of Mac peripherals to their Amigas and A-Max emulators. A-Max can access Amiga RAM, drives and peripherals. Users with Mac peripherals can connect them, too. External Mac SCSI storage devices (hard drives, Bernoulli, SyQuest, Floptical drives, etc.), Apple CD-ROMs (we tested a double-speed Apple CD-300 drive), scanners, and other SCSI devices can be attached. The A-Max includes ports that support 14.4 Kbps modems, Apple printers and LocalTalk networks, including access to System 7's file sharing feature. A printer connected to the Amiga's parallel port can also be used, with optional ImageWriter emulation for some models.

Although the Amiga 2000 does not come with the 68020 microprocessor A-Max requires, it can be upgraded with a variety of accelerators (such as the GVP GForce '030-25 with the 68EC030 chip) to run A-Max. Some users keep a Mac hard-drive partition on a 44Meg SyQuest or other external cartridge for maximum convenience in their Amiga environment.

Some users also emulate a PC with Commodore's Bridgeboard. Using the IBM-compatible ISA slots in an Amiga 2000 or greater, users have successfully installed Multimedia PC upgrades such as the Windstorm MPC upgrade (SVGA, Spectrum16, SoundBlaster, Joystick, SCSI, CDROM) for the Bridgeboard. A product called CDFS from Asim allows the use of standard SCSI CD-ROM drives on the Amiga (including the popular NEC models). With A-Max IV, and the appropriate Macin-

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tosh drivers, these drives can now be used on the A-Max side as well.

A-Max supports Mac disks directly, and can use Macintosh SCSI peripherals. A SCSI CD, for example, isn't added to the drives; it's added via the SCSI device prefs. Select the SCSI ID of your CD, install the Mac CD drivers and you have a CD. The manual provides all the details.

On GENie, users report success in using an Apple CD300 SCSI CD on an A3000 under both A-MaxIV and Amiga. Apple supplies its own drivers. If your drivers are properly installed, the SCSI ID is selected via A-Max IV's SCSI prefs, and you have the SCSI device driver named properly in the same SCSI prefs menu, then you should have a CD up and running.

What kind of Macintosh A-Max ends up emulating depends partly on what kind of Amiga system you are running it on, but not as much as you might suspect. (One A-Max user with an Amiga 2000 with a GVP 040 33 reports that, when he selects "about this Mac" it says it's a Quadra 950.)

Although the 128K ROMs from a Mac Plus are incapable of addressing more than 4 megabytes of memory and do not support QuickTime or Color QuickDraw, the A-Max somehow patches these ROMs to provide full support for these features — an amazing feat. Other Mac emulators, such as the Emplant, require the more costly and scarce 256K Mac II ROMs to accomplish this.

Yes, you can run QuickTime video with A-Max. Using A-MaxIV on an A3000 (25mhz with 10megs RAM) and an Apple CD ROM, QuickTime CDs such as the Beatles' Hard Days Night ran with no problems.

The most significant characteristic that defines your A-Max Mac's limitations is likely to be its video display. An A3000's ECS graphics chipset will only have 16 colors. To display more colors, an A4000's AGA graphics chips or a third-party display card, such as the Picasso II card reviewed in the April '94 issue of TCP, are required.

A-Max IV allows for changing color depth on the fly through the Mac Monitors Control Panel. You can also change color resolution on the fly this way. You can set up several Mac screens via A-Max preferences and then switch to them as virtual monitors. Each virtual screen can have its own color depth set via the Mac monitor. Best of all, if you have a 24-bit video card, such as the Picasso II, the Mac operating system supports virtual monitors the same way it does on a real Mac: more than one monitor can be connected simultaneously and independently; each monitor acts as a "viewport" into a single desktop. Too cool!

Drive Dilemmas

Although older A-Max and A-Max II cartridges contained a connector that allowed the direct connection of a Mac 800k drive, the A-MaxIV does not support this option. It can, however, read Mac 800K disks and, if you have an HD drive, 1.4MB HD disks, directly in the Amiga's own floppy drive. With an HD Amiga drive you can read/write HD Mac disks directly under emulation. For some reason, though, 800K disks must be read in Amiga mode and transferred to a special "image file" that is accessed when in Mac mode. In other words, you can't read them/write them directly under emulation but you can read/write to and from file devices that are available when you're running the emulation. Despite the obvious drawbacks to this limitation, it does not represent an insurmountable problem. (You

might want to add a high density drive to your Amiga, anyway.) We hope that Readysoft integrates better 800K disk support in future releases.

There are a few problems when using certain Mac peripherals. For example, a Floptical drive such as the one we wrote about back in July, 1993, works fine with A-Max and adds the ability to read/write Mac 1.44 disks, IBM 1.44 and 720k, as well as the 21 meg Flopticals. (Unfortunately it doesn't read/write the Mac 800k disks, but this is a Floptical limitation, not an A-Max problem.)

However, unlike the Mac, an Amiga's

floppy drives require manual disk ejection. Thus, the floptical drive works, but because there is no eject button on the drive, when used with the Amiga, to eject disks you have to stick an unbent paperclip in the little eject hole on the drive. Now that's high technology!

Because most Amiga models prior to the release of the A4000 lack a high-density floppy drive, it can be a problem to install some of today's Mac software, which often ships on HD disks. For example, Adobe's Photoshop and Illustrator programs ship on High Density diskettes, as does Apple's own Sys-

tem 7.1 software. Amiga users without HD drives have to figure out how to transfer these disks to A-Max's hard drive. The most likely solutions are a removable hard disk (SyQuest or Bernoulli), a modem, or using a friend's Mac to compress HD disks onto DD diskettes with an archiving program. Needless to say, using A-Max IV without an HD floppy drive can lead to some hassles.

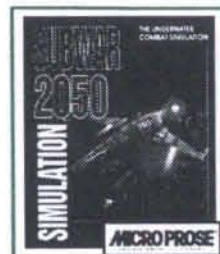
A Few Problems

Some users have reported that the Apple System Software installer does not always work

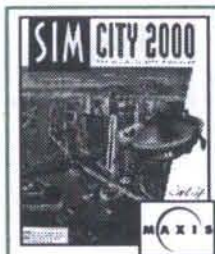
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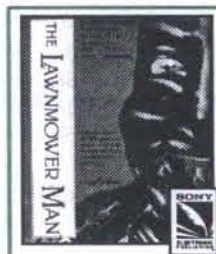
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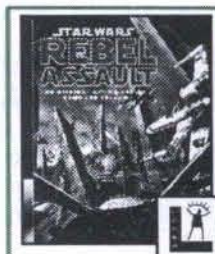
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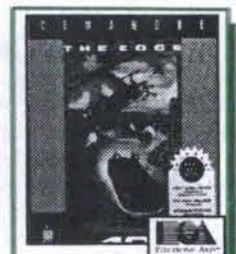
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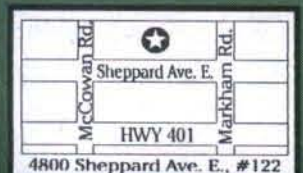
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the same under A-Max emulation as it does on a real Mac. When we spoke to a Readysoft support technician, he claimed that some System software installations work when "for all Macs" is selected, yet others do not. Apparently, on a few systems, the "Install System software for all Macs" results in a script error which does not occur on a real Mac. One user reported that, by selecting (with shift-clicking) all of the types of Mac, this allowed the system to run.

The A-Max unit isn't compatible with KickROM 3000s. These were older models that booted the Kickstart from the hard drive. In these models, Kickstart 2.0X loaded from the hard drive. They won't work with A-Max. These machines must be upgraded to the 2.04 OS ROMs or newer to work. (The only difference between the 2.04 and 2.05 ROMs is support for PCMCIA cards and IDE drives.)

Users running a 24-bit graphics board, such as the Retina mentioned in the April issue of TCP, should note that A-Max's screens should not be redirected through the Retina's Workbench emulation software. In the case of the Retina, users report that they must either not startup the Retina emulation program at all, or else must type the command "retinairq off". The emulation programs such as EGS WB-emulation and Retina Emulation seem to have set a vector somewhere that A-MaxII+ doesn't like.

Some other graphics boards have more severe problems. The Spectrum board is currently incompatible. According to ReadySoft's tech support, a driver fix is not yet available for GVP's EGS card, but it is currently being worked on. The IV24 board is also not compatible. A-Max is also incompatible with certain SCSI controllers, includ-

ing the DKB 4091 SCSI board.

Tech Support

Several users reported that ReadySoft's tech support is poor. One GENie user claimed that he had left many messages at tech support and not one call had been answered. *The Computer Paper* had no problems getting through to ReadySoft, and spoke with a technician several times. Early in the day usually proved to be the best time to get through to the company's tech support department.

Compatibility

We were impressed by the number of happy A-Max users we discovered on GENie and CompuServe. Here are some of their comments.

"...a better Mac than the Mac LC I had...so I sold the LC."

"My A-MaxII has been running flawlessly since day one, and I find it to be an amazing piece of work. I would love to have the color the A-Max-IV offers and would upgrade if it works as well as my A-MaxII does."

"...greatest Mac emulator around."

"It is working flawlessly on my A3000 with Picasso II. It's such a good Mac that I sold my old and slow LC and hooked up my external hard drive, Apple CD-ROM and StyleWriter printer to my A-Max IV/3000. Lately the Amiga interface is up less than Mac's desktop."

"I have been an A-Max II user since they were first introduced. I have found the product to be rock solid; very stable...the product is just about perfect. I have found myself using my Amiga more for the Mac emulation than for the Amiga software itself." ■

Works for Windows

Continued from page 25

file. And if you only know a few of the letters that are likely to be in the file name, that's OK too. This Wizard will automatically run off and find the names of all the files containing those letters. Once it has produced this resulting list of files, it will also let you preview the contents of those files without requiring you to actually load them into the relevant Works module.

In playing around with Works for Windows 3.0, I also found the existence of Cue Cards technology a big help in offering me step-by-step instructions on how to do various things that I wouldn't normally have the patience to work through in the User's Guide. It also saved me having to lug the User's Guide around with my notebook

computer.

Finally, I was quite impressed by the range of templates included with Works for Windows 3.0. Microsoft calls them AutoStart templates, and they really do help you get going quickly on writing your own business budgets, cashflow statements and income statements. By including most of the fields and cell names you are likely to need, you can get on with the real work of trying to make your figures make sense.

I do have one problem with Works for Windows 3.0: it is making me wonder why I need Microsoft Office Professional on my desktop system. But that, as they say, is a debate for another day. ■

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SOHO

The Ink Jet Prescription

BY FRANK GARCIA

Are you exhibiting the following symptoms? Disgust with your dot-matrix printer? Urges to throw it out the window? Blurring vision when reading output? Headaches and ringing in the ears while printing? Reach for the Ink Jet prescription!

Ink jet printers provide high quality output, and work quietly. Speed can be as high as three pages per minute. No more pins swinging back and forth like nails across a blackboard.

Ink jet printers are becoming a popular alternative to pricey laser printers for those who are demanding high-quality black and white, grey scale or even color output with quiet operations. Ink jets are available from a number of printer manufacturers, including

Canon, Hewlett-Packard, Epson, Brother, Apple, NEC, Sharp and Lexmark, for both the PC and the Macintosh.

What You Should Expect

If you've watched a dot matrix printer work, you will have noticed a print head moving back and forth along a set of rails. Inside the head are nine, 18 or 24 pins that strike the ribbon in various sequences, thereby forming the image on a page.

Ink-jet printers use the same back and forth motion to form an image on the page but they use ink sprayed out of nozzles instead of pins striking ribbons. What you will find in the print head are a series of tiny nozzles through which are sprayed tiny

quantities of ink. The ink is supplied from replaceable cartridges, black and — in the case of color ink jets — other colors.

Most ink-jet printers will print on letter or legal-size plain paper, transparency material, and envelopes. They usually come with assorted fonts.

Canon

Canon produces three black and white and one color ink jet printers for the PC. All printers boast 360 dpi (dots per inch) resolution. This is to compensate for the fact that it is an Ink jet. The extra 60 dpi helps boost the quality of the work. Printer drivers are available for DOS and Windows work.

Canon's BJ-200e (BJ for the Bubble Jet trademark) is the introductory model for the PC. It is, in effect, the same machine as Apple Macintosh Stylewriter II.

The BJ-200e has a small footprint (13.5 x 7.5 inches). There's a 100-sheet paper handling tray to make sure the paper is guided smoothly into the printer with a slide-out sheet feeder to receive the job from underneath.

For more demanding black and white printing, the BJ-230 looks like a sideways stretched BJ-200e to account for the 11"x17" paper capabilities, but there's no paper handling tray to take up the job.

For color work, Canon has the Canon BJC-600. Slightly larger than its cousins, BJC-600 uses a 4-color cartridge system to generate very impressive color output.

For portability, Canon's BJ-20 succeeds the now-discontinued BJ-10e. Weighing in at a measly 2.0 kilograms, the BJ-20 is small enough to fit into a briefcase and boasts a detachable 50-page sheet feeder. (On the road without a sheet feeder, you'll have to feed in a page at a time.) An optional rechargeable NiCd battery pack will keep you on the go.

Canon offers a 1-800 Help phone number for users in Canada with technical problems. The printers are also cartridge refillable. Available at most computer stores are boxes containing two refill bottles that will keep your cartridge running for as many as 10 refills. Each refill box is usually \$10.00 less than the price of another cartridge.

Hewlett-Packard

Hewlett-Packard is a long time player in the Ink jet game (they pioneered the now-defunct ThinkJet printer). They have two printers for black and white and one for color work. Unlike Canon, all of the following models are 300 dpi.

The company sells its ink-jet printers under the DeskJet name for PCs and the DeskWriter name for the Macintosh.

Competing against the Canon BJ-200 is HP's Deskjet (DeskWriter) 520, HP's introductory ink jet model. Although it is an intimidating boxy design (as are almost all HP printers), the Deskjet 520 can print up to 3 ppm. Canon's output is rated at 360 x 360 dpi resolution, while the new Deskjets support printing of 600 x 300 dpi.

The HP DeskJet 560C is the color counterpart to the Deskjet 520, but unlike its sister, offers grayscale features. Imagine now, a

color printer with grayscale options. When using the color cartridge the printer mixes the colors to produce black, and sometimes that black comes out brown.

Also competing against Canon's BJ-20 portable, HP has produced the Deskjet Portable. This printer, with its optional cut sheet feeder attached, looks like a strange, black art deco piece on your desk. Your girlfriend will really swoon over this one if you get it. Weighing in at 2 kilograms, Deskjet Portable offers a rechargeable battery (up to 100 pages per charge), a 'worldwide rapid recharger' for a quick charge and overseas use, and a carrying case for the PC and the printer.

Epson

Epson Canada's Stylus 800 uses a high pressure "piezo" print. Epson claims this head deposits the ink more precisely than other ink jet mechanisms, and creates very sharp print. The resolution is 360 x 360 dpi.

The Stylus looks a bit like the HP Deskjets. It has a paper tray that holds 100 sheets, and also handles envelopes and transparency stock. The printer comes with eight resident fonts — four bit-mapped, and scalable.

Brother

Brother's HJ-400 is both IBM and Apple-compatible. The printer offers a 360 x 360 dpi resolution and uses a 64-nozzle print head. It has a 100-sheet paper feeder, and a dual path feature that allows the paper to exit from the front or top of the unit.

The printer comes with 12 built-in fonts. 30 Windows TrueType and 18 Macintosh-compatible scalable fonts are also available.

Others Ink Jet Printers

C.Itoh Speedjet CJ-300
BM ExecJet 4076
NEC Jet Mate 1000
TI Micro Marc.

Postscript Ink-jets

Then there's the concept of a Postscript color Ink jet printer. Two printers are worthy of your inspection: the Lexmark IBM Color Jet (PS) and HP's DeskJet 1200C/PS.

The Lexmark model is for PC and Mac environments, offering a four color 360 dpi. They have a 'ColorGrade' feature that reduces banding and produces halftone quality comparable to 600 dpi printers. Lexmark says the printer is Pantone-licensed and that it carries with it 35 scalable fonts. If that's not enough, the printer is big enough to handle 11" X 17" paper and features an "out of ink" sensor to stop the printer until the cartridge is replaced. Why can't all ink jets have this?

The other heavyweight in this very exclusive club is the HP DeskJet 1200C/PS. At 600 dpi, it offers printing at 7 pages per minute, and offers 35 Adobe Type 1 fonts.

Like Lexmark, DeskJet 1200C/PS uses four cartridges to do the color and it supports 4 megs of memory (upgradable to 20 megs).

Others Ink Jet PostScript printers

Brother HS-1PS
Dataproducts Jolt PS
Sharp JX-730
IBM 4099 Color Jetprinter PS. ■

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MACINTOSH REVIEW

Expert Office Design

BY NAOR WALLACH

Runs on: Macintosh
 From: Expert Software, 800 Douglas Entrance, North Tower, Coral Gables, FL 33134, (305) 444-0080
 Price: \$49.95
 Rating: 3
 Summary: A competent drawing program for use in the design or remodeling of small offices. Is probably most useful for the amateur architect or small business owner.

All of the Expert programs that I've seen to date use the same basic program and then customize it to the task at hand via the specific libraries that are present. This case is no different.

If you have seen either Expert Landscape Design or Expert Home Design, you already know how to use this program. However, for those not familiar with these programs, a brief explanation is in order.

The base of all the Expert programs is a general purpose, object oriented, drawing program. Essentially, this program operates in a very similar manner to the MacDraw style of programs. You are given a drawing area in which to place the different objects. To the left of the screen is a tool bar that contains a selection of tools that you will need. On the right part of the screen will be one of several libraries that are unique to the specific application.

The menus allow you to define your work environment and set various variables and parameters that are unique to your setting.

In our case, Expert Office Design, the program comes with six different libraries. The libraries are: Bathroom, Chairs, Desks, Accessories, Conference, Waiting Room, Electrical, Filing Cabinets, Plants, and Kitchen.

When each of these is opened, we see a collection of images that represent real life objects as they are viewed from directly above.

Making a layout of an office is a relatively simple process. First, you must lay out the walls of the space with the wall tool, which lets you draw the walls at whichever angle you need. After the walls are drawn in, you use the copy tools to bring in the various objects that are placed in the space that was created.

The libraries contain different furniture pieces, including such modern essentials as wall dividers, copiers, computers, and fax machines.

Once you've placed an object inside your drawing space, you can rotate it any number of degrees in any direction, stretch or shrink it, or modify its colors and other attributes.

Now let's talk about the downside. Locations for wall switches and plugs are nice, but what about telephone jacks and local area network hookups? Also missing, in my opinion, are symbols for heating and air conditioning ducts. Finally, I find it incompre-

hensible as to why there is no symbol at all for windows!

To add to the list of missing items, I find that there is only one kind of wall divider which is certainly contrary to my own experience in the corporate world.

Essentially, this program operates in a very similar manner to the MacDraw style of programs. You are given a drawing area in which to place the different objects.

Since this program seems to share much of the code of the other programs in the Expert programs, it was probably inevitable that some of the problems of those other programs would find their way here as well. For instance, the program is very slow and memory-hungry. Even in my Centris 610 with 8 MB of RAM, it took several long seconds for the library windows to open.

Finally, I could only open two libraries at a time before the program complained of the need for more memory. In addition, placing several items and rotating them seemed to take an inordinately long time. Finally, some of the more obscure bugs that I've encountered before are present here as well—if you use the zoom capability, be prepared for trouble.

All in all, this is a competent program with some problems. I would not want to be a professional office architect who had to rely on this program for my livelihood. On the other hand, for the occasional remodeling job in a small company, or at home, this is probably as good as it gets. ■

PERFORMANCE: 2 Very slow at times. Extremely memory-hungry.

USEFULNESS: 3 Should be used by those with relatively simple needs. A complex layout or one that needs to be handled professionally will not fare well with this program.

MANUAL: 4 The manual is very thorough and contains a reasonable tutorial. I could find no typos or problems in correlating the text to what the program actually did.

AVAILABILITY: 3 Available from mail order and software stores. Expert Software does not maintain a toll-free number.

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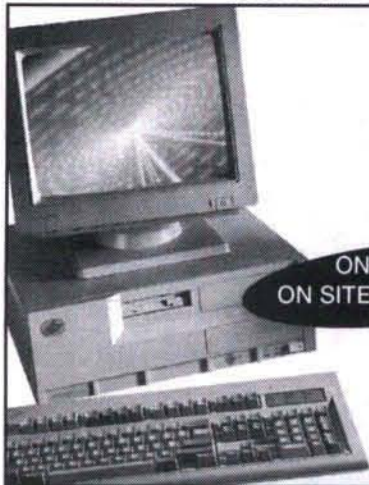
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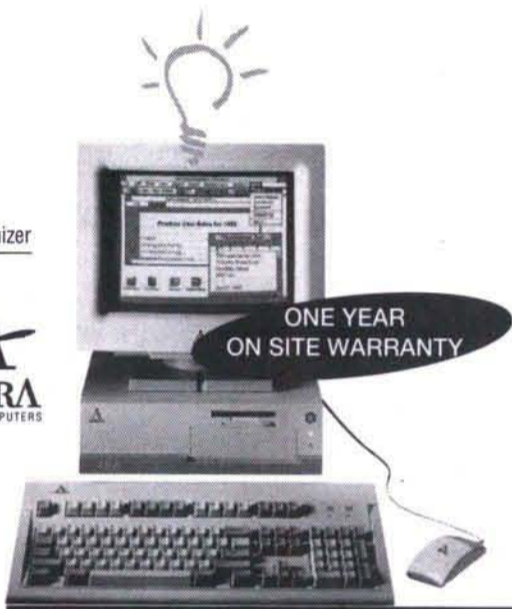
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Computer-proofing The Kids

BY GEOF WHEELWRIGHT

*Get your child started using computers early!
Don't let her fall behind in the information age!*

These phrases and others have fallen on my ears for more than a decade now — and I have largely ignored them. But when my three-year old daughter Alexandra started to show increasing interest in "daddy's computer" recently, I decided it was time to get some educational software into the house and let her plunge into the information age. It seemed like a good idea at the time.

She threw up her hands in disgust every time a disk error or an "out of memory" message flared up on the screen

may not load properly!

Failing to do this caused no end of frustration for a young person with limited patience and attention span, and just as much angst for my daughter. Quite justifiably, she threw up her hands in disgust every time a disk error or an "out of memory" message flared up on the screen. A word of advice to anyone planning to introduce their child to the PC: load up and test all of the software you plan to offer your youngster before you sit down. There will be far fewer tears before bedtime.

One observation that software companies should note. My daughter and I had completely different assumptions about what was happening when we couldn't do what we expected to be able to do with the software. I assumed I had made a mistake. My daughter said "this thing isn't working".

In fact, she was right. And her attitude illustrates a confidence level with computer technology that often astounds parents, but is matter-of-fact for today's children. Software producers of the future had better take note.

Another important realization was that children do not naturally understand what a "mouse" is supposed to do, especially when the buttons on the mouse are big enough, and hard enough to press that even the most determined three year old (and Alexandra is certainly one of those) cannot easily make use of it.

She started out doing all the things that most neophyte adult computer users do: waving the mouse in front of the screen, running it up and down her pant leg and

throwing it up and down in the air. Eventually she understood that it needed to be rolled around on a smooth, flat surface and became quite good at controlling it.

I could have saved myself a lot of trouble, however, if I had selected one of the many "children's mice" available - with big, bright push buttons that were easy to control and press. Many such devices are actually shaped like real mice and are also small enough to fit comfortably in a child's hand. On some of the packages, the trouble did not stop here.

Once she got used to using the mouse — and we got the software up and running quickly — she (and I) got bored quite quickly because the software itself didn't do much. This need not be a hindrance. One of my daughter's favorite computer programs is actually a simple coloring application featuring characters from the popular Berenstain Bear children's books. The software doesn't actually do anything more than use an on-screen "paint" package to color pre-drawn pictures of the famous bears but it did keep her amused for hours.

The best of the new children's software packages, however, are those that use sound, graphics and the huge storage capacity of CD-ROM (Compact Disc - Read Only Memory) to offer an interesting environment with lots of different things always going on. A good example of this is the Kids Can Read series from Toronto-based Discis Knowledge Research - which has won a number of awards and features "computer-enhanced" versions of classic children's literature such as Beatrix Potter's The Tale of Peter Rabbit.

If you have a CD-ROM, older children might enjoy packages such as Microsoft's 1994 version of its Encarta electronic encyclopedia and the same company's Creative Writer and Fine Artist products. In order to run these products, you'll need an IBM-compatible or Apple Macintosh computer with a CD-ROM drive, sound capabilities, at least 4 Mb of computer memory, preferably a color screen and usually a considerable amount of free hard disk space.

After that, you and young child are on your own to explore all the possibilities of joy and frustration that personal computing can offer. ■

Load up and test all of the software you plan to offer your youngster before you sit down.

There will be far fewer tears before bedtime

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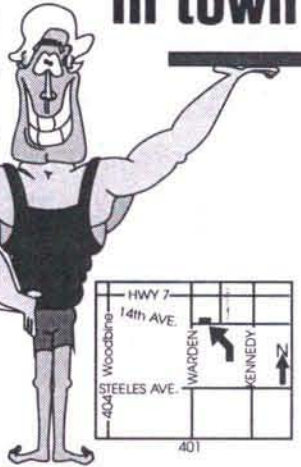
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OPERATING SYSTEMS

Linux — A Free Unix for PCs

BY DALE LUTZ

What would you say if I told you there was an operating system for 386 or better PC compatibles that was not only free, but also had following partial list of features:

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"No way", you say? Way! It's true! The operating system is called "Linux" and it is real and available now. In this introduction, I'll describe what Linux is, why you might want it, how you can get it, where you can get documentation for it, the kind of hardware it requires, and my impressions on installing and using it.

What Is Linux?

Linux is a built-from-scratch clone of the Unix operating system. Until recently, if one wanted to run Unix at home on a PC, there were few alternatives and most were relatively expensive. Then "Minix" came along, a Unix-like operating system which runs on 8086 (or better) machines. However, Minix is somewhat limited in what it can do because it does not take advantage of the power in the 386 and above Intel chips.

This led a group of Internet-connected individuals to start discussing ways of making Minix more powerful. Enter Linus Torvalds of the University of Finland. He took up the challenge of putting together such a Unix kernel from scratch. In October of 1991, version 0.02 of the kernel code was unleashed upon the Internet community, and hundreds of Unix programmers and wizards around the world began to cooperate in putting together a free Unix clone.

It was and is an anarchic development effort, without much central control and without most of the developers ever even meeting one another. However, very quickly the system began to mature, and today we are at version 0.99 patch level 15 (very, very close to being at the official "1.0" point).

The name "Linux" (rhymes with cynics) is a cross between the original author's name and the operating system it clones. There are now many, many free applications available for the operating system, and some commercial applications have started to appear.

There are at least four very active USENET news discussion groups dedicated to

Linux, and at least one Linux periodical is available. A non-profit support group, "Linux International," has formed to provide commercial caliber support to Linux users who want to pay for it. In short, the operating system has matured to a point where thousands of people all around the world are relying on it for hobby, educational, and business applications.

Linux itself is only an operating system kernel. To be a usable system, a large number of supporting system software utilities like compilers, shells (command interpreters) and, optionally, a windowing system are needed. To simplify the task of putting together complete Linux systems, several groups have assembled "distributions" of Linux, which contain everything that is needed to easily install, configure, and use the operating system.

There are several distributions around. The "Soft Landing Systems" (SLS) distribution from Victoria, BC used to be the most popular, but it has lost that title now to the so-called "Slackware" distribution, which I believe originates in Europe. There are some other distributions in the works which promise to be even more complete and easy to install than these.

The Linux software has been placed under the GNU General Public License, which basically means that anyone can freely copy, change, and distribute it, so long as no restrictions are placed on further copying, changing, and distribution. All software on the distributions mentioned above is provided under the same set of conditions.

Why Linux?

So why would you want to have Linux running on your system? For a large number of Linux users, it is all about learning. By having Linux on your home machine, you have a convenient, inexpensive, and non-threatening environment for learning all about using and administering Unix systems. Linux provides a platform for almost any level of Unix user to grow in their confidence with the Unix operating system.

Engineers who use Unix at work will find it nice to have the same environment at home, and they may be able to develop software with it which they can use for their work. I have used my Linux system at home to develop software which ultimately runs on Sun workstations.

A number of businesses are now using Linux as their desktop operating system. They claim that it is a very cost effective way of putting a powerful operating system on their developer's and user's desks, and that the support they get via the Internet is at least as good as the support they had from commercial PC Unix providers.

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Linux — A Free Unix for PCs

Continued from page 36

Getting Linux

Linux is freely distributable, so there are a great many ways of getting it. Traditionally, Linux distributions consisted of a number of 3.5" diskettes which you could download from a bulletin board, ftp from the Internet, copy or borrow from a friend, or order directly from the organization that created the distribution. A very popular, and in my

opinion the most convenient, way of getting Linux is to order it on CD-ROM. There are several advantages to getting it on CD-ROM. One is purely practical. It is much easier and faster to deal with a single CD-ROM than 35 or more diskettes. Another reason is that because of its large capacity, a CD-ROM distribution will contain more source code and applications than any diskette-only distribution can. Finally, a CD-ROM distribution will often have a "live" file system of installed software on it, which means that if you want to conserve your hard disk space, you can do

a minimal installation on your hard drive and then access infrequently needed files directly from the CD-ROM.

I purchased my "Slackware 1.1.1" distribution on CD-ROM from: Trans-Ameritech Enterprises Inc., 2342A Walsh Ave., Santa Clara, CA 95051 voice: (408) 727-3883 fax: (408) 727-3882, for US\$30 plus shipping (close to \$50 Cdn by the time I was done). There are other CD-ROM distributions available, but the Trans-Ameritech is the least expensive I know of and is highly regarded in the Linux community.

Linux Documentation

In the past, there was very little Linux-specific documentation available. This is changing now that the system is more widely used and distributed.

There are a number of Frequently Asked Questions (FAQ) lists for Linux, which provide answers to the most commonly asked questions, and "how to" documents that describe how various facilities of Linux are set up. The "Linux Documentation Project" (LDP) is a volunteer effort organized on the Internet to produce freely distributable Linux manuals. Many distributions include the softcopy text of these.

The Linux USENET newsgroups are a hotbed of Linux information. There are usually more than 200 postings per day which are full of information. You need some kind of Internet news access to read these, though.

The "Linux Journal" is a monthly magazine dedicated to Linux. A subscription is \$19 US, and is available from: Linux Journal, P.O. Box 85867, Seattle, WA 98145-1867, 206-524-8338, fax: 206-526-0803.

Before installing Linux, I strongly recommend reading "Linux Installation and Getting Started" by Matt Walsh of the LDP. Besides being freely available electronically, it can be ordered for \$15 US from: SSC Inc., P.O. Box 55549, Seattle, WA 98115, 206-527-3385, fax 206-527-2806.

SSC also has put together the complete set of Linux How To's and FAQs, the Linux Installation book, several reference cards, a year's subscription to the Linux Journal, and a CD-ROM distribution of Linux, all for US\$88.

Linux System Requirements

To install Linux on your system, you'll need a 386SX or better CPU. A minimal installation can fit in as little as 15 MB of hard disk space, although a more realistic installation needs around 60 MB.

If you don't care about running the X-windows windowing environment, which provides the standard Unix graphical user interface, 4MB of memory will suffice. If you want to run X-Windows, you need 8 MB. Most CD-ROMs, printers, and monitors are supported, although you may need to do a little fiddling to get things configured right for your particular setup.

I'm running on a 386DX-40 with 8MB of memory, a 16 MB swap partition, a 90 MB Linux partition, and a TSENG 4000 SVGA card running at 800 pixels by 600 lines, and I'm very, very pleased with the performance I get. From what I've read, the system generally benefits more from added memory than it does from a faster CPU, since swapping virtual memory to disk is a relatively slow operation. An accelerated, local bus video card would also make it seem faster. People running Linux on high-end 486 machines with 16MB or more of memory and local bus video report performance equal or greater than that of engineering workstations costing thousands more.

Installation Experience

Installing Linux will seem a bit daunting to the uninitiated, but it is easier than you might think. I studied as many of the FAQs and LDP documents as I could before I attempted an installation, and then went for it. I set up the new partitions I needed, and

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OPERATING SYSTEMS

Multitasking and Networking Built Into Novell DOS 7

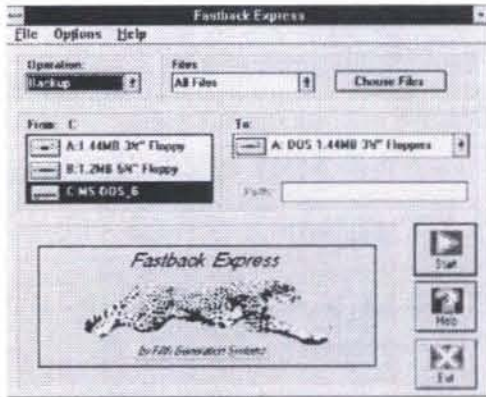
BY SCOTT FLETCHER

Throw away MS-DOS, QEMM, Desqview, and Lantastic, and replace them with Novell DOS 7.

Novell's new DOS 7 includes a number of walloping features, such as Stacker 3.12, FastBack Express, and best of all, real multitasking and real networking. With a street price of \$99, Novell, the network software giant and new owner of WordPerfect, is offering a solid contender to the DOS throne. Move over, Microsoft.

Novell DOS 7 is a complete replacement for MS DOS, IBM DOS, and the dozens of vendor specific renditions of DOS. Not only does N-DOS7 offer most of the same features as the competition but it includes components that might give Quarterdeck and Artisoft, the manufacturers of Desqview and Lantastic, nightmares. N-DOS7 integrates networking and multitasking memory management directly into the operating system. What could make more sense?

N-DOS7 installed easily on our one gigabyte test machine. You simply feed it the six disks and it gobbles up 12 MB of drive space — a piece of cake. During the process, N-DOS did not disrupt or destroy any files, including my old MS-DOS 6.2 files, yet it did



extended RAM. Multitasking allows for simultaneous operation of programs, whereas task switching will freeze programs that are running in the background.

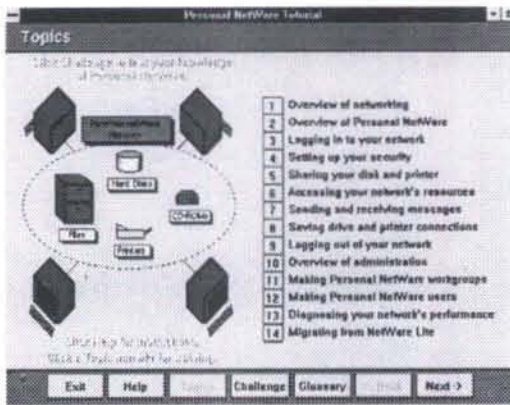
In N-DOS7 you simply select the minimum and maximum amount of RAM you want for your applications and, bingo, you're done. Compared to the ghastly Desqview setup, where you need to specify dozens of archaic parameters, this was a refreshing change.

Admittedly, though, the N-DOS7 multitasker is not nearly as flexible as Desqview, since it does not allow you to customize the memory requirements for each program. Nevertheless, multitask it does, and does well. Switching between programs is engaged through a hot key sequence which you can define, the default being CTRL-ESC. Pressing the hot key brings up a list of multitasked applications that you can switch to, and some rudimentary options such as adding or deleting sessions.

Amazingly, when running Windows as a N-DOS7 multitasked program — and yes, you CAN do this in Windows standard mode — other N-DOS7 multitasked applications appear in the Windows task manager! Best of all, you can switch to them and they actually work. Although this is interesting, I am still wondering what the practical use for this would be, since Windows on its own is a good multitasker.

Whether you use N-DOS7 with or without the task switcher or multitasker, it behaves just like any other DOS. The usual commands — COPY, FORMAT, CHKDSK and so on — all perform the expected functions.

The networking aspect of the operating system, called Personal NetWare, is enabled or disabled when you first install N-DOS7. Subsequently you use the SETUP and NETADMIN programs to define how it will work. Beyond this you need a cable, two network cards, and Shazam! Instant network. In



rename the hidden system files. If N-DOS7 discovers Windows on your system it will automatically install Windows versions of Personal NetWare, Fastback, and a few of the other tools.

After installation, it is suggested that you run SETUP to configure the multitasker, disk cache, networking, security, and all the other goodies. The menu-driven setup program allows you to modify every conceivable system option, including colors, RAM disks, path, prompt, virus detection, memory management, disk caching, networking and much more. This virtually eliminates the need to configure your system from the gruesome DOS prompt.

When configuring the memory management, SETUP asks if you want multitasking or task switching. To use multitasking you must have a 386 with at least 2 megabytes of

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• UNIX employment opportunities in finance, banking, medicine are exploding. — Open Systems Today, Jan. 93 p. 65

"Linux source code is definitely recommended reading for any computer science student." — UnixWorld, Mar. 93 p.66

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- M. Welsh, Linux Installation and Getting Started, 175 pages, \$28
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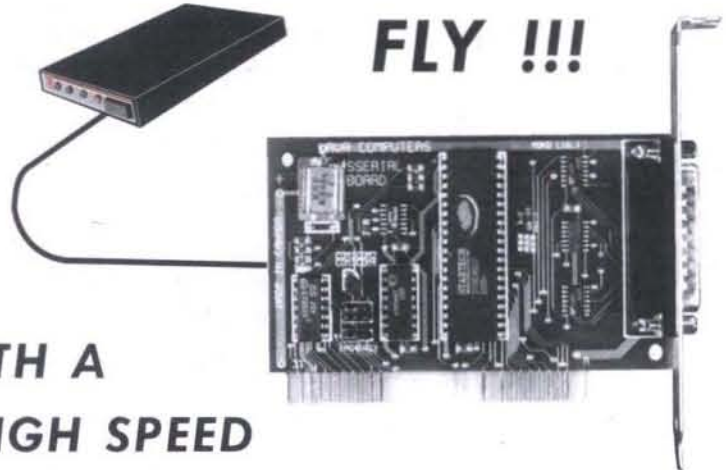
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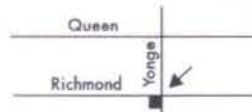
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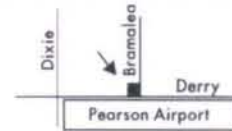
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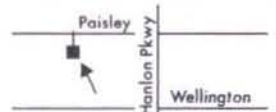
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OPERATING SYSTEMS

HP Leads As Unix Market Grows

SAN JOSE, CA (NB) — Despite the much-hyped threat by Microsoft's 32-bit Windows NT operating system, market research firm Dataquest reports that the worldwide Unix-based systems market grew more than US\$2 billion for an 11.6 percent growth rate in 1993.

The survey also claims that Hewlett-Packard gained the lead for Unix-based computer systems by increasing its Unix revenue nearly \$1 billion in 1993. HP's server and midrange businesses were the main contributors to increasing its Unix market share to 19.5 percent. Sun Microsystems is reportedly

still the leading Unix-based workstation vendor and increased its revenue by more than \$500 million in 1993.

Client-server is the key. Said Rikki Kirzner, principal analyst at Dataquest: "Unix systems are blazing the trail for client/server computing to conquer a larger share of the computing market."

"Unix vendors will not be able to control the entire client/server market and must, therefore, learn to live with and support Windows, Windows NT, and DOS applications on the network as native clients residing on Intel-based PCs," she told Newsbytes.

The Top Five Unix Vendors

Company	1993 Revenue US\$Millions	1993 Market Share	1992 Market Share
Hewlett-Packard	\$3,834.5	19.5 %	16.2%
Sun Microsystems	\$3,588.9	18.2 %	17.5%
IBM	\$2,307.1	11.8 %	10.3%
Digital Equipment Corp.	\$1,098.4	5.6%	5.7%
Silicon Graphics	\$1,087.7	5.5%	4.5%

Linus — A Free Unix for PCs

Continued from page 38

about 40 minutes later I had a command-line Linux up and running with no problems. It took a few more hours to properly set up the X-windows windowing system and support for my CD-ROM drive and mouse. Since then I've spent nearly no time maintaining my system, and have been using it almost exclusively.

One nice thing about Linux is that it coexists very well on a system that has MS-DOS and/or OS/2 on it. Linux can read and write MS-DOS partitions, and can read OS/2 HPFS partitions. This means that you can allocate a small partition for Linux, and still access and update data on your other non-Linux partitions.

In my opinion, anyone who has used Unix before will be able to do an installation

on their own so long as they have some patience and are willing to do a little tinkering. Having Internet access helps greatly, because by reading the Linux newsgroups and asking questions you can usually find out what you need to know. If you do not meet those criteria, then I would advise you to find a friend or get a consultant to set up Linux for you. Once set up, it will pretty well look after itself while you learn and grow more confident with it. ■

Dale Lutz is a consultant and trainer specializing in Object Oriented software analysis and design, C++, and Unix with Safe Software Inc. in Richmond, BC. He can be reached at (604) 241-4424 or via Internet E-mail at dal@safe.com.

Novell DOS 7

Continued from page 39

fact, networking has never been easier, and this is not just some chincy network, but a full peer-to-peer network that allows the sharing of peripherals and files, with security, workgroups, messaging, and the whole nine yards.

Personal Netware can also be set up as a client/server network, where one big computer acts as a file server and library, and all the other computers feed from it. Either way, up to 50 computers can be interconnected. Beyond this number, one needs to upgrade or attach to one of Novell's larger scale products.

Stacker, which doubles the capacity of your disk space, works even when you are using the stacked drive on a network file server. All in all, Novell thoughtfully integrated networking into every aspect of N-

DOS7. The Search and Destroy program, which hunts down viruses, and Fastback Express, which is used for backups, are also both network capable.

The documentation for Novell DOS 7 is provided in both printed and digital form. A program called DOSBOOK is the complete hypertext version of the manual. Also included is a superb networking tutorial program that effectively de-mystifies the whole connectivity process.

If you plan to stick with DOS or Windows, N-DOS7 offers more flexibility than other DOS's. If you are a network administrator, N-DOS7 will make your life easier. But if you are considering moving to another operating system, then DOS, no matter what the flavor, is still no match for OS/2. ■

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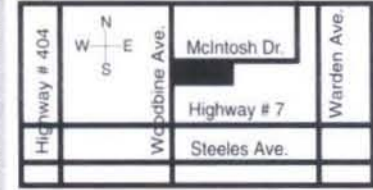
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OPERATING SYSTEMS

Microsoft's Chicago: Convergent Evolution

BY JAMES MACFARLANE

The successor to Windows 3.1, code named "Chicago," is due out later this year. It promises to bring many new features, including full 32-bit capabilities, pre-emptive multitasking, "plug and play" technology and an improved user interface. But it's too early to know whether the public will embrace it, considering Windows NT was a sleeper.

Why Chicago?

Windows NT is designed for high end PCs, servers and workstations and was never intended to be a mass-marketed product for the average person. Windows 3.1 was for consumers, but it lacked the power and flexibility that many people were demanding of newer applications.

Chicago is intended to fill the gap, providing people with a more feature-filled and intelligent operating system. Windows, although easy to use, was sometimes difficult to set up with different peripherals and drivers because of its DOS heritage.

The idea was to make a compatible operating system that allowed people to continue to use the software and, more importantly, the skills they've invested in over the years, while gaining the benefits of a more integrated and advanced environment.

Chicago is intended to fill the gap, providing people with a more feature-filled and intelligent operating system.

No more DOS

Macintosh purists don't consider Windows 3.1 to be an operating system at all because it sits on top of DOS. That is no longer true with Chicago - your machine will boot up into Windows directly without the aid of DOS. People who still need to use DOS can open a DOS window and run any DOS application.

Many DOS programs, especially games, will not run properly in a Windows 3.1 DOS session. This is usually because these applications need to talk directly to hardware registers, which can conflict with the Windows environment. This is a very important factor, and a challenge for Microsoft to overcome. According to Microsoft, Chicago's DOS capabilities "are not good enough until it can run DOOM". That's a fair benchmark, if you ask me.

When an operating system claims to be 32-bit this means not only can it execute 32-bit code but it uses the system memory in one contiguous block. Gone is the 640K-384K-1MB architecture that has been a hold-over since the days of the XT and 286 machines, as well as the entire memory management industry that grew up around breaking these barriers.

Use your existing Windows software

Microsoft says Windows 3.1 software is fully compatible with Chicago and there will be no performance losses when using 3.1 apps if you have at least 4MB RAM. Those with more memory can expect performance increases of about 10 per cent.

What Chicago will not do is run on a RISC platform. It's just not designed to do that. Chicago requires a 386 or better CPU. People wanting RISC will have to use Windows NT.

Long filenames

One of the main limitations of DOS is the 8+3 filename structure. This creates limits as to what files can be called. With DOS you



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can't call something "Chicago article," you have to call it dumb things like "chiart.rtf". This, too, is gone from Chicago. You will be able to name files anything you want, up to 255 characters.

To maintain compatibility with DOS applications, Chicago will actually have two filenames per file. One will be the long filename and the other will be the 8+3 filename. This means that many file utilities for Windows 3.1 will have to be rewritten to be able to handle the new file structure.

Hardware: smarter integration

You've probably seen, the phrase "plug-and-play" tossed around in the computer media recently. The idea is to make the peripherals, drivers, BIOS and operating system smart enough for you to be able to plug, or unplug, devices without having to dig through your manual and spend an hour configuring the hardware and software, just to find out there's a conflict with another device.

That means the system will be smart enough to look around your hard drive or network to find device drivers and automatically install them without your having to go through "insert disk #17 of 39" syndrome. This means buying Chicago on CD-ROM makes sense, because it will have extensive driver libraries.

The framework allows for your notebook computer to automatically sense when it's connected to your network, for example. You can choose to print documents, send faxes and E-mail while you're on the road and then everything is automatically processed when you plug into your network or docking station.

New GUI

The user interface of Chicago has not been finalized as of yet but it does contain many changes from Windows 3.1. Double-clicking has been eliminated wherever possible. From my own experience giving technical support, when you tell someone to click on something they always stop and ask 'do you want me to click or double click.' Half of the time I don't know myself because it's become so automatic.

The right mouse button has been used to trigger context-sensitive menus. The help engine has been completely overhauled and is now multimedia capable so you can click on items on the help file and it can even play an on-screen training video. The help engine is based on the same system used to develop Encarta, Microsoft's encyclopedia CD-ROM.

File Manager has also been revamped. It now provides a split window that displays the familiar tree-style file/directory listings as well as a desktop/icon interface. You can even drop icons onto the desktop.

Although you can launch applications from the program manager, just as in 3.1, you also have a "start" bar at the bottom of the screen. When you choose start you get a pop-up menu asking whether you want to open a document, launch an application or change settings.

This may sound strange, but it's beginning to feel more and more like a Macintosh. Convergent evolution?

Chicago will be available in the last half of the year and is expected to cost around \$100 as an upgrade. It will be able to be installed on your existing DOS/Windows environment. Full product pricing has not yet been established. ■

IBM/Lotus OS/2 Agreement

HANOVER, GERMANY (NB)—Lotus Development and IBM have announced an extension of their partnership, to include the full spectrum of Lotus products for IBM's OS/2 2.1 operating system.

According to officials with Lotus at the CeBIT Computer Fair, held in Germany, the agreement extension follows on from the June 1991 announcements that Big Blue was to distribute Lotus Notes and cc:Mail packages. This new extended agreement includes Lotus SmartSuite.

John Landry, senior vice president and chief technology officer with Lotus, claims that SmartSuite for OS/2 has been designed to take full advantage of the 32 bit functionality, such as multitasking and faster navigation between applications.

"In our view, OS/2 is an ideal platform

for future application development. The capabilities of OS/2 complement our products. As you know, Notes was first offered on the OS/2 operating system," he said.

Commenting on the agreement extension, Lotus Development's director of European sales said that OS/2 is growing in importance in Europe, especially in the corporate sector. "There are about three million OS/2 licenses installed worldwide, primarily among large customers who rely on the powerful functionality and features of IBM's 32 bit operating system," he said.

"The extension of our co-operative agreement means that our complete range of OS/2 software is being sold and supported by IBM. Analysts are predicting rapid market growth for OS/2 over the coming years," he added. ■

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OPERATING SYSTEMS

Apple System 7.5, Future Operating System Direction

BY LINDA ROHRBOUGH

CUPERTINO, CA (NB) — Apple Computer is again talking about intelligent assistance in the future and its enhanced System 7.5 operating system scheduled for release this year. The company is also emphasizing its desire to entice DOS and Windows users into the Macintosh fold with a new advertising strategy, "Stand Out and Fit In."

The company says it plans to extend the user interface capabilities on Macintosh on PowerPC systems. The company has already disclosed that some PowerPCs will have the option of running DOS and Windows applications via Insignia's Softwindows.

This announcement of operating system strategy is reiterating Apple's dream of allowing the user to interact verbally with the Macintosh. Apple has been talking about this concept for years and has even shown demonstrations of a computerized "agent" that would listen and talk to the user, offering reminders and doing information errands, such as retrieving documents or reports. While no definite time frame is being announced, Apple says the PowerPC puts the company closer to making this a reality with advanced graphics and multimedia technologies as well as improved speech recognition and text-to-speech capabilities.

As a step toward this dream, Apple said it will ship a major release of the operating system, System 7.5, which will include a range of advancements in the areas of active assistance, customization, advanced graphics, networking, and interoperability.

In the area of active assistance, System 7.5 will include Apple Guide, a software application that acts as a tutorial for instructing users in how to accomplish tasks. Apple claims applications developers can use Apple Guide to create tutorials as well.

As for customization, System 7.5 will have the first scriptable Finder. Apple Script has been available for some time to record and automate tasks on the Macintosh, but this will be the first time scripting has been available at the operating system level, Apple representatives said.

Apple's Quickdraw GX application will be the advanced graphics built into System 7.5 and, in terms of networking, Apple will add networking protocol TCP/IP. The addition of TCP/IP will make the Macintosh more interoperable with DOS and Windows-based computers. A new Open Transport architecture will be included and Apple's Mac PCP, now offered as a separate product, will be built into System 7.5 as well.

Also, Apple's Easy Open and PC Exchange products will be included in the new operating system. These products include translation software in order to make it possible for the user to open an file, even if the application used to create the file

isn't available.

Apple again mentioned Opendoc, known as "component" software. Sun and other operating system vendors have announced a similar strategy, where users would not need to jump from one application to another to get their work done, as they do now.



For example, to create a document with graphics at the moment requires a word processor to create the document, graphics software to design or modify drawings, and page layout software to arrange it all. Component software would enable users to do all the work they need to do in one place, so a user could grab a drawing tool and draw, then a word processing tool and enter text, and so on.

Apple announced Opendoc in December of last year and said it hoped third party software developers would want to build interchangeable components for Opendoc which users could then purchase as the need arises. In this announcement, Apple said it expects to deliver Opendoc to software developers this year and incorporate Opendoc into a release of its operating system software within the next two years.

Other announced enhancements for the operating system in the next two years include technology advances in the area of active assistance and system-level improvements in areas such as multitasking, memory protection, and data input/output.

Out in the more distant future, Apple said it plans to deliver an even more advanced version of its operating system, which will offer intelligent assistance, a fully exploited microkernel architecture, and a significant advancement in graphics. ■

(/19940307/Press Contact: Nancy Morris, Apple Computer, tel 408-862-6200, fax 408-974-2885)



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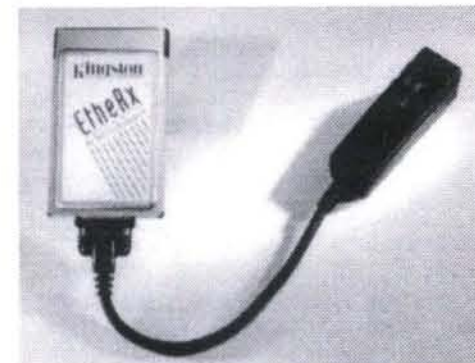
To allow mobile professionals to plug their portable computers into the office network, a number of manufacturers are producing network connectors that work from the Personal Computer Memory Card Industry Association (PCMCIA) slots being built into most new portables. **The EtherX Ethernet card is made by Kingston Technology of Fountain Valley, CA** is one such example.

The cards are available in 10Base-T or 10Base-2 versions, and

include version 2.01 of Card and Socket Services, which allows easier configuration to portables from different manufacturers.

The PCMCIA Ethernet cards cost US\$179 and up.

Contact Kingston Technology Corp., 714-435-2600

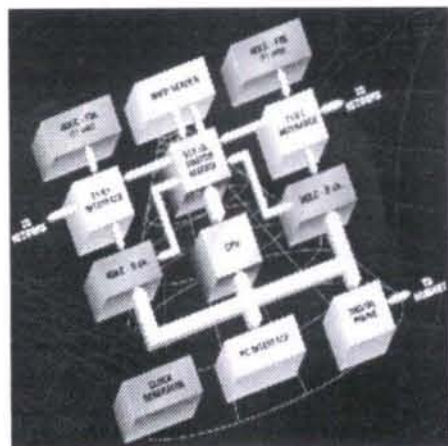


Among the technology books offered by Micro House International Inc. of Boulder, CO, is *Network Interface Technical Guide*. The book covers network topologies and protocols, cable types and interface

cards. It also includes a directory of manufacturers, including technical support numbers.

If you have a CD-ROM drive and use Windows, Micro House also has the same title, plus **The Encyclopedia of Main Boards** and **The Encyclopedia of Hard Drives** on a single CD-ROM volume.

Contact: Micro House International, 800-926-8299

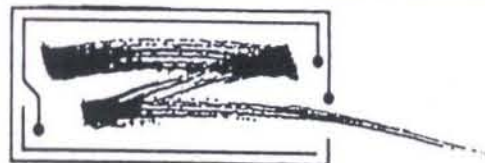


This diagram depicts **Mitel's enhanced dual T1 (EDual T1) card**. The EDual T1 card contains two primary T1 trunks with on-board processing and integrated ISDN signaling and maintenance software.

The card is part of a family of devices that support the Multi-vendor Integration Protocol (MVIP). The standard was developed by Kanata, ON-based Mitel and five other communications product developers to allow multiple vendors to integrate multiple technologies on a standard PC.

MVIP will allow more rapid development of PC-based voice, video and telecommunications applications, according to the company.

Contact: Mitel Corp. 1-800-267-6244



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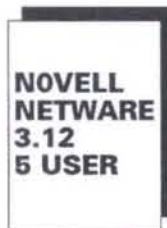
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OPERATING SYSTEMS

TCP-IP and SLIP for OS/2:

The Internaut's Home Companion

BY JOHN F. BOYCE

Transmission Control Protocol - Internet Protocol or TCP-IP for short probably doesn't mean a whole lot to most people, but if you want to access the huge resources of the Internet you are going to have to use it directly or indirectly whether you know it or not.

Most of the Internet service providers supply a local host computer that takes care of much of the hard work for you. This machine transfers and collects information from other computers on the Internet and stores mail, files or news for your retrieval at your convenience on a delay basis. In many ways it resembles a dial in bulletin board system of the kind that most people are familiar with. Unfortunately, it also insulates you from much of the fun and excitement of exploring the Internet on your own.

The Internet evolved from networks of Unix computers linked together by TCP. In the past, accessing it has meant rolling up your sleeves and wrestling with cryptic com-

mands issued from a command line on a computer with a live Ethernet connection.

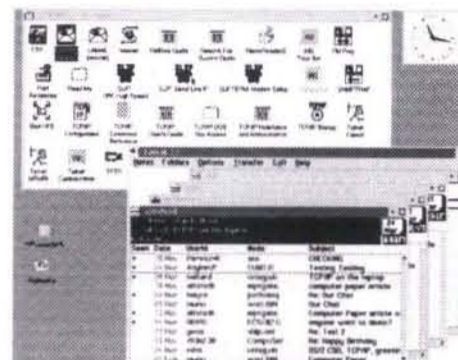
The good news is that those days are rapidly becoming history, thanks in part to products such as TCP-IP for OS/2 2.0. Despite its bland name (this is from IBM, after all!) this is a gem of a product which I have heard many users refer to as OS/2's "killer application," and which should probably be more correctly marketed as "Your Internet Connect Kit". OS/2 has much of the power of Unix with a friendly, easy to use interface and this provides an ideal environment for simplifying the task of getting connected to the "info-baun."

While I'm sure IBM doesn't realize it, the critical feature they have provided in TCP-IP for OS/2 is a Serial Line Interface Protocol or SLIP driver which can be used to effectively convert an ordinary telephone cable into a slow Ethernet connection. Very simply, a SLIP interface running TCP-IP permits a home based PC to connect directly to the Internet and enjoy all the benefits of a networked Unix computer while it is connected. IBM has included all the tools to make accessing the resources of the Internet easy and even fun to use. This means that instead of typing:

```
> ftp software.watson.ibm.com
ftp> ls -l
ftp> cd /pub/os2/fixes
ftp> ls |grep lans
ftp> binary
ftp> get lansrvfx.zip
```

to get the latest Lan Server fix issued this morning from IBM, you simply click on the FTP icon, highlight the file lansrvfx.zip and drag it to the local directory folder on your desktop. Done! no fuss, no muss and you've just transferred a file from New York directly to your home computer with no stops in between and no long distance charges. It has cost you about 80 cents for 20 minutes of connect time with your Internet slip provider.

At the same time my file is transferring I



get caught up on the latest news on the Novell / WordPerfect merger by reading Usenet News and suddenly notice that someone in Australia has just posted information on how to get the new game, Boom! to work with my Ear Blaster sound card. This catches my interest so I click on LaMail, the mail program included with the TCP-IP base package, and send him a message asking for details.

Unfortunately, it's getting late now and I have to finish writing that report my boss wants first thing in the morning. I forgot to bring a copy of the file home with me, but I'll just mount the server's directory as a local drive on my home machine and work on it directly using the Network File System (NFS) module for TCP-IP. My boss is an early riser and I'm not, so I think I'll avoid having to get up by sending a copy of my report to the printer beside her desk. IBM includes a printer port redirector with the base TCP-IP package which will let me send output from my home machine to any networked printer I have access to. After Susan reads it she'll be able to mail it out directly to our client.

While the scenario I've described above sounds like fantasy, it's not — everything I've described I do routinely over a SLIP telephone connection from my home computer using TCP-IP for OS/2 and an Internet service provider which offers SLIP support. IBM bundles an extensive collection of utilities and applications in the base TCP-IP package, including a multi-threaded news reader, a mail program, REXX scripts for configuring a modem and connecting to SLIP service providers, and a graphical FTP (file transfer protocol) program for sending and receiving files.

TCP-IP is terse, frequently cryptic and often difficult to install, and IBM's Spartan hard copy documentation set doesn't help much. More extensive documentation is available on-line but there is much to be improved here. Nevertheless, those budding Internauts enduring the pain of configuring the software will be richly rewarded by the world of information brought directly to their desktop? At a street price of about \$200 for the base package, this is great value, given the tremendous resources it gives you access to. ■

John F. Boyce is a Vancouver based consultant specializing in OS/2 systems and networks.

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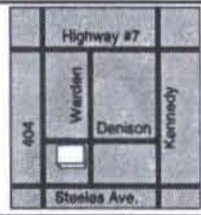
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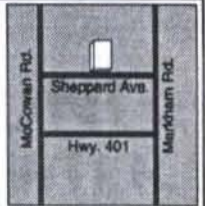
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Parsing Hackish

Continued from page 12

Increasingly, a thought expressed in conversation in a manner meant to irritate is also called a flame.

flame war — An acrimonious dispute, especially when conducted on a public electronic forum such as usenet.

footprint — The floor or desk area taken up by a piece of hardware. Increasingly, used to describe this same type of space taken up by non-electronic devices. "I liked the Honda CRX. It cornered well and had a small footprint."

froblicate — To manipulate or adjust. Thus, you can frob a program, a mason jar or a light switch.

From the Jargon File: Usage: frob, twiddle, and tweak sometimes connote points along a continuum. 'Frob' connotes aimless manipulation; 'twiddle' connotes gross manipulation, often a coarse search for a proper setting; 'tweak' connotes fine-tuning. If someone is turning a knob on an oscilloscope, then if he's carefully adjusting it, he is probably tweaking it; if he is just turning it but looking at the screen, he is probably twiddling it; but if he's just doing it because turning a knob is fun, he's frobbing it. The variant 'froblicate' has been recently reported.

GIGO — Garbage In, Garbage Out and more recently, Garbage in, Gospel Out. The contexts are numerous.

gillion — Same as an American billion or a British milliard. The relative soft or hard-

ness of the "g" is a matter of personal preference.

gonk — To embellish the truth beyond a big fish story. "Don't gonk me, I know a billable hour when I see one."

gonzo — Overwhelming; outrageous; over the top.

Good Thing — Capitalized, even in speech. A thing that is wonderful. Oppose Bad Thing. Tax reductions and mocha lattes are Good Things.

grep — To look for something electronically and by pattern. Increasingly, "I grepped through the bookstore for a copy of the OED, but they were back ordered."

grok — To understand in a global sense. Indicates intimate and exhaustive knowledge. (From Robert Heinlein's book *A Stranger in a Strange Land* — Ed.)

guru — An expert. Implies not only wizard skill but also a history of being a knowledge resource for others. Also sometimes used with a qualifier, "She's a Unix guru."

hacker — A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the necessary minimum. Increasingly, an expert or enthusiast of any kind. "He's a mountain biking hacker."

From the Jargon File: It is better to be described as a hacker by others than to describe oneself that way. Hackers consider themselves something of an elite (a meritocracy based on ability), though one to which new members are gladly welcome. There is thus a certain ego satisfaction to be had in identifying yourself as a hacker (but if you

claim to be one and are not, you'll quickly be labeled bogus.

hackish — Said of something that is or involves a hack, hackers or the hacker subculture.

hyperspace — From the science fiction idea of a ship taking a shortcut through a different dimension in space, often with dire results. "That piece of code must have gone into hyperspace." Or, "He looked all right yesterday, but he must have gone into hyperspace before the party."

manularity — The manual labour required for a specific task. "There's a lot less manularity involved in writing a lot of letters with a computer than there was by hand."

marketroid — A sales demon. The term is derogatory. Other forms are marketing slime, marketeer and marketing droid.

mumblage — Mumblage can be used in place of a perjorative as in, "That mumble, mumble system is driving me crazy!" Also, when the topic of discussion is not quite clear.

neophilia — The trait of being excited and pleased by novelty. A hacker would be exhibiting neophiliac traits if he started exuding happy signs over a new OS at Comdex.

newbie — A neophyte. Classically, a new poster to usenet or one of the local online services.

oblick — *From the Jargon File:* A bizarre semi-liquid sludge made from cornstarch and water. Enjoyed among hackers who make batches during playtime at parties for

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it amusing and extremely non-Newtonian behavior; it pours and splatters, but resists rapid motion like a solid and will even crack when hit by a hammer. Often found near asers. Here is a field-tested ooblick recipe:

- 1 cup cornstarch
- 1 cup baking soda
- 3/4 cup water
- food coloring

This recipe isn't quite as non-Newtonian as a pure cornstarch ooblick, but has an appropriately slimy feel.

Some, however, insist that the notion of an ooblick *recipe* is far too mechanical, and that it is best to add the water in small increments so that the various mixed states the cornstarch goes through as it *becomes* ooblick can be grokked in fullness by many hands.

parse — To understand or comprehend. If someone said, "Pass the glitch on the glockhand," you would likely reply, "I can't parse that."

pnambic — An acronym from a scene in the film version of "The Wizard of Oz." The line when the wizard is first discovered goes: "Pay no attention to the man behind the curtain." Pnambic refers to a process or function whose operations are at least partly falsified. There are some who, when a certain next-generation operating system was first introduced, yelled pnambic quite loudly.

propeller head — Non-hackers sometimes use it to describe all techies. In hackish, the phrase is synonymous with computer geek.

quick-and-dirty — Something put together under pressure. Quick-and-dirty can refer to a computer program; a brochure design or an automobile rushed through R&D.

RTFM — Always spelled rather than spoken: Are-Tee-Eff-Em. Acronym for "Read The F***ing Manual." A UK variation — quite a bit more polite — is RTBM, or "Read The Bloody Manual."

samizdat — A Russian word that means, literally, "self publishing." In hackish, samizdat takes on the added meaning of distributing information and documentation through underground channels.

scanno — Analogous to a typo or a thinko. The error a scanner will sometimes make when going about its business.

smiley — See emoticon.

snail-mail — Traditional mail sent by peons, as opposed to electronic mail. "I'll snail you a copy of that article," or "Give me your snail mail address and I'll send it."

sneakernet — A term generally used with ironic intent for transfer of electronic information by physically carrying a disk from one computer to another.

studly — Impressive and powerful. "AcmeSoft's new grok parser is most studly."

unleaded — Decaffeinated coffee, lite beer, diet cola could all be said to be unleaded.

virtual — A common alternative to logical; often used to refer to the artificial objects. Thus a network might become a virtual playground in certain hands. Regular moo-ers are sometimes said to have virtual sex and someone who is perpetually unemployed might be said to have a virtual vocation.

wave a dead chicken — To perform a ritual in the direction of an operation that hasn't worked in the hopes that something — however unlikely it may seem — will happen. "I'll wave a dead chicken over the

Ford, but I don't think anything short of a new motor will really help."

wonky — An approximate synonym for broken. A malfunction that creates a result slightly to the left of center. "The font lists went wonky. I was asking for Times Roman and got cyrillic glyphs!"

workaround — A temporary solution to the problem at hand.

YABA — How about another bloody acronym for Yet Another Bloody Acronym?

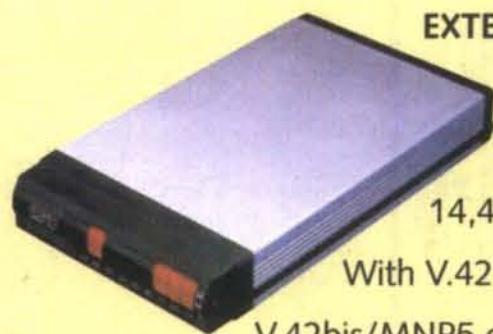
zap — Essentially, spiciness that can be applied equally to food and code. "Zap the chili. My nose didn't run." Or, to fry a chip or processor with electricity. "It's zapped. We'll have to replace it."

zen — Enlightenment by means of direct, intuitive insights. "How did you figure that out?" "I zenned it." Differs from grok in that there is no actual work involved: more intuition. ■

Linda Richards is a freelance writer who nearly defenestrated this whole project while working on it. "A little frobnication and it was gonzo. And really zenned together in the end," she says, adding that she hopes it parses easily. Reach her at this publication or electronically at 1104@mindlink.bc.ca

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PC SOFTWARE REVIEW

Norton Desktop for Windows 3.0

BY GEOFF WHEELWRIGHT

Product: Norton Desktop For Windows 3.0
From: Symantec

For longtime users of Norton Desktop for Windows, this latest version of the product will be an affirmation of everything you always knew about it. It is more sensible than the Windows Program Manager and File Manager combined, offers a more extensive array of tools and utilities, and

really goes a long way to making Windows a much richer environment in which to work.

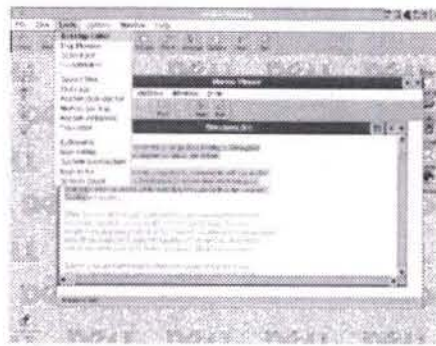
In Version 3.0, Symantec has worked harder than ever to make all the functions more accessible, more powerful and easier to use. Take the new File Viewer, for example. Not only can you see a wider array of document presented in WYSIWYG format - including Microsoft Word 6.0 - but you can also copy and paste from the viewed document. This represents a major, yet quite natural, improvement over the old File Viewer - which only let you look at the contents of the file.

Similarly, the new Smart Groups function lets you create application groups that keep track of specific categories of files that you have created or deleted. If, for example, you put all your Word .DOC files into one group, Smart Groups will automatically keep track of all the .DOC files you create and delete.

When looking at icons in a group window, you've now got the option of looking at them as a Toolbox (a strip of program icons), the traditional Icon view or as a detailed list of icons and application descriptions in the List view. For new users who might see the icons for an application such as Lotus Freelance and not know what the application does the option of putting detailed text that explains an application's function opposite the icon could be a big help.

The whole thrust of this release seems to be to make life easier in every possible part of Windows. If, for example, you install the File Assist option in Norton Desktop for Windows 3.0, you see an extra line come up at the bottom of your Open file or Save As dialog box that allows you to view files, make new subdirectories, delete files and copy files. This is particularly helpful when opening files, because the View function allows you to take a quick look at a file without actually having to open it, and lets you copy little chunks of that file into the Windows clipboard (or clipbook if you're using Windows for Workgroups 3.11) for later pasting into another document.

And yes, it does work quite happily with Windows for Workgroups 3.11 - even including support for network drives and providing the option of adding a Network Menuing



program. Norton Desktop for Windows 3.0 also supports Novell NetWare, Banyan VINES, Microsoft LAN Manager and Lantastic.

There are lots of other very useful features - including built-in virus detection and correction software, a Day Planner personal organizer, a hard disk optimiser, file compression that is compatible with Zip 2.0, a directory comparison and the ScriptMaker macro language and a Dialog Editor to work with it.

But Norton Desktop for Windows is not without fault. To start with, the viewer in our review version did not offer support for the Excel 5.0 file format - probably because this product was still in beta release when Norton Desktop for Windows shipped. A more important omission was the lack of auto-dialling functions in the Day Planner.

Although it was nice of Symantec to build this function into Version 3.0, it would have been nicer if the software offered you the chance to use your modem to dial telephone numbers selected from the phone list - and kept track of your calls if you wanted. It was also a little strange to see Symantec including a Day Planner in this product when Schedule+ had already started shipping as part of Windows for Workgroups 3.11.

At any rate, these are minor complaints about what is an otherwise excellent product that will be quite justifiably be taking its 15 MB of flesh from my hard disk for the foreseeable future. I would urge you to give it a long, hard look. It provides today the features that other users may have to wait until they buy Chicago to get. ■



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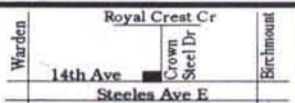
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ERGONOMIC PRODUCT REVIEW

The Forminco Chair

BY DANA BLANKENHORN

From: Forminco, 9610A Ignace, Brossard, Quebec, Canada J4Y 2R4
 Price: \$399-\$499
 Rating: 4 (on a scale of 1=lowest to 4=highest)
 Summary: If you work at home, or control your company's furniture budget, this is the chair you want.

angle of your back, there's a knob in the back. To adjust the chair forward, push the top and tighten the knob clockwise. To adjust it back, again push the chair and this time adjust the knob counter-clockwise.

Do you like a firm seat or a loose one? A knob below the seat lets you move anywhere between the feel of a wooden seat and that of a beanbag. Share your home-office with a taller or shorter spouse? A simple lever on the right, below the seat, takes care of that — just stand a bit and lift it up to raise the chair, sit and lift the level to lower the chair. On the opposite side there's a tilt-lock lever that lets you keep the chair-back rigid or let it flip back.

My favorite parts of the chair, however, are the wheels and round base. The wheels let me quietly roll around the office, while I can put my feet on the base. Not only does the chair conform to your comfort, in other words, it can even conform to your bad habits.

One final note. I reviewed this chair on a wooden floor. Your mileage may vary if you've got shag carpeting. In other words, you won't roll as fast or far. But you can



lock the wheels in place and solve that problem.

I'll admit I liked the Forminco chair the first time I saw it at a trade show two years ago. Now that I've experienced it, I like it even better. ■

Performance: 4.0 The easiest thing I've ever put together, infinitely adjustable, incredibly comfortable.
 Usefulness: 4.0 Who can't use a nice chair?
 Manual: 4.0 A coated cardboard card explains how to both assemble the chair and completely adjust it.
 Availability: 4.0 Available at various dealers.
 Contact: Forminco, 1-800-663-6764 for the dealer near you.

"Fetch hither the comfy chair!" So said Michael Palin in the famous Monty Python skit "The Spanish Inquisition."

I know. You weren't expecting the Spanish Inquisition, were you? But I can't help it — this chair makes me giggle.

Most workers today spend as much time in their office chairs as they do in bed, and yet it's amazing how little thought they give to their chairs. If you're not self-employed, you have no choice in the matter. But even the self-employed give the matter little thought. For most, the chief question is whether the thing has arms. That's an executive chair. Secretaries' chairs lack arms.

The Forminco chair is the first honest effort I've seen to deal with the real issues in office furniture — comfort and health. The two are related, as anyone with carpal tunnel syndrome or chronic neck pain from working at a computer terminal will tell you. But people are different, not just in size and shape but in habit. It would seem impossible to create a chair that would fit everyone.

Forminco has dealt with this by designing a chair that's infinitely and easily adjustable. It took this klutz just a few minutes to set it up — stick the wheels on the base, put the pedestal into the center of that base, and stick the seat on the pedestal. Every other factor in chair use is up to you.

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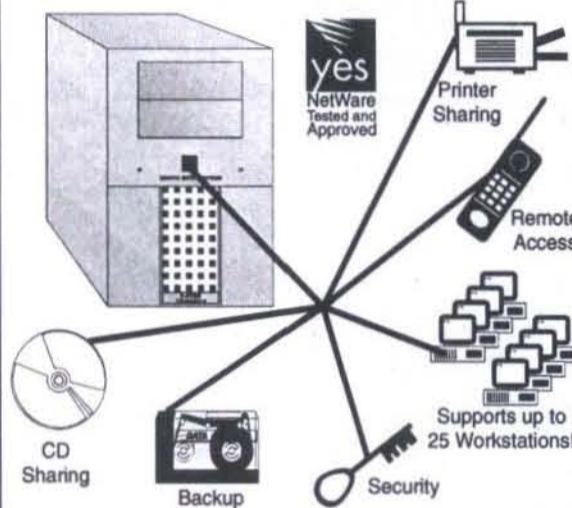
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Virtual RAM — RAM Doubler for the Macintosh

BY GRAEME BENNETT

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Cons: Slight performance degradation on machines with less than 8MB RAM.

Illustrator 5.0.1.
FaxSTf version 3.0 (and the 3.01 update) are both **seriously** incompatible with RD. Although sending faxes works normally, there is a system-freezing crash when receiving faxes. A few users, discussing RD in Connectix' forum on CompuServe, described how their whole hard disks were trashed when this happened. Your intrepid reporter installed FaxSTf 3.0 and RAM Doubler 1.01 on a system and experienced no problems as long as faxes aren't received.

Virtual RAM

The ads promise that this product lets you "Just Click and Double Your RAM." It's a pretty irresistible ad campaign, although I suspect that most users must think Connectix thinks they are pretty dumb to believe a line like that. Well, the good news is, it's close enough to the truth that I'll cut to the chase and call RAM Doubler the "must-have" product of the year. If you have a Macintosh with a 68030 processor and a minimum of 4 MB of RAM, you should get doublin'. And, since RD is available only on the Mac, and Connectix has a patent (United States Patent Number 5,063,499) on the product, Mac users have at least one thing they can gloat over PC users about.

Installing "virtual RAM" with RAM Doubler is certainly a lot less expensive than adding real RAM to your computer. When I last checked, 8 Megabytes of RAM cost almost \$1,000. RD costs \$99 (cheaper, from some outlets). It's never been easier or more affordable to add memory to your Mac.

What doesn't work.

Despite Connectix' claim that RAM Doubler is compatible with all applications, we found a few apps that weren't compatible. For starters, Connectix' own virtual memory software, Virtual, can't coexist with RD. That's not too surprising, as both programs are fooling around with the memory mapping. (For this reason, Apple's VM doesn't work with RD, either.)

Both RAM Doubler and Connectix Virtual, by the way, are currently incompatible with Apple's new Power Macintosh series of computers. Connectix has said it is working on a PowerPC-compatible version of RAM Doubler.

Reportedly, Connectix is working on a new version of its MAXIMA RAM disk software that will use RAM Doubler technology to double the size of RAM disks.

On the application front, users report that the American Heritage Dictionary isn't RD-compatible. Ray Dream Designer 3.02 isn't compatible with RAM Doubler 1.0, but the current 1.01 release fixes the problem. Although we've heard reports that RD is incompatible with Illustrator 5.0, we could detect no anomalies when running RD and

Luckily, we've tested several dozen other programs with no problems. Successfully tested programs include Photoshop 2.5.1, PageMaker 5.0a, FreeHand 4.0a, Illustrator 5.0.1, Alias Sketch 1.5, Elastic Reality 1.1, Fetch 1.2, Ray Dream Designer 3.02, Strata StudioPro 1.0, Microsoft Word, HyperCard, Now Utilities, Now Up-to-Date, Stack, and many others. All ran with flying colors, with no perceivable slowdown.

Killer Hack

RAM Doubler not enough for you? How about RAM Tripler? Here's a great hack.

Using ResEdit, I opened a resource called pref. There, I found an listing labeled "RAM multiplier." And there, crying "change me...change me," was the number 2. Sure enough, changing the 2 to a 3, saving, and restarting produced the hoped-for effect: 24,576K of memory available on my 8MB Mac. Everything still worked, albeit with a slight performance hit. In fact, a large image that I had not been able to render with ASDG's Elastic Reality morphing program on my "RAM doubled" machine was successfully loaded and rendered using "tripled" RAM, by allocating 16MB of RAM to the Elastic Reality program.

For those of you not up to hacking around inside software with ResEdit, a US\$5 shareware program called MaxRAM 1.0 performs these modifications with a click of the mouse.

MaxRAM allows you to:

- Triple, quadruple, quintuple, or have SIX times as much memory when using RAM Doubler from Connectix Corporation. Normally, RAM Doubler will double your RAM, but with MaxRAM, you can have SIX times as much memory as you have built-in. That's right - SIX. For example, if you have 8 MB of real RAM in your Macintosh, MaxRAM will give you 48 MB of RAM. (You can also choose a lower amount, if you desire.)

- Display an indicator in the menu bar that will flash when RAM Doubler is used.

(On America Online, the file is in LIBRARY: MUT/New Files or MUT/Applications #3. You can search for it by using these keywords: RAM MAX DOUBLER DOUBLE VIRTUAL — Ed.) ■

SOHO

Canon's Flatbed Scanner For the Home

BY DAVID TANAKA

Product: Canon IX-4015 color flatbed scanner
From: Canon Canada Inc., 6390 Dixie Road, Mississauga, ON L5T 1P7
Platforms: Macintosh and PCs running Windows
Suggested retail price: \$1,699. Price includes Ofoto 2 scanning software
Availability: Authorized Canon Dealers



Canon Canada's latest scanner, the IX-4015, is aimed at the small office-home office (SOHO), and nearly everything about this flatbed unit makes sense for that market. It is small, easy to use and easy to set up.

At the same time, it doesn't sacrifice quality or performance. The unit is capable of three scanning modes: 24-bit color, and 4-bits or 8-bits monochrome. It uses a single pass scanning method and will scan at up to 400 dpi x 1,200 lpi, according to the company.

Canon says the scanner is nearly half the size of its competitors: the Canon is considerably smaller than the HP ScanJet IIcx, for example. The Canon unit measures 11 x 16 x 3 inches and will take originals of up to 8.5 x 11.7 inches. (The ScanJet is approximately 14 x 23 x 5 inches and will take originals up to 8.5 x 14 inches.)

Canon says it has designed the IX-4015 to reduce the number of moving parts normally needed for scanning. The result is faster scanning. The scanner uses a Xenon lamp, which Canon says maintains its brightness over time.

To reinforce the focus on ease-of-use, Canon has wisely chosen to include Ofoto Version 2, a sophisticated scanning program. Reviews of Ofoto have been filled with superlatives, and many have said that Ofoto is so good it makes color scanning push-button easy.

Working with the Canon

The unit is equipped with a SCSI port, and comes with an ISA-bus SCSI interface card for PCs. I managed to install the card into my PC, plug in the scanner, run the set-up software and perform my first scan in less than 10 minutes. The card uses jumpers that you must set manually, but happily, the fac-

tory settings created no conflicts with other cards on the PC, so that part was a breeze.

The IX-4015 is a Twain-compatible device, and Canon supplies the appropriate driver. Adopting Twain is a forward-thinking move on Canon's part, since Twain is being adopted increasingly as a standard. However, users of older software that doesn't support Twain will encounter difficulties with Canon's supporting only Twain.

For example, two optical character recognition software packages, a document image management package and one photo image-editing package I have on my PC would not recognize the Canon because they don't support Twain. Moreover, Canon does not include a driver that will allow the IX-4015 to emulate other common scanners like the HP ScanJet, which the software packages do support.

Since an optional sheet feeder is available with the scanner, being able to use OCR software will be important to some potential users of the Canon scanner. A Canon representative pointed out that newer versions of the OCR packages and image editing software now include Twain support.

Canon rates the unit's scanning speed at 20 seconds for a letter-size color image and half that for a monochrome image. Using an art book cover as a sample I timed the scanner. It took precisely 20 seconds to perform a prescan using the supplied Ofoto software. (The actual scan took about 45 seconds.)

The suggested retail price of \$1,699 makes the Canon IX-4015 a bit pricey. However, a Canon representative told me dealers may sell for less. Also keep in mind that Canon includes a copy of Ofoto 2, a program that has a suggested retail price of US\$295. ■

See OFOTO 2 Review on Page 78

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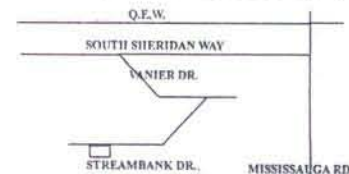
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PUBLISHING

Telling Great Stories In New Ways

Is Mission of Southam's Infolab

BY BRAD HONYWILL

HAMILTON, ON — Canadian newspaper giant Southam Inc. is packing for a trip down the information super highway, putting its resources into a tiny research division in Hamilton, Ont.

The division, called Infolab, is located deep within the bowels of *The Hamilton Spectator*, one of 17 daily newspapers Southam

owns across Canada. It was created almost two years ago to give Toronto-based Southam a window into the electronic future of mass media and employs six full-time staff and about four part-time workers.

And now, at a time when Southam is taking dramatic steps to reduce its workforce on the newspaper side, Infolab is looking at

expansion. The reason, says Infolab director Wayne MacPhail, is that computers are on the verge of pulling the market out from under Southam's feet.

While desktop publishing has eliminated the need for a large number of skilled production employees, on-line services have the potential to make the presses themselves redundant, opening the market to virtually everyone.

"We have had the luxury of being the ones with the presses," says MacPhail. "People are learning that everyone can be a publisher."

Once the barriers come down, reporters and editors have to ask themselves what added value they provide, he says. "It's imperative to add value in new ways, otherwise we don't have a business."

The specific mandate of Infolab is to ensure that Southam can continue to competitively market information products, says MacPhail, a former *Spectator* reporter and science writer. Or, as MacPhail says, "to tell great news stories, new ways."

And that means staying up to date on the latest media technology and its applications as well as developing prototype prod-

ucts. To date that's meant developing, with *The Spectator*, an electronic bulletin board for Hamilton as a foundation for a community-based electronic newspaper. It will serve as a model for similar services in Vancouver, Calgary, Edmonton, Ottawa, Montreal and other Southam markets.

"It's imperative to add value in new ways, otherwise we don't have a business."

It's also meant developing a multimedia product for the school market, called True North Arrivals, based on the experience of 10 immigrant groups in Canada, and a CD

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ROM-based photo book, called *Kate's Story*, heralding the trials of a cancer-stricken 12-year-old Dundas girl.

Another multimedia product just getting off the ground is an electronic expanded book, based on a soon-to-be-released book by a *Spectator* reporter on the murder of a Burlington business executive. The expanded book format permits electronic searches of key words, video and audio as well as the traditional text.

In the future, Infolab's quest for leading-edge storytelling techniques could mean alliances with organizations such as Prodigy, the U.S.-based on-line service company. The company has begun talks on a joint venture, taking advantage of Prodigy's on-line expertise and Southam's news gathering system. But multimedia is really where Infolab's head

is these days.

"I hope that what we're doing in the lab is positioning Southam as the premier multimedia provider in Canada," says MacPhail. The idea for *True North Arrivals* started in the Infolab and was then spun off to a wing specifically devoted to that project, enabling "lab" employees to move on to testing other waters.

True North encourages students in the target junior high school category to explore various aspects of the immigrant experience through video, audio, and text. Someone exploring the Irish experience, for example, can choose to listen and watch an Irish immigrant tell the story of how and why he came to Canada. Move the cursor to another on-screen button symbolizing music, click, and you'll see and hear four sample Irish

instruments.

"It's the kind of learning resource teachers are looking for given the rising sophistication of students with computers," explains project manager, Brian Porter. And, he adds, "it's one of the few multimedia CD-ROMS that's Canadian produced with Canadian content."

Most multimedia material is produced in the U.S. and that's reflected in its contents. Porter says the project is important as a teaching tool, not because it is better than traditional tools, but because it is different and current.

"No one's saying we'll replace textbooks," he says. "What *True North* is about is another dimension to learning."

The project, which is being published by McGraw-Hill Ryerson, is scheduled for com-

pletion this fall.


Southam will not be building the information super highway like companies such as Time-Warner and Rogers Cable. But, through projects such as these, the company hopes to at least grab a place on the laneway, says MacPhail. And, most importantly, it will be driving a Canadian-made vehicle.

"Southam is a content-provider and a Canadian content provider," he says. "It's important that we have Canadian content otherwise we're going to be awash in American content and I don't think that's a good thing." ■

Brad Honeywill is the expanded book project manager at Southam Infolab

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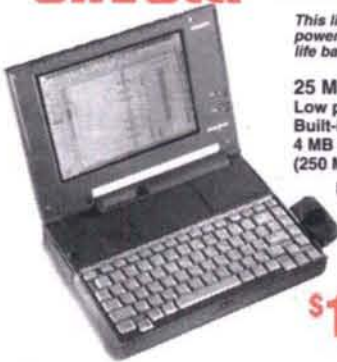
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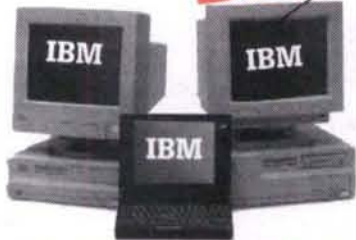
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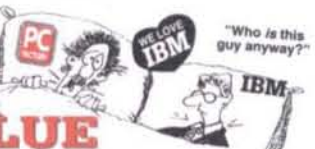
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NETWORKING

A Network Primer

BY GRAEME BENNETT

There are a variety of methods for physically networking PCs together. One of the most common is Ethernet. Ethernet networking, the virtual mainstay of the local area network (LAN) marketplace, offers transmission speeds of only 10 megabits-per-second (Mbps), compared to 16 Mbps for Token-Ring. In the increasingly demanding corporate networking world, even Token-Ring speeds are just not fast enough for many critical and bandwidth-intensive applications, and as a result, the move is on to initiate 100Mbps speeds over Ethernet.

A group called the Fast Ethernet Alliance has announced the completion of a draft 100Base-T wiring specification that it claims

will provide end users in voice grade wiring environments with interoperable Fast Ethernet products. The alliance maintains that the draft goes some way to "fulfilling its commitment to support multiple wiring structures."

Prominent members of the 15-member consortium include 3Com, Digital Equipment Corporation, Intel, National Semiconductor, Sun Microsystems and SynOptics. It has presented a high-speed Ethernet specification called 100BASE-X to the Institute of Electrical and Electronic Engineers (IEEE) standards committees for consideration. The specification is also sometimes referred to as "4T+".

The alliance says that the completed

Macintosh networks are relatively hassle-free, as well, although connectivity to some types of PC networks remains problematic.

specification addresses 100Mbps Ethernet running over four-pair Category 3, 4, and 5 unshielded twisted pair (UTP) wiring.

The FEA is one of two multivendor consortiums dedicated to developing specifications for a high-speed 100 megabit per second Ethernet standard. The other group's spec is known as 100Base-VG.

Most experts agree that, although Token-Ring networks offer slightly higher throughput (16 Megabit per second) compared to traditional Ethernet's 10 Mbp rate, the performance improvement isn't worth the much higher cost.

If the PC has an EISA bus, a 32-bit EISA network card will improve network performance, much as a fast EISA hard drive controller card will improve hard drive perfor-

mance.

All Macintosh computers have network connectors and are shipped with software that allows peer-to-peer networking, file-sharing and printing. Other computers, including most IBM-compatibles, require additional hardware and software to network two or more PCs together.

Macintosh networks are relatively hassle-free, as well, although connectivity to some types of PC networks remains problematic.

If you want to minimize PC network hassles, look for a PC that is "Novell-certified." This means that it has been tested and its BIOS is known to work correctly with NetWare. ■

Some popular types of networks

Unix network — Common in higher education, research. Runs on workstations, high-end PCs.

Banyan Vines — High-end enterprise networking standard in government and industry. A good choice for wide-area networks.

Novell Netware — Corporate PC standard. Runs on mid-range PCs and higher.

Windows NT Advanced Server — Good security, price/performance ratio. Inexpensive client software.

LANtastic — Peer-to-peer DOS network. Runs on workstations, high-end PCs.

Simply LANtastic — Artisoft's entry-level network operating system (NOS); offers basic sharing of files, printers, and CD-ROMs.

Windows for Workgroups — Inexpensive and easy to set up peer-to-peer Windows-only network. Version 3.11 is much faster

than the original 3.1 release, and supports ODI protocol for improved interoperability with Novell and other networks. Also includes fax capabilities. Runs on 386SX PCs or better. It is worth noting that Windows for Workgroups 3.1 or 3.11 will not run under OS/2 or OS/2 for Windows.

Farallon PhoneNet — Runs on 286 PCs or better. Connects to Macintosh networks. Not supported by most PC network software.

Appletalk Network — Built-in serial network and System software runs on all Macintoshes; offers basic sharing of files, printers, and CD-ROMs. At 275Kbps, its main drawback is that it is slow. Some Macs have a faster Ethernet connector built in, which provides greatly improved network performance. Ethernet adapters can be added to other models, too. Apple's System 7 Pro software adds e-mail and scripting functionality.

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Common Networking Terms

LAN - Local Area Network

WAN - Wide Area Network. Windows NT has a dial-in connection feature called Remote Access Server (RAS). It allows modem users to access network features. Apple's AppleTalk Remote Access (ARA) offers similar features to Macintosh users.

10BaseT - twisted-pair "telephone" cabling specification chosen and named by the

Institute of Electronic and Electrical Engineers (IEEE).

Coax (pronounced "co-ax")— coaxial cable is thicker than 10BaseT. Coax or thick Ethernet is better suited for large networks.

NetBEUI - default network transport protocol in Windows NT. Default protocol in LAN Manager, LAN Server, and Windows

networking. A purely LAN-oriented protocol, NetBEUI is unroutable and can't be used to build WANs. (Microsoft LAN Manager 2.1 uses TCP/IP for this purpose). See TCP/IP.

IPX - Novell's network transport software. Netware has an IPX router built in. Other client/server software, such as Microsoft SQL Server and Lotus Notes, also have

IPX services.

LAN (local area network) —

ODI - Novell network card driver. Supported by Windows for Workgroups 3.11. If you combined Netware and Windows NT, you would typically use only ODI drivers.

NDIS - Microsoft's network adapter driver; allows multiple protocol stacks on one adapter. Supported by Windows for Workgroups 3.1 and 3.11.

NetWare - trademarked name for Novell product. A common PC network for LANS or WANs. Version 4.0 improved on ease of use and performance of earlier versions.

SMB (Standard Message Block) — a Microsoft protocol that enables workstations to communicate with each other and with servers. SMB provides services that allow workstations to connect to servers, open files, lock records, queue print jobs, etc.

SNA — Systems Network Architecture

APPN — Advanced Peer-to-Peer Networking

Other Terms

LAN Hub — if you use a 10BASE-T LAN without a hub, the entire daisy-chained network goes down if one machine is disconnected. A hub solves this problem.

ASIC — application specific integrated circuit. Used in Ethernet controllers and other computer hardware.

ISDN (integrated services digital network) — fast-data services now available in 46 states.

fiber-based — generic term for fibre-optical cabling, which allows very fast data transmissions.

SONET (synchronous optical network) — advanced fiber optic transmission equipment used by telecom providers and other communications companies.

Other Networking-related Terms

AOCE (Apple Open Collaboration Environment) — A specification created by Apple to allow a standardized method of messaging and directory services in Macintosh productivity applications.

API — application programming interface. A programming term that refers to using a published set of standard routines and operating system calls when writing an application.

CMC — Common Mail Calls, established by a Jan/94 Apple/Microsoft agreement.

MAPI (Messaging Application Program Interface) — using a published set of standard routines and operating system calls when adding e-mail functionality to an application.

PowerTalk — Apple's personal communication software based on AOCE technology. Incorporated in System 7 Pro, the newest Macintosh operating system.

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AppleTalk — Macintosh standard

DECnet — not suitable for WANs

IPX — NetWare LAN

MacIPX - Macintosh implementation of IPX

NetBIOS — networking protocol that enables workstations to communicate with each other and with servers. NetBIOS provides both connection-oriented services and connectionless services (i.e., messages). NetBIOS is not a transport protocol, but rather serves as an interface to a transport protocol such as NetBEUI. Unreliable across WANs.

OSI (Open Systems Interconnection)

SNA (Systems Network Architecture) — IBM mainframe standard

TCP/IP (Transmission Control Protocol/Internet Protocol) — enterprise-wide (routable) network protocol. The foundation of the Internet. TCP/IP is used by products such as LAN Manager 2.1 and Windows NT as an alternate transport protocol for NetBIOS to build WANs on top of. Microsoft calls TCP/IP its "strategic networking protocol," but, interestingly, doesn't currently use the system for its own global connections.

SURVEY

Network Specialists Surpass MIS Generalists

MANHASSET, NY (NB)—Network professionals have surpassed their generalist management information system (MIS) counterparts to become the single most influential group impacting computer-related purchasing, according to an Intelliquest survey sponsored by Communications Week.

Exactly 54.1 percent of the MIS professionals surveyed were either "formally" or "informally" involved with networks, up from 38.8 percent two years ago, the survey reported. Intelliquest projects that 63.2 percent of the group will fall into this category two years from now.

Most of the new networking personnel will come from in-house, the researchers theorized, since the surveyed companies anticipate only minimal growth in the total numbers of computing professionals.

At the average site in the survey, 63 percent of all PCs were connected to networks. Intelliquest forecasts that this figure will rise to 85 percent by 1995. An earlier Intelliquest survey, released in 1992, predicted that the majority of department-level information would be available on company-wide net-

works within the next few years.

The new survey also found that more than two-fifths of respondents had either dedicated a person to overseeing the network function, or planned to name one by 1995. Comparatively few of these designated individuals yet hold the title of "chief networking officer," though. Most networking specialists are still called systems analysts, programmers, or information technology specialists, the study discovered. ■

Quoted

Up until recently, information technology was pretty much the job of people in MIS — the people who know about computers and could help process transactions and furnish reports.

But that's changed — largely because of personal computer networks, new communications technology and new software, particularly software that's come to be known as groupware.

As a result, information technology is moving from the back office to the front lines. It is no longer used just to count money, but to make money. And anything that's used to make money has strategic importance. No CEO, no one in management in any organization, can afford to ignore it.

— Jim Manzi,

CEO of Lotus Development Corp.

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NETWORKING

Digital Democracy Flourishes From Free-Net Fever

BY ALLAN EARLE

Digital Democracy is spreading across Canada coast to coast, due to Free-Net fever. Five Canadian Free-Nets have gone on-line in the last two years. The Toronto Free-Net was launched last month and 16 others are in varying stages of devel-

opment.

"The Free-Nets initiative is central to the Canadian transition to a knowledge based democracy and, by extension, to an information-based economy," according to Dr. Jay Weston, a founding member of a National

Association called Telecommunity Canada and a board member of the Capital City Free-Net. "The vision of Free-Nets is to accelerate this transition," he says, "by providing a cost effective, national strategy for creating mass literacy in communication technologies."

Free-Nets are independent, non profit, computer networks tailored to communities' special needs. They provide telecommunication access to users — for free. Operating costs and equipment are funded by corporate sponsors, charitable users, and government grants, and are run almost entirely by volunteers, some of whom contribute their professional expertise. Systems operators, including doctors, lawyers, educators, community group representatives, and hobbyists, manage computer-moderated conferences.

Administrative sites are often at colleges or universities, which offer access to vast amounts of information, including public records, government documents and business information, that you can access from your home if you have a computer and modem. However, most Free-Nets also have public-access terminals in various locations, such as public libraries, so information is available to virtually everyone (which is the whole idea).

These networks differ from other on-line hosts such as electronic bulletin board systems, because Free-Nets liaise with public institutions such as libraries, hospitals, community centers and schools.

The Free-Net in Trail, BC began last fall with \$150,000 provincial funding and the support of local volunteers and school administrators, who first established the electronic network, linking all 12 area schools, then opened the operation to the community at large.

Those who traditionally were left out of

the information technology boom of the last decade — the elderly and the poor for instance — get the opportunity to interact with others and become computer literate through these networks. The adage "think globally, act locally" can best be applied to Free-Nets because local users aren't limited to community networks for communicating or gathering information. Through a gateway to the Internet, a global network of more than a million computers, users can communicate, search for and retrieve information worldwide.

And yet, in these computer-generated communities, you can take local educational workshops, browse on-line for community events, get medical advice or legal counseling, locate a book at the local library, let the public works department know when a street lamp is out, and the like. In special subject areas, you can lounge with people from all walks of life to debate, pontificate, find romance, rally support for local issues, play games or exchange electronic mail with users down the street, across the country or around the world — gratis.

Although 25 Free-Nets are scattered globally and dozens more are under development, Canadians are especially eager to establish them.

"I could easily see Canada becoming the leader-nation in the development of community computing within the next year or two," said Dr. Tom Grundner, founder of the first Free-Net in the U.S. and president of the National Public Telecomputing Network, after attending a Free-Net conference in Ottawa last summer.

At the conference it became clear that the needs of Canadian Free-Nets were distinct from U.S. needs, and a national Canadian organization began to form. According

Continued on page 64

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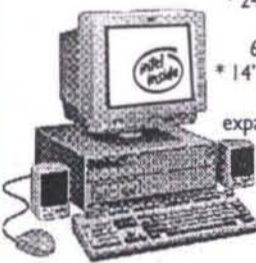
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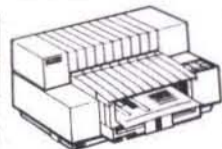
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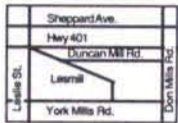
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Freenet

Continued from page 62

to its electronic pamphlet, the organization will provide a united national voice and a "warehouse of information and skills" for the Free-Net movement. It is tentatively titled Telecommunity Canada, and David Sutherland, president and founder of National Capital Free-Net, is the provisional president. The organization has already applied for \$2.04 million from the Canadian Network for Advancement of Research, Industry and Education (CANARIE) to develop and improve the operating software for Canadian Free-Nets.

The National Capital Free-Net is forming a national Free-Net organization because it is presently the largest Canadian Free-Net. Barely a year old, the NCF receives 4,000-5,000 calls daily over 100 phone lines, and has more than 16,000 registered users. By comparison, Victoria Free-Net (twice as old) has 2,700 users.

Next year, NCF could be eclipsed by Toronto which "will likely have the world's largest Free-Net because we will be the largest city to have one," predicted Jud Newell, at TFN's first public meeting. Newell is founder of Canada Remote Systems — Canada's biggest bulletin board system — and a founding member of the Toronto Free-Net.

Recently, Newell helped negotiate a five-year contract with Roger's Cable Co. for an estimated \$450,000 worth of services with matching funds from ONIP — as part of

Ontario's \$250 million telecommunications project — and additional funding from Ryerson University, York University and the University of Toronto, totaling an estimated operating budget of \$1 million over five years. Newell plans to have 200 phone lines installed.

Barely a year old, the National Capital Free-Net receives 4,000-5,000 calls daily over 100 phone lines, and has more than 16,000 registered users.

Presently, the largest — and also the first — Free-Net is in Cleveland, OH, started in 1986 by Case Western Reserve University. It offers direct citizen access to the governor of Ohio and provides services like Doc in a Box at "St. Silicon's Hospital." It now monitors more than 500 subjects including arts, education, government, health, law and recreation. Its 133 phone lines handle more than 10,000 calls per day.

"The Free-Nets provide a strategy for achieving mass literacy in the existing telecommunications products and services, says Jay Weston. "The Free-Net concept has taken root very quickly and very successfully, establishing enormous potential for catapulting Canada into the information-based economy ahead of the rest of the world." ■

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Alan Wilson
 4 Bracken Place
 Elliot Lake, ON P5A 1L4
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 E-mail: alanwils%vef@canrem.com

Prince George Free-Net, Prince George, BC

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Niagara Free-Net, St. Catharines, ON

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 Brock University
 St. Catharines, ON L2S 3A1
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486DX-50 \$1,799
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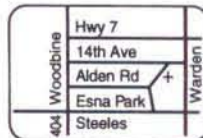
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NETWORKING

Dive In!

Create a Modem Pool On Your Network

BY PARRY LOEFFLER

There are many reasons for installing a network, ranging from simple file-sharing or electronic mail to sharing of resources such as costly laser printers. Once a network is installed, there are other less common ways to tap the full potential of the LAN while providing some great cost savings. One of these is to

create a shared modem pool. With access to a modem for dialing out to on-line services such as CompuServe, BBSs, and other on-line services becoming a more common requirement of PC users, it is very common practice to simply purchase a modem for every user that requires one. This also requires the installation of an extra phone line to the office. This approach can become very costly, and in some cases creates difficult problems. I encountered one company that had so many modems installed that they were close to running out of phone lines to the building they occupied!

This is not necessary if your computers are networked. Modems are a resource, just like printers, and can just as easily be shared among users of the network. Very often they are used only a few minutes a day or week by the user and sit idle the rest of the time. It only makes sense to have several users share one modem to maximize its usage. This is the main idea behind modem pooling and there are several ways to accomplish it, depending on the size of the network and how heavily the modems will be used. In this article, I will describe a few of the solutions along with their advantages and drawbacks.

So, How Does It Work?

Before I go into detail about each solution, I want to describe how modem pooling actually works. How can we get the data that is normally sent to the modem connected to our PC to instead go over the network to one of the modems in our pool? A redirector is essentially how this is accomplished. The software redirector is a small TSR (terminate and stay resident) program that is loaded into memory which steers all of the data destined for the modem to the network card instead of to the local serial port where it would normally go. The redirector can do this in a number of ways, the most common being by using the NASI protocol designed for this purpose, or by using Interrupt 14 (INT14). Once you have the redirector loaded, you simply load your communications package and use it as you normally

would do. The only problem is that your communications package must explicitly support either NASI or INT14 redirection.

However, most of the later LAN versions of popular packages do support one or both protocols. This can be determined from the

documentation that comes with the software. Redirection can also be done in hard-

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ware by installing a special card in each PC instead of using the software TSR, but this is less common.

Another very interesting approach for redirection that I have seen when using Windows based communications packages is done by Shiva Corp. for use with their modem pooling products. If the user is running a Windows based package, a TSR is not needed. Shiva replaces the standard Windows COMM.DRV file with their own SHIVACOM.DRV file which intercepts all modem traffic and redirects it to the network. This approach has the advantage of not requiring any of the PC memory for a TSR. This can be very significant in some networked PCs where extra memory is scarce.

What Are the Options?

Now that we know how to get the data redirected to the network, let's look at the actual hardware needed to create the modem pool to deal with it. The first solution is actually very much like printer sharing. Special modem sharing software running on a networked PC will allow other users on the network to access its modem. This extra activity is transparent to the owner of the system with the modem, who can still use their system as they normally would. Once a user attaches to the modem, all other users that attempt to connect to it will receive a mes-

sage saying that it is currently busy and they must wait. You can set up as many of these modem sharing PCs as you require to handle user demand. If the PC has two serial ports available, two modems can be connected to it and both can be shared. If several modems are available on your network, the redirector will simply ask the user which of the modems they want to attach to when they load their communications package.

A separate copy of the modem sharing software would have to be purchased for each PC with a modem(s) to share and all other PCs requiring access would be given the redirector software. The redirector software usually has unlimited user license, meaning you can load it on as many PCs as you want. This approach is inexpensive and works well in an environment with a small number of users.

However, if you have a large network and you need to designate several systems for modem sharing to serve your user base, the administration and support of all of the PCs can become time consuming. A better approach in this situation is to dedicate a PC as a modem server (can be referred to as an asynchronous communications server or ACS). Special multi-port serial cards with four, eight or more ports on each can be installed in the PC. A modem can then be connected to each of these ports. Although

It only makes sense to have several users share one modem to maximize its usage.

it is possible to have twenty-four or more modems on each PC, this may not be practical and a smaller number is more common. This approach allows the modem pool to be centralized on one or two servers, making the support and administration tasks much easier. This is also a good use for any older PCs that you may have available.

The last solution I will mention is probably the most elegant, but can also be the most expensive. It involves using a specialized stand-alone piece of hardware designed especially for tasks such as modem pooling. These units have built in network connectors, so you simply connect them right up to your network. The most basic ones are stand-alone network modems that can only support one user at a time. As mentioned, instead of being attached to a PC, these special modems simply connect directly to the network and are accessed by users via the redirector software that is included with them. Another type of more advanced unit is a controller that has four, eight or more serial ports on it which you connect your own modems to, and as a result can support many users at once like an ACS. The advantage is that, unlike an ACS, you do not have to tie up one of your PCs as a server and have the hassle of installing extra serial cards into it. These pieces of hardware are usually easy to get up and running and can provide very good speed performance.

Additional Uses and Benefits of the Pool

Most of the better ACS and specialized hardware solutions will provide much more power than simply basic dial-out modem pooling. For example, some of them have the ability to act as multi-protocol routers as well. Another benefit that a modem pool like this may offer is remote dial in. This is a topic that could easily occupy another full article, but the idea is that users in remote locations can dial in to the modem pool and actually become remote nodes on the network. They would be able to use the network just as if they were actually in the building connected directly to it (though they will notice slower response, of course, since the modem providing the connection can be a speed bottleneck). If remote networking is an important requirement, there is another, more elaborate, type of solution consisting of a cabinet which holds multiple processor cards with a modem connected to each. Each of these cards is essentially a network connected PC that can be controlled by a remote user to give them access to the network. This system can also work the other way around, of course, and allow local users to access one of the modems for dialing out as well.

An important last point: since all products will not run with all networks, you must be especially careful that the product you choose is fully compatible with your particular network environment.

Now For the Real Work

You now have a basic background of modem pooling to guide you when looking at specific products for creating a modem pool on your network. There are many good products available and most will fit into one of the general categories that have been mentioned. Although the idea of modem pools may seem complex, they are not difficult to install and can help you save money while getting more from your LAN. ■

Parry Loeffler is a consultant in Calgary. He has a degree in Computer Science and also holds a technical diploma in Computer Hardware Technology.



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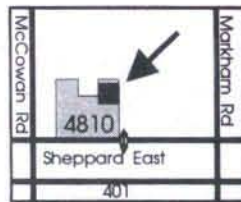
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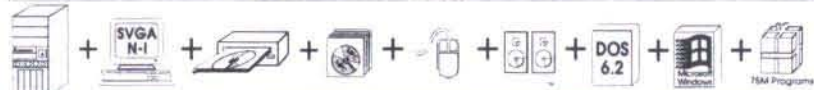
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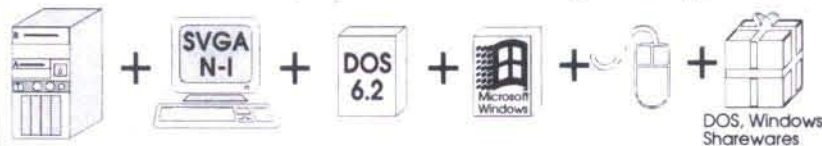
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GAMES

Pedals to the Metal Review Of Advanced Game Control Devices

BY GORDON GOBLE

As the gaming environment matures, so too do its peripherals.

Knowing we were held spellbound by his wonderful stories, Grandpa took a deep breath and continued, "Yessiree, things were different back in my day. We didn't have any fancy-shmantzy company makin' joysticks for us. Nope...we made our own. Dad's screwdriver stuck into a wad o' chewin' gum — and none of this sugar-free stuff, either — that was our joystick. And we liked it, too."

Yet Grandpa, with all his seeming disdain for modernization, couldn't hide his interest in today's newfangled gaming/simulation control devices. It was with his blessing (and input) that this look at advanced control devices, henceforth referred to as "ACDs", was pieced together.

Increased specialization is by far the most important development in ACDs over the course of the last five years. In terms of sales, it is the venerable joystick that still rules the ACD roost, yet as both games and simulations grow increasingly more complex and realistic, the joystick has taken on a multitude of new faces, and often doesn't look like a joystick at all. In many instances, offshoots such as wheels, yokes, pedals, or "gamepads" may provide the ultimate control method for a given program (thereby making it a lot more fun). Purchasing decisions should be made only after consideration of a number of factors, such as:

1) Amount of Time Spent Gaming. (This

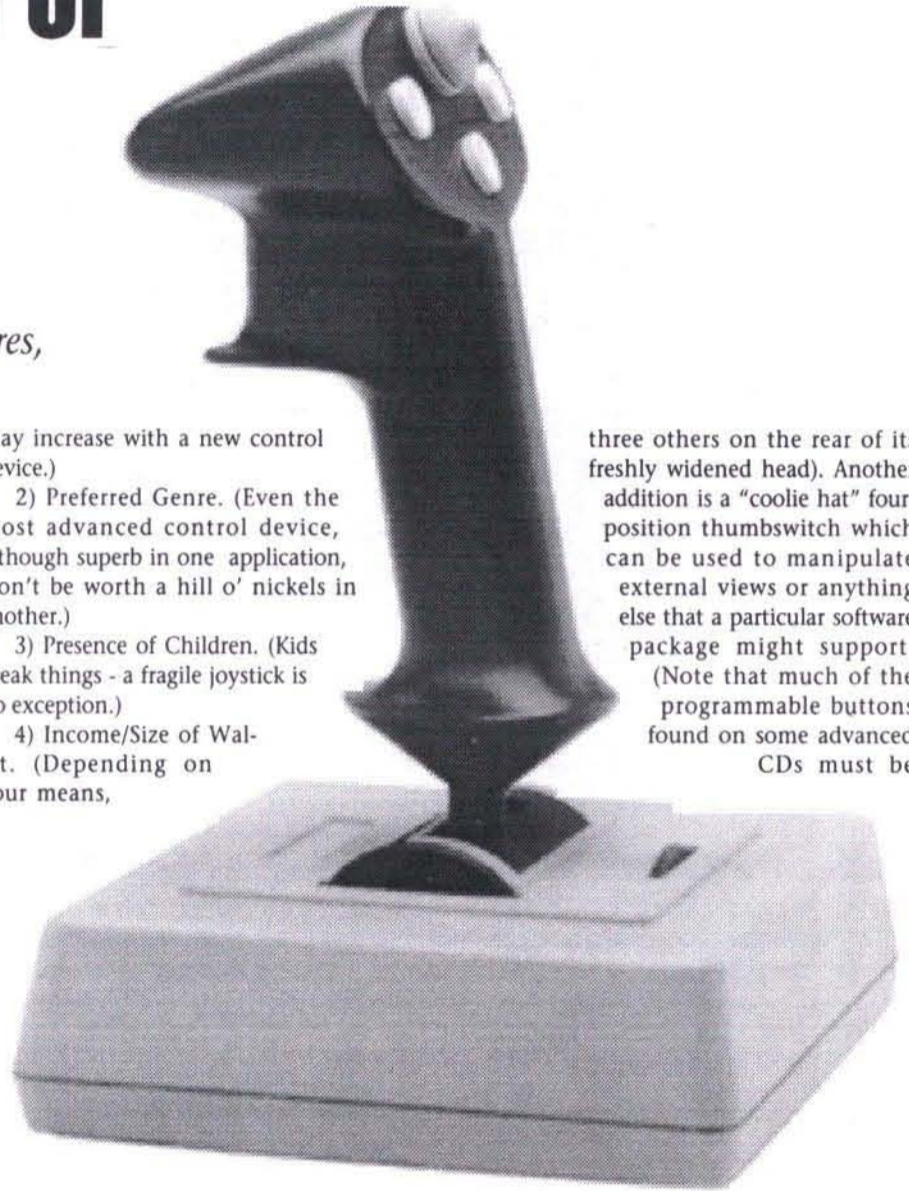
may increase with a new control device.)

2) Preferred Genre. (Even the most advanced control device, although superb in one application, won't be worth a hill o' nickels in another.)

3) Presence of Children. (Kids break things - a fragile joystick is no exception.)

4) Income/Size of Wallet. (Depending on your means,

three others on the rear of its freshly widened head). Another addition is a "coolie hat" four-position thumbswitch which can be used to manipulate external views or anything else that a particular software package might support. (Note that much of the programmable buttons found on some advanced CDs must be



this exercise can get expensive.)

The following review will classify control devices by category, then in descending order of overall quality and performance (in this reviewer's humble opinion, anyway). Some products may be conspicuous by their absence - be assured that this does not reflect on their merit (or lack of), just their lack of presence for this review.

Joysticks

Flightstick Pro By CH Products

Average Street Price: \$80.00

Best suited to (In order): Aircraft Fighter Games, Flight Simulations, Auto Racing Simulations, Arcade Style Games.

From first look to final analysis, this is a quality product. The comfortable, jet-like jumbo black stick that has become a CH trademark has grown some from the inaugural Flightstick, and now includes four fire buttons (index finger on the front side, and

software supported. Most any keyboard stroke can be "mapped" onto these new smart sticks, provided the program or packaged software allows it.)

The Flightstick Pro features a smooth throttle wheel and two very accurate pot adjusters (which become trim adjusters for flight sims) built onto its six by six-inch gray base. The stick itself stems from a rectangular box in the middle of the base, and since most games request that the stick be moved to its uppermost left and lowermost right corners to establish range, the Flightstick Pro user will always open his quest in perfect calibration (as far as his joystick goes, anyway). Included in the package is a software disk containing calibration and test utilities, and special drivers for Microsoft FlightSim 4 & 5.

The Flightstick Pro kept me "on the needles" in Flight Simulator 5, and tore its way through enemy squadrons in Falcon 3.0. It performed admirably in IndyCar Racing and NHL Hockey, yet these two programs exposed one tiny drawback concerning the

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new configuration on the stick head. The new buttons and wider head are a definite step forward when dealing with multiple manipulations, but for games in which just two buttons are needed, the Pro predecessor (the Flightstick) with its smaller single button head and index trigger more comfortably fits the hand over the long haul. Adventure game addicts (especially first-person fans) may want to look elsewhere as this, and most other analog joysticks, provide a somewhat slower response time than digital (on/off) CDs such as the Gravis Gamepad.

The Flightstick Pro continues the fine tradition of CH Products' CDs, that of solid construction, precise directional guidance, good looks and great feel.

Flightstick By CH Products

Average Street Price: \$50.00

Best suited to (in order): Aircraft Fighter Games, Flight Simulations, Auto Racing Simulations, Sports Games, Arcade Style Games, and practically anything else.

The forerunner of the Flightstick Pro, the CH Product Flightstick has long been considered the pinnacle of joystickism. It looks, feels, and responds in much the same manner as the Flightstick Pro (reviewed above), with a slimmer one button/one trigger head, and (a slightly noisier) throttle. I've been using the Flightstick for nearly two years, and have found nary a hassle. The Flightstick offers precise, unwavering control for the most exacting of games, yet takes a licking and keeps on ticking.

With only two on-board switches, advanced keyboard mapping is not possible with the Flightstick (although some games,



such as World Circuit, allow for a swapping of button/trigger functions), but if a straight-forward joystick will do, there is none better. Amazingly, the Flightstick is priced on par with a multitude of lesser quality joysticks. This combination of quality price and versatility is hard to beat. A Best Buy.

Thrustmaster Flight Control System By Thrustmaster

Average Street Price: \$100.00

Best suited to (in order): Aircraft Fighter Games, Flight Simulations, Auto Racing Simulations, Arcade Style Games.

A black stick and base with "stamped-on" lettering gives the Thrustmaster Flight Control System a none-too-subtle military appearance. Despite the extravagant nametag, the TFCS is a joystick, albeit with

four programmable buttons and 4 position "coolie hat" switch (pioneered by Thrustmaster and eliminating much in the way of keyboard interaction), all strategically mounted on the jumbo stick in much the same manner as real-life jet fighter controls. There are currently no software drivers included with the TFCS, therefore the extra buttons and coolie hat will work only with games that specifically support such features (this includes Falcon 3.02, MiG-29, F15 Strike Eagle, Aces of the Pacific, Strike Commander and most helicopter sims).

With joysticks, bigger is better, and the TFCS is no exception. A little lighter (and perhaps somewhat fragile in feel), the TFCS nevertheless gives accurate feedback and, as with most ACDs of this calibre, the entire unit will remain quite immobile on the desktop. The comfortable TFCS stick is mounted in a rectangular box on the base, making calibration a very simple procedure indeed, and response time is quick.

The Thrustmaster Flight Control Systems works very well (especially in tandem with the Thrustmaster Weapons Control System - reviewed later) in specialized areas. The seeming fragility of the unit means it may not be the best choice for sports games (stickbreakers such as NHL Hockey) or anything that may induce extreme physical wear and tear. The TFCS is not cheap, yet true jet jockeys could well find a complete Thrustmaster set-up to be their method of choice.

Gravis Gamepad By Advanced Gravis

Average Street Price: \$25.00

Best suited to (in order): Arcade Style Games, Adventure Games, Puzzle Games, Sports Games.



The Gravis Gamepad is a tiny, handheld combination of Nintendo-style controller and joystick. Four fire buttons combine with a removable one inch joystick handle to supply just about all the options and versatility one could ever hope to expect in such a small package.

The unit can be switched from a right to left-handed set-up without fuss, and although it won't give nearly the feel or response of a full size stick, is the perfect device for stealthy office use and/or budget-conscious shoppers. The Gamepad is best suited for adventure and arcade style games (although it worked surprisingly well with flight and racing simulations), and is always a heck of a lot easier than keyboard control. Inexpensive and completely portable, the Gampad is a neat product that has found a niche.

Gravis Analog Pro By Advanced Gravis

Average Street Price: \$55.00

Best suited to (in order): Arcade Style Games, Puzzle Games, Adventure Games, Aircraft Fighter Games, Flight Simulations, Auto Racing Simulations, Sports Games.

There is something to be said for buying Canadian, and for a whole lot of years the words "Gravis" and "joystick" have been

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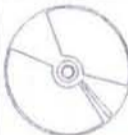
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almost synonymous. Smart marketing and widespread distribution have buoyed the original Gravis joystick to almost legendary

status. Over the last couple of years, though, other joystick manufacturers have been busy building and designing a superior product, and Gravis has had to fight back with its latest joystick, the Gravis Analog Pro.

The Analog Pro features a conventional, yet curiously undersized, stick mounted on a flat black base (a popular colour scheme these days). To Gravis' credit, they are one of very few manufacturer's to pad their sticks, and that's a nice touch over the long haul. But, considering the recent strides made in the joystick biz, it seems odd that the Analog Pro has developed very little from the original. Now sporting two fire buttons atop the handle instead of one (and an index trigger on the front of the stick) and two on the

base, all the components are there, yet the feel of the product remains unchanged. At one time the "Rolls Royce" of a thin market, the Analog Pro now feels "small" and has very little throw (motion) when compared with other products.

It is very important to keep the Analog Pro in calibration as it's real tough to reset. You must use a tiny screwdriver (included) and have a lot of patience to re-centre the pots. The base buttons have swappable functions and a tension adjuster allows the stick to become free floating, if needed. A throttle wheel (important for the latest flight sims) is awkwardly placed on the side of the unit, but the Analog Pro worked very well with first-person adventure games. A decent stick and great for kids, yet priced a little high for my liking.



G-Force By Suncom

feature is provided to prevent fore and aft movement when racing automobiles. This is a laudable feature that is not really necessary, as the rocking motion for analog throttle and brakes feels quite natural and smooth. One of the best devices available for Flight Sim 4 & 5 and racing sims.

Yokes

G-Force By Suncom

Average Street Price: \$79.00

Best suited to (in order): Flight Simulations, Auto Racing Simulations, Aircraft Fighter Games.

The G-Force is a specialized desk mounted flight yoke that doubles admirably as a driving controller. It was the surprise find of this project, and a pleasant surprise it was.

Featuring a unique swiveling column fore/aft axis and U-shaped yoke handle that pivots at the base and arcs from side to side, the G-Force offers precise control and a short and sweet turning radius that makes it perfectly suited to exacting flight simulations (nearly as good with yank and crank fighter sims), and the latest auto racing sims (such as World Circuit and IndyCar). The attractive unit is mountable to the desktop (via four oversized suction cups), or clampable to deskfront.

The G-Force comes equipped with large, comfortable thumb and trigger buttons at the tops of each yoke handle, and a column switch that reverses the signals going to each pair of buttons. Smartly configured trim adjusters are present for elevator/rudder control in flight games, and a column lock-out

Virtual Pilot By CH Products

Average Street Price: \$100.00

Best suited to (in order): Flight Simulations, Aircraft Fighter Games, Auto Racing Simulations.

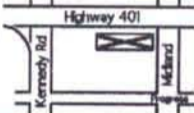


This article is beginning to sound like an advertisement for CH Products, but can I help it if this company consistently turns out some of the best control devices ever to hit the market? The Virtual Pilot is a desk mounted flight controller that features a sliding shaft and hourglass shaped yoke. A T-handled throttle, easily manipulated trims adjusters, ideally placed fire buttons, and rock-solid construction make the Virtual Pilot a product to remember when looking for flight and autoracing ACDs.

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Like the G-Force, the Virtual Pilot has a limited turning radius which makes it very good for precision flight sims and mimics closely a real small plane yoke, but the sliding fore/aft movement may be too awkward for analog control of autoracing simulations. A mild detraction might be the angle and position of the unit, which sits flush and parallel to one's computer desk or table. The VP clamps itself to the table (and does not work well with beveled or rounded edges, much like the G-Force), but these criticisms aside, this is a quality product at a reasonable price.

Mouse Yoke By Colorado Spectrum

Average Street Price: \$50.00
Best suited to (in order): Flight Simulations, Aircraft Fighter Games.

This unit is evidence that no matter what the circumstances, a mouse makes a lousy joystick. The idea here is that a mouse strapped to a rotating shaft will enable one to pilot a plane or drive a race car through the attached yoke handles. There are no fire buttons and no centering routine, and the whole idea, inexpensive though it may be, proves that you get what you pay for.

Specialized Control Devices

The Prowheel By Wizard Racing

Average Street Price: \$130.00 US
 (though the manufacturer)
Best suited to: Auto Racing Simulations.

Of interest to anyone who takes their computerized racing cockpit seriously is a product from a little company called Wizard Racing of Gaston, Oregon. The ProWheel Steering Controller is one of a precious few wheeled control devices currently in the marketplace, and its appearance continues an ongoing thrust toward increased realism in all aspects of the simulation environment.

The most enticing component of the ProWheel is its authentic Go-Kart steering wheel and shaft, which have been set at a comfortable driving angle into sleek black ABS plastic housing. On the back side of the padded wheel are four fingertip switches, two on each side, that accommodate throttle, brake, and gear change control. Aside from a serial connector and on/off switch on the rear of the wedge-like housing (for connection of foot pedal units), the rest of the unit is free of exterior fluffery. Weighted and equipped with non-skid rubber feet, the ProWheel does not require a table clamp to lock it in place. Wheel action features gradu-

ated resistance, and successfully mimics the motion and feel of the real thing.

As of this writing, the ProWheel has been configured to work with only two racing simulations, World Circuit (Microprose) and IndyCar Racing (Papyrus), but that certainly shouldn't discourage the enthusiasm of digital racing addicts. Although ProWheel drivers may find a slight loss in the pinpoint precision they have become accustomed to with a quality joystick, with some practice and seasoning, this minor quibble will carry less weight. The Wizard ProWheel comes with a utility disk packed with car set-up tips, graphic upgrades, a screen capture program, etc.

Thrustmaster Weapons Control System Mark II By Thrustmaster

Average Street Price: \$160.00
Best suited to (in order): Aircraft Fighter Games, Flight Simulations.

So, who needs a keyboard anymore? Built to compliment the Thrustmaster Flight Control System (see review in this article), the Weapons Control System consists of a rounded black plastic ball built onto a shortened joystick handle. The unit features a

plethora of buttons and switches on its head and base and will emulate most any keyboard stroke available to most modern desk-based pilots. The feel is pleasing, while the buttons and analog throttle are both responsive and placed to get the most input possible out of any human hand.

When in conjunction with the FCS stick, jet fighter games take on a whole new dimension. The HOTAS (Hands On Throttle And Stick) principle is used in real jet fighters for a reason, and serious fighter sim pilots with a little cash to burn will be astounded by the realism.

While the WCS is designed primarily for aircraft-base simulations, practically any game (or business application for that matter) can be mapped into the unit. And when the power has been turned off, the WCS sports a non-volatile memory chip that will retain any single program that has been downloaded into it. Highly recommended for the ultimate in flying realism.

And That's Not All

As mentioned earlier, this review is not all-encompassing, and as the control device marketplace grows, it will become ever-increasingly tougher to get all the products into one place at one time. Please be assured though, that a lot of the good stuff is here, and most areas have been represented.

In related news, The Maximum Company of Nampa, Idaho has suspended manufacture of their Maxx Yoke, and have put their Maxx Rudder Pedal production on hold. On a more positive note, Burnaby's Advanced Gravis is due to release what inside sources say is "a joystick a Klingon would love" later this summer. The two-handed unit with 21 selectable buttons promises to be "an entirely new concept in joysticks...like something right out of a starship". Intergalactic travellers take note. Meanwhile, other currently available products of interest include:

A steering wheel/pedal combination (The "Formula T1") from Thrustmaster.
 Something called the Cobra Computer-

stick (permitting the mapping of 127 separate keystrokes - more keys than appear on the average keyboard) from The Maximum Company [Tel: (208) 465-4606].

A keyboard holder, rudder pedals, and complete self-enclosed cockpit (now that's riding the fine line between realism and sickness!) from ThunderSeat Technologies [Tel: (310) 410-0022].

'Til next time, please don't forget that there are groceries to buy and bills to pay. Gaming is merely a pastime, right?

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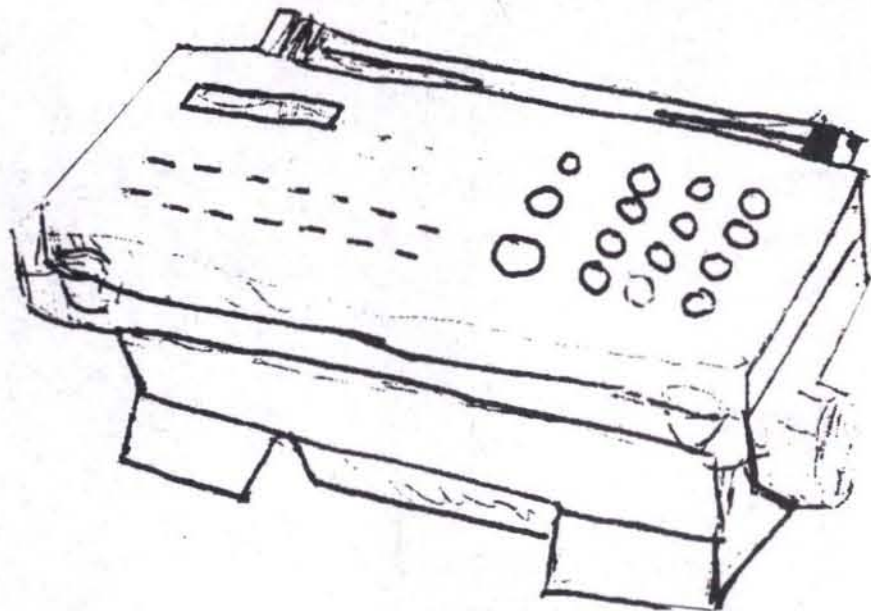
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MULTIMEDIA

Logitech Intros Movieman PC Video/Audio Capture Board

FREMONT, CA (NB)—Logitech has announced its first video and audio capture board for IBM and compatible personal computers (PCs)—Movieman. The company claims that the Movieman offers compact disc (CD) quality audio and "true color" video.

Known for its pointing devices and hand-scanners, the Fremont, California-based company says Movieman was developed jointly with Sunnyvale, California-based video technology company, Winnov.

Logitech claims Movieman is capable of 30 frames-per-second, fullmotion video capture, as well as sound. Because the sound card is built into the board, the company says sound and video are already synchronized and there is no need for an additional sound card. The board supports the analog signal formats NTSC (North American Television Standards Committee), which is popular in the US, and the European PAL interface standard, as well as the emerging Digital Video Connector Interface (DVCI) standard.

A small computer systems interface (SCSI) is included in Movieman, so users can interface a compact disc read-only memory (CD-ROM) drive and play multimedia titles

with sound. Support for Microsoft's Video for Windows and audio WAV format files is also included, the company said.

Compression for the large amounts of information generated by video capture is built into the board at a factor of four to six times. However, Logitech says Movieman has a modular design that allows for the addition of more powerful compression add-ons.

Logitech is including Adobe's Premiere video editing software application, its Foto-touch Color image editing software for single frame editing, and Easyclip capture software for "drag-and-drop" software capture.

Movieman requires a 486 or higher PC running Microsoft Windows 3.1 and DOS 5.0 or higher, a VGA card, one 3.5-inch 1.44 megabyte (MB) disk drive, a hard disk drive, and a mouse. Retail pricing has been set at US\$299 and the product is expected to ship to retailers and distributors beginning in mid-April.

Logitech has also announced availability of Sound Advice, a free audio CD for playback in standard music CD players that allows users to hear the differences in PC sound technologies. The product features discussions of sound terminology and advice on how to purchase a sound card. The CD also includes a \$10 rebate coupon for any Logitech sound product and can be ordered via a toll-free number while supplies last, the company said.

Contact: Logitech, 800-231-7717; Sound Advice Orders, 800-889-0046

Creative Technology Intros Awe32 PC Sound Card

Singapore (NB) — Creative Technology has announced its new Awe32 sound card, which it claims is the most advanced audio card on the market. The card combines capabilities from its flagship Sound Blaster 16 Advanced Signal Processing card with those from E-mu Systems' Emu800 integrated audio digital signal processing.

The card includes a programmable digital signal processor (DSP) chip that offers the ability to compress and decompress audio files on the fly. Two compression modes—Fastspeech 8 and Fastspeech 10—are available. Fastspeech 8 compresses the audio file to one-eighth of its original size while Fastspeech 10 crunches the audio down to one-tenth its former size. Real-time compression means users do not need to conduct off-line processing.

Also included is the new Textassist voice synthesizer product for text-to-speech conversion. Creative claims Textassist includes five Windows-based applications and includes Digital Equipment Corporation's (DEC's) Dectalk technology. Company officials

say they expect the Textassist technology to become popular for business applications such as proofreading, remote talking electronic-mail, talking scheduling for appointment reminders, and talking faxes. Nine voices, one child, four male, and four female, are included, though users can create their own voices as well.

Qsound, 180-degree virtual audio sound localization technology for advanced special effects, has been added to the Awe32 sound card package as well.

Creative's Voicassist speech recognition software for Windows is also included, as is the wave file editor Wavestudio, HSC's Interactive SE, the sequencer software program Cakewalk Apprentice, and the Creative Ensemble. Creative describes the Ensemble as a home "hi-fi" system consisting of a set of software applications for playback of wave, CD, and MIDI (musical instrument digital interface) files.

Continued on page 90

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	540MB	10ms	512K	649	699
Maxtor	245MB	15ms	64K	\$ 339	\$ N/A
	345MB	14ms	64K	399	499
	540MB	8.5ms	256K	N/A	899
Western Digital	213MB	13ms	64K	\$ 299	\$ 329
	270MB	13ms	64K	399	499
	342MB	12ms	128K	489	599
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Telecom Means Choice

BY JAMES MACFARLANE



Telecommunication is all about choices. It's about you and your mind and where your information comes from. An entirely new channel for free expression has just been given to you: your television and something called SAP.

SAP stands for 'secondary audio program' and it's a separate but parallel audio channel that's sent along with regular TV signals. I saw SAP mentioned on an announcement on Toronto's CITY-TV (which also owns MuchMusic). They were planning to provide a completely uncensored version of the movie Boys 'N the Hood on the SAP channel, finally giving viewers the choice over whether they want to hear the F-word or not.

If you've got a newer TV or VCR you probably have the ability to access SAP. Look for "MKS" in the audio section of your TV or remote control. MKS controls whether your TV audio works in mono, stereo or SAP modes.

Discovering SAP is like stumbling across a secret underground TV network. While most channels don't use SAP, some of them use it for broadcasting news updates and providing TV listings. CBC's "As it happens" is even piggybacked on the PBS SAP channel. Turn on SAP and go channel surfing to see what you find.

Paul and Karla get Wired

My favourite magazine, *Wired*, issue 2.04 has been yanked from store shelves or censored in Ontario and Manitoba because of its coverage of the Paul Teale-Karla Homolka story. The article discussed the publication ban and how information was circulated through the Internet newsgroup alt.fan.karla-homolka.

The article made the mistake of revealing the very information that the ban was all about in the first place, causing the magazine to be pulled from shelves, the article to be blacked out with marker, or the offending page to be removed entirely. I picked up my copy the day it hit the stands, before anyone noticed the offending article. I showed the article to the store manager where I bought my copy. She grimaced, sighed and thanked me for pointing it out.

According to a press release from *Wired*,

the company expects this mistake to cost it about US\$50,000 but it will probably end up being less than that because most stores have chosen to remove the offending information rather than send the copies back.

The Internet newsgroup 'alt.wired' has been a hotbed of debate over censorship since the issue hit the streets. Many American participants in the newsgroup have resorted to Canadian-bashing. "Oh, unlike you, we believe in freedom of speech. We'd never do such a fascist thing, you stupid Canadians. Go back into your igloos" seems to be the consensus. Of course, this spills over into a discussion of whose health care system is better *ad nauseam*. Tune into alt.wired if you want to participate in this endless flame war.

Lynx: A real Internet application for the rest of us

Tomorrow's libraries will be electronic. Oh sure, you've heard it all before and I'm sure the skeptic-quotient of many of the people reading this just went to the moon, but take a step back and listen up.

Forget FTP, TELNET, GOPHER and all the other Internet stuff. You can learn all that later. If you're a beginner when it comes to the Internet you should start by using Lynx. Here's why...

One of the greatest contributions of books, hundreds of years ago, was the creation of cross-indexing. It allowed you to find related bits of information on any topic you could dream up, even if they were in another chapter, another volume or another title altogether. By simply browsing a topic you could find enormous amounts of useful information very quickly.

The idea of cross-indexing became much more powerful with the creation of hypertext indexing. Instead of flipping back to the index to find a related topic, an electronic link, called a hypertext link, is embedded right in the document itself. Clicking on the

hypertext link with your mouse took you immediately to the cross-referenced item. It would find the title, chapter and page for you automatically. Smart, huh?

Now, take this one step further: what if the link pointed to a document that was on someone else's machine, somewhere else in the world? That's what the World Wide Web or WWW does. It does all the legwork: it calls the other machine via Internet link, requests the information on your behalf, and spits it onto your screen — complete with pictures, and even video clips. Sound amazing? It is.

All this is possible due to something called HTML, or Hypertext Markup Language. HTML contains all of the information about formatting words, pictures and the hypertext links that can point to any document anywhere on the Internet.

In order to access HTML documents, you need a viewer or reader. These come in two flavours: Mosaic, which allows you to view pictures and video clips in the documents as well as providing a graphical interface, fancy text formatting and colour; and WWW, which is the vanilla ASCII text version.

One problem with using WWW and Mosaic: your machine must have a live Internet (IP) connection. The information servers out there need to know where you are so they can send the resources of the document. That requires a real Internet connection. For most users this means paying for a SLIP/PPP (read: tricky to set up and can be expensive for the average BBSer) type of Internet account.

If you don't have SLIP/PPP account, you do have an alternative. Internet access providers, and some BBSes, can provide a service called Lynx. This is a text-only reader that allows you to do everything you'd normally do through WWW and a SLIP/PPP connection with a normal TTY dial-up type

Continued on page 76

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Telecom Means Choice*Continued from page 74*

of account (read: with your modem and practically any terminal software).

What's available on WWW? Well there's news, back issues of magazines, books, scholarly papers, electronic publications people make just for fun, recipes and anything else you'd find in a typical public library, except it's in electronic form and, once you're

online, it's all absolutely free.

Here are a few fun examples I came across while browsing: a movie database, the dead sea scrolls, a collection of works by Bruce Sterling and the online version of the Internet Underground Music Archive that I wrote about a few months back, real-time colour weather maps and high-resolution pictures of the moon from the Clemetine orbiter. There are even video cameras that are just sitting in someone's lab or kitchen waiting for you to

log on and see who's in the room. This is fun stuff. Go see for yourself.

More importantly, there are online interactive help files on how to use all those "Nifty Internet Things" that everyone keeps writing about but fail to tell you about in enough detail for you to be able to figure them out for yourself.

If the BBS or online service offers any serious Internet access (more than just newsgroups and mail), ask them about Lynx. It's

easy to use and probably the best place to start.

Question of the month: If tomorrow's libraries will be electronic, why isn't the public library system embracing the technology and providing public Internet access terminals? Why aren't they educating the public on how to access online publications?

Consider the facts: it's in the public interest to have a literate populace, thus the reason for public libraries to exist in the first place. Librarians are information storage and retrieval experts who act as agents in assisting the public with accessing information stored in the public library system. The Internet is the most public information resource ever to exist.

Put two and two together folks, go to your town or city council and demand that your local library get wired into the information age. After all, isn't that what libraries are all about?

Goodbye, Telix

The only program I jump to DOS to use is Telix. It's the best DOS shareware terminal program there is. I've never been happy with Windows terminal programs. I must have tried a dozen of them. They've all been either lacking in features or awkward to use. It looks like the guys at Delrina have been doing their homework, though, because I've tried their WinComm Pro and I'm hooked.

Using WinComm Pro is one of those "Gee, that makes sense" experiences. The phonebook is a set of on-screen icons. You double click to log on. Simple. If you press the "record" button before you log on, the program will make an automatic logon script for you, that will automatically run every time (you can turn it off if you need to).

The logon script is generated in C code, so you can edit and write your own scripts if you want to do anything really fancy. You can also define macros and put them on the toolbar.

For uploading, you can drag and drop files from the desktop or file manager while WinComm is minimized, or use WinComm's own file selector. I didn't like the program's file selector much because you have to hit BROWSE instead of just seeing a list of files in your default upload directory.

Because we need to interact with data, not just read it, WinComm offers many ways to capture, cut and paste bits of text. You have a scroll-back buffer that allows you to cut and paste information to the host system (ASCII upload) to a file, the printer or scratchpad. This allows you to make clipping files and to pull out items to insert into other messages. Very handy.

What is also nice about the capture facility is that you can have the program automatically open and name capture files. You can have it number the files sequentially, by date, to append to the previous file or to overwrite the previous file.

Aside from the file upload selector the only thing I didn't like about WinComm is that many components have to be loaded from disk. If you're operating on a less-than-optimal computer system, like my puny 386-40 with a doubled 80MB drive and 6MB RAM, this means waiting around for scripts to start running and for file upload dialog boxes to appear. Contact Delrina at (416)441-3676. ■

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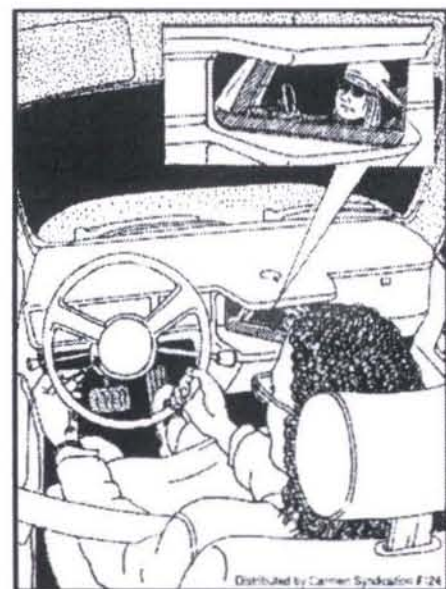


Using a stand-alone fax machine as a computer scanner is nothing new, but it used to be only you could get it to work if you had two phone lines: one for the outgoing fax call, and another leading into your computer's fax/modem. Provincial Products now offers a more direct solution that does away with the second phone line. Their new FaxScanner product turns any standard Group III fax machine into a computer scanner and printer. This small, battery-powered device tricks your fax/modem and fax machine into thinking that they are communicating over the phone line. Simply connect all three devices together, run the software that comes with FaxScanner, and you are set to scan and to print.

FaxScanner allows users to scan full pages of text and graphics and can utilize 16 levels of gray-scale. It is compatible with all major Desktop Publishing software packages and is available for \$199.

Contact: Provincial Products 1-800-267-4686.

Sightings Steven M. Johnson



Drivers on dangerous urban streets who wish to avoid eye contact with drivers or passengers of other cars may now purchase a "sideview" mirror, which is adjusted by moving a lever on the steering post.

NEC Launches DX4-Powered Notebooks

NEC Technologies latest addition to their line of Versa E notebooks comes equipped with new Intel 75MHz Intel DX4 microprocessor. Announced in conjunction with Intel's official release of the DX4 computer chip, this new series of computer chips helps to provide the best 486 performance in a notebook computer. Using Intel's SL technology, the new 486DX4 microprocessor can operate while using only 3.3 volts, maintaining the high performance level demanded of the best of today's notebook computers, while keeping power consumption low.

NEC's Versa E 75MHz DX4 notebook comes with a 340MB hard disk drive and an active-matrix color LCD screen. The suggested retail price is \$8,289.

Contact: NEC Technologies Canada 905-795-3500.

Internet Business Conference

RainMaker Media has announced a conference on business applications for the Internet, featuring several influential Internet figures. Guest speakers include: Jim Carroll, co-author of the Canadian Internet Handbook, Ed Krol, author of The Whole Internet Users Guide and Catalog, and Michael Strangelove, publisher of the Internet Business Journal. The conference will feature topics such as "The Internet in the Canadian Environment", "Internet and Its Commercial Aspects" and ways in which businesses can cut costs and improve productivity through using the Internet.

The conference is being held at the Metro Toronto Convention Centre Room 105 on April 28, between 7:45 am. - 1:00 pm. Tickets are \$95 if bought before April 11.

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Oak Street Software Marketing Service

Are you a programmer with a good idea, but not sure how to produce a final, marketable product? Oak Street Software is offering their marketing services under the name CANWARE Software, are aimed at aspiring programmers who need help getting their product launched.

Oak Street provides a full range of services, including testing facilities, guidance in writing user documentation, and counselling to enhance the marketability of the software to the target market. They also provide a service for disk duplication, centralized order-taking, mailing services and all of the other office and communications work required. Any programmer who thinks they have a product with potential are welcome to approach Oak Street for their services.

Contact: Oak Street Software (519) 824-0323.

OCR improvements from Caere

Caere Corp., Los Gatos, Ca has introduced two revised optical character recognition (OCR) packages for Windows: OmniPage Professional 5.0 and OmniPage Direct 2.0.

OmniPage Professional 5.0 offers superior accuracy with its advanced 3D OCR technology and complete compound document processing through the use of True Page technology, the company claims. True Page allows a user to capture an accurate pictorial representation of the original.

Caere says OmniPage Direct 2.0 employs the company's latest recognition engine for highly accurate results, implementing its proprietary Compound Neural Network system, the

Language Analyst and Caere AnyFax 2.0 technology, which deliver greater accuracy for fax images, documents with small text and otherwise degraded documents.

OmniPage Direct 2.0 will also support the new HP AccuPage 2.0 technology for greater accuracy on degraded or otherwise damaged documents.

OmniPage Direct 2.0 has a suggested retail price of US\$119, a reduction of more than 50 percent from the previous SRP of \$295.

OmniPage Professional 5.0 has a suggested retail price of \$695, while OmniPage sells for \$495.

price of \$695, while OmniPage sells for \$495.

Contact: Caere Corp. 408-395-7000



Logitech Gives Away "Sound Advice"

Logitech, best known for its line of computer peripherals, is giving away free copies of their "Sound Advice" CD to educate the public about the value of computer sound cards. The CD is being given away free as a promotion for Logitech's new SoundMan Wave sound board, released recently.

The Sound Advice CD can be played on any CD player, and features a discussion between radio personality Leo Laporte, Logitech representative Dave Pelton, and award-winning professional musician Wayne Gabriel. The discussion tries to clarify the terminology of sound boards, looks at MIDI, common industry sound standards and the difference between digitized and synthesized sound. The CD also features several compositions by Mr. Gabriel using Logitech's SoundMan Wave board.

The CD is being offered only as long as supplies last. Each CD comes with a \$10 off coupon towards the purchase of any Logitech product. People can ask for their copy of the Sound Advice CD by calling Logitech at: 1-800-889-0046.

Contact: Logitech Inc. 1-800-889-0046.

Microsoft Canada Announces FoxPro 2.6, Access 2.0

Microsoft Canada announced the Microsoft FoxPro relational database management system version 2.6 for the Windows and MS-DOS operating systems and Access 2.0 for Windows.

Both the Windows and MS DOS versions of FoxPro now offer new features such as the FoxPro Catalog Manager, a handy graphical interface for managing tables, queries, screens, reports and other database elements;

AutoMigrate technology, which automatically senses dBASE components and converts them to FoxPro; 10 innovative new wizards that simplify common database tasks; and more than 50 new dBASE language extensions that allow users to run most dBASE programs unchanged. Also available are the FoxPro version 2.6 Professional Editions for Windows and MS-DOS, offering a variety of developer tools as well as the standard database management system.

Microsoft is making FoxPro version 2.6 Standard Editions for Windows and MS-DOS available at a special promotional price of \$135 each through June 30, 1994. A money-back guarantee allows users who aren't completely satisfied to return the product within 90 days and receive a full refund.

Microsoft claims Access 2.0 is the first desktop database to bridge the gap between end-user and developer needs, providing a single solution for all levels of users in an organization.

The company says it has included more than 300 new and updated features in Microsoft Access 2.0

Contact: Microsoft Canada, 905-568-0434.

Awards Fever Hits Software Industry

In San Francisco in mid-March the Software Publishers Association (SPA) handed out Codie Awards in 25 categories for the best consumer, education, and business software of 1993. The SPA calls its "Codie" Excellence in Software Awards the "Oscars" of the software industry.

Filemaker Pro 2.1 by Claris Corp. won the Critics' Choice Award for Best Business Program. Myst by Broderbund Software, Inc. won the Critics' Choice Award for Best Consumer Program. Davidson's Kid CAD by Davidson & Associates, Inc. captured the Critics' Choice Award for Best Education Program.

what's new

Two products were winners in multiple categories: *Myst* by Broderbund Software, Inc. (Best Fantasy Role Playing/Adventure Program and Best User Interface in a New Program); and *Quicken 3.0* for Windows by Intuit (Best Consumer Program and Best Personal Productivity Program).

Four companies received honors for multiple products: Adobe Systems, Inc. for *Adobe Photoshop 2.5* for Windows (Best New Business Application: Graphic or Display) and *Adobe Acrobat* (Best New Use of a Computer); Edmark Corp., for *Thinkin' Things* (Best Early Education Program) and *KidDesk Family Edition* (Best Educational Tool Program); Maxis for *SimCity 2000* (Best Simulation Program) and *SimFarm* (Best Secondary Education Program); and Microsoft Corp. for *Microsoft Word 6.0* for Windows (Best Business Application: Word or Text), *Microsoft Excel 5.0* for Windows (Best Business Application: Numeric or Data) and *Microsoft Encarta Multimedia Encyclopedia 1994* (Best Home Learning Program).

The Software Publishers Association is the principal trade association of the PC software industry. The SPA comprises more than 1,000 members worldwide including business, consumer, and education software firms. The SPA has offices in Washington DC, and Paris, France.

STF Technologies shipping AutoPak

AutoPak is STF Technologies' latest fax software for the Macintosh. It comprises four add-in modules for the company's *FaxSTF 3.0* software. *STF AutoOCR* is optical character recognition technology that the company has licensed from Calera Recognition Systems.

STF AutoPrint allows a user to print faxes as they are received or to schedule printing at a later date.

Background Imaging is a conversion utility that converts *QuickDraw* files to *Fax* format.

The *STF Developers Kit for FaxSTF 3.0* allows developers to fax-enable their programs. STF is located in Kansas City, MO.

Contact: STF Technologies Inc., 816-463-2021

TSE Automation Delayed Again

BY GRANT BUCKLER

TORONTO (NB) — The Toronto Stock Exchange has further delayed the next step toward closing its trading floor and moving entirely to automated trading in equities.

The exchange announced that a pilot project that was to start in April will now be put back to June, due to the discovery of more problems than expected and to a flood that damaged equipment in the exchange's computer room.

A memo to member firms of the exchange from Fred Ketchen, chairman of the board, also said that because of record trading volumes the exchange would have to install a generator to provide electrical backup, a project that will take two weeks away from testing of the new electronic trading systems.

The pilot testing phase, in which some traders will conduct live trades on the new

electronic system, had been due to begin in January, but a delay to April was announced at the beginning of the year.

It is the latest in a series of delays for a conversion that was announced in February, 1992, and was originally supposed to have been complete last spring. Closure of the 115-year-old TSE trading floor, originally scheduled for March, 1993, was delayed at the beginning of 1993. It was then supposed to happen in the fall, but has since slipped back again.

Jim Gallagher executive vice-president of the exchange, told *Newsbytes* in January that the floor was expected to close before the end of this year, but would not give a more specific date. He said the exchange will probably announce a new target date for closing the floor a month or two after beginning the pilot test. ■

Running with Ofoto 2

When the Canon scanner and *Ofoto 2* software arrived for review, I happened to be playing with a layout that included several historical photographs, the quality of which varied considerably. Among them were a badly faded snapshot taken in 1910, a very dark 8 x 10 glossy and a picture of a painting that wasn't properly aligned because the photographer hadn't held the camera level when he took the picture. Others were of pretty good quality, but all had to be scaled or cropped or both.

To make a long story short, *Ofoto* turned what could have been a long, fiddly process into one that was push-button easy. Once I'd created a custom calibration file — a two-minute procedure that is very well explained in the manual — I scanned the photos, sized them to the correct dimensions and saved them as TIFFs. I corrected the very dark photo with two clicks and manually corrected the picture of the painting using *Ofoto's* straighten tool. I placed the TIFFs into *PageMaker* and sent the file to an image setting service bureau. The owner actually commented on how consistent the images — the variability of scanned images he receives from customers is one of his ongoing headaches.

Developed by Light Source Computer Images Inc. of Larkspur, CA, *Ofoto* simplifies color or monochrome scanning to a point where everyone can produce a good quality scan. One of the keys to *Ofoto's* talent lies in its calibration system, which allows you to calibrate your scanner to take into account the characteristics of a specific output device.

The program also includes a number of automatic and manual image controls — color correction, dynamic range for shadows and highlights, moiré elimination from previously screened images, image straightening and automated image scaling.

Ofoto has been the darling of the Macintosh graphics community, and earlier this year, Light Source introduced *Ofoto* version 2 for Windows. It has a suggested retail price of US\$295 (US\$395 for the Macintosh version).

— DT

Contact Light Source Images Inc., 415-925-4242.

Legal Self Help

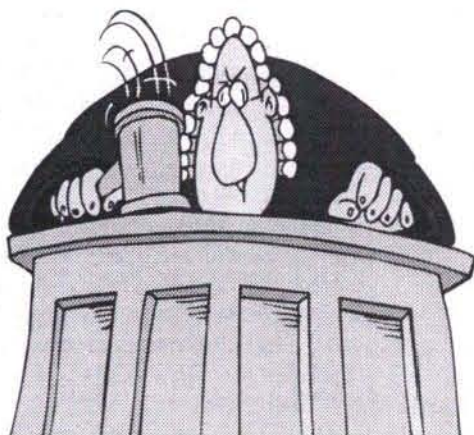
Proform Software of Ottawa has *The Desktop Lawyer*, a legal software package; and *Home Office*, a package of electronic forms letters and agreements geared for small business.

documents, credit application forms, collection letters, lease forms and corporate documents.

The *Home Office* package contains all the forms, letters, etc. needed by a small business operator, according to the company. The software contains various form letters, business plans, commission agreements etc.

Both packages support common word processors including *Word* for PC and Macintosh, *Ami Pro*, *WordPerfect*, and *WordStar*.

The *Desktop Lawyer* has a suggested price of \$199 while *Home Office* sells for \$99.



The *Desktop Lawyer* is based on Canadian law and contains more than 130 contracts, forms and letters. The forms and letters cover a wide variety of business needs — agreements, employment contracts, sales

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Western Canada: Tri-Raven Software, 604-737-4998

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newsbytes EXCLUSIVE NEWS

CIC Updates Handwriting Recognition

REDWOOD SHORES, CA — For pen computing to be successful across a broad spectrum of users, handwriting recognition must continue to improve. Now Communication Intelligence Corporation (CIC), a developer of input computer technology, has announced version 4.0 of its US Handwriter Recognition System (HRS).

The company claims that version 4.0 features enhanced shape recognition, updated linguistic post processing, and increased processing speed.

According to CIC, the new version is nearly twice as fast and recognizes more forms of handwriting, even when it is distorted, overlapping and connected.

CIC develops HRS for use in its own input technology systems and products and for licensing to developers of other systems.

Formatted Certifi-Kits

WHEELING, IL — Micro Format Inc., the company that makes and sells Banner Band and Super Color inkjet paper, has announced a kit for producing certificates.

Micro Format President Steve Singer says Certifi-Kit solves the main problem in printing certificates, the difficulty of formatting. "You space and tab and space and tab and many times you just give up in frustration," says Singer. The Certifi-Kit software works with several popular word processing programs. It is compatible with DOS and Windows versions of Wordperfect, Microsoft Word, and Lotus AmiPro and the Mac version of Microsoft Word.

In addition to the certificate forms, Certifi-Kit comes with 10 templates, including: Award of Achievement, Sales Award, Diploma, Certificate of Completion, Certificate of Participation, Employee of the Month, First/Second/Third Place Awards, Honorable Mention, Most Valuable Player, and Certificate of Appreciation. Micro Format says the templates can be changed and adapted for other uses.

Certifi-Kit has a suggested retail price of US\$19.95.

Contact: Micro Format, 708-520-0197 or 800-333-0549

Hello Kitty Moving To Video

SAN FRANCISCO — Hello Kitty, the popular character from Japanese Sanrio Incorporated, will now be the star of a video game for girls from newly formed Big Top Productions.

Hello Kitty and her companion characters, a Dalmatian dog named Spottie Dottie and a frog called Keroppi, have sprung up as the decoration for gift items ranging from erasers to stuffed animals in mall stores

across the US. Sanrio's "Small Gift, Big Smile" products got their start in Japan, and today the company claims it controls 70 percent of the children's gift business there. Sanrio also has two theme parks and produces an animated television series featuring Hello Kitty and her friends.

Jim Myrick, head of marketing at Big Top Productions, says the new Hello Kitty title will be aimed at girls. "The gaming and interactive markets have virtually overlooked girls. There's a fairly obvious gender bias in our industry, and we hope to help overcome it by creating an edutainment product for girls that's fun and intellectually stimulating," Myrick said. Big Top says "Hello Kitty" is scheduled for release mid-April.

Contact: Sanrio, tel 415-952-2880, fax 415-872-2513)

Crosswise Crosses Platforms

SANTA CRUZ, CA — Just as cross-platform document viewing tools such as Adobe Acrobat and Common Ground are becoming more popular in the marketplace, Crosswise Corp., claims its Face to Face software allows cross platform and real-time viewing and annotation on a one-to-one station basis.

With a voice-over modem connection or a separate additional line, two parties can conference while observing and simultaneously manipulating the same document.

The company released the Macintosh version in January, 1994, and a Windows version has been announced for the end of May. According to Crosswise, the software is independent of platform, application and networks and requires no additional hardware.

According to the company, the software allows for full document interaction from remote locations between two parties and, accompanied with editing tools, address book (supports PowerTalk), modem software and electronic-mail/file transfer capabilities, Face to Face allows users the fastest document turn-around possible.

Contact: Crosswise Corp., 408-459-9060

Radish Voice Wins Praise

BOULDER, CO — A new technology from Radish, called VoiceView, has won big endorsements from the computer industry—with Microsoft, Intel, Rockwell, and Octel all among the endorsers.

VoiceView is a protocol that allows people to exchange voice and data information on a single phone call. A Microsoft spokesman called it complementary to Voice Span, as well as to a new Intel technology called ProShare. AT&T also confirmed that it is in discussions for a license for VoiceView, which is compatible with the company's Voice Span.

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EXCLUSIVE NEWS

Boulder, Colorado came up with VoiceView, and is already using it with its own systems and customers such as Oppenheimer Shareholder Systems.

But the endorsements will greatly speed up the pace with which VoiceView is implemented. Rockwell alone sells 80 percent of the world's modem chip-sets, and will implement it in silicon. Hayes and US Robotics, which also endorsed the technology, use other sources for their modem chip sets. Octel and Dialogic, both leaders in voice processing applications, will also feature the technology.

Contact: Radish Systems, 303-443-2237

Zenith Wins HDTV Endorsement

WASHINGTON, D.C. — Zenith Electronics Corp.'s vestigial sideband technology for high-definition television has won the endorsement of the grandiloquently named Digital HDTV Grand Alliance as the HDTV standard for terrestrial broadcast and cable.

The HDTV standard is expected to play a major role in the development of the "national information infrastructure" because it can serve as an engine to drive development of receivers with high-resolution displays and can offer a fast data lane into the home for information, education and entertainment services.

Zenith won over competing technology, quadrature amplitude modulation, offered by General Instrument. The alliance said the Zenith technology offered better coverage area, minimal interference with existing TV signals, and a robust digital signal.

More Reader Rabbit Titles

FREMONT, CA — Educational software producer The Learning Company, has announced two more of its award-winning Reader Rabbit titles are available for Microsoft Windows. "Reader Rabbit 1" and "Math Rabbit for Windows" now feature better graphics, digitized sound, and more activities aimed at children ages three to seven, says the company.

The firm is responding to the demand for Windows software from its customers. According to the Software Publisher Association's 1993 Consumer Survey, half of IBM and compatible computer users now use Microsoft Windows.

Reader Rabbit 1, aimed at ages three through six, has children working with the Reader Rabbit character, sorting, stacking and matching words at the Word Factory. A Word Train game, it has children identify words that differ by just one letter and then load them on the train headed to Wordville. The product features animated 256-color graphics and sounds.

"Math Rabbit for Windows," aimed at children ages four through seven, is set in the Circus of Numbers. Colorful, animated members of the circus beckon the player to enter one of the four attractions: — the Calliope Counting Game; the Tightrope Show; the Sea Lion Show; or the Balloon Matching Game — for practice in counting, addition, subtraction, number, and pattern recognition skills.

Contact: The Learning Company, 800-852-2255

Photoshop 2.5 Ships For Sun, SGI

MOUNTAIN VIEW, CA — Adobe's new Photoshop 2.5 version is now shipping in versions for Unix workstations and servers from Sun Microsystems and Silicon Graphics Incorporated (SGI). The image processing software began shipping in the current version for the Macintosh and Microsoft Windows in 1992.

The company claims its Photoshop 2.5 versions for the Mac, Windows, Sun, and SGI platforms can create binary-compatible files that can be shared from one platform to another via diskette or network. In addition, the Sun and SGI versions offer the same features as the Windows and Macintosh products.

Pricing for Photoshop on the Sun or SGI platforms is: single right-to-use at US\$1,895; five right-to-use at \$7,595; and 10 right-to-use at \$13,495.

Contact: Adobe Resellers, Adobe, 800-83-FONTS

Merger Fever Hits Software Industry

Hot on the heels of the merger of Adobe and Aldus four other companies have announced merger plans in two separate deals.

Novell, WordPerfect Merge

Novell and WordPerfect announced their merger plans March 21. The deal will result in a combined Canadian operation that will generate \$130 million in sales this year, according to the companies.

Under the terms of the merger, WordPerfect will become a subsidiary of Novell.

Novell also announced it was buying Borland's Quattro Pro spreadsheet business for US\$145 million.

Symantec Buys Central Point

Symantec is buying its 11th company since it went public five years ago. This time the company is competitor Central Point Software in a US\$60 million merger.

Central Point and Symantec are well-known in the software industry for their utility software packages aimed at both IBM compatible and Apple Macintosh computers.

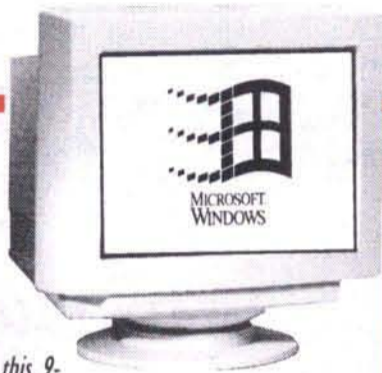
One of Central Point's most popular products is the PC Tools set of utilities for file management and system backup. Central Point also has a strong antivirus and utilities software line.

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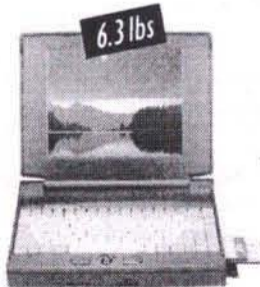
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CANADIAN PRODUCT LAUNCH UPDATE

HP Updates Deskjets, And A Newer Newton

HP Intros Color Printers, New OmniBooks

Hewlett-Packard (Canada), based in Mississauga, Ontario, announced a line of four new DeskJet printers, two of which are color models using the company's ColorSmart technology. In Canada, the DeskJet 560C and DeskWriter 560C list at \$998, and the DeskJet 520 and DeskWriter 520 list for \$476.

HP Canada also announced the HP OmniBook 430 PC, a new version of its notebook computer. The new machine is available in three models, ranging in price from \$1,709 with a 40 megabyte (MB) hard drive to \$2,279 for a 105MB model. HP Canada also cut prices on the existing OmniBook 425 models, to \$1,795 for the version with a 40MB hard disk and \$2,095 for the version with a 10MB "flash disk" or flash-memory storage device.

Hewlett-Packard announced new models in its NetServer line of network servers, plus network management products. Slated for general availability in Canada on April 1, the new NetServer LF will start at \$6,854 and the high-end NetServer LM at \$7,624, a company spokeswoman said. The company also announced NetServer Remote Assistant 2.0, a software product for server management.

New Newton From Apple

Apple Canada in Markham, Ontario, announced the Newton MessagePad 110, a new version of its personal digital assistant. The revamped MessagePad should be available now from Apple Canada's Newton dealers, with prices starting at about \$850.

An Apple spokesman said Apple Canada will not offer the MessagePad 100, a modified version of the original Newton that the

U.S. company announced March 4. The company is still evaluating an upgrade program being offered to current Newton users in the US.

Claris Stops Work On Resolve

Claris Canada, of Toronto, said it has ceased development of its Claris Resolve spreadsheet software and is offering current users of the package the option of switching to ClarisWorks 2.1, the company's integrated software. Canadian Resolve users can get ClarisWorks 2.1 for C\$29 until the end of September by calling Claris at 800-361-6075, the company said. ClarisWorks' regular Canadian list price is C\$349.

Dell Re-enters Laptop Market

Toronto-based Dell Computer Corp. launched in Canada its Latitude line of notebook computers. All using various models of the Intel 486 processor, the new Latitude notebooks have Canadian list prices starting from \$2,299, Dell said.

Dell also announced its OmniPlex 486 family of computers, aimed at demanding desktop PC users. Canadian prices start at \$2,110, and the machines are available now, Dell Canada said.

Lotus Changes Support

Toronto-based Lotus Development Canada Ltd. followed the lead of its US parent in making changes to its customer support programs. The new programs include Lotus Knowledge Base for Notes, round-the-clock telephone support for communications products, and a toll number to replace the

toll-free number for desktop software support in the first 90 days after purchase.

Updated Word Processor From SPC

Software Publishing Corp. Canada announced Professional Write 3.0 for DOS, an upgrade of its managerial word processor. The Richmond Hill, Ontario, company said the new release will be available in Canada by the end of March at a suggested retail price of \$299. Users of previous versions can upgrade for \$89.

Toshiba's Faster Notebooks

Toshiba of Canada Ltd. of Markham, Ontario, launched the T4800CT, a notebook computer built around Intel Corp.'s new 75 megahertz (MHz) 486DX4 microprocessor. Canadian suggested retail prices are \$9,399 for a unit with a 320 megabyte (MB) hard disk and \$9,999 for one with a 500MB drive. The new notebooks will be available in April, the company said.

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<p>386DX-40, 128K w/387 Socket \$145</p> <p>486DLC-40, 128K Math. Co, VESA \$250</p> <p>486DX-40, 128K VESA P24T \$420</p> <p>486DX-33, 128K VESA P24T \$450</p> <p>486DX2-66, 128K VESA P24T & Fan \$660</p> <p>Mini-Tower Case, 220W \$60</p> <p>Med-Tower Case, LED 220W \$90</p> <p>Full-Tower Case, LED 250W \$130</p> <p>Cirr. Logic 1M VESA SVGA Card \$116</p> <p>Acer VESA 1M SVGA Card \$125</p> <p>Genoa VESA 1M SVGA Card \$155</p> <p>Trident 1MB SVGA Card \$85</p> <p>VESA IDE Controller (2S/1P/1G) \$35</p> <p>IDE Controller (2S/1P/1G) \$20</p> <p>245MB IDE Hard Drive \$305</p> <p>270MB IDE Hard Drive \$330</p> <p>340MB IDE Hard Drive \$375</p> <p>420MB IDE Hard Drive \$440</p> <p>Megalimage 14" NI Monitor 1024 \$320</p> <p>Megalimage 17" NI Monitor 1280 \$760</p> <p>Daewoo 15" NI FLR. 1280 Momtor \$488</p>	<p>HP 4P Laser Printer 600dpi \$1345</p> <p>Canon BJ-600 Bubble Jet Printer \$739</p> <p>Canon BJ-200e Bubble Jet Printer \$365</p> <p>Citizen GSX-220 24pin Color Printer \$250</p> <p>Golden Pro 16bit MCD Sound Card \$165</p> <p>Practical 14.4 Ext. S/R Fax/Modem \$245</p> <p>USR 14.4 Ext./Int. S/R Fax \$233/213</p> <p>DSI 14.4 Ext./Int. S/R Fax \$220/190</p> <p>Zoltrix 96/96 S/R Fax/Modem \$55</p> <p>Weekend At Ernies (Adult) \$44</p> <p>Oriental Vol. 1 (Adult) \$32</p> <p>Oriental Vol. 2 (Adult) \$32</p> <p>Q69 (Adult) \$59</p> <p>Princess of Persia (Adult) \$48</p> <p>Sweet Summer (Adult) \$32</p> <p>Best of Microprose Games CD \$30</p> <p>Moving Fantasies CD (Adult) \$38</p> <p>Girls of Maral Gras CD (Adult) \$48</p> <p>La Traviata CD (Adult) \$28</p> <p>Microsoft Bookshelf 93 CD \$65</p>	<p>486DX-33 VESA \$2,095</p> <ul style="list-style-type: none"> * 128K Cache * 4MB Ram (70ns) * Panasonic 1.44MB Floppy Drive * Super IDE Controller (2S/1P/1G) * 1MB SVGA Card * 14" SVGA N-I Monitor (1024, .28) * 340MB IDE Hard Drive * Golden Sound Pro 16bit Sound Card * Panasonic CD ROM (Dbl. Speed) * Stereo Microphone * 6 CD Titles: (1. MPC Encyclopedia, 2. Animals, 3. World Atlas, 4. US Atlas 5. Reference Library, 6. Game) * Medium Tower Case (220W) * 101-Enhanced Keyboard * MS Compatible Mouse & Mouse Pad * FREE Speakers & CD Holder
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MULTIMEDIA SYSTEMS:

<p>386DX-40 \$1,098</p> <p>486DLC-40 VESA \$1,269 (Upgradeable to 486DX-33/50/66)</p> <p>486DX-33 VESA \$1,439</p>	<p>486DX2-66 VESA \$1,845</p> <p>486DX-33 VESA \$1,645</p> <p>486SX-33 VESA \$1,475</p> <p>486DLC-40 VESA \$1,465 (Upgradeable to 486DX-33/50/66)</p>
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- * 128K Cache
- * 4MB Ram (70ns)
- * Panasonic 1.44M Floppy Drive
- * 170MB IDE Hard Drive
- * Super IDE Controller (2S/1P/1G)
- * Trident 1MB SVGA Card
- * 14" SVGA Monitor (1024 Res.)
- * Mini-Tower Case (220W)
- * 101-Enhanced Keyboard
- * MS Compatible Mouse & Pad
- * ShareWare Programs
- (486DX & 486DLC Systems come with Math.. Co-processor)

3 years labour & 1 year parts warranty for all systems; All prices are cash discounted & subject to change without notice

Easiest Computers

Continued from page 24

tems, such as the HPFS format available with OS/2.

Adding a CD-ROM **** Several popular brands are available direct from Dell, including Toshiba, Sony, and Media Vision. A half-height bay (mentioned above) is available for an internal unit, or an external model may be used.

Connecting to a network ** (networking software and hardware extra)

DOS and Windows system software supplied on hard disk only.

Replacing system battery: easy.

Diagnostic disk supplied.

CSA/UL approval: both.

Misc. Dell Hardware notes

Our test group of beginners found Dell's choice of iconic labels for the various ports on the back of the computer to be slightly less obvious than those on the Compaq PC. Largely due to the company's pre-installation service, the Dell was deemed to have the easiest hardware configuration overall.

Our test unit had an innovative single-height dual floppy drive that supported both 3.5- and 5.25-inch disks.

Compaq Presario

From: Compaq Canada, Inc., 1-800-263-5868

Summary: The Presario appears to be Compaq's answer to the Apple Macintosh. By integrating the computer and monitor into a single box, the unit was easier to set up than any of the other PCs we tested. The Presario also had the most intuitive symbols for the connections on the back of the unit of any of the systems we tested. A slide-out drawer makes it easy to add standard IBM-compatible expansion cards. The system comes with a slightly flawed, but still impressive, set of tutorials to help new users get up and running. The tutorials were among the best of the PC units tested — second only to those supplied with the IBM PS/1.

Compaq Hardware setup and configuration



Adding an expansion card *** To install optional equipment, the user must open a tray on the back of the computer. The screws that secure this system tray are of

an unusual "Torx T-15" variety. Once opened, the tray simply slides out, revealing two 2/3 length ISA expansion slots. Configuration is manual and is handled via a SETUP utility on the diagnostic disk supplied with the computer. A system configuration label provides additional expansion slot and jumper setting information.

Adding RAM *** Slots are clearly visible by sliding out the drawer on the rear of the machine. Configuration is handled via the SETUP utility supplied with the computer. The manual contains a serious flaw that seems to imply that the power should be on during the installation of additional RAM. (It says that, as soon as you slide the system tray back into the computer, the SETUP utility will automatically run). Don't believe this. The power should be off while adding RAM or expansion boards to your computer. Aside from this flaw, the manual is quite good, and contains an entire chapter devoted to the often-confusing subject of MS-DOS memory management.

Using a modem ***** (pre-installed). The software and hardware supports fax, 9600-bps (and slower) telecommunications and voice-mail functions, including nifty features such as Caller ID, if your phone company supports this. The voice-mail function records and plays back low-fi audio at 7200 Hz.

Adding a printer *** Parallel and serial interfaced printers may be easily connected, but you'd never know it from the "Beyond Setup" manual, which doesn't even mention the word "Printer" in the Table of Contents or Index.

Adding sound *** As mentioned above, the diagnostic disk reported false informa-

tion about the Presario's audio capabilities. Third-party sound cards may be added with relative ease.

Adding a hard drive ** Available space limits internal storage options.

Adding a CD-ROM *** No space is available inside the case. External CD-ROM units are available from Compaq and other suppliers, but typically cost more than internal drives.

Connecting to a network ** (networking software and hardware extra.)

DOS and Windows system software supplied on hard disk only.

Replacing system battery: easy.

Diagnostic disk supplied.

CSA/UL approval: both.

Misc. Compaq Hardware notes

Our test group of beginners found Compaq's choice of iconic labels for the various ports on the back of the computer to be the most obvious of any of the systems tested.

Presario models are available with Intel CPUs ranging from 486SX/25 to 486DX2/66, and are upgradable using Intel OverDrive processors.

Compaq Keyboard:

Enhanced **** Standard "AT" design; noisy spacebar. Good tactile "click," one-step height adjustment. PS/2 type connector ensures that other, third-party products could be substituted.

Compaq Mouse

Tracking: ** mediocre — but typical of most inexpensive PC mice. (The standard PS/2 type connector ensures that it could be

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Conner 250M int. tape backup w. s/w,	\$199
DC2120 250MB tapes	\$23

HARD DRIVES

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mxt 213MB SCSI w. 16bit controller,	\$277
250mb IDE, 3.5", 64k, 14ms,	\$299
350mb IDE, 3.5", 128k, 13ms,	\$375
420mb IDE, 3.5", 256k, 12ms,	\$455
526mb IDE, 3.5", 256k, 12ms,	\$578
2.4gig SCSI, 512k, 12ms,	\$1762

CASES and POWER SUPPLIES

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Mini Tower, 5bays, 220w, csa,	\$64
Mid Tower, 6 bays, 200w, csa,	\$77
Full Tower, 8bays, 250w, led, csa,	\$139
Server Tower, 10bays, 250w, door, wheels	\$199

MAINBOARDS

386sx-40, amd cpu, ami bios,	\$99
386dx-40, 128k, amd cpu, ami,	\$159
486dlc-33, cyrix cpu, 128k, ami,	\$169
486slc-33, ti cpu, ami bios,	\$138
486dlc-33, with 2mb simm!l, 128k, ami,	\$259
Opti 386dx/486dlc/sx/dx/dx2/ universal with	
128k, vlb, no cpu, clock gen, ami,	\$133
Above board with cyrix 486dlc-40mhz cpu,	\$239
486slc2-50 / 66, intel, ami, copro,	\$Call
486dx board, 128k, no cpu, vlb, ami,	\$125

COPROCESSORS and CPU's

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KEYBOARDS

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Fujitsu Professional 101, click, at,	\$69
IBM 101, professional, at, RFB,	\$88
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Super I/O 2IDE/2FD/2ser/1par/1game,	\$18
Super I/O 2IDE/2FD/2ser/1par/1g, vlb, accel.,	\$39
Adaptec 1522 SCSI/FD bundle,	\$129
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Mini amplified speakers,	\$29
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Boca 14.4k s/r faxmod, int., v.32bis, s/w,	\$169
USRobotics 14.4k s/r faxmod, int., v.32bis,	\$199
Boca 14.4k s/r faxmod, ext., v.32bis, s/w,	\$209

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Aamazing 14" svga, .28dp, color, bkr,	\$277
Orchestra 14" svga, .28dp, color, intrlc,	\$328
Orchestra 14" svga, .28dp, color, n-int,	\$355
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Monitor heavy duty STAND, flexible,	\$59

AB video switchbox, vga, w. cable,	\$34
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Okidata OL810 ramboard, 2m ram,	\$199
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4MB memory upgrade for HP4 /4p	\$188
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MS DOS 6.2 full, 3.5", \$42

good service, good prices, all the time

replaced with a third-party product if desired.) Pointer seems jittery. Adjustable speed, double-click rate, button setup, pointer size, etc.

Feel: **** good — similar to a mid-range Logitech mouse. Suitable for both right- and left-handed users, small to large hands.

Diagnostic disk supplied; reported false information. The diagnostic disk reported that our review had "Compaq Business Audio" installed, which it did not. A technician could not explain this anomaly, but speculated that the fax/modem might be the cause.

Compaq Manuals

Presentation of info **** The Presario manual avoids presenting too much confusing information and thus is very clear, but at the expense of some technical detail.

Technical info *** Detailed technical info is provided in the on-disk MS-DOS tutorial.

Health and safety info **** Provided in an appendix. Other appendices cover basic mouse techniques, using a fax/modem, understanding memory, cleaning the unit, etc.

Illustrations ****

Overall clarity ****

Glossary: **** extensive. Some descriptions may be confusing to novices.

Compaq Tutorial

Compaq's Presario is highly appropriate for novice users, and comes with tutorials on virtually all aspects of using the computer. A few of these tutorials are marred by some confusing aspects. For example, when you

click on one of the options in the opening screen, it opens a word processor that shows the various options. Unfortunately, a Help button that is labeled "click here" does not perform the expected function, and baffled our test group when it opened a drawing program instead. (The button works as expected once you quit the word processor, but this is not explained.) Nevertheless, the Presario is one of the simplest PCs to set up and operate.

Compaq Software **** The Presario came with the best selection of preinstalled software, including PSF:WindowWorks, which sports a reasonably powerful word processor (with spelling checker and thesaurus), spreadsheet, database, chart maker, label maker, address book, drawing tools, and communications program.

A free 10-hour trial subscription to America Online — arguably the easiest-to-use online information service — is included, along with Prometheus MaxFax fax and voice management software. Note that, once your 10 free hours are up, America Online is one of the more expensive services to access, as we described in our March, 1994 issue.

Other preinstalled software: MS-DOS 6, MS Windows 3.1, Quicken for Windows, and Symantec Game Pack. Manuals supplied.

Backing up disks ***** The second time the computer is turned on, it prompts you to run the backup program, which is included on the hard drive. It also tells you approximately how many diskettes are required to complete the procedure.

Other Compaq notes: Some configuration options require typing codes hexadecimal

Summary

Here's how the units stacked up:

Apple Macintosh

- Best-suited for educational users. Utilities are provided that cater to young children and disabled users.
- Hardware add-ons are configured automatically — a feature that none of the PC systems tested could match.
- Sound support was the best of all the systems tested.
- CD-ROM support was the best of all the systems tested.

Dell OptiPlex 433/L

- support for the widest variety of video modes.

- The best mouse.
- The best technical documentation.
- the best service and support.
- the easiest system configuration overall.

Compaq Presario

- The easiest to set up of any of the computers we tested.
- The most intuitive symbols for the connections on the back of the unit.
- Most appropriate for novice adult users.
- The best selection of pre-installed standard software.

mal (base 16). Quick reference cards supplied.

Warranty: ***** 3 years standard (1st year on-site).

Technical support **** Toll-free. Seven days a week, 24 hours a day — for life. On-site service available

We waited an average of 20 minutes to speak to a representative during our calls.

Next issue: IBM's PS/1, NEC's Ready PC and a "clone" do battle. Watch for it! ■

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SPECIAL 486-66MHZ \$1338

GREEN VESA

Intel CPU, Pentium Upgradable, 128K Cache, 4MB Ram (70ns), Panasonic 1.44MB Floppy Drive, 270MB IDE Hard Drive, IDE I/O, 2S/1P/1G Ports, VLB 1MB SVGA Card Upgradable to 2MB), 14" SVGA monitor (1024 x 768, 0.28 Dot), Enhanced 101 Keyboard, 3-button Mouse, Mini Tower Case / 230W Power Supply.

486 DX-33 \$1518 **486 DX2-66 \$1728**

PENTIUM VESA

Intel CPU, Pentium ZIF Socket, 256K Cache, 4MB 72PIN SIMM, Panasonic 1.44MB Floppy Drive, 340MB IDE Hard Drive, VLB IDE I/O, 2S/1P/1G Ports, CL5428 VLB 1MB SVGA Card (upgradable to 2MB), 14" SVGA NI monitor (1024 x 768, 0.28 Dot), Enhanced 101 Keyboard, MS 2.0 Mouse, Mid Size Tower Case / 230W Power Supply.

DX-60 \$2888 **DX-66 \$3268**

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Mayo Health Clinic	\$ 30
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Desert Storm	\$ 24
Multi-Lingual Shareware	\$ 23
San Diego Zoo Animals	\$ 25
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Modem

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USR Sportster 14.4 Int Fax	\$ 199
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bookreview

Of the Useful and the Useless

BY CATHALYNN LABONTÉ-SMITH

Title: *The Evolution of Useful Things*
Author: Henry Petroski
Published by: Vintage Books, February 1994,
 New York, 288 pp. Originally pub. in
 hardcover by Alfred A. Knopf, Inc. 1992
Price: \$17.

As I begin the process of putting thoughts into words, I find it ironic that I am doing so ancient a craft on an electronic magic box, while listening to music recorded on a silver disk, played by a beam of light.

Henry Petroski's book, about the struggle through the centuries to design the simplest of implements, like the unassuming four-tined fork, makes you wonder. It is now a

marvel to me that we ever got beyond the problem of attaching sheaves of paper together without destroying the sheets themselves, to putting pages together in a paragraph flow. Before the Gem paper clip, before the staple, and generations before the word-processing program, where pages are available to be endlessly electronically pinned together, we pierced holes through oversized leaves and elaborately tied them together with ribbons.

If you laugh at me for rushing home from my computer-related job to pour over the inventive intricacies of oyster forks vs. fish forks, the Chinese vs. the North American wheelbarrow, and even the popular proliferating yellow sticky note, well, please

understand that I'm seeing the world differently now, thanks to Petroski's fresh approach to the artifacts of humanity.

Petroski's use of patent drawings are part of what makes the book so successful at transforming objects that once seemed mundane, from the straight pin to the humble hammer, to engineering triumphs. So captivating a writer is Petroski that I have to admit that I held my breath throughout the "Stick before Zip" chapter, to see if the zipper would ever be born after twenty years of design failures. It seemed that inventing Velcro might have been an easier job than the zipper, which had a series of unfortunate names like Talon slide fastener, hookless fastener, Bobolink, and the worst of all, the Utilok. The word zipper itself was what propelled the device into the mass marketplace, originally as a boot closure. As recounted by Petroski:

The new good Goodrich product was finally announced: "The Mystik Book with the patented Hookless Fastener. Opens with a pull. Closes with a pull." But salesmen did not like the name of the boot. It did not suggest a very practical article. "Zip" is a word that came into use in the latter part of the nineteenth century to suggest "a light sharp sound such as that produced by a bullet or other small or slender object passing rapidly through the air or through some obstacle. . . or a movement accompanied by such sound." . . . The company president [of Goodrich] Bertram G. Work, himself familiar with the sound made when he closed up his new galoshes, is reported to have replied, "What we need is an action word. . . something that will dramatize the way the thing zips?" And so, in 1923, Zippers were first advertised.

I would recommend this book not only to the mechanically curious — including younger readers who always want to know how things work, and those interested in

processes — but also to technical writers, as an outstanding example of how to write clear descriptive passages. Consider for example, his description of a pop-top on a can:

A church key is a simple lever whose fulcrum hooks under the top lip of a can. The handle extending outward from the can provides one arm of the lever, and the pointed cutting edge extending over the can top provides the other. As with all levers, the length of the handle magnifies the effect of the force applied to its end, but, by the same token, the piercing force diminishes as the distance from the fulcrum to the tip of the cutting edge is increased.

Engineers, inventors, and entrepreneurs will find woven into the book patenting advice, like:

Pressman admits that there is a lot of redundancy in a patent application and defends it as effective communication of this kind: "first you tell 'em what you're going to tell 'em, then you tell 'em, then you tell 'em what you've told 'em." And what is told mostly in a patent application is what's wrong with existing things.

Industrial designers will be delighted by Petroski's treatment of the Form follows Function argument in his chapter Form follows Failure. Potential readers would also have to include sociologists, anthropologists, and anyone else interested in social artifacts. For example, the Patterns of Proliferation chapter details how the explosion of silverware in the Victorian age of elaborate table manners came to be pruned down to our present-day cutlery solution of fork, knife, and spoon. Also, Petroski provides an extensive bibliography and an excellent index to his useful non-fiction work.

Other books by Petroski include, *Beyond Engineering, To Engineer is Human*, and what I think I might pick up next, the saga of the evolution of a now disappearing writing tool, *The Pencil*. ■

Cathalynn Labonté-Smith is a Lower Mainland technical writer and computer journalist.

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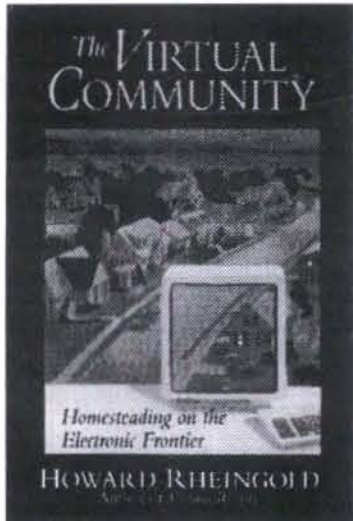
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bookreview

The Virtual Community: Homesteading on the Electronic Frontier

REVIEWED BY KEITH SCHENGILI-ROBERTS



when ideas are suppressed, people try to find ways around any restrictions, such as when the Prodigy on-line service tried to suppress the exchange of ideas (including criticism of

how it supplied its services) and users found ways to get around the restrictions placed on them.

It becomes increasingly obvious as you

read through the book that virtual communities share many characteristics in common. Without face-to-face contact, social

Title: *The Virtual Community: Homesteading on the Electronic Frontier*
Author: Howard Rheingold
Publisher: William Patrick
Price: \$29.95
 Hardcover 325 pages 1993

The Virtual Community: Homesteading on the Electronic Frontier is a landmark book covering the development of various on-line services and organizations around the world. Written by a man who has first-hand knowledge of the many on-line systems available in the world today, and of their creators, this book provides a much-needed analysis of how people are interacting and using the virtual communities that have been created using computer and telecommunication technologies.

The strength of any on-line community does not lie with how people interact with their computers, but how people interact with other people through their computers.

Rheingold provides a good history of the Internet, the Electronic Frontier Foundation, and many other virtual communities and institutions around the globe. He raises tantalizing issues regarding the future of the electronic global village.

The one major point Rheingold keeps making throughout the book is that the strength of any on-line community does not lie with how people interact with their computers, but how people interact with other people through their computers. Time and time again we see examples of this: now the use of France's Minitel service ballooned immediately after the ability to meet other people on-line was realized, and how the best Multi-User Dungeons (MUDs) rely on the creativity of the people using them. Even

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barriers fall away, and people tend to express themselves more readily. You see the positive results of this in the creativity of MUDs, and the negative aspects in "flame-wars", where users hurl insults at each other. The character of on-line communities is not created exclusively by the types of services they offer, but by the ways people use them to interact with each other.

Possibly the best section in the book is where Rheingold looks at the implications of on-line services for democratic institutions and for privacy issues. He argues effectively against the view of techno-optimists who believe that the very nature of electronic communications will promote greater personal freedoms and democracy. He looks at the corporate interests and mis-information

that motivated such things as the infamous Operation Sundevil, a crackdown on American hackers.

This led indirectly to the birth of the Electronic Frontier Foundation, and ended up setting favourable legal precedents for the virtual community as a whole in the States, but things could have turned out very differently if it weren't for the perseverance of a few electronic activists. Privacy issues were raised when it was revealed that subscribers to Prodigy had a program in their communications software that allowed Prodigy to read the contents of their hard disks.

Rheingold argues that there will be a continual struggle between people who will try to gain more power through using computers and those who use computers to expand

The idea has made its way to the popular press that computers and communications are inevitable tools for democratic change.

personal freedoms.

When asked what single factor helped Lech Walesa of Poland to overturn the old communist regime, he pointed to a fax machine. Since then, the idea has made its way to the popular press that computers and communications are inevitable tools for democratic change. Yet for every Poland that frees itself using these technologies, there are countries that place heavy restrictions on them, actively censoring messages or making





the technology inaccessible to all but a small group of people.

This reviewer found The Virtual Community a very frustrating book to read. It is filled with useful information on the electronic community, but its editor should have taken a much firmer hand with Rheingold's writing style, which tends to wander all over the place. In many ways, this would have made a much better electronic hypertext document than a published book, as Rheingold jumps from topic to topic.

Rheingold's book has charted the beginnings of the virtual community: how it develops depends on our understanding of how this technology helps people interact with each other. The Virtual Community goes a long way to helping us understand how we currently use this technology, and provides us with some good ideas on what to expect in the near future.

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training

Learning To Be A Teacher

BY CUB LEA

All of us who have been around computers for more than a year are eventually going to be called in as "consulting physician" when one of our friends or relatives buys their first computer. This is the best place to start to relearn good habits we've forgotten over the years and to give a new user the kind of introduction we wish we could have had.

Here are some guidelines for de-stressing the learning process and making the computing experience less like having a new problem and more like owning a new toy.

1. Never allow someone to be dependent upon software they don't own. If you're installing an unregistered operating system, that's software theft and you deserve every panicked phone call you get when the system has problems — and eventually every system has problems.
2. Force every new user to learn the two-backup habit unless they're too poor to afford all the floppies. One set should be stored off the premises so it won't be lost if anything happens to the computer. Create a clean boot disk for use if problems occur

with the hard disk, and remember that even the new Microsoft Backup is far too cryptic for novices. Stick with simple file backups which a new user can restore from a batch file, and use the backup time to teach the basics of file and directory structure everyone eventually needs to know.

3. Keep the boot setup simple and avoid third-party software. The average user needs only about a half-dozen standard device drivers and TSR's to keep the system running smoothly. New users will willingly sacrifice speed and a bit of memory for simplicity and reliability.
4. You won't be the only person to service the system in its lifetime, so avoid cryptic program setups and complex menus

which others may find tricky to change. MS-DOS users should stick with simple batch menus. Windows, OS/2 and Mac users don't need third-party front ends until they gain experience.

Any special software you add to the system should be commented in the AUTOEXEC.BAT, CONFIG.SYS, or a SVC_READ.TXT file saved to the root directory. Make allowances for gaps in others' knowledge or you may leave your student vulnerable to problems only you can solve.

5. Give your charge room to grow by carefully housecleaning unneeded system files and obsolete software. If there's plenty of room on the hard disk, configure Delete Sentry or a safe delete system to protect against accidental data loss.

Casual users don't usually exit Windows properly. It's not uncommon to accumulate 10MB of .TMP files every month. Adding DEL C:\DOS*.TMP to AUTOEXEC.BAT will eliminate this clutter permanently.

6. Start by teaching what the user wants to know, not what you think they need to know. Avoid housecleaning chores until they can run and install new programs. The first lessons most home users need are executing programs, printing and reading text files, modem use and processing compressed archives.
7. Idiot-proof the system. I often make three copies of a program with three different names so the user will be sure to

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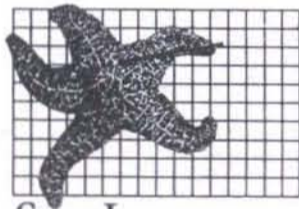


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remember one of them. Renaming programs to reflect their functions helps most users do more with less training.

Add the root and UTILS directories to the PATH statement so that any needed programs can be run without path syntax. Install simple, one-touch utilities - graphical if possible - to take the place of the clunky disk and file functions built into most operating systems. List all of these changes in the README file so they can be restored later.

8. The goal of effective training is to teach people how to take care of themselves. Once a user knows how to install programs and save data, teach them how to un-install software and identify what can and cannot be safely erased. Users usually need one-on-one help with modem configuration, downloading procedures, processing compressed archives, formatting documents and passing parameters to programs, no matter how thorough the manual might seem.

9. Panic-proof the new user by creating a few harmless crashes and system errors. There's seldom any reason to panic unless the whole system collapses, but error messages of any kind scare the daylight out of most novices.

10. Take your diplomatic duties seriously. If your student wants to modem, introduce them to BBS ethics and rules of behavior. If they plan on trading software, it's your job to make them aware of the differences between shareware, freeware and

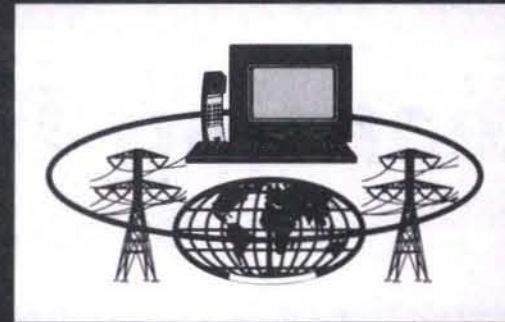
illegal pirated software. And shame on anyone who instills virus terror in a novice. Trojans and viri are never more than a rare annoyance to anyone who regularly backs up their data.

11. Remember your first month at the keyboard and treat your charge accordingly. Talk in terms and analogies the user can understand, let them set the pace, and never leave them hanging between lessons with half the skills needed for a task. In return, you have the right to expect appreciation for your efforts and to limit the number of panicked phone calls you'll accept. Good teachers don't have all the answers; instead, they teach their students how to find their own answers using the resources available.

12. If your charge is still confused and desperate after the 18th emergency phone call this week, remind them that there's always the manual. Ah yes, the manual — but that's a nightmare tale for another dark evening. ■

Cub Lea works in Burnaby, BC as a computer consultant, troubleshooter, tutor and efficiency expert for families and owner-operated businesses. He can be reached days and evenings at (604)298-6415.

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USER GROUPS

AMIGANAUTS MEETING On the second Sunday each month, 6-8 p.m., at 2975 Don Mills Rd. West, Oriole Community Resource Centre, 2nd floor, Games Rm. Full Amiga users support, monthly tutorials and presentations of latest software and hardware for the Amiga and, coming soon, a BBS.

ANIMATORS' GROUP — Interested in the creation of 2-D and 3-D animation? Zimgraphics Ltd. offers hands-on training and memberships for those interested in computer graphics. For more information call (416) 929-8155.

CANADA ROUNDTABLE ON GENIE — Nightly and weekend meetings. Discuss Canadian Politics, Sports, Canada-U.S. Relations, Travel, Entertainment, Try En Français, which includes a French tutorial. More info? 1-800-638-9636.

CANADIAN COMPUTER GRAPHICS ASSOCIATION — CCGA's mission is "to provide education and information in computer graphics technology and its applications." At special events members are informed of developments in the industry, and provided with a networking forum to develop career and business opportunities. Additional benefits include: insurance, newsletters, subscriptions, employment liaison office, and annual art & design competition. CCGA, 2175 Sheppard Ave. E., Suite 110, Willowdale, Ontario, M2J 1W8. Fax: 491-1670 Tel: 491-2886.

CANAM COMPUTER CLUB - for serious computer hobbyists. Breakfast meetings are held every Saturday morning at Obies Restaurant in Warden Woods Mall, Scarborough. The club has a sister group in the U.S. with whom info., ideas and help are exchanged. Membership is free but a full breakfast is \$5.00 including gratuity. For info. call Cy Leonard at 288-0318.

CASE SPECIAL INTEREST GROUP — A special interest group is being formed to help people interested in learning more about CASE. The purpose is to provide a forum where members may share their experiences. Experienced users or those interested in CASE call Joe Da Silva at 252-1408, or Rob Beckman at 928-2694.

CASE — Computer Aided Software Engineering is open to anyone interested in being tool and technology independent. 1-1 1/2 hours, monthly scheduled meetings. Vendor presentations as well as individual. BBS 497-5263, (log on if MIS Affiliated messages, into Tech 2nd category called CASE). Contact Joe Da Silva at 252-1408 or Rob Beckman at 928-2694.

CLIPPER DEVELOPERS ASSOCIATION OF TORONTO will hold its May meeting on Thursday, May 5th, 1994 at the North York Central Library in North York at 7pm. Jeff Power of Delcom International will speak on clipper and networking. For details call Mike Parente 905-336-5191 ext. 447.

CLUB CUBASE — Toronto area users of Steinberg Software products, especially their powerhouse sequencer Cubase, now have a forum to share information and develop skills. Club Cubase meets at 7:30 pm on the last Monday of every month, in Room C426 at the Casa Loma Campus of George Brown College - 160 Kendall Ave. For more information contact Club Cubase at 62 Hamworth Drive, Willowdale, ON, M2H 3C2 or call 496-9905.

CLUB MAC COMPUTER GROUP OF ONTARIO — All Mac users, Macintosh OS & related issues, meets 2nd Tuesday, Michener Institute, 222 St. Patrick St., Toronto, 7 pm to 10 pm, infoline 462-1702.

COMPUTER TRAINERS' NETWORK — A group of teachers, tutors and consultants who meet the first Thursday of every month to discuss training or computer-related issues. Meeting format consists of refreshments, business portion, guest speaker and memberships available. Location: 121 King St. W., 24th Floor, Toronto, Ontario. For more information please call Veronica of Vision Computer at (416) 323-0406.

CYBERPUNK RESEARCH LABORATORIES — Merry hackers in search of picturesque mountains, RAM and picytales. For further data write c/o CyberPunk Research Labs, Seneca College of Communication Arts, 1124 Finch Ave. West, North York ON M3J 3J3.

ELECTRONIC GAMES PLAYERS' ASSOCIATION (EGPA) — EGPA announces the start of their Canada-wide search for computer and video game players interested in swapping their used games. As a member of the EGPA, individuals will be able to exchange game software.

Members will also be able to buy used games without a trade. Membership available for the first year with an annual renewal. If you are interested in joining or would like more information, please send \$1 to cover postage and handling to: EGPA, 292 Patricia St., North Bay, Ont., P1B 7Z3. The one dollar is applied to your membership fee.

Helpful User Group of Ottawa (HUGO). Home and business uses for the PC, First Thursday, Sandy Hill Community Centre, Information: (613) 728-4770

IRMAC — Information Resource Management Association of Canada; dedicated to data management, IRM, data dictionaries, CASE, and strategic planning in the corporate environment. Monthly meetings in Toronto, Ottawa, and Victoria. (416) 960-6508.

IRMAC - Information Resource Management Association of Canada; offers monthly meetings on state-of-the-art issues concerning Information Resources, Strategic Planning, Computer Aided Software Engineering, Business Process Re-engineering, etc. Above all, it offers the opportunity to meet fellow practitioners in similar organizations who have similar challenges. Write to P.O. Box 5629, Station "A", Toronto, M5W 1N8, or telephone 510-6457.

International Programmers Guild Meets every second week starting at 7:00 pm on Tuesday Nights in downtown Toronto at the Graf Bobby, 36 Wellington East, Toronto. Other locations to follow this year. Programmers who are not members are also welcome to attend. Ask at the front desk for the Programmers Guild. Upcoming meetings are May 10th and 24th. Food and refreshments can be ordered. The IPG also communicates throughout the IPGnet on-line service. For more information, 1994 meeting schedule, or a free copy of the latest newsletter, call the IPG at 905-824-7947.

K.R.D. — 1995 (The Kidstuff-Reunited Drive Group For 1995) At 144 Gillard Ave., Riverdale, Tel: 461-1343. Call for meeting dates 11AM Saturdays. Group's focus is to collect 1975-6 Canadian pennies in order to reassert interest by signing a petition to reinstate the 1975-76 CTV Show "Kidstuff". Komputer Kidstuff 1995??? 2005???. Ask for Jeffrey Leitner (416) 461-1343.

KW-MUG — 376 Peel Street, New Hamburg, ON, N0B 2G0. (519) 662-2627. Focus: Public domain distribution; reviews of current software; meetings variable, no fees.

LOGIC — A computer group supporting Macintosh and Apple II users: Provides a support and information network to users at all levels. LOGIC accomplishes this by: holding monthly meetings, providing an electronic bulletin board, publishing the Maple Orchard magazine (free to members), and maintaining an extensive library of shareware and public domain software. Meetings 1st (Macintosh) and (Apple II) Tuesday of the month, North Toronto Memorial Community Centre, 200 Eglinton Ave West at 7:00pm. Messages 416-323-0828. BBS 416-487-9771, FAX 905-737-6159.

METRO TORONTO ADAM GROUP (MTAG) — Supporting ADAM, CP/M-TDOS Users contact: (416) 424-1352 or write to: P.O. Box 165, 260 Adelaide St. E., Toronto, ON, M5A 1N0. Meetings 2nd Monday of each month. 14th Albion Rd (Community Centre) and 4th Sat. each month at the Pape Ave. Community Center. Bi Monthly newsletter.

MISSISSAUGA COMPUTER CLUB - (M.C.C.) Supporting IBM-PC, Macintosh, and Amiga systems. Presentations, Demos, Raffles, SIG's, and "LOADS" of shareware... also a monthly newsletter. "ALL WELCOME". If interested or further information please call Robert Brower (President) at (416) 890-4503 or "TOTAL ACCESS BBS" at (416) 568-5294... Meeting held the last Tuesday of each month.

NEXT USERS GROUP — NeXT computer support, 2nd Thursday, Toronto Western Hospital, corner of Bathurst & Dundas, yellow elevator to 6th floor, 7:00 pm, Daniel O'Connell (416) 365-1899.

NORTH AMERICAN DESKTOP - A computer users group for PC and Apple. Useful, constructive exchange of ideas, business services and information through presentations, discussions and networking at an affordable price. Bi-monthly. For more information call (905) 889-5311.

PCCT (PERSONAL COMPUTER CLUB OF TORONTO) — PC users, 3rd Tuesday, St. Gabriel's Community Centre, 672

Sheppard Ave. E. (2 blocks East of Bayview, North side), North York, 7:00 pm; membership includes shareware, BBS, special interest groups (SIGs) & workshops. Information (416) 244-6786.

TAF - TORONTO ATARI FEDERATION - XE/ST/Falcon computers. 300 members. BBS, Newsletter, SIGS for MIDI, DTP, General and more. Meets 7:30pm, Third Thursday of month in North York Memorial Community Hall in the N.Y. City Centre Ligray building, 5110 Yonge St. at Park Home. BBS - (300-16.8) 235-0318. Info-Line (416) 22-55-823 CALL-TAF.

TANUG - Toronto Area Network Users Group meeting held on May 25th at the Education and Meeting Centre of the Canadian Bar Association - Ontario, 2nd floor, 20 Toronto St. (north of King, east of Yonge). Registration starts at 5:30pm and meeting at 6:00 until 9:00pm. Admission is \$20. Pre-registration is advisable. Please leave a message with TANUG at 416-269-0940.

THE CANADIAN AUTODESK MULTIMEDIA USER GROUP — Interested Users of Autodesk Multimedia products are invited to call Pia Zimperi at (416) 929-8155.

THE CANADIAN INFORMATION PROCESSING SOCIETY - presents the following meetings at the Toronto Board of Trade, 3rd Fl of First Canadian Place. April 7 at 6pm Windows NT and Microsoft SQL Server; April 19 at 6pm Past, Present and Future of IMAGING; April 21 at 6pm, Integration of O-O and Relational Technology. For further information call Brian Gilbert 351-6283.

THE CANADIAN INFORMATION PROCESSING SOCIETY is sponsoring a dinner at the Mississauga Board of Trade. April 28. 5:30 Cocktails, 6:30 Dinner. Speaker: George Oliver, Royal Bank of Canada, speaking on Transition from Mainframe To Client/Server: Are You Positioned For Success Or Disaster. For more information please contact: Meta Ferguson 882-0018.

THE COMMUNICATION NETWORK - Join our Social Network/Support Group for SHY people and enhance your social and interpersonal skills. Participate in weekly organized social and cultural activities. Weekly meeting from 7-10pm. Pre-registration is required. For more info at 851-6696 or 851-2980.

THE DURHAM P.C. USERS' CLUB - supports local computer enthusiasts with monthly meetings and a newsletter, a software library and many special interest groups. Meetings on second Thursday of each month at 7-10 pm (free admission). Meetings held at CAW Local 222 Hall, 1425 Phillip Murray Ave., Oshawa. Contact Barbara Rice at 416-434-7420 or Bruce Laycraft at 416-728-9351.

THE ELITE GROUP OF 3-D PROGRAMMERS — (E.G.3D P) in association with L.T.P.D. Dedicated to Atari users. For more information write to L.T.P.D. c/o (E.G.3D P), 37 Monty Ave., Box #2, Toronto, Ontario. M6S 2G8.

THE INTERNATIONAL INTERACTIVE COMMUNICATION SOCIETY (IICS) is a non-profit professional organization dedicated to the advancement of interactive and multimedia technologies. Through monthly meetings, newsletters and networking IICS members are able to keep up-to-date in this growing field. Membership is \$90/yr. For more information call Peter Richardson 416-288-0550 or fax 285-4395.

THE SOCIETY FOR TECHNICAL COMMUNICATION - TORONTO CHAPTER, will hold its May meeting on Tuesday, May 10 at 7pm. Our topic is about how technical communicators can recognize the costs and effects of bad documentation. Our speaker is Joan Vogelsang, Vice President of Consulting Services for Hitachi Data Systems. The meeting will be held at the North York City Centre, 5100 Yonge Street (Gold Room A). Take the subway to the North York Centre Station (between Shepherd and Finch stations). Parking is available in the neighborhood. For more information, call Chris Mills. (416) 408-7690.

THE TORONTO COLOUR COMPUTER GROUP — meets on the 2nd and 4th Mondays of each month. For more information, call Larry Osborne at (416) 972-1809.

THE TORONTO GUPTA USERS GROUP (TGUG) - Open to anyone who is a user, developer or vendor of Gupta SQL database software. Meetings held in Feb, Apr, June, Sept, Nov each year. Contact Terry Lewis at 416-620-6565 X639 or 416-620-6913 (fax) for more info. Corp membership fee: \$50/yr (up to 3 employ-

CALENDAR OF EVENTS

APRIL

LONDON ONTARIO COMPUTER FAIR, Apr 17, Ilderton Community Centre. Dealers offering savings on a variety of products. Representatives from various computer clubs will be on-hand. For more information call 1-800-465-8286.

WHITBY ONTARIO COMPUTER FAIR, April 24, Whitby Soccer City. Dealers offering savings on a variety of products. Representatives from various computer clubs will be on-hand. For more information call 1-800-465-8286.

AUTOMATION SHOW & SEMINAR April 24-26, 1994, Westin Harbour Castle, Toronto, ON. Consisting of Seminars, panel discussions, workshops and a show case of new technology covering all the travel trade automated operations, with keynote speaker Pierre Jeannot, Director General of I.A.T.A. Contact: Alan G. Crockford, special projects manager at (416) 968-7252.

PC EXPO: April 29,30 and May 1, Montreal's Palais des Congrès. PC EXPO will deliver over 15,000 buyers in three days. For more information call Industrial Trade & Consumer Shows Inc. 514-270-5481.

TECHNOLOGY FOR LAWYERS '94 7th Annual Conference. April 29 & 30, Metro Toronto Convention Centre. The Conference encompasses topics involving the application of technology to the practise of law with emphasis on computer-related technology. For more information contact Cathy Castaldo, The Law Society of Upper Canada 5th Fl 130 Queen St West Toronto Ont M5H 2N6.

OTTAWA ONTARIO COMPUTER FAIR, Apr 30-May 1, Nepean Sportsplex. Dealers offering savings on a variety of products. Representatives from various computer clubs will be on-hand. For more information call 1-800-465-8286.

MAY

CANADA'S ADVANCED ELECTRONICS SYSTEMS EXPO, May 3rd&4th, Ottawa Congress Centre. For more information call Reed Exhibitions Companies 416-491-7565.

BURLINGTON - ONTARIO COMPUTER FAIR, May 15, Burlington Central Arena. For more information call 1-800-465-8286.

RACING TOWARDS MILLENNIUM: May 16 and 17, Westin Harbour Castle Hotel, Toronto. CATA/ITAC Seminars on the Super-Highway For more information call (613) 236-8189.

VARDEX: Value Added Reseller/Dealer exposition. May 18-19, Toronto International Centre, Toronto. For more information call Reed Exhibitions Companies at (416) 491-7565.

EXECUTIVE SYMPOSIUM ON OPEN CLIENT/SERVER COMPUTING, May 24-26, Crowne Plaza Hotel, Toronto. For more information call (416) 497-9562.

MULTIMEDIA '94: May 27-28, 1994, Toronto Convention Centre. An exposition and Forum featuring Multimedia Communications, Vcom, Electronic Design, Production, and Virtual Reality. Contact: Susan Blair, 905-660-2491 or 905-660-2492.

THE DIGITAL HIGHWAY: Part of programming at the International Space Development Conference, May 27 and 29, Royal Constellation Hotel, Toronto. For more

ees); Single membership: \$25/yr.

TIMEX-SINCLAIR USERS CLUB — All Timex and Sinclair Computers. 1st Wednesday of the month, 14 Riche Court, Scarborough, ON, M1K 2Y1, 7:00 pm. Demonstrations, bi-monthly newsletter. Voice Info. (416) 751-7559.

TORCHI (Toronto Region Computer Human Interaction) — Meets every second Wednesday of the month from 7:00 pm-10:00 pm. Members come from business, academic, and government to share interests in human use of computers, reflected in human factors, usability, ergonomics, the user interface and many other related disciplines. For more information re speakers, topics and membership. We are the local chapter of Sigchi a part of ACM. Call M. Boshes (416) 448-2697.

TORONTO APL SIG — An educational and social organization concerned with the use and promotion of APL computer language. 4th Monday of each month at 6:30 pm (excluding the Summer) at BCE Place, 161 Bay Street, 10th Floor. Or

information call (416) 626-0505.

JUNE

MONTREAL INTERNATIONAL COMPUTER AND OFFICE EXHIBITION: June 1-3, Place Bonaventure. For more information call 514-288-8811.

JULY

COMDEX Canada: July 13-15, Metro Toronto Convention Centre, Toronto. For more information call The Interface Group at 617-444-3322 or 617-449-6600 ext. 4904.

INTERNATIONAL

QUICKTIME: The Conference & Film Festival, Mar 30- Jan 31, 94, San Francisco, CA. Contact: Sumeria, Inc. 415-904-0813.

WINDOWS tm WORLD/MILAN: April 13-16, 1994, Spazio Milano Nord, Milan Italy. A premier event for vendors and buyers of Windows hardware and software products. Special pavilions and conferences highlight the latest in market trends. Contact: Chris Blanchard at IDG World Expo at 800-545-3976, or 508-820-8629.

APPLE '94: Budapest, April 21-23, 1994, Budapest, Hungary. Part of the MAC-WORLD Expo series, the most successful Trade show series for Apple-related products and services. Contact: Susan Leary at IDG World Expo at 800-545-3976 or 508-879-6700.

PC WORLD EXPO: April 25-27, 1994, Stockholm, Sweden. Contact: Chris Blanchard at IDG World Expo at 800-545-3976, or 508-820-8629.

COMNET PRAGUE: May 25-27, 1994, Prague, Czech Republic. The first data, voice, and communications exposition and conference of its kind in Central and Eastern Europe since the creation of the new Republic. Contact: Lisa Judd Parkins at IDG World Expo at 1-800-820-8629 or 1-800-879-6700.

MACWORLD EXPO/Milan: May 4-7, 1994, Part of the MacWorld Expo series of events, Apple-related products and services.

MACWORLD EXPO/SUMMIT: May 10-12, Washington Convention Center, Washington. For more information contact Mitch Hall Associates 617-361-2001.

WINDOWS WORLD/Sydney, May 10-12, 1994, Sydney, Australia. This is the premier event for vendors and buyers of Windows hardware and software products. Special pavilions and conference tracks highlight the latest in market trends, from networking to multi-media. Contact: Chris Blanchard at IDG World Expo at 800-545-3976 or 508-820-8629.

VIRTUAL REALITY '94: May 11-13, San Jose Civic Center, San Jose, CA. For more information call (203) 226-6967.

WINDOWS WORLD/Tokyo June 15-17, 1994, Tokyo, Japan. Windows World/Tokyo is the premier event for vendors and buyers of Windows hardware and software products. Special pavilions and conference tracks highlight the latest in market trends, from networking to multi-media. Contact: Chris Blanchard at IDG World Expo at 800-545-3976.

SUNWORLD/San Francisco, June 13-16, 1994. SunWorld/San Francisco is the largest conference and exposition dedicat-

ed to Sun, SPARC and Solaris-based products. This conference and three day exposition is produced by IDG World Expo. Contact: Susan Granata at IDG World Expo at 800-225-4698 or 508-879-6700.

COMPUTERWORLD EXPO/Wellington, NZ, June 21-23, 1994. Computerworld Expo/Wellington will attract users of high-end systems from the home of large government computing sites. This conference and exposition will focus on client-server computing. Contact: Matt Mandino at IDG World Expo at 800-225-4698.

PC Expo June 28-30, New York. For more information call Bruno Blenheim Inc. at (201) 346-1400.

MACWORLD EXPO/Singapore, July 8-10, 1994. MacWorld Expo/Singapore is part of the MacWorld Expo series of events, the most successful trade show series in the world for Apple-Related products and services.

SUNWORLD/Tokyo, July 6-8, 1994. SunWorld Expo/Tokyo will continue its growth with approximately an extensive conference and exposition featuring 50,000 attendees and 200 exhibitors. SunWorld Expo/Tokyo '94 will also include a special simulation studio at the APARC experiencing corner. Contact: Jackie Murphy at IDG World Expo at 800-225-4698 or 508-879-6700.

OBJECT WORLD/San Francisco, July 26-29, 1994. Object World/San Francisco is part of the World's largest all object technology (OT) series of events. This conference and three-day exposition is organized by the Object Management group (OMG) and IDG World Expo and focuses on the commercial and practical aspects of object technology.

SEMINARS

RAPID APPLICATION DEVELOPMENT - April 21, '94. Will show you how to level up information systems with a high level of user involvement and support.

ELECTRONIC PUBLISHING - May 19, '94. Learn how electronic publishing and on-line documentation can reduce costs and enhance retrieval of information.

For more info, or to register for the seminars, call Flynn McNeil Reheb and Associates at (416) 925-8111 or Fax: (416) 925-8515.

UPGRADING AND ENHANCING YOUR PC, 23-24 April, Sheraton Toronto East, 2035 Kennedy Rd, Scarborough. Learn how to upgrade and enhance your IBM PC or compatible. Topics: CPUs (including Pentium), motherboards (ISA, EISA, MCA, VESA, PCI), Interrupts, Hard Drives (IDE, SCSI), floppy drives, Video, Modems, Printers. Cost \$199. Limited Seating. For more information call 905-513-9410.

LOTUS SMARTSUITE June 1st, 1994. Metro Toronto Convention Centre, Toronto, ON. This free half-day Lotus presentation introduces you to a powerful new equation: Lotus 1-2-3 spreadsheet plus four industry-leading applications-Ami Pro word processor, Approach relational database, Freelance Graphics presentation graphics, and Lotus Organizer personal information manager-equals Lotus SmartSuite, a dramatically effective way to get more work done faster. For reservations call 1-800-327-6148.

write: Toronto APL SIG, Box 384, Adelaide Street P.O., Toronto, Ont., M5C 2J5. Contact Ben Best (416) 862-3193.

TORONTO BORLAND USER GROUP — meets 1st (C/C++), 2nd (Paradox) and 3rd (Quattro Pro) Thursdays of every month at 6 pm, 5:30 pm and 7 pm respectively. Meetings are held at Borland, 5001 Yonge St, 14th Floor. Learn about "PAL" (Paradox Application Language), Spreadsheets, C & Object Oriented Programming tips and traps. For membership and meeting details please contact Doug Campbell 496-2120. Free BBS (905) 271-9795.

Toronto Regional Autocad will hold hardware night, 31st May 1994, 7:30 PM at the Malton Community Centre, 3540 Morningstar Drive Mississauga. Contact: Tim Lucas 416-750-9765.

TORONTO USERS GROUP — User members support of Intermediate CL. Next meeting is held on Sept. 22nd at the Howard Johnson Hotel, 400-401 Keele St. Please contact Wendy Boddy at suite

2550, P.O. Box 77, Toronto Dominion Centre, Tor., ONT, M5K 1E7 for more information, or call (416) 607-2546.

TPUG (TORONTO PET USERS GROUP INC.) — Commodore users (PET, 64/128, Amiga, CDTV, MS-DOS, etc.), meets Tuesdays (1st, 12th, 2nd, Amiga; 3rd, GEOS; 4th, 64), York Public Library, main branch, 1745 Eglinton Ave. W. (near Dufferin), 7:30 pm; 3rd Thursday Alderwood United Church, 44 Delma Drive, Etobicoke, 7:30 pm, software library, newsletter & BBS, information (416) 253-9637.

TRACE — Toronto Regional AutoCAD Exchange: Presentations on the last Tuesday of every second month. Held at the Malton Community Centre, 3540 Morningstar Drive. For details call Tim Lucas at (416) 750-9765.

ZIM USERS GROUP — Revival of the Toronto Zim Users Group. Emphasis on exchange of ZIM technical expertise in a friendly environment. Contact Fay Rakoff, Phone (416) 979-6216, or Fax (416) 979-4888.

Creative Technology Intros Awe32 PC Sound Card

Continued from page 73

Patented digital sample playback technology, gained from E-mu's Emu8000 audio DSP, is incorporated into the Advanced Wave-effects synthesis. This features compact disc (CD) quality, with real instrument sounds better than the audio quality produced by wave table synthesis technology, the company asserts.

The new card supports multi-timbral musical instrument digital interface (MIDI) channels with 32-voice polyphony as well as independent control of advanced special effects (reverb, chorus or QSound), vibrato (pitch oscillation) and tremolo (volume oscillation) for each of its 32 voices. Additional advanced audio features include pitch-shifting techniques, resonance filters that control the timbre of each instrument when played at different dynamic levels, a six-part amplitude envelope, and a six-part auxiliary envelope for independent controlling of pitch and timbre. Creative claims these are features that have been available previously, but only in sound cards costing thousands of dollars more than the Awe32.

The new sound card is fully compatible with applications that work with the Sound Blaster 16-bit audio family of sound boards, Creative said. The company also said the card is compatible with General MIDI, Sound Canvas, and MT-32 specifications and also supports compact disc read-only memo-

ry (CD-ROM) drives from Sony and Mitsumi, as well as its own CD-ROM drive.

Creative Technology announced retail pricing for the Awe32 is \$399.95 and the card will be available in the retail channels in mid-March. Those with Sound Blaster 16 cards with Advanced Signal Processing can upgrade to the Textassist application for only \$29.95. An Advanced Signal Processing upgrade with Textassist will also be available to Sound Blaster 16 owners for \$99.95. Upgrade information in the US is available by calling Creative's toll-free support line, company officials said.

On March 15, Creative launched a Textassist application programming interface (API) developer kit in the form of a dynamic link library (DLL), which can be used to integrate text-to-speech capabilities into Windows applications. The developer kit will include a royalty-free license for developers to distribute the Textassist API DLL with their applications, Creative said.

Based in Singapore, Creative Technology purchased sound company E-mu Systems last year. The company's other US subsidiaries include Creative Labs and Sharevision Technology. ■

Contact, Creative Technical Support, 800-998-5337

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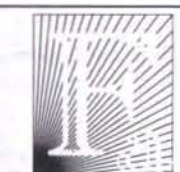
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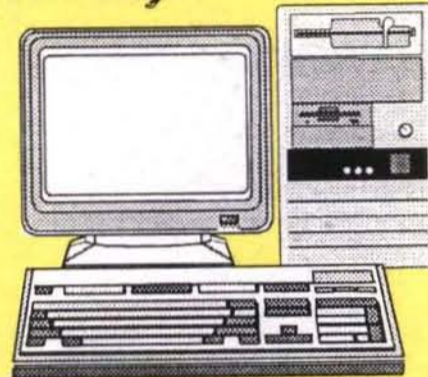
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 MICROSOFT Compatible 3-Button Mouse
 DOS-6 Installed w/ Manual & Disks
 Two (2) Years Parts & Labour Warranty

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VESA LB

**486DX-33
 INTEL CPU**

486 VESA Local Bus Main Board
 w/ 128K Cache Expandable to 256K
 INTEL 486DX-33MHz CPU
 4MB RAM (70ns), Expandable to 32MB
 PANASONIC 1.44MB Floppy Drive
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 32-Bit VESA Local Bus Video w/ 1MB
 14" SVGA Non-Interlaced Monitor
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 32-Bit VESA Local Bus IDE Drive Controller
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**486SLC2-50
 IBM CPU**

IBM 486SLC2 VESA Local Bus Main Board
 w/ 128K Cache Memory
 IBM 486SLC2-50MHz CPU
 4MB RAM (70ns)
 PANASONIC 1.44MB Floppy Drive
 MAXTOR 170MB Hard Drive
 32-Bit VESA Local Bus Video w/ 1MB
 14" SVGA Non-Interlaced Monitor
 1024x768 & 0.28dp
 32-Bit VESA Local Bus IDE Drive Controller
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**PENTIUM !!
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PENTIUM 586 PCI Local Bus Main Board
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 SEAGATE 340MB Hard Drive
 DIAMOND VIPER PCI Local Bus Video 2MB
 15" SVGA Non-Interlaced Monitor
 Digital Control, Flat Screen & 0.28dp
 IDE Hard & Floppy Drive Controller
 Medium Tower Case 200W Power Supply
 2 Serial, 1 Parallel & 1 Game Port
 101 Enhanced Keyboard
 MICROSOFT Compatible 3-Button Mouse
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Diamond Viper
\$3569

PCI

**486DX2-66
 INTEL CPU**

486 PCI Local Bus Main Board
 w/ 256K Cache Memory
 INTEL 486DX2-66MHz CPU w/ Cooling Fan
 8MB RAM (70ns), Expandable to 128MB
 PANASONIC 1.44MB Floppy Drive
 SEAGATE 340MB Hard Drive
 MICROSTAR PCI Local Bus Video w/ 1MB
 14" SVGA Non-Interlaced Monitor
 1024 x 768 & 0.28dp
 IDE Hard & Floppy Drive Controller
 Medium Tower Case 200W Power Supply
 2 Serial, 1 Parallel & 1 Game Port
 101 Enhanced Keyboard
 MICROSOFT Compatible 3-Button Mouse
 DOS-6 Installed w/ Manual & Disks
 Two (2) Years Parts & Labour Warranty

\$2299

PCI

**486DX-33
 INTEL CPU**

486 PCI Local Bus Main Board
 w/ 256K Cache Memory
 INTEL 486DX-33MHz CPU
 8MB RAM (70ns), Expandable to 128MB
 PANASONIC 1.44MB Floppy Drive
 SEAGATE 260MB Hard Drive
 MICROSTAR PCI Local Bus Video w/ 1MB
 14" SVGA Non-Interlaced Monitor
 1024 x 768 & 0.28dp
 IDE Hard & Floppy Drive Controller
 Medium Tower Case 200W Power Supply
 2 Serial, 1 Parallel & 1 Game Port
 101 Enhanced Keyboard
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64kb buffer
MPC compliant
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320ms access
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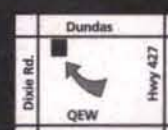
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3 VESA LB slots
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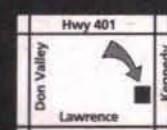
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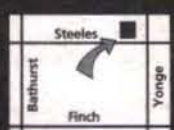
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