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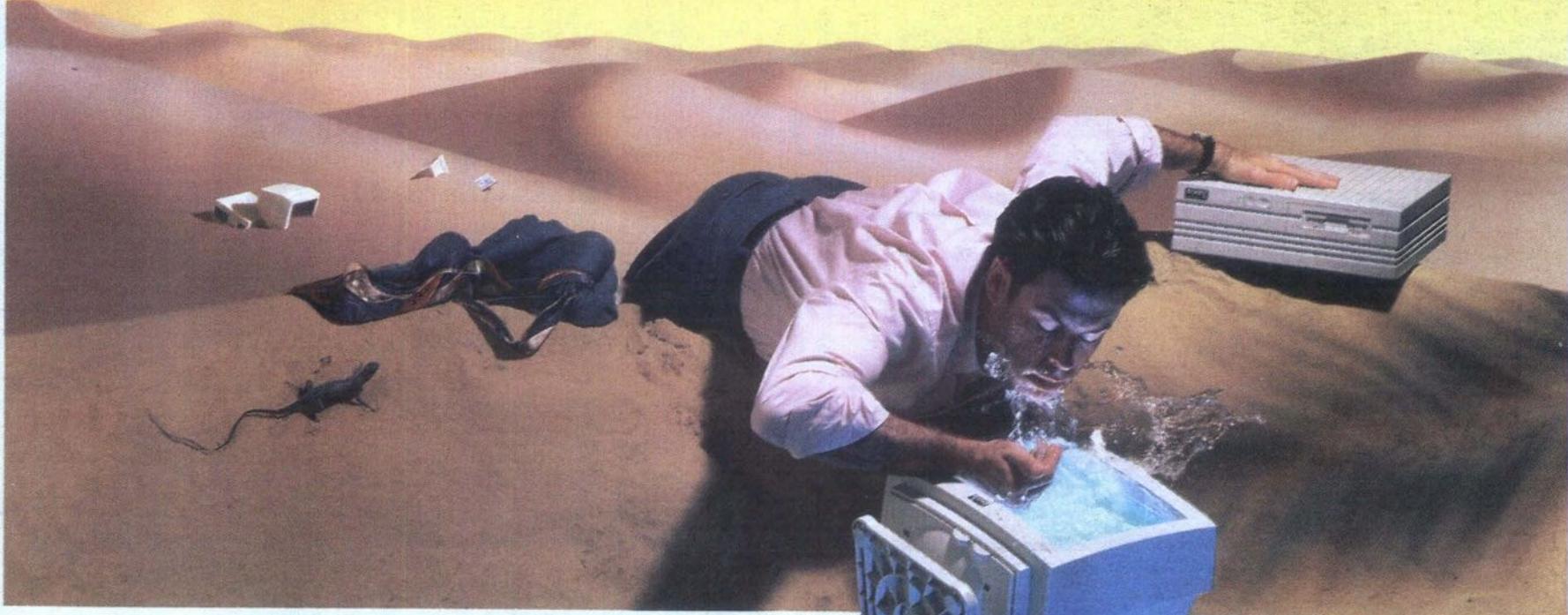
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ONTARIO EDITION JULY 1993 VOLUME 6 NO. 7

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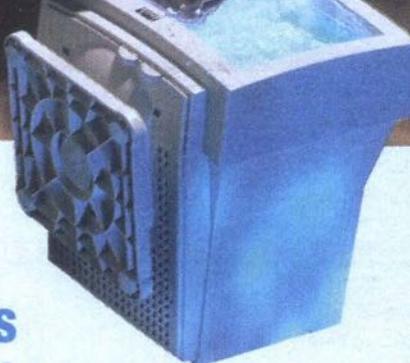
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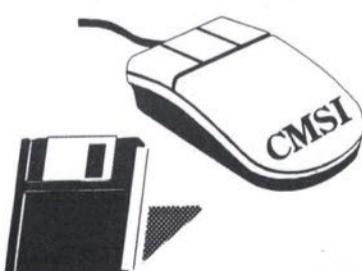
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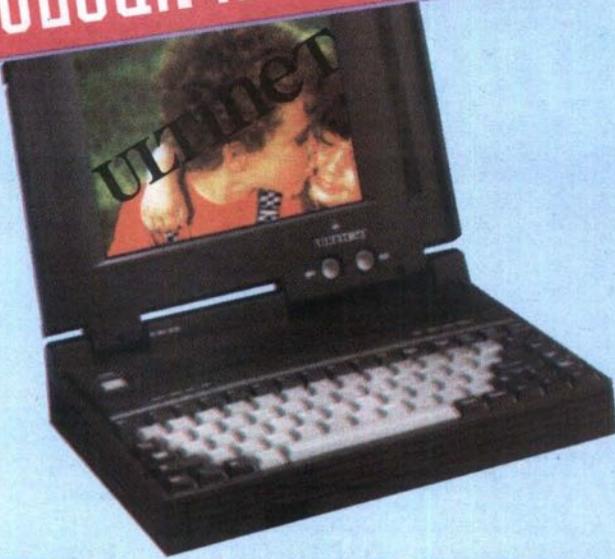
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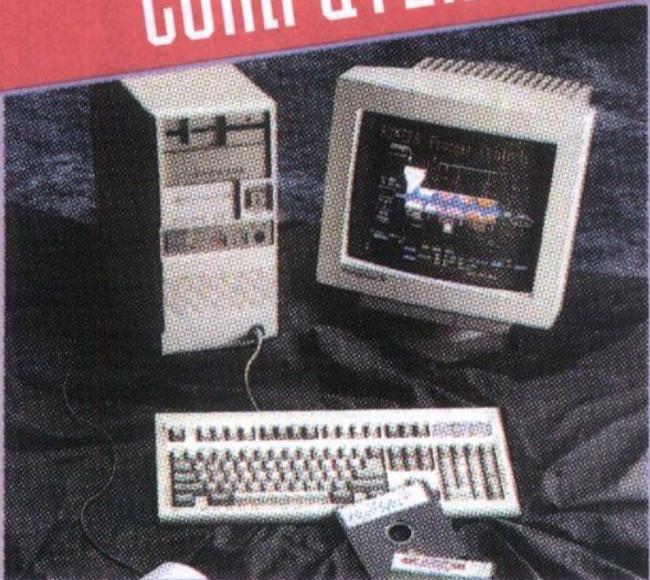
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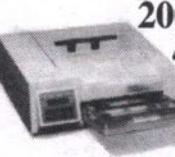
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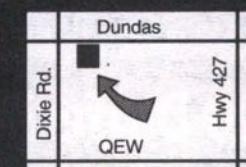
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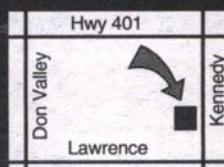
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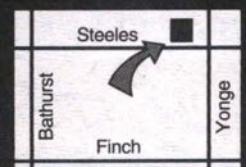
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From the Editor



Is now the time to buy?

This was the question posed to me on a recent CBC radio show. Every so often the world of computing intrudes on the rest of the world. The reason for this most recent intrusion was the hoopla surrounding Spring Comdex in Atlanta and the one-two punch of Windows NT and new, more powerful microprocessors to run it on. NT is a major new operating system and the DEC Alpha and the Intel Pentium promise untold speed and performance increases. Change often brings on fear of the unknown. Consumers don't want to be that last one to buy an 8-track tape or a Beta format video player.

Real Soon Now

What all this hype doesn't tell you is that it will be a while before these products realize their full potential. In the computer industry, there is a standard term "Real Soon Now" (RSN)—meaning that given the vagaries of software and hardware development, we can't tell you exactly when, but the products will be available RSN.

The big issues here are price and performance. Many will recall that in the initial shift from 286 to 386 and then 386 to 486 computers, the margin of performance improvements was small because Intel chip clone vendors were pushing the edge of the envelope by selling higher-MHz versions of the older chip. In both cases, the new chips initially didn't offer much more and were usually sold at a premium.

"Going Native"

To really take advantage of the power of the new Pentium chip, or the DEC Alpha chip, software vendors will have to recompile their software to "run native" to the new chip. The analogy here would be that if the chip is an engine, and software the fuel, then when you convert from an engine that could run either gas to natural gas, you would have to re-blend the fuel. This will take time. Don't expect to see much of it happen until a year or so from now.

Killer Apps

Ultimately software vendors will be looking for the next "killer app" to sell their new systems. A killer app is a software application program that is so good that you buy the computer to run it. Previous instances of this were programs like Lotus 1-2-3, which many claim launched the original IBM-PC.

At some point all this extra speed is wasted. How fast does your computer have to run if all you are doing is typing in a word processing document? High-speed computers need programs that need high speeds—multimedia, voice processing, video conferencing, desktop publishing, Computer Aided Design, large-scale numeric processing, large databases for multi-user access, etc.

Buy now—upgrade later

Consider what you can buy now instead of a Pentium or a DEC Alpha. For the price that premium vendors will want to extract from the "early adapters" you can add a pile of options to your PC. I recommend people look at their needs first. If you are currently interested in buying a PC, don't hold off. Instead, try to use your money wisely. Consider the kinds of things that will add utility to your computer. Instead of buying the fastest PC, consider loading up your PC with RAM so that your programs will run faster and better. Local Bus video offers incredible speed boosts to existing systems. Larger hard drives mean never having to say "Delete." CD-ROMs and sound boards can offer you vast databases of information, multimedia collections of clip art or video clips, info-tainment software and great games. High-speed modems allow you to log on to BBSes and information services to download the latest software, or keep in touch with electronic mail. (Save a little money for the access cost of the commercial services—while there are plenty of free BBSes, you will find the "pay" systems offer better services.) Video output boxes, laser printers or color printers make the wonderful stuff you do on the computer shareable with your friends and coworkers.

Future think

Think about what your needs are now and what they are likely to be in the future. Consider getting a computer with an upgradeable processor, so that you can simply pull out the 486 chip and put in a new Pentium chip. Be warned, however: not all systems are designed to deal with the extra heat that the current generation of Pentium chips puts off. Manufacturers currently claiming to have "Pentium-ready" systems are really only offering Pentium upgrade technology and not the full version which will, of course, be a 64-bit internal/external device, which is not compatible with the current blue-pin socket.

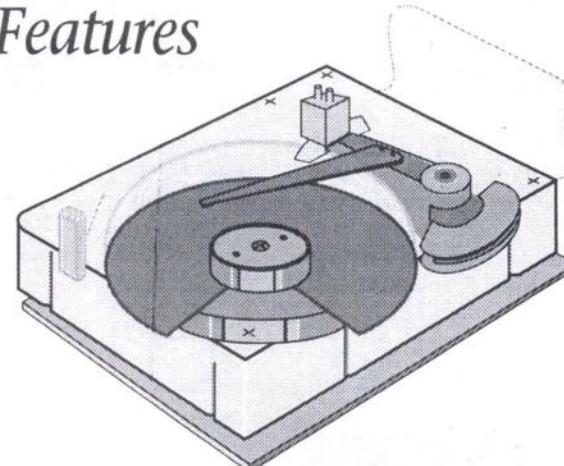
Should you buy now?

It depends. Look at your needs. What do you want to do with your computer and how soon do you want to start doing it? There will always be next year's model. Would you hold off buying a car because electric cars will be here Real Soon Now? Perhaps—it depends on how far you have to ride your bike to work.

Please come and see us at Comdex Canada July 13-15. We will have a display downstairs at the Metro Convention Centre in Constitution Hall in Booth 3417—right next to the big IBM-OS/2 area.

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Quacks like a Duck

Re: Operating Systems (May 93)

I don't understand you magazine guys sometimes! After all these years of people writing and reminding you, you still refer to Windows as an "Operating System".

One more time: Windows is not an operating system. The following are the current, state-of-the-art, MS-DOS compatible operating systems: MS-DOS (1-user) DR-

DOS (1-user) PC-MOS (33 users)

Everything else is "add-ons". Windows is an add-on graphical environment. Windows NT is still vapor-ware. If you media types keep these things straight, it helps us to see our way through the cloudy mists. But if you keep mixing it up, you're not helping anyone!

RJ Burke

Graeme Bennett replies: Here are a couple of quotes from that article.

1) "Being a DOS-based environment, Windows also suffers..."

2) "Windows and Windows for Workgroups are, of course, running DOS..."

I suspect that's clear enough for most of our readers.

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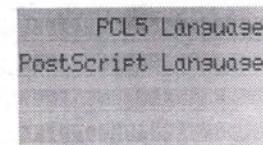
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Continued from page 6

DR DOS 6.0 Not Mentioned in Operating Systems Article

I understand that this article was actually about 32-bit O.S.'s with DOS and Windows 3.1 thrown in to acknowledge Microsoft's contribution. Yet DR DOS 6 should have also been compared as well, to even up the score.

Network services are provided for with DR DOS 6.0. That's why Novell packages it with their network software. DR DOS also has better batch file (and CONFIG.SYS handling than DOS 6). And VIEWMAX is easier to use than DOSSHELL. It even handles EMS and XMS better than DOS 6 without having to add 3rd party memory management software like 386Max, QEMM, and the like.

I don't know why DOS 6.0 or Windows 3.1 were included. It looked more like the author was convincing us the 32-bit route is faster, less prone to system crashes (not), etc. Whilst the 680x0 based systems are certainly unique, they cannot be compared as far as performance goes with the 80x86 based systems. Different styles of multitasking and programming separate the two and it would be grossly unfair to say that System 7 is better than say DOS, or even Windows.

As well, the cover fails to mention the inclusion of Windows 3.1 in the comparison. NeXTstep and Atari MultiTOS 4.0 are also not mentioned on the front cover. I can only assume the author hasn't yet tested them out exhaustively and is only going by the literature.

About the only thing I've learned about 32-bit systems is my 80386 needs to be in real mode before I could access it, which means I'll have to upgrade to an operating system that can boot it into 32-bit mode. NT doesn't cut it for multiple device requests. OS/2 lacks multiuser capability. NeXTstep has yet to be commercially available locally to make an accurate assessment. UNIX is costly due to licensing, unless you can afford the time to download LINUX or BSD386. If I had the money I'd rather just stick with DR DOS 6.0 and get the latest version of DesqView-X, if it behaved with DR DOS. Though, now that Novell, having bought AT&T's UNIX system, could possibly port a DOS version of X-Windows to interface with its network software as a GUI.

But if NeXTstep is as cheap as a NeXT machine was for hardware, then I'd seriously consider upgrading laterally to NeXTstep.

I'd appreciate an article on NeXTstep in the near future. It has potential.

Stephen H. Kawamoto
via MIND LINK!

Graeme Bennett Replies: Thanks for your comments. DR DOS was discussed on page 19 of the May '93 issue. Also, some of the OSes were not put on the cover due to a lack of space, not because an error of omission. I did check fact-sheets on NeXTstep and Atari TOS, but I have hands-on experience with both, too. The first MultiTOS equipped Falcon systems are now on Atari dealer's shelves. As the June issue says, we'll be looking at the Intel release of NeXTstep again ASAP. A Falcon review is also in the works. Stay tuned.

Re: MS-DOS 6.0 article in the April '93 issue of The Computer Paper

The statement re choosing "Lines of your config. sys. and autoexec.bat" is incorrect (see p. 23, 3rd column, 2nd new paragraph). Pressing 'N' to the query to process the autoexec.bat results in no execution of the autoexec.bat file. The statement, as written, applies to the config.sys. file only. (See the DOS 6.0 documentation-press and release the F8 key to start this process on (re) boot. Type Y or N to process each line etc).

M.G. Felts,
Belleville, ON

Three Windows Questions

I have three questions regarding Microsoft Windows.

1. Will software application run faster on a comparative system with a color monitor as opposed to one with a monochrome monitor (everything else being the same, including system RAM, graphic board RAM, etc.)?

2. Does adding a Windows accelerator board make a substantial difference in speed?

3. Can Microsoft Windows (the program) make use of a math co-processor to speed up its screen writes?

Amin Juma,
Toronto, ON

Graeme Bennett Replies:

1. No. The opposite is true. Even on a color system, fewer colors will display more quickly.

2. Yes — in many cases, a very noticeable difference.

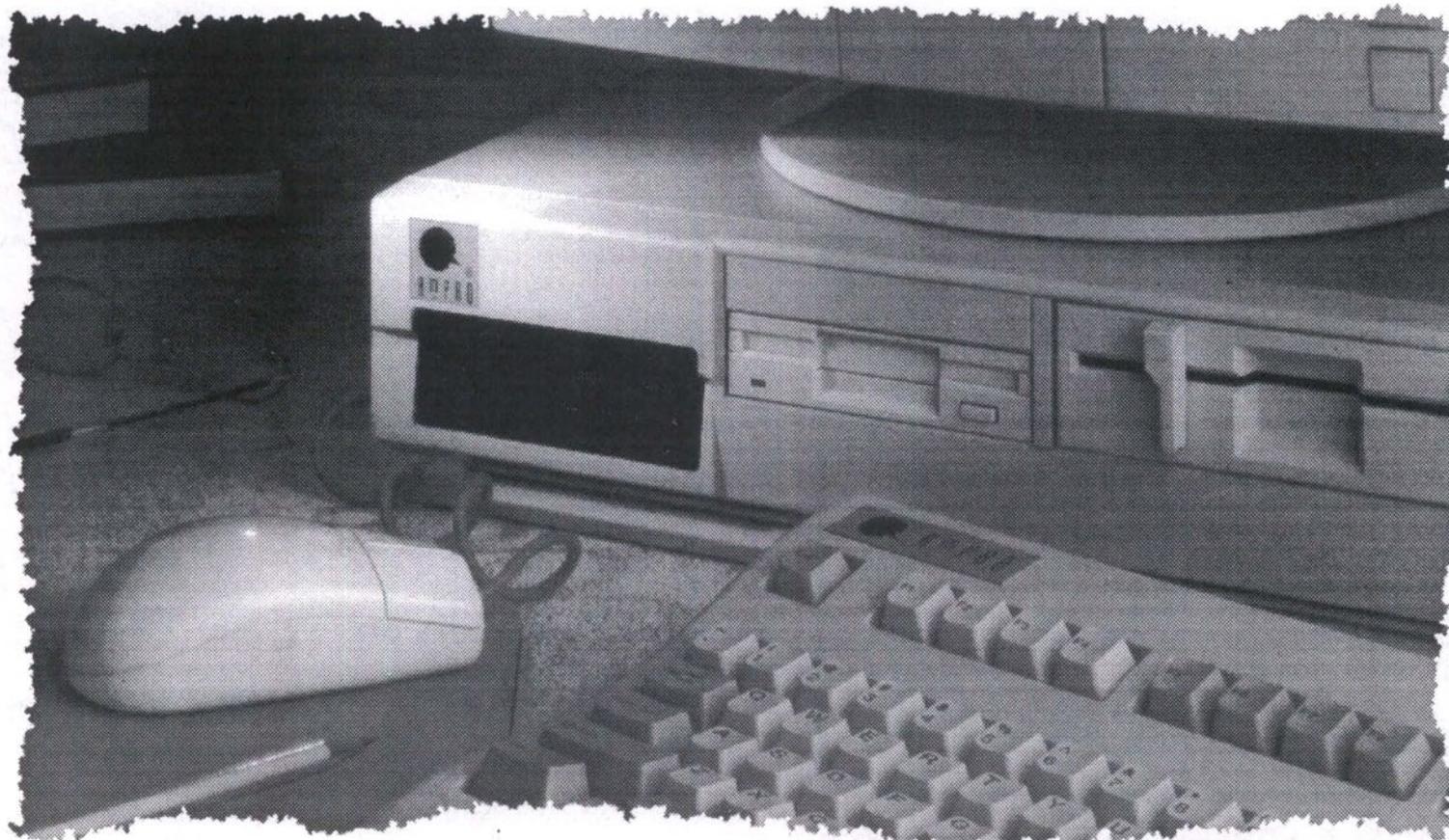
3. No. Relatively few programs exploit a math co-processor — typically, spreadsheets, CAD and 3-D applications. Surprisingly few DTP and drawing programs use a math co-pro.

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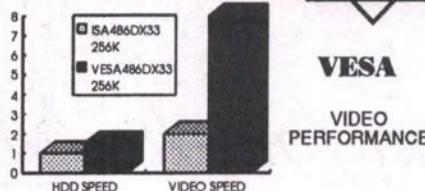
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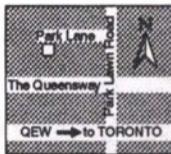
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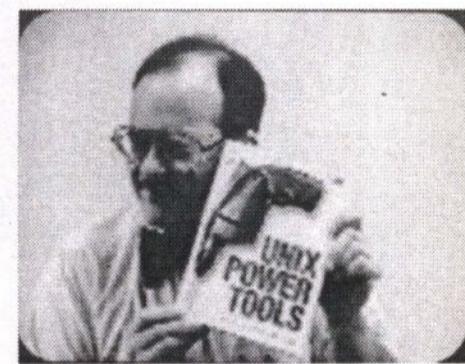
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The newFaces Spring 1993 collection can be purchased for \$109, or individually starting at \$19/font. Image Club Graphics, located in Calgary, Alberta, was one of the first vendors of high-quality, low-priced fonts. They also were one of the pioneers to offer CD-ROM collections of fonts from which users could unlock fonts on an as-needed basis. They currently lay claim to having the largest Windows 3.1 TrueType font libraries, with over 600 original and licensed typefaces.

Contact: Image Club Graphics 1-800-661-9410.

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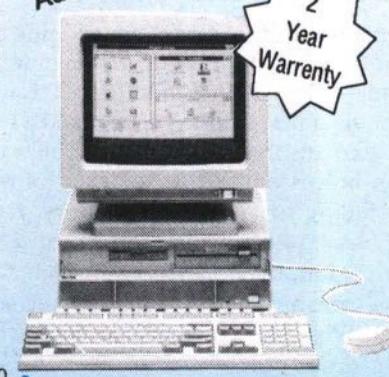
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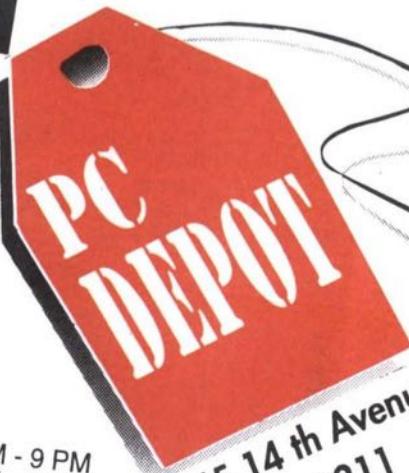
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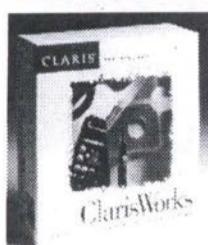
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what's new

ClarisWorks for Windows Released



TORONTO — Claris Canada has released a version of ClarisWorks for Windows, a PC-based version of their best selling ClarisWorks for the Macintosh. ClarisWorks is a combination word processor, graphics, database, spreadsheet and communications package.

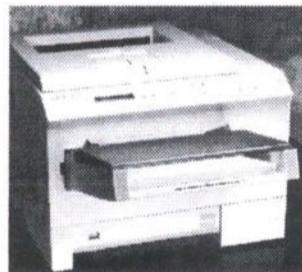
Using a single, standard interface for all its functions, the user can choose to use any function at any time within the program. Users already familiar with the Macintosh version will find that it is essentially the same program, and can transfer files from one platform to another as long as their Macintosh can write and read floppy disks in a DOS format.

For all its functionality, it is a relatively small program, taking up only 3 MB of hard disk space after installation. It is targeted primarily at new buyers, small businesses, notebook users looking to conserve disk space, business generalists, students and educators.

The suggested retail price is \$349, but until August 15th it will be offered at \$119.

Contact: Claris Canada 1-800-668-8948.

Xerox Introduces Personal Laser Printer



NORTH YORK — Aiming at the personal laser printer market, Xerox has launched its 4011 printer. Designed to

work as either a stand-alone printer or connected to a local area network, this model can print 8 pages per minute at 300 x 300 dots per inch resolution.

It comes standard with 3 MB of RAM, which can be expanded to 5 MB. It is PCL-5 compatible, and comes with 34 built-in fonts. It can handle 15,000 pages per month, and can print on many sizes and weights of paper stock. It is a very compact machine, measuring 15 x 15 x 9 inches (40 x 40 x 22 cm), and weighs 36 pounds (14.5 kg).

The suggested list price for the Xerox 4011 is \$2,235.

Contact: Xerox Canada Ltd., (416) 229-3769.

Correction: Ontario Edition June '93

In the *Mac Software Family Tree* article on page 31, the reference to LZH compression should have been LZW, after the authors Lempel, Ziff and Welsh. LZW is the type of compression used for CompuServe's .GIF format and some TIFF files.

New Publication for Internet Business Users

OTTAWA — Calling itself the information source for the virtual business community, Ottawa's Strangelove Press has launched *The Internet Business Journal*. It is the first publication to deal exclusively with the Internet business community, and provides detailed analyses of commercial opportunities on the Internet.

Commercial interests are playing a larger

role in shaping the Internet, a rapidly expanding electronic communications network. The Journal's publisher estimates that by the end of the decade, there may be as many as 50 million commercial users on the Internet.

Articles in the first issue include stories on virtual marketplaces, advertising on the Internet, and profiles of businesses currently

using Internet services.

It will be published six times a year, and an annual individual subscription costs \$179. For educational institutions and small businesses the rate is \$89.

Contact: Strangelove Press (613) 747-6106 or 72302.3062@CompuServe.Com on the Internet.

More What's New on Page 45

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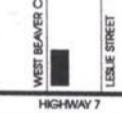
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The Multimedia Expo 93 was a huge show that took up the complete upper floor of the Metro Toronto Convention Centre and ran from May 27-29. The Multimedia Expo originally started as a show aimed at professional photographers, and almost half of the floor-space this year was devoted to film and photographic equipment. Film manufacturers like Agfa and Fuji were there, along with high-end camera outfits like Hasselblad and Leica. In short, any serious photographer would have been very happy to be at this show — but nobody could get away without getting a good sense of what multimedia is all about and where it is heading.

Adobe Photoshop

Adobe had a prominent display, and were showing off several of their image-editing software packages.

One of the most impressive was Adobe Photoshop 2.5, designed primarily to let professional photographers retouch their photos, and allow designers to create original artwork. With a scanned photo-negative, the user is able to edit images in many different ways, from eliminating a blemish on a piece of fruit to editing the background so that this same piece of fruit can look like it is on the surface of Mars. Probably the best new fea-



ture in this version is the "variations" option, which shows the original picture and along with it, the same picture using different color saturations and levels of brightness. Simply click on one of these variant pictures and drag it over to the one you are working on until you get the color combination you want.

What you see can no longer automatically be believed with programs like this. It is available in both the Macintosh and Windows format. Suggested retail price: \$1,095.

Contact: Adobe 1-800-833-6687

IBM's Illuminated Books and Manuscripts

IBM was showing off their "Ultimedia" computers at this show, which were showing off the educational potential of multimedia with their Illuminated Books and Manuscripts series. Using CD-ROM and a video disc, users are able to see and hear video clips from various literary works. At any point the user can go to various icons which can provide various contexts for the "reader." The program can provide background detail on a subject, different authoritative interpretations of it, and can be read to you by any one of several different speakers. Current titles include *Ulysses*, *Hamlet*, *Letter from Birmingham Jail* and *Black Elk Speaks*.

The combination of CD-ROM and

videodisc, though more expensive than CD-ROM alone, provides a very dynamic multimedia experience — and it is certainly a more enjoyable way of being educated. Call for pricing information.

Contact: IBM Canada (416) 946-9000

International Multimedia Development Association

The International Multimedia Development Association (IMDA) had a very impressive display of new multimedia technologies. They made the local news by having Jaron Lanier, the man who founded VPL Research and inventor of the "eyephone," hold a press conference on multimedia and education alongside their booth on the first day of the show. Local musician Vincent John Vincent also demonstrated the Mandala system, a "virtual musical instrument."

IMDA is a non-profit organization designed to bring together individuals and organizations with ties to the arts, publishing, computers or education and provide an environment to explore the possibilities of multimedia.

Contact: IMDA, (416) 233-2227.

Silicon Graphics

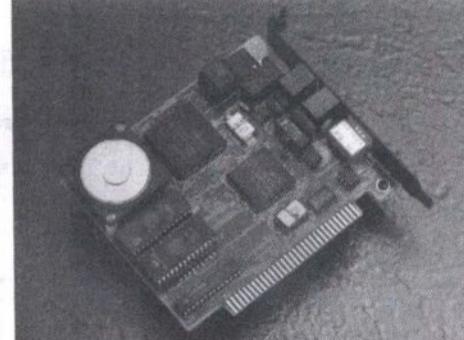
Best known for providing the raw computing power needed to produce special effects sequences in movies like *The Abyss* and

Continued on page 47

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The following article is rated "5 beanies" and is intended for technically advanced PC users. -Ed.

Installing PC Hard Disks

BY NICK MAJORS & PETE ROGERS

Part 1 Installing & Configuring

Installation

To successfully install or replace a hard disk drive you should always have documentation for the drive itself and for the controller card or the host adapter. Without proper documentation it will be difficult to interpret jumpers/switch settings and may be impossible to isolate problems.

(Most manufacturers now have bulletin boards for downloading copies of manuals.)

Physical installation of controller card/host adapter:

1. Some cards provide for Hard disk only - some for both hard disk and floppy.
2. Ensure that the floppy controller (if present on card) is the only one in system - or disable it.
3. Does the controller have a ROM chip on it?

XT — Always

AT/MFM — NO

AT/RLL — YES

ESDI — YES

SCSI — YES

IDE — Normally No

4. Most controllers with a ROM allow you to specify the upper memory address to be used. The default is often C800.

Make sure that whatever address is selected — it does not conflict with other devices in the PC (network board, etc.) or with any memory management software.

Special note about ROM chips: The upper memory blocks of PCs are reserved addresses for use by certain hardware and system devices. These devices can be accessed with either an 8-bit or 16-bit path to data. If your HD ROM is 16 bits, and any other device — such as network board or VGA card — uses only an 8-bit data path - you may not be able to correctly access the HD ROM. If your system has trouble recognizing a ROM chip, ensure that all devices are using the same size data path.

Cabling, Drive Select & Termination

Ribbon cables attach to the drive and controller by either a card or pin edge connector. Make sure that the cables you want to use match up correctly with the connectors on both sides. The cables are coded, with pin 1 being colored red or blue to help orient them correctly.

Standard ST506 drives require two ribbon cables: a 34-line control cable and a 20-

line data cable. The data cable is always a straight-through connection (no twist), but the control cable may be either straight or twisted.

Cable Twists — Both hard and floppy configuration permit the connection of two drives with a straight-through "untwisted" cable. If this were done, you would have to set a drive-select jumper on each drive to determine which is the first and which is the second.

Since people routinely swap floppy drives from one machine to another, it is now standard to jumper all floppies the same and then to have a twist in the cable that reverses the drive-select and motor-enable lines so that even with both drives set the same they react to different signals. All floppies are normally set to be the second drive and the one mounted at the end of a cable (after the twist) gets its signals reversed to react as the first drive. To have a drive A: there must always be a twist in the cable.

It is the same with ST506 drives, but while floppies are all jumpered to the second drive select — hard drives are user configurable as either first or second. If a hard disk is jumpered to be the first drive, it needs a straight-through control cable — but if it is set to the second drive, it needs a twisted cable.

WARNING: While both floppy-drive and hard-drive control cables are 34-pin ribbon, those with a twist in them have different lines crossed!

Floppy cables twist lines 10 through 16 (close to pin 1, the colored line) while hard drive control cables twist lines 25 to 29, closer to the other side.

ST506 drives are configured with one straight data cable (20-pin) for each drive (maximum of two) and one single (34-pin) control cable. With two drives, each gets its own 20-pin data cable but the single control cable must have two connectors on it (one for each drive).

For a single drive, the control cable can be straight if drive jumper is set to first drive or twisted if drive jumper is set to second drive. If both connectors on the control cable for a two-drive setup go straight through (no twist) then the drive jumpers must be set so that one of them is the first drive and the other the second drive. If the end connector comes after a twist, then both drives can be configured the same and the one after the twist will react to different signals.

The last drive on any control cable (at the end) must have a terminating resistor on it and any drive plugged in before it must have its terminator removed.

This is especially important if you are

moving a drive from one computer to another or when adding a second drive.

ESDI drives use the same cables as ST 506 systems (but with different signals on each line). They have the same options with regard to twisted or straight control cables, drive select and termination.

SCSI drives are connected to a Host Adapter by means of a single 50-pin ribbon cable. No complication with twists. If there is more than one device attached to the same host adapter, it is connected to an additional connector on the cable. Instead of drive select, a unique SCSI ID number must be assigned to each drive, (normally numbered from 1 to 7). Once again, the last drive on a cable must have a terminating resistor, and any drive plugged in before it must have its terminator removed.

IDE drives are connected to a host adapter with a single 40-line ribbon cable. No twists. IDE drives are configured as either Single drive, Master drive or Slave drive by jumpers or dip switches. You should always have documentation. With one drive alone, single drive is selected; with two drives one must be master and the other slave. These switches normally configure both drive select and termination.

Power Cables

The hard drive receives DC power (5 volts for electronics and 12 volts for motors) from a standard power connector coming off the power supply. This connector is bevelled or rounded in two corners to mate with the outlet on the drive assembly. Make sure it is connected the correct way. Some notebook computers use special cabling that both controls the drive and carries power through one ribbon cable. If you are brave enough to venture inside notebooks - count the number of lines in any cable and make sure it is a standard 20, 34, 40- or 50-line cable. If it is different — do not make changes without technical help.

WARNING: If cables, drive select, or termination is incorrect the drive(s) will not operate correctly but no harm should be done to the system, BUT if you connect the power cables wrong you will destroy the drive!

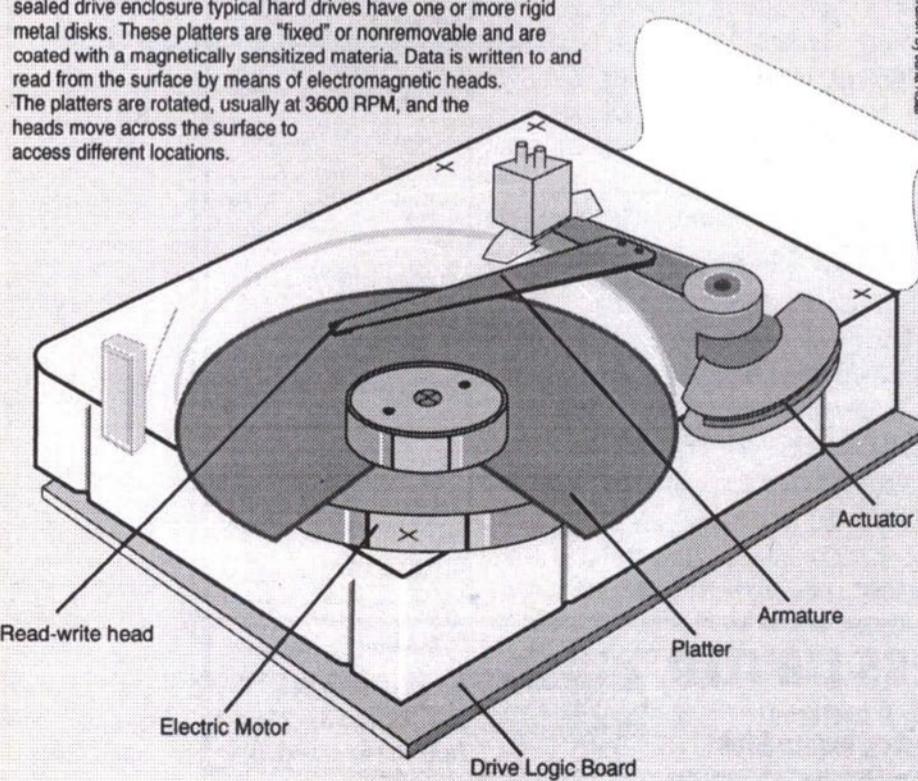
(If cabled incorrectly some IDE drives, with 40-pin ribbon cable, may prevent the computer from starting up at all. If this happens, check your cabling.)

Setting the Drive Type

Drive parameter tables are used to tell the computer the physical geometry of the drive(s) to be used.

Anatomy of a Hard Drive

The hard disk subsystem is comprised of the hard drive(s) and a controller mechanism with cabling to connect the two. Within a sealed drive enclosure typical hard drives have one or more rigid metal disks. These platters are "fixed" or nonremovable and are coated with a magnetically sensitized material. Data is written to and read from the surface by means of electromagnetic heads. The platters are rotated, usually at 3600 RPM, and the heads move across the surface to access different locations.



ST 506 — XT Controllers — Always set the drive type in AT CMOS to zero or no hard drive installed. This means there are no "standard" drives to control.

ST 506 — AT Controllers — Select the exact drive particulars from the choices available in the setup program. Pay special attention to Write Precomp parameter. If no drive type exactly matches your drive, you have a number of choices:

1. Use a drive type which most closely matches, without exceeding, the Heads, Cylinders or Sectors/Track for your drive. This will work correctly, but with reduced capacity.
2. Most newer computers have a User Definable Drive Type (often #47) that allows you to specify parameters of your choice. Define the drive type to exactly match the physical particulars without exceeding the limit of 1024 cylinders — 16 heads and 64 sectors per track.
3. Some AT controllers include a ROM chip with a built-in program that allows user definable types. Access this program with Debug (as per Documentation).
4. Use a third-party software driver, such as Diskmanager.
5. For those with the knowledge and facilities, change one of the drive types in the motherboard ROM by reading the chips, amending the code, and burning new ROMs.

ESDI Controllers — Most require a drive type "1" (305 - 4 - 17) regardless of actual parameters, which is enough to recognize the drive until the controller's ROM code can take over.

SCSI Controllers — Most SCSI drives, like XT controllers, require the drive type in CMOS be set to zero or no drive installed. A few require a drive type "1" (similar to ESDI configuration.)

IDE Drives — This is where the fun begins because all IDE drives require that you specify a particular drive type which will determine the storage capacity of the drive. If you know the drive's physical parameters and have a user-definable drive option available, set up the correct numbers.

The big difference with IDE drive types is that most can respond to any drive type you select — so long as you do not exceed the total number of sectors on the drive.

(Total sector count = Cylinders x heads x sectors per track)

If you exceed the sector count, drive initialization will fail and report "drive failure".

Example: If your drive is physically 1,204 cylinders with eight heads and 38 sectors/track, you can specify any type that does not exceed 366,016 total sectors.

$602 \times 16 \times 38 = 366,016$ (Good choice)

$1,024 \times 16 \times 17 = 278,528$ (Reduced capacity)

$1,024 \times 16 \times 26 = 425,984$ (Too much)

Note: While you can configure most IDE drives to various drive types, once the drive has been O/S formatted, you cannot change the parameters without losing the drive contents. Therefore, once you decide on which drive type to use, RECORD IT! If the

CMOS information is lost, it could be critical to accessing data.

Formatting the Drive

Once your drive is physically installed, it still cannot be used until it is formatted. The formatting process requires three separate and independent functions.

Physical or Low-level Format

This process actually writes the sector labels to the drive surface. Before it can be performed you must know the physical parameters of your drive, any bad spots on the drive (per bad track tables) and the interleave factor supported by your controller card. The process is a destructive format

that will overwrite everything on the drive. After it is performed there is no way to retrieve any data that was previously on the drive.

This format is performed by a software program like HDPREP or Diskmanager. If your controller uses a ROM there is usually a built-in format program in the ROM chip. Access to this program code is normally through DEBUG (as explained in the controller documentation).

Many ROM-based controllers demand that you use their program.

Tech note: To access a ROM Format Program without documentation, you must:

1. Find ROM address in Upper memory (try c800, cc00, d000, etc.).
2. Find the offset to start of format program code (try offset 0005, 0006, or 0008).
3. Execute the code with a G-command.

IDE drives are low-level formatted by the manufacturer at the factory. DO NOT attempt to perform a low-level format — you may cause harm to the drive!

Partitioning

After a drive is low-level formatted, you must run a partitioning program, such as DOS FDISK to allocate space on the drive to a particular operating system. This program will write a Master Boot Record to Cylinder 0, Head 0, Sector 1 (first sector on the drive) and imbed in that record a partition table that controls space allocation to various operating systems and which partition should boot at startup.

Operating System Format

Finally, drives need an O/S format. In DOS this is performed by the FORMAT command. This format will place onto the drive the O/S boot-up program, the Directory/File allocation (FAT) system which is used to allocate space to programs and files. In the case of DOS it writes to the first sector of the partition - a DOS boot program - followed by two copies of the FAT (size depends on particulars of drive) and a root directory which can hold up to 512 entries.

Performance Considerations

As software has become more sophisticated it makes increasing demands on computer hardware. This has made system perfor-

mance in general and hard-disk performance in particular an important factor in suitability of a computer for any particular task. Hard-disk performance is measured by two benchmarks:

Average access time & Data transfer rate

Access time is how long it takes the drive to find a particular piece of information. Some drives may have an average access time of 65 milliseconds or 24 ms or 15 ms. So if the drive has to read a sector of information from a track, on average it will take 65 (or 24 or 15) milliseconds to move the heads and find that piece of data.

Data Transfer Rate is how fast data can be moved from the drive through the controller and into the computer, once it has been found. Data transfer speed is determined the following way:

1. Most drives rotate at 3600 RPM = 60 rotations per second.
2. If a track is formatted with 17 sectors per track it has $17 \times 512 = 8,704$ bytes of data/track.
3. If the drive is interleaved 1 to 1 (non-interleaved) it can read one entire track of data on each rotation.
4. Therefore the data transfer rate is reading 60 tracks per second, each track containing 8,704 bytes ($60 \times 8704 = 522,240$ bytes per second). The data transfer rate becomes 60 tracks read per second $\times 13,312$ bytes per track ($26 \times 512 = 798,720$ bytes per second).

If this same drive was formatted with a 2 to 1 interleave (it takes two rotations to read an entire track) the data transfer = read 30 tracks per second $\times 13,312$ bytes per track = 399,360 bytes per second.

While these numbers can vary slightly - in the setup of our example, once data has been located (whether in 15 ms - 24 ms or 65 ms) we can read or write 522,240 bytes per second, or 798,720 bytes per second, or 399,360 bytes per second.

To read or write a 4 MB file (once it is found) would take

- Example 1 - 8 seconds
- Example 2 - 5 1/4 seconds
- Example 3 - 10 1/2 seconds.

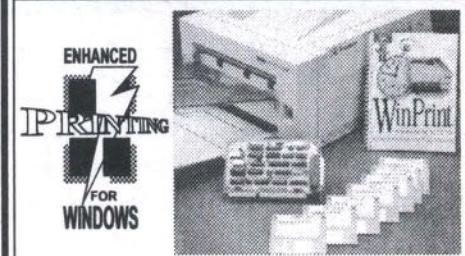
Warning: many drive manufacturers quote transfer times that are exceedingly high, but this is often the highest internal speed possible between the drive and the controller (with the controller built onto the drive) and may not represent the speed at which data is transferred into your computer.

Access time is determined by the particulars of the hard disk that you have — while Data Transfer Rate is dependent on the capabilities of the controller mechanism.

Contrary to what drive manufacturers would have you believe data transfer is usually more critical to performance than access times. While the drive may need to locate data if a drive is contiguous there is limited random searching required for the next piece of data. Most applications improve dramatically with the speed at which they transfer data to and from a drive once it is found than by improving the speed at which it finds pieces of data.

The factors that influence data transfer rate are rotation speed (almost always 3600 RPM), Interleave (rotations to read an entire track), and how many sectors of data are physically on each track.

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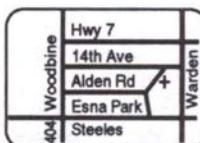
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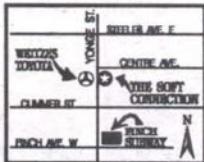
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With IDE and some SCSI drives where extensive translation allows for different logical configurations of sectors per track the data transfer can only be correctly calculated by a performance benchmark program. These drives mask what they are actually characteristics.

The other factor that can greatly improve transfer rates, and even some access times, is disk caching. A disk cache is an area of RAM memory (either on the motherboard for software cache, or on the controller card for hardware cache) where data is stored on its way to or from the drive. When the controller reads a sector of data it will also read a number of subsequent sectors into the cache. Therefore the next read may not require physical access to the drive, because the information is already stored in cache. Caching can dramatically improve the performance of a disk subsystem.

There is considerable debate as to whether software or hardware cache is better. In theory, relieving the CPU to do other work should be better. But certain software utilities like DOS SMARTDRIVE or NetWare have inherent caching buffers that provide sensational results.

How much information is stored in the cache depends on the amount of memory used for the task, from as little as 16 K to as much as 32 MB on network file servers. If the next piece of information needed is not in the cache — perhaps the drive is fragmented — then a physical read is required. The proper amount of cache for a system can only be determined by trial and error of your particular application. More is not necessarily better.

**Part 2
Why Hard Drives Fail**

Hard drives can and do fail on a regular basis. Major reasons for failure include:

Physical failure which occurs when the hard disk physically cannot read or write data from its surface. Hard drives are electro-mechanical devices and like any machine they will eventually wear out. Despite strict manufacturing tolerances, any part can fail even on a brand-new drive. While disk drives can be repaired or overhauled, if certain parts fail there is no

chance of retrieving data. In today's market it is often not economical to repair out-of-warranty drives because newer replacements often cost the same or less.

Several environmental factors can lead to physical failure.

- Static discharge can damage electronics.
- Electrical surges can burn out components.
- Physical damage can occur by dropping or banging a unit, especially while it is powered up.
- Overheating poses one of the biggest threats. PCs are cooled by internal fans that circulate air through components and out of the case. If the fan (often built into the power supply) stops working there are few indications or warnings, and the temperature can increase to the point of permanently destroying drive components or even motherboards.

Hardware malfunction can occur while the drive is still functional but either failed in a certain operation, or is experiencing intermittent operation. This can be caused by lack of proper maintenance of format structure, erratic electrical power, physical shock to the unit while operating, running the drive while not warmed up, or improper configuration.

Application failure by even the best of programs can sometimes blow up and incorrectly save data or scramble an index. Depending on complexity, many applications can severely damage data files if they are not correctly exited. Therefore if a program hangs-up or the system crashes it can be devastating.

Operating system failure

Your OS, be it DOS, Unix, Netware, etc., involves complexities that baffle the mind. Intermittently failing to correctly update directory or FAT structures is routine.

More data is lost every year to user error than to any other cause. It may be as simple as inadvertently deleting files, improper correction of routine maintenance problems.

And of course there are viruses. They can destroy data, they cannot destroy hardware, but in truth it is a greatly overstated

Continued on page 25

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Creating Your Own CD-ROM

BY B. RICK RODER

That's it! You've made the decision to wrestle your data into submission. Somehow. Some way. Maybe your hard drive is full and you want to clear some space. Maybe you need to send a lot of information to some or many users. Maybe you've got a software product to sell. It doesn't really matter. You've got a lot of data and you need a solution to deal with it — immediately!

You've probably looked at the alternatives. Floppy disks are too small. And loading or unloading the data means doing the disk shuffle. Another hard drive would be nice but it's too expensive. A Syquest hard drive would be good but it only holds 88 megabytes per cartridge and the cartridges can be expensive. One of the magnetic tape systems would be much cheaper but they're slow and sensitive to magnetic fields. It's time to consider CD-ROM.

CD-ROM holds up to 650 MB on a single, lightweight disc. It's read-only so it can be used to make archived data accessible since it can't be erased by a stray magnetic field or a user error. You can store your data on a recordable CD for yourself or you can get the discs mass produced for about \$2 a disc. With the prices of players now at a reasonable level, CD-ROM is a cost-effective solution.

So let's say you've made your decision; CD-ROM it is. Now you'll need to prepare your data and choose a file system. We'll assume that if you are going to distribute this data, you have the rights to copy this material. You do have those rights, don't you?

Your first step is to make sure your files are in the correct format for the hardware you want to use. This means you will need to determine what platforms your disc needs to run on and choose the corresponding file system. The standard format for Windows, DOS and Unix is ISO-9660. The standard format for Mac is HFS. If you create a disc in the ISO-9660 format, it can be read by virtually everything including Macintosh and Amiga because this format is the lowest common denominator. But it's also a limited format. Filenames must be the DOS standard of eight characters with a 3 character extension. Directories can be no more than eight layers deep. This is probably not a problem if the disc will only be used on a DOS machine but your disc only needs to be read by a Mac, so create a Mac HFS disc instead.

Now that you've chosen a file system, you can prepare your data files. If the disc is only for your use, all you need to do is structure the directories so you can quickly find the files you need. If anyone else will be using this disc you'll need to make sure they can understand your directory system. This is a part of the human interface that you will need to test with some volunteers to determine whether it works. You may need to set up custom icons as landmarks the user can easily navigate.

If you're including a large number of files, a search engine may be required. This is an application that helps the user to quickly find the desired file or data. It can be a database or a custom tool like

How much information can a CD-ROM hold?

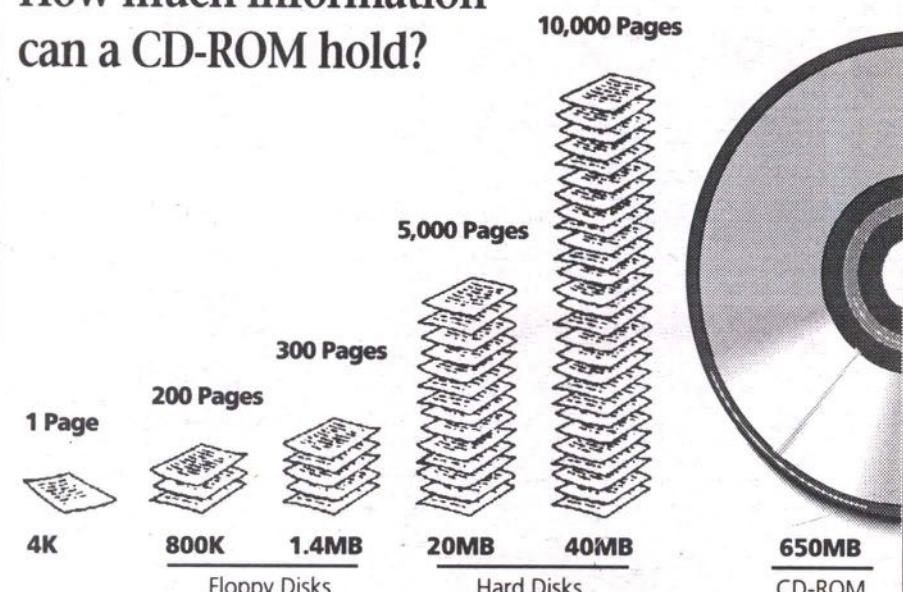


Image courtesy of Apple Canada.

Hypercard or Toolbook. There are a wide variety of text search engines available including Ful/Text by Fulcrum Technologies of Ottawa and many others.

Not only is your directory structure important, so is the file format. Try and choose the most interchangeable file formats so that virtually any application can open and use the files. For example, bitmapped graphics in the TIFF format can be opened by most graphics applications and any word processor can open a TEXT file. The more accessible your files are, the more useful they are.

Since CD-ROM is a digital medium, all the data you put on it must be in a digital format. If you are dealing with analog data such as pictures or pages of text, you will need to digitize. This can be a major part of the process if you've got a lot to convert. Keep in mind that you lose quality whenever you convert. A color picture will lose resolution and color accuracy. Text that is scanned will have errors that need to be found and corrected. As with any conversion process, the higher the quality of the original, the higher the quality of the copy.

Once your information is converted to digital data, it may need to be compressed. Compression does not only mean the file takes less space, it also loads faster (since it is smaller). In cases such as video, it is the only way to squeeze much of this data onto CD. If you compress applications, it ensures that the user must copy to a hard drive before the program can be used. Of course, if you choose to compress, your user will need the tools to decompress.

Once your data is ready, you can now transfer it to a large hard drive, if it isn't

there already. This provides the opportunity to defragment the files and run a thorough virus check. Back up this drive! It is the master image of your CD-ROM. The backup tape or the hard drive can then be used to create a one-off CD-ROM. This disc is recorded on a desktop unit that you can purchase or you can have it done by a service bureau such as the One-Off CD Shops (800-387-1633). Although it looks exactly the same as a mass-replicated CD-ROM to a player, it is produced with a different process. This one-off CD-ROM can be used "as is" for archiving or prototyping purposes. It can also be used as the master for a mass replication of the disc.

If you need a mass replicated disc and you have a one-off CD in hand, your choice now becomes how many copies you need. It's cost-effective to get a mass pressing done if you need more than roughly 10 copies. Less than that, one-off CDs are cheaper.

There's one more thing you'll need to consider if you want a mass replicated disc. Packaging for the disc can be a jewel box with printed inserts or a variety of new cardboard packages. Most presses also provide a two-color silkscreened label on the disc. You'll need artwork for the labels and the print materials.

If you take care of these major points in the creation of your CD-ROM, you will have worked through the most important considerations involved in the preparation of your data for this powerful medium. ■

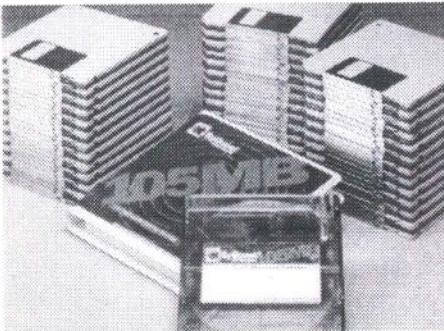
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PRODUCT REVIEW

SyDOS removable media drive for PCs

BY GRAEME BENNETT

Product: Marlin 105i internal SyDOS drive
 Puma 105 external SyDOS drive
 SyDOS, 407-998-5400 or
 1-800-43SYDOS
 (The company does not sell direct.
 In Western Canada, the products
 are available through
 London Drugs.)
 Price: US\$1119
 Media cost (SRP): US\$299



SyQuest drives have enjoyed enormous success over the past few years. SyQuest has shipped over 800,000 disk drives and more than 3 million data cartridges since its incorporation in 1982. The company claims it now commands over 90 percent of the removable hard cartridge disk drive marketplace.

The largest group of users have been service bureaus, graphic artists incorporating large scanned images in their work and other desktop publishing aficionados who exploit the portability of the cartridges, but the removable disks have been popular as backup devices with many business-oriented users, too. The drives offer a convenient way to organize data by application, file or user and the disks may be locked away at night for security.

Another reason the SyQuest drives have been successful is their performance. They are roughly three times as fast as optical drives, and with an average seek time of 14.5 milliseconds, the latest models are in the same ballpark as a good fixed disk. In fact, the SyQuest disks use the hard-disk "Winchester" technology, and are little more than a hard disk platter in a plastic shell.

There are several different models of SyQuest drives. First, there were 44MB drives, then 88MB models that could read but not write to 44 MB disks. Then came 88MB drives read-and-write-compatible with the 44MB disks. Now, the company has released its first 3.5" drive — one with even higher capacity: 105MB. SyQuest has set up a division it calls SyDOS to distribute removable cartridge disk drives to the PC and compatibles marketplace. SyDOS markets a PC-specific version of the 105MB 3.5" drive.

Cards and Letters

The reason the SyDOS drive is PC-specific is that it uses an ISA (industry standard architecture) bus card to connect the drive to the PC. This card will therefore not work on PS/2 microchannel architecture (MCA) machines, although we successfully connected it to a PC equipped with an EISA (extended industry standard architecture)

bus. This is because EISA cards have a "deeper" edge connector on them than ISA cards do. When you plug an ISA card into an EISA slot, the card does not extend as far down into the slot as an EISA card would. Thanks to this clever design, EISA machines are able to accept 32-bit EISA cards as well as the older 16-bit (AT style) ISA cards. Aside from allowing faster data transfer, the 32-bit

EISA and MCA designs also allow cards to auto-configure without requiring the user to fiddle with DIP switches, jumpers, etc. (Computer trivia: The first consumer-level computer to have such an auto-config feature was the Amiga, with its "Zorro" card specification.)

Continued on page 24

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SyDOS

Continued from page 23

The Computer Paper installed and tested the SyDOS drive. Here's what we found.

The package contains the single-height drive mechanism, a 7-inch ISA card and a 3.5-inch floppy disk containing software drivers for DOS and Windows, along with a manual and a blank SyDOS disk.

We were pleased to see that the drive was CSA approved.

The interface card has a daunting number of jumpers on it, but at least there's a table silk-screened onto the card that shows the I/O

addresses, interrupt settings and ROM addresses for each of the various settings. If you are not familiar with these terms, or comfortable with the thought of fiddling with a circuit board, you might consider having your dealer install the card and drive for you.

The eject mechanism for the drive is similar to that of the older 5.25" SyQuest drives, but it takes a little getting used to. There is a push-button mechanism that pops the eject door open.

Because the new mechanism will not pop out the lever that permits the ejection of a disk until safe to do so (unlike the older design), there is no amber light, as is found

on the older 5.25" SyQuests, that indicates when the drive is coming up to speed or preparing to eject. The only visible activity indicator on the SyDOS drive is a green activity light that glows when the drive is accessed.

Performance was good on our 486DX2 test machine. The SyDOS drive copied a one-megabyte file in 7.9 seconds. A directory of 27 files totalling 10 megabytes took 1:20, or almost exactly ten times as long.

According to a SyDOS spokesperson, the company does not support the Macintosh, although SCSI models of the 3.5" drive are available from several vendors that produce drives for the Mac and other non-PC plat-

forms using SyQuest mechanisms.

There is a problem that can happen with removable drives, especially if the system is set up with a "dual boot" option with DOS and another OS in separate partitions. Because DOS, Windows, Windows NT, OS/2 and other PC operating environments refer to disk drives by letter, path assignments can get really fouled up if a new device is added. Suddenly, CONFIG.SYS and PATH commands don't point to the right places, etc.

The same type of situation can occur if you have multiple hard drives or partitions in your PC, even if you only use DOS. According to Jim Miller of Syquest Technologies (510-226-4134 ext 4134), DOS 6.0's DoubleSpace compressed drives and "phantom" drive letters complicate the issue even further. He explained that the way the drive is connected to the PC can also affect how DOS treats it at startup time. The card that controls the drive (known as a "host adapter") sometimes identifies the drive (as in the case of SCSI, with an ID number). In other cases, DOS takes care of the assignments. (Because Macs use only SCSI hard drives, they do not encounter this problem.)

There are a few ways PC users can work around this problem. The first rule of thumb is to always place your fixed disks before removable drives in your drive "chain." That way, the removable drive(s) will be assigned after the fixed disks or partitions have all been mounted.

Another solution is to format your removable disk as an "extended partition," which will force it to always be installed after primary drives and partitions are mounted. The disadvantage of this method is that you will not be able to boot from this disk in case your primary hard disk fails. Of course, you could always keep another Syquest disk on hand that is formatted as a "primary partition."

The "brute force" method, of course, is to always have a removable disk inserted and mounted during boot-up. Depending on your computer's operating system and configuration, you may be able to reassign drive letters via software.

Also, you should determine if the controller card/host adapter itself is capable of overriding DOS in assigning a drive ID and/or letter. This will probably require a careful examination of your drive's user manual.

The plastic shell that contains the hard disk platter does not have the same sliding plastic-door mechanism on it that the earlier 44 MB disks had, but instead uses a locking metal flap that flips up when the disk is locked into the drive. Presumably, the 3.5" platters are subject to the same perils from dust contamination that the larger disks are. Having had a number of serious problems over the years with our SyQuest disks (carelessly handled SyQuest platters typically develop serious errors after several months of use), we strongly advise you to be nothing short of fanatical about keeping SyQuest/SyDOS disks free from dust. Keep disks in their cases or the drive at all times. Despite the 5-year warranty on the media (two years on the drive), you probably won't want to lose your data.

Conclusion

SyQuest technology promises fast, convenient and reliable storage on removable media. As long as you handle the disks with care and keep them impeccably dust-free, the latest-generation SyDOS drives go a long way toward fulfilling that promise. ■

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Hard Disks

Continued from page 20

threat. Of every 10 recovery jobs we receive that are attributed to virus damage, on examination eight prove not to be.

Protecting Your Valuable Data

An entire book can be written on this subject but if you follow these guidelines you can avoid most disasters.

1. Maintain a comprehensive backup program. Nothing gives more protection against disaster than proper backup routines.

While everyone claims to do so, we regularly get data recovery jobs from companies whose back-up — or more importantly, restore has let them down. When you need to restore data is the wrong time to find out if your tape (or other media) is readable. Was the correct data being backed up? If your backup device malfunctions do you have access to an alternative? Is it even still being manufactured?

2. Record and have available documentation for drive and controller (your dealer or manufacturer may not be in business when you need it).

3. Record and save CMOS and configuration particulars.

4. Use a utilities program to back up and save a copy of the drive's partition table, or at least record the details.

5. Use a utility program such as DOS 5/Central Points Mirror or Nortons Format Recover-Image to save images of your drives Directory and FAT structure. Get a program and make sure it is run at least once a week. Do not run this program after you have run into difficulties.

6. Have the drive periodically defragmented (every six months). This will also improve performance. But make sure you have a current backup before running the program.

Understanding PC Hard Disks

This article is excerpted from a booklet published by Data Recovery Services Inc. to provide readers with knowledge of some fundamental concepts and terminology that are

Sightings

BY STEVEN M. JOHNSON



A new generation of West Coast office workers has taken up the fad of skating along business district sidewalks on wheeled, reinforced attache cases called Skatebriefs.

necessary to deal with the complexities of hard drive subsystems. It is *not* a technical reference guide and should not replace original documentation available from manufacturers.

Learning the ins and outs of hard disks is not a simple task and requires years of study and experience. Don't expect any book, training course, or manual to make you into an expert. But if you read and understand the subject matter covered, you will be off to a fine start. While this article refers specifically to PC and PC-compatible

systems, there is much information to benefit support personnel working with other hardware platforms.

The principal author is Nick Majors. He has been in the PC industry for 13 years, designing and developing hardware and operating system enhancements and performance tools. He is an experienced machine-language programmer and has provided technical training to support personnel for some of Canada's leading banks, government departments, corporations, and PC service organizations. He is the manager of

technical services for Data Recovery Services Inc.

The text has been contributed to and edited by Pete Rogers, client services manager at DRS, who has used much of his 10 years of experience to ensure that this booklet is clear and comprehensive. While every attempt has been made to ensure accuracy, misprints or ambiguities may still remain. So please use caution. ■

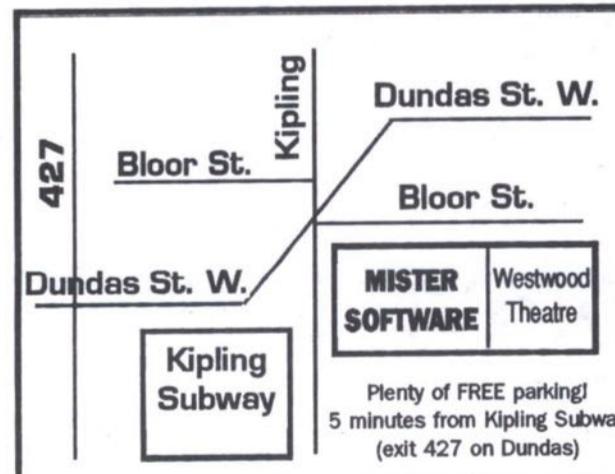
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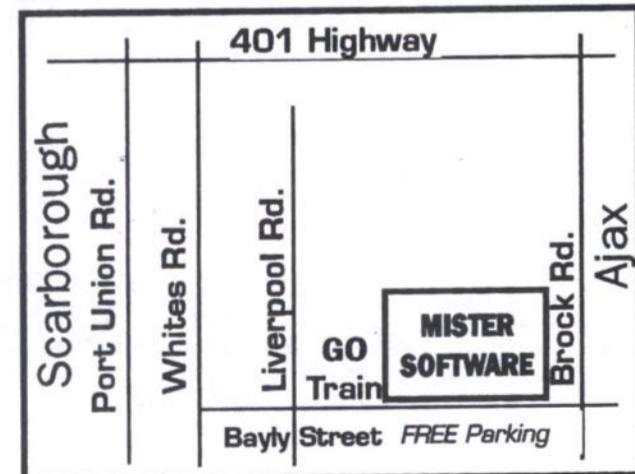
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Iomega Floptical for Mac

BY GRAEME BENNETT

Street price: US\$400

Although the disks resemble floppies, they have more in common with hard disks. Notably, a Floptical disk can be shared on an AppleShare network or via Apple's System 7 "personal file sharing." Interestingly (and appropriately), the drive will not attempt to share a standard floppy disk.

The drive was able to mount and access Floptical disks without requiring a special driver, although Iomega ships a system extension with the unit that adds Floptical formatting capabilities to the Mac's operating system. The Floptical drive cannot read or write 800K disks. The unit is smart enough to recognize when the wrong kind of disk has been inserted and immediately ejects it, rather than presenting you with a potentially alarming "Do you want to initialize" dialog.

Interestingly, although the drive can read and write 720K and 1.4MB PC-formatted floppies, it cannot easily create PC-compatible very-high-density 20MB disks. With Apple's PC Exchange software installed, the Floptical drive presented me with only the option to format a blank HD disk as a Mac disk, although PC Exchange allowed me to format that same floppy as a DOS disk using the internal drive of a Mac. Both drives could read DOS floppies. Insignia Solutions' Access PC software offered to format the Floptical disk as a PC disk, but formatted it with only 1.3MB of space available. After reinitializing it as a Mac disk, it displayed 20.3 MB of available disk space. Again, the formatting operation took only about 10 seconds.

I called Iomega's toll-free tech support four times and got through each time without any significant delay. According to Iomega's technicians, the workaround is to format the disk on a PC equipped with a Floptical drive and use Access PC or one of the other DOS disk mounters to read it on the Mac.

My only other disappointment is that the drive is Mac-specific. Although you may be physically able to hook it up to a PC, the unit will not work on anything other than a Mac, according to Iomega. Based on my

tests (I tried both Trantor SCSI and CorelSCSI drivers), I'd have to agree.

Chaos Theory

As chaos theorists say, "Initial conditions may vary." To be sure, the trouble-free installation and usage a Mac owner is likely to experience may not be shared by a PC user. Because the PC "hard-codes" drive-identifying characters in PATH statements, DOS .BAT files and Windows Icon Properties, havoc is unleashed when a change is made to the system that may cause drive letters to change.

Also, PC users with ISA (industry standard architecture) bus-equipped machines will undoubtedly have to fiddle with DIP switches, IRQ settings and memory hassles that Mac users do not encounter. The only difficulty a Mac user is likely to encounter is with the complexities of SCSI itself.

SCSI (small computer system interface) allows seven devices — each with a different ID number — to be "chained" together. Fortunately, the Floptical's manual explains the potential pitfalls clearly, and the drive itself has push-button ID selection and switchable "SCSI termination." Top marks for hardware implementation.

HOT Technology

According to the company, every one of its Floptical disks is a master — its optical reference track etched with a laser beam, using its second-generation "Holographic Optical Tracking" technology. It is this reference track which allows Floptical disks to store 14 times the amount of data of a standard floppy. Other Floptical disks have the reference track stamped on by a metal tool. Iomega maintains that its disks are thus more reliable than other brands. It is quick to point out that its disks can be used with other brands of Floptical drives, too.

Although blank Floptical disks do not appear to be formatted when you first insert them into the drive, they initialize in only 12 seconds using the Iomega driver. The company says this is because they are low-level preformatted.

The Floptical connects via SCSI and hence works with any Mac equipped with a SCSI port. Because Mac II and IIx machines

lack an external floppy port, this drive is an excellent alternative to adding a high-density floppy drive to those machines — especially considering the \$500 or so that most Apple dealers charge for a SuperDrive floppy disk upgrade. Users of other machines, too, may find a second floppy drive a useful addition for making backups etc. (Note, however, that the Mac Floptical drive cannot boot from a high-density floppy, although it can boot from a VHD disk. The PC version of the Floptical drive can boot a DD, HD or VHD disk and thus makes a Floptical drive a viable replacement for the "A" drive in an IBM-compatible machine.)

Of course, backups are why most people will want a Floptical drive, anyway. The advantage of being able to store over 20 megabytes on a single removable disk is obvious. The fact that the media is quite low in cost adds to the appeal.

A blank 21MB Floptical disk costs about US\$30. A SyQuest platter holds 44 megabytes and retails for about US\$70.

Extra cartridges for a 256 MB optical drive are only US\$89.

A name-brand high-density floppy diskette can be obtained for about US90¢.

Performance

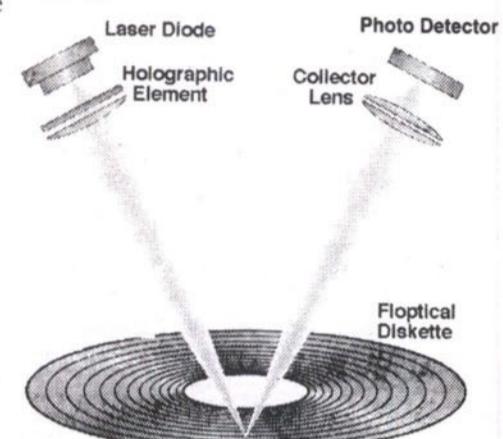
I had no problems using the drive. That in itself is no faint praise. I tested it on a Quadra 700 running System 7.1. (According to Iomega, it also works under System 6.) Overall, the Floptical's speed is about double that of standard "floppy technology." The Floptical copied a 1.8MB file to hard disk in 34 seconds. Readers may recall similar tests performed on CD-ROM and hard disk drives described in the June 1993 issue of *The Computer Paper*. For comparison, an Apple CD-300 drive took 29 seconds; a Fujitsu hard drive took seven seconds. A standard high-density floppy took 35 seconds to copy a 924K file. We may, therefore approximate the time required to copy a 1.8MB file by doubling that figure to 70 seconds. This is not quite up to Iomega's claim

of "up to three times faster than floppies," but it is not too shabby, either. Despite those claims, the speed was better than I expected.

I tested the drive's performance at copying large numbers of files. Copying 485 files, comprising 20MB worth of data, took just over 14 minutes.

It would take over 70 minutes to copy this data to an equivalent amount of floppies — plus time for formatting.

Corel Corp. is an early supporter of Floptical technology, much as it was for the CD-ROM. In what must surely qualify as one of the best deals of the decade for PC users, Iomega has arranged to preload a copy of CorelDRAW 3.0 onto its "Insider" PC Floptical and removable Bernoulli disk drives. A disk containing System 7.01 and 18 MB of shareware is included with Mac drives.



Floptical Technology achieves high capacity by using optical servo positioning to pack more tracks on a disk than conventional floppies.

Conclusion

The most compelling reason to use a Floptical drive is clearly its low cost — of both the drive and the media. The long-term success of the Floptical, I believe, hinges on its media costs. Therefore, I propose that media manufacturers use a trick that has long served print media, radio and television. Instead of charging the end user \$80 for the disks, subsidize the cost of the media with advertising. Imagine: the manufacturer sells disk space to leading software manufacturers, for demo versions of their programs and multimedia adverts. If the ad sales department does its job, the end user could pay next-to-nothing for the product and the company can still turn a tidy profit. Hey, it works for *The Computer Paper*.

Come to think of it, why stop there? I'd pay fifty bucks for a 500 MB hard drive loaded with advertising, wouldn't you? ■

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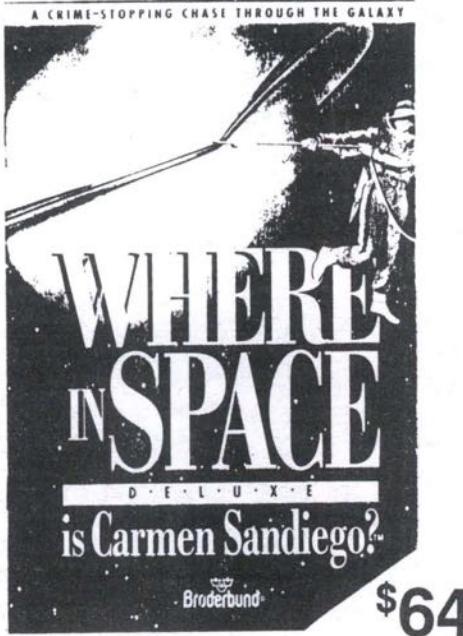
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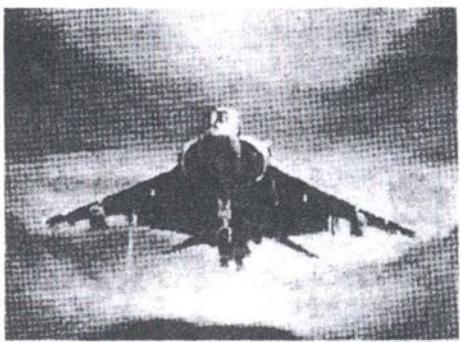
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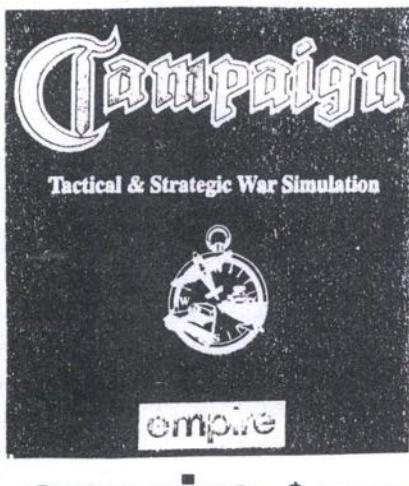
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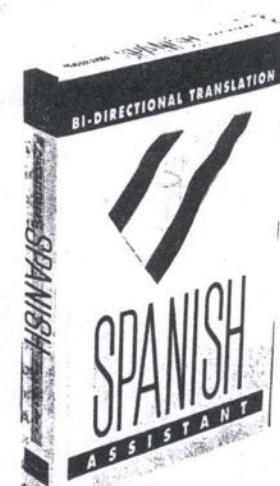
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HP LaserJet 4L

BY GRAEME BENNETT

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From: Hewlett-Packard

Street price: \$949

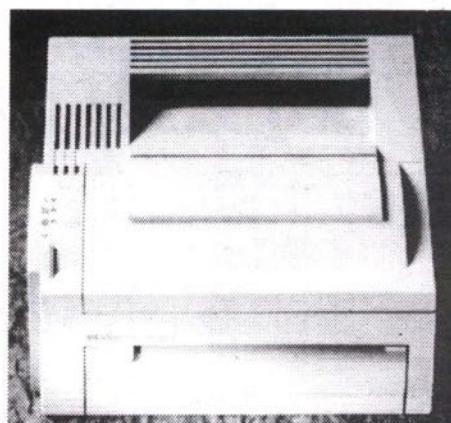
Summary: HP's lowest-cost laser printer is positioned to replace the 11p+ in HP's lineup, with new features such as resolution-enhanced 300-dpi text, 26 scalable typefaces, enhanced PCL 5, and a new bidirectional parallel "Bi-Tronics" interface. The printer lacks a power switch, but automatically powers down when not in use. One of its most novel features is its "Memory Enhancement Technology" that can print full pages of graphics on a unit with only one megabyte of memory. Although image quality suffers slightly, this is a boon to users who do not want to invest in more printer memory.

Although some users may find the lack of a power switch disconcerting, the printer's "power-smart" electronics are practically foolproof. The printer is completely silent when not in use. As soon as a print command is received by the unit, it powers up and prints the page. An activity light stays on for 15 minutes or so. If the printer is not used again during this period, it powers down again.

Explorer

Explorer is a DOS TSR (terminate and stay resident) application that allows convenient control of the printer. It does not work in Windows. (Windows has its own printer status messages).

Via the HP Explorer Remote Control Panel, I was able to select any of the print-



er's internal or downloaded typefaces and adjust the unit's print quality, as well as select how many copies to print, default form length setting, direction of the print on the page, automatic (continuous) or manual feed, paper or envelope size, etc.

The Explorer Remote Control Panel is also the door to several of the printer's most interesting and innovative features. One is an option called "Page Protect Auto."

If a page is very dense or complex, the printer may not be able to create the print image fast enough to keep pace with the laser printing process. Page Protect lets the printer form the image in memory before physically moving the paper through the print mechanism.

The manual instructs users to set Page Protect to On if the printer's amber Error light comes on frequently. With this setting, the printer uses Page Protect for every

print

FIGURE 1: RET enhanced the LaserJet 4L's 300-dpi output (shown at 400%).

print

FIGURE 2 (a/b/c): QMS PS-2200 (300 dpi) (shown at 400%).

page. All pages print slower. HP says that if you find that you need to turn Page Protect on all the time, you should purchase the optional printer memory.

If you select Auto, the printer automatically uses Page Protect only when necessary.

Selecting Off gave the best printer performance, but limited the printer's ability to print complex pages. I also got occasional memory error messages (the printer's amber Error light blinks).

When printing a very large graphics file at 300 dpi, setting Image Adapt to Auto tells the printer to use its advanced data compression capability to form the image within available memory. There is a small loss of detail (see Figure 2), but the entire image prints at 300 dpi.

With Image Adapt on, error-diffused scanned images printed faster.

Turning off Image Adapt tells the printer to print as much of the image as possible without losing any detail. In many cases, part of the image is cut off.

EconoMode

By turning EconoMode on, you can conserve about 50% of your toner. This reduces the print quality, but the text is still very readable for proofs and rough drafts. EconoMode does not affect print speed.

Adjusting RET controls the size and density of selected dots to smooth jagged edges on curved lines. Available settings are Off, Light, Medium, and Dark.

Adjusting density affects the boldness (line width) of your text or image. The range is 1 (lightest) to 5 (darkest).

Toner

The printer takes a new type of "microfine" toner cartridge that, according to the company, is more environmentally friendly.

HP does not recommend recycled toner cartridges.

The LaserJet 4L is a good choice for a home-office printer. Its "power-smart" electronics are a feature we expect to see a lot more of in the next few years. Text quality is excellent, thanks to HP's resolution enhancement technology.

Nice work, HP! ■

Connecting the 4L to a Mac

According to an HP rep at the company's "Driver Hotline" number (1-800-848-9283), 4L drivers are available for Windows 3.1 Printing System, TrueType Screen Fonts, DOS (WordPerfect, Lotus 1-2-3, Microsoft Word, etc.), Explorer, OS/2 version 2, Windows 3.x, and Intellifont. HP does not supply Macintosh drivers for the 4L, and its "Macintosh Printing Tools" drivers for the LaserJet 4M (a Mac version of its popular LaserJet 4), do not work, as they expect the printer to be equipped with the PostScript option. The HP representative told me that the company plans to release a PostScript version of the 4L for the Macintosh in July. A Mac version without PostScript is not in the works, according to HP. Presumably, the company thinks all Mac users want PostScript — and are willing to pay extra for it. What about Mac users who just want a low-cost laser printer?

Fortunately, there are several companies that make third-party drivers for non-PostScript HP printers. In our experience, the best solution is the LaserJet 3 driver in the PowerPoint collection by GDT Softworks (604-291-9121).

PowerPoint version 2.0.1 supports a huge array of dot-matrix, inkjet and laser printers, including the 600-dpi LaserJet 4 and the RET-enhanced LaserJets III and 4L.

Because the 4L, like many PC printers, has only a parallel port, a parallel-to-serial converter is required to adapt a parallel printer to the Mac's serial port.

Although the HP rep on the company's hotline recommended Orange Micro's Grappler interface as a possible way of hooking up the 4L to a Mac, I was unable to connect a Grappler to the printer, due to the deeply recessed parallel port hidden under a side panel.

Luckily, the Paralink interface optionally available with the GDT PowerPoint package fits and works fine. Earlier versions of the Paralink required a separate A/C power adapter, but the newest model is self-powered.

Aside from the trouble it causes the Grappler, the 4L's design has some benefits. On the side of the printer opposite that of the parallel connector is a similarly recessed power cable socket. The unit ships with a non-standard power cable with an "L" shaped end. These recessed ports serve to reduce the room required behind the unit. This may be useful where the unit's small (14" x 14" x 6.5") footprint is a valuable asset. ■

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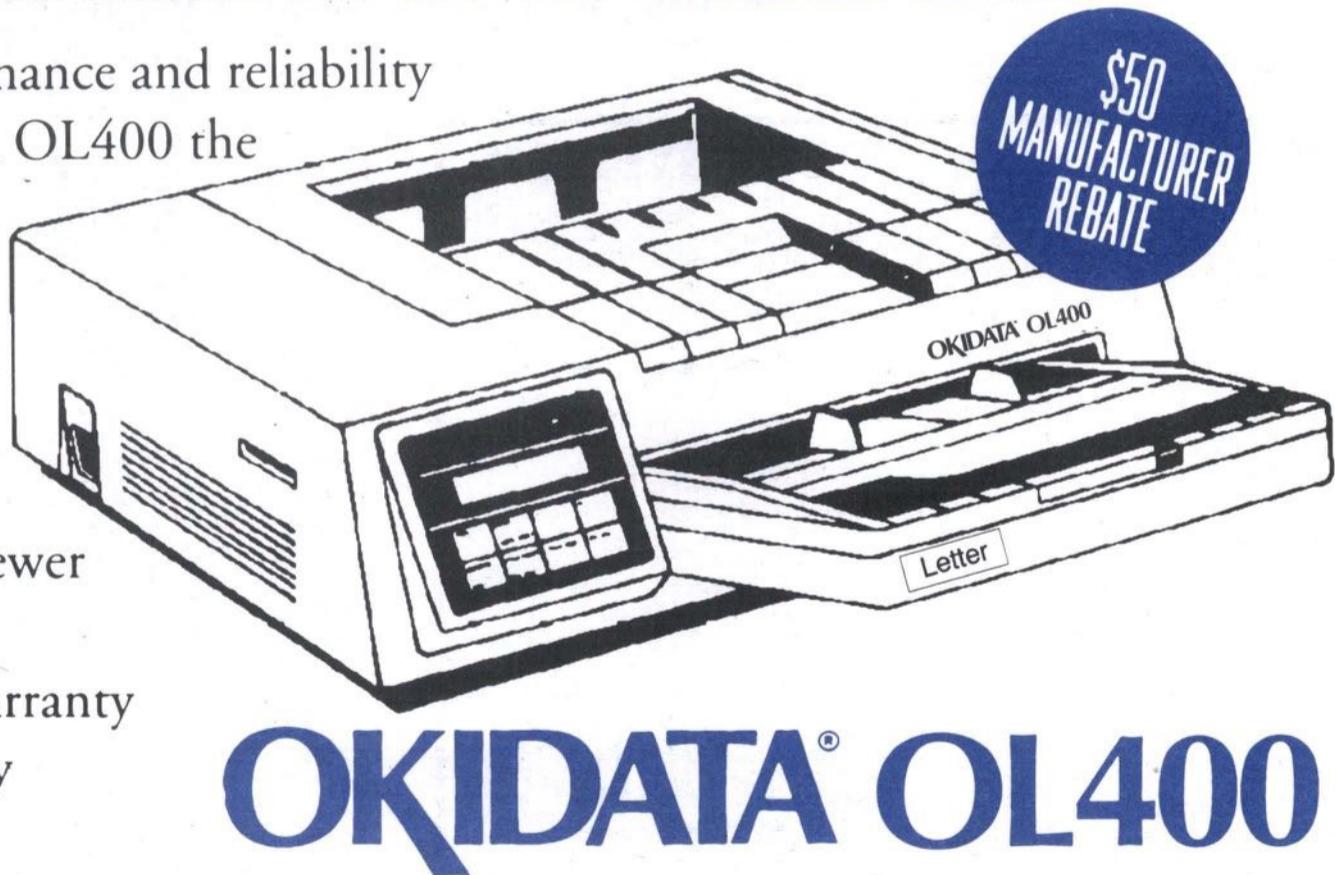
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Computers and MIDI

BY SHEKHAR GOVIND

TECHNICAL EDITING BY CRAIG O'DONNELL

AND NICK ROTHWELL

ADDITIONAL MATERIAL BY GRAEME BENNETT

Introduction to MIDI

Picture yourself as a musician, composing and arranging each part of, say, a quartet, printing the sheet music, playing, and flawlessly recording (in CD quality, of course) the entire performance. Did we mention you could do all this by yourself on your computer? You are the publisher, the composer, the band, the conductor, and the sound engineer, all rolled into one. As

instrument will be faithfully "recorded" on the computer for editing and playback. (As explained later, the sequencer does not record the audio sound; it records performance information only.)

The Antecedents

It is important to remember that MIDI was created to simplify live performances. During the 1981 fall convention of the

Audio Engineering Society, Dave Smith and Chet Wood, two engineers from the synthesizer manufacturer Sequential Circuits (creators of the popular Prophet-5 synthesizer) proposed an industry standard for an electronic musical instrument interface. The idea was that performers should not have to create custom cables and devices to connect synthesizers. Instead, they should be able to "plug and play" with units from different manufacturers. (This was not the case before, when Moog synthesizers could not talk to ARP 2600s and neither would talk to Buchla Music Boxes.) Dubbed the Universal Synthesizer Interface



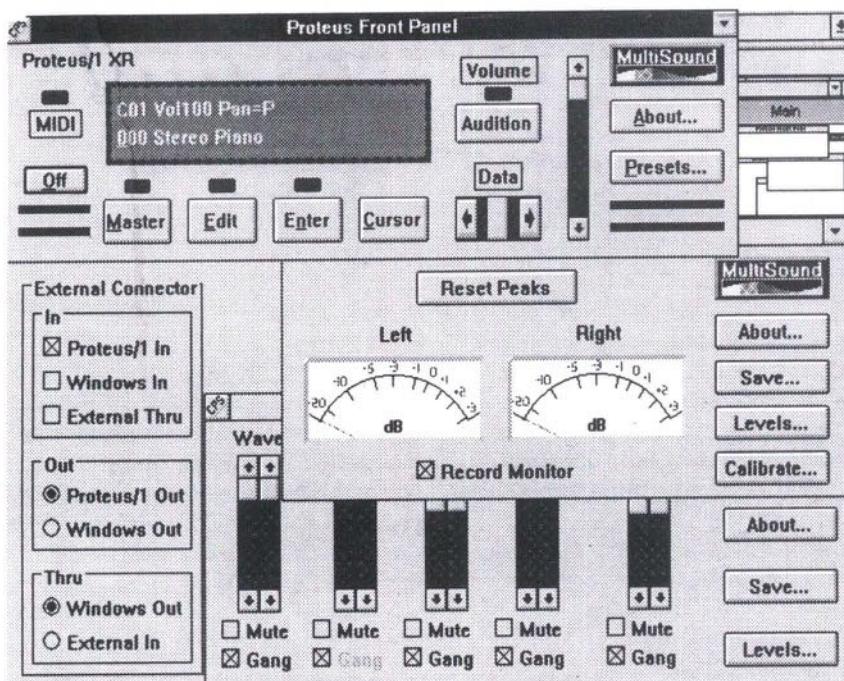
Zonker Harris would say, "Imagine!" If you'd rather live the scenario than imagine it, step into the world of MIDI where you can spend as little as \$600 or so for software, an interface, and a used synthesizer, or as much as \$50,000 for a complete MIDI-based production studio.

The MIDI specification (MIDI stands for Musical Instrument Digital Interface) enables synthesizers, sequencers, personal computers, drum machines, etc. to interconnect through a standard protocol via an inexpensive serial hardware interface. Even though the operating system within each device may be different, MIDI gives musicians "plug and play" synth-computer communication. Any MIDI-savvy musical instrument can connect to a PC, Mac, Amiga, Atari or other personal computer with a MIDI interface. With so-called "sequencing" software running on the computer, a musical piece played on the

(USI), this draft proposal was modified by the techies of various synthesizer manufacturers (Oberheim, Roland, Korg, Yamaha, and others of their ilk). A consensus was orchestrated on the revised proposal and in late 1982 (drum-rolls please) the first set of universal MIDI specifications was adopted.

The Effects

MIDI turned into an unanticipated success, rocketing sales in the synthesizer category to the top of the musical instrument industry within a few years. New companies like Opcode and Digidesign appeared overnight in what had previously been a sedate and technophobic industry. In the early 1970s the best-selling synthesizer keyboard (the MiniMoog) sold only about 12,000 units, and in the late 1970s the best seller (the Korg Poly6) sold some 100,000 units; the best seller during the dawn of the MIDI



The Multisound card from Turtle Beach Systems (717-843-6916) puts a Proteus in your PC.

age, the Yamaha DX7, combined new sounds and MIDI to sell at least triple the previous record (exact numbers are hard to find).

How MIDI Works

MIDI translates a predefined set of performance events at one instrument, called the master controller, into digital messages that are sent to other devices over a low-speed serial link operating at 31.25 kbps — about twice the speed of a v.32bis modem. To make it easy to keep musical information going where it should, these events are encoded on any of 16 independent logical channels within the MIDI data stream.

A synthesizer receiving this incoming data stream responds by playing music. Imagine playing a series of half-note C-major chords on Middle C on a DX7 synthesizer wired to one or more other synthesizers. In this case, the receiving MIDI device plays a matching chord in perfect synchronization with the DX7. But (and this is a big but) the receiving instrument may use a different instrument sound, or "patch" (a patch being a particular synth voice — grand piano, hot guitar, sax, viola, what have you), depending on its settings. The chord is the same, but the generated sounds within each synthesizer may differ. In other words, MIDI keeps track of the performance events, and not the audio sounds. Further, a MIDI keyboard can control a number of sound-producing synthesizers without any computers being involved, and without any recording of the digital data.

As an example, consider a DX7 wired up to a Sound Canvas which is in turn wired to a Proteus. (Sound Canvas and Proteus are "sound modules" or electronic musical instruments with a synthesizer's sounds/circuitry but without the keyboard.) The musician plays a half-note C4 series on the DX7 keyboard (which could be patched to sound like a piano.) Notes, timing, and other performance information is transmitted to the keyboard-less Sound Canvas and Proteus sound modules (which could be patched as, say an organ and strings respectively).

Schematically, it would look like:

DX7 — MIDI cable -> Sound Canvas — MIDI cable -> Proteus (master)
plays C4 plays C4 plays C4
as piano as organ as strings

The two sound modules play the same

chord as the DX7; but the actual sounds generated within each module use a different instrument sound, or patch.

People did pre-MIDI data recording and editing with special hardware. Some of the most sophisticated pre-MIDI systems came from Sequential and Oberheim and consisted of keyboards, drum machines and a hardware recorder (called a "sequencer") connected by proprietary data links and cabling. Around the same time Fairlight and PPG offered integrated systems controlled by a piano keyboard, keypad, and CRT.

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Here is an example of a simple Mac-based MIDI setup. A MIDI keyboard (we'll stick with the DX7) interfaces to a Mac serial port with a \$60 MIDI interface and two MIDI cables, one from the keyboard's MIDI output to the interface input, and one from the interface output to the keyboard's MIDI input. The MIDI data links are unidirectional to keep everything simple and inexpensive. Schematically, MIDI data travels like this:

DX7 output -> MIDI cable 1 -> interface in
interface port -> serial cable -> Mac port
DX7 input -<- MIDI cable 2 -<- interface out

The two MIDI data links convert to a bidirectional serial signal inside the MIDI interface.

Consider this. You launch a sequencer program and tell it to record incoming MIDI data (typically by clicking on a cassette deck-style button labeled "Record."). When you play a note on the synth, a message is sent to the computer identifying the key, how hard you struck it, for what duration you held it down, etc. The software stores this information. Once you play the music and all performance information has been recorded, you can edit individual musical events on the screen in much the same way you edit text in a word processor.

To reiterate, a MIDI sequencer file is only performance information, not the sounds themselves. The universal standardization of MIDI has made it possible to use software sequencers instead of the earlier proprietary hardware sequencers.

If the sequencer software is a high-end package, sheet music can be displayed on screen, and printed from the MIDI "sequence" file. The MIDI performance data can be edited, looped, reversed, the tempo can be changed for playback, and the entire piece can be transposed to different keys. In short, the data can be processed separately and in a more innovative manner compared to anything in the audio domain. Finally, the file may be present as MIDI commands back to the synth for flawless playback.

One showcase MIDI music CD is "Switched-on Bach 2000." Wendy Carlos' re-recording for the 25th anniversary of the hit classic(al) album "Switched-on Bach" was produced on a Mac IIfx. Wendy Carlos owns a stunning array of advanced synth gear, however, so remember that the computer isn't making the sounds; the synthesizers are.

MIDI and General MIDI

MIDI commands are 8-bit binary serial messages with 16 encoded channels. A master keyboard, one cable, and a slave device make up the simplest possible MIDI network. Once a computer is connected to the MIDI network, messages can be captured by a sequencing program and saved as a Standard MIDI file, a cross-platform standard. This means that MIDI music is, to a certain extent, device-independent. A Standard MIDI file played on Synth A and recorded on a Mac can play back on Synth

B which is connected to a PC clone.

While most synths respond to the complete set of MIDI commands, a few older (and cheaper) models don't. Many of the latest generation of synths understand "General MIDI," a new subset of MIDI specifications from the MIDI Manufacturers' Association. In a nutshell, General MIDI specifies a few hundred consistent instrument sounds which all General MIDI synthesizers can play.

Why the need for General MIDI? Well, to start with, for years and years, synth manufacturers invented their own "map" of sounds, or voices. As an example, a Roland synth and a Korg synth would both have a Grand Piano as one of the instruments they could emulate. However, the "address" of the Grand Piano in the ROM would be different for the two synths — or, put another way, the two synths would assign different patch numbers to the Grand Piano sound.

Furthermore, one synth might have 48 different Grand Piano sounds and another might have four. An expensive synth might have 256 pre-programmed patches, and a cheap one, 32.

This free-for-all made it impossible to take a fully-orchestrated MIDI file from a Korg M1, load it into a computer, and play the music as the composer intended on a Proteus from E-Mu. You'd get music all right, but instead of violins

during the intro, you might hear a flute. For the music to sound as originally intended, someone would have to revoice (or "repatch") the arrangement for the new output device.

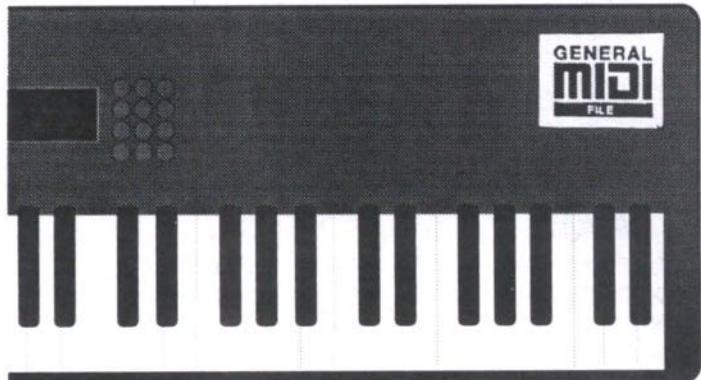
So we lied a little bit to you before. MIDI files aren't strictly device-independent when it comes to playing the *original* sounds. General MIDI solves this because within a certain subset of MIDI, it specifies instruments which all synthesizers can share. Of course, any manufacturer is free to go beyond General MIDI.

To use MIDI in multimedia, and to put MIDI chips on sound cards, there has to be agreement on what sound is assigned to which patch number. Remember, MIDI is tone-deaf and doesn't know a Hammond Organ from a Tam-Tam. MIDI just broadcasts signals such as: "Yo! Synth on Channel 1! Set Patch 45! Now play these chords!" Unfortunately, with complex orchestrations, the results can be unintentionally hilarious. A piece of well-crafted music ends up sounding more like the Portsmouth Sinfonia, Spike Jones, or Peter Schickele.

General MIDI also answers a question that's a shade more esoteric — "What do I do with the drumkit?" (Musicians who play live would probably phrase this as "What the hell do I do with the drummer?") In MIDI, a couple of drumkits may be contained in a single patch with individual drums and cymbals assigned to different notes on the piano keyboard. For example, a drum patch on your keyboard might map C2 to bass drum, C#2 to a rim shot, D2 to a snare drum, E# to a china cymbal etc. (Yes,

you can play drums from the keyboard! Different drumkits could be different patches. You might have:

Patch #	Type of Drumkit
45	light jazz kit
46	rock kit
47	electronic rock kit
48	orchestral percussion



A synth needs to listen for drum commands on a given MIDI channel so that the notes come out as hi-hat and snare instead of as flugelhorn notes. We have already discussed that General MIDI specifies a standard patch number for a particular instrument (including drums). But which of the 16 possible channels could possibly be broadcasting the drum events? Well, prior to General MIDI there was no default channel number for drums that everyone agreed on. Now there is — Channel 10 is reserved for drums.

In a certain sense, General MIDI restricts MIDI in that it makes demands of the instruments to conform to a limited set of sounds and a minimum capability. It is not necessarily the future of MIDI and synthesis; it is merely the lowest common denominator for people who want to orchestrate music for a predefined palette of sounds. General MIDI music can be ported as MIDI files and will continue to sound similar on different hardware setups (for example, for multimedia applications) without requiring patch remapping.

The MIDI specification can be purchased from International MIDI Association (which is just that — a worldwide MIDI user group) with offices at:

International MIDI Association
1185 Hartsook Street
North Hollywood, CA 91607

Other technical information about MIDI is available on the Internet via FTP from, among other places, <ucsd.edu> and <louie.udel.edu>.

Further Readings

Don't be lulled into a false sense of complacency. Like any computer communications language, MIDI becomes complex once you move beyond a simple setup with a couple of synths and a computer. Fortunately, most music retailers that sell electronic instruments

are very computer-literate. You are more likely to find a salesperson in a music store's keyboard department who knows a lot about computers than you are to find a computer retailer who knows about music.

For further edification, you may want to delve into some MIDI reference books. Steve De Furia has authored (and co-authored) several informative general and Mac-specific MIDI books. *Keyboard Magazine* has published several useful volumes and "Special Focus Guides" for a detailed look at MIDI and synth basics. Craig Anderton's readable *MIDI for Musicians* is a classic. Most libraries (and fine bookstores) offer at least a dozen other publications about using MIDI and creating MIDI software. Like most things technical, MIDI is a moving target and new books appear each year. ■

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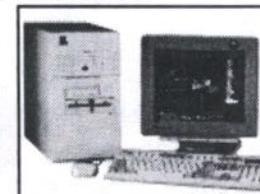
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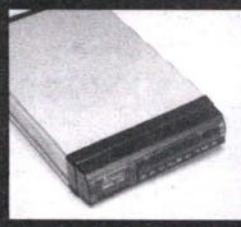
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Machine-aided translation

for the Chinese language: evolution & potential

BY ELEANOR NG

Translation is an interlingual, intercultural and interdisciplinary activity. It is at once an artistic endeavor and a technical process — much more than the conversion or transposition of words from one language to another. It requires a high level of awareness and intelligence and also a good knowledge of the vocabularies and structures of the languages involved.

Such requirements were too demanding for earlier microcomputers to cope with. However, recent breakthroughs in computer technology offer many possibilities in this area. With the availability of bigger storage devices at a more affordable price, storing and matching of dictionaries and grammatical structures are more feasible. The debut of newer generations of CPUs with significantly faster processing speeds allows the use of artificial intelligence in automatic translation by microcomputers. Standardization of basic computer codes for different languages, e.g., ASCII for the English language, made possible the translation of documents to be independent of the proliferation of software tools which create those documents. Recent advances in the technology of optical character recognition (OCR) further smooth the operation of machine translation.

Typically, computer-aided translation takes the form of draft translation. Accuracy and satisfaction in the translation of technical texts or even professional documents is much higher than for literary works. Another overriding factor in the degree of accuracy is the basic differences of grammatical structure between the source and target languages. In any case, a language-capable operator is preferred, as system operators must understand and have a working knowledge of the language being translated to effectively update language dictionaries and polish the final output.

Background

Computer-aided translation originated in the U.S.A. in the late 1950s. The need to translate Russian documents for intelligence purposes in the era of the East-West Cold War was further fueled by fierce competition in space technology. These events laid the cornerstone for intensive research and development in such software. Both the U.S. government and commercial enterprises invested huge amounts of money in programs which dramatically advance the ability to meet the increasing need for fast production of a workable draft for scientists and national defence personnel. Such fervency lasted well into the '60s. The industry, however, had always been crippled by the immature computer technology of the time and haunted by unrealistically high expectations of machine

translation. These deep-seated drawbacks finally culminated in the negation of its perceived value by the U.S. Congress's ALPAC Report.

Two decades later, historic forces in the East again provide an opportunity for machine translation to flourish. The 1980s witnessed Japan's unprecedented economic advances in both domestic and international trade. In order to reach and stay in the frontier of technology and industrial innovation, the Japanese in turn invested heavily in the development of translation programs so that they could keep track of commercial trends and foreign technological innovations.

In 1984, a company called Bravice marketed Japan's first translation package; it was followed by other prominent industrial leaders such as Sharp, Hitachi and Toshiba. Their major products are English-to-Japanese programs and vice versa. By this time, researchers and educated end-users had redefined the role of machine translation in providing working drafts as the current industry standard for automated translation.

In essence, it greatly enhances communication capabilities while substantially cutting down the time required to translate a document. In the process it also helps to break down the cultural barriers between different peoples, foster their understanding and facilitate exchange of information among them. It works best for translating manuals, legal contracts, patents, technical and medical documents, product descriptions, official correspondence and any subject-specific text. With the availability of personal computers at more affordable prices, PC-based translation software is now becoming a popular and valuable tool in breaking through language barriers.

The current situation

Having gone through major stages of development, machine translation is now a mature and marketable technology. In Europe, "Eurotra," a powerful package facilitating translation of nine major European languages, is being developed as a tool to improve communication among EEC members.

In Japan, where pioneer translation products first took off, breakthroughs in voice capture and conversion are making amazing milestones in the industry, rendering teleconferencing with participants speaking different languages a possibility.

While progress in translation in the U.S.A. has been stalled since the ALPAC Report, Canada has manufactured a variety of programs to meet the needs of its multicultural and multiracial society. "Taum Meteo" is one of the outstanding products

for translating meteorological reports from English to French.

In the East, the Peoples' Republic of China started research and development in machine translation well before Taiwan did. It started off with major efforts focused in developing Russian-to-Chinese translation programs, followed by English-Chinese and French-Chinese packages. However, its endeavors are to a great extent impeded by its comparatively backward computer technology. Taiwan, on the other hand, supported by its advanced achievements in computing science, especially in personal computers, has succeeded in manufacturing two major lines of translation systems which are suitable for commercial or general professional use.

For those who demand low-level word-by-word translation, there are palmtop translating machines which usually come with phone directory and appointment book — a handy tool for businessmen on work trips, tourists and foreign students. As an example in this category, is "Passport," a hand-held word translation device which uses photography to capture text which is then converted into Chinese characters. For sentence-to-sentence or document-to-document translation, however, more sophisticated systems with most or all of the following characteristics would be required:

1. built-in bi-directional bilingual dictionaries;
2. support for dictionary additions and editing;
3. built-in libraries of grammatical structures of both languages;
4. support for "learning" of grammatical structures;
5. support of an on-screen editor to view and edit both languages;
6. support of scanners and OCR softwares to import existing documents of both languages;
7. processing speed of 10 MIPS minimum (equivalent to 486/SX 25 MHz PCs) to enable the satisfactory processing of the artificial intelligence required for adequate translation.
8. support for high-resolution graphic-interfaced monitors for the display of different languages with different character matrix formations.

PC-based translation software

"TransPerfect," a full-blown PC-based software package, promises up to 80% accuracy in English-to-Chinese translation. In its dictionary look-up, it includes the capability to search for synonyms, antonyms and terms often preceding and following a particular term. The output can either be in classical or simplified Chinese. A voice card and a Sound Blaster to facilitate voice output in Chinese can also be installed as part of the translation package.

It supports the key features mentioned above, and has an open architecture for incorporating external word processors for creating and editing English and Chinese documents. It also supports a mouse and optical character recognition device for text capture giving you a choice of processing your document in either batch or interactive mode.

On a even higher level, programs are now available that can recognize English text, create internal data structural patterns and churn out Chinese text. We'll discuss these products in the next issue of *The Computer Paper*. ■

Say Hello to Mini-mouse HP's next-generation notebook

Smaller and lighter than other notebook PCs, HP's new notebook comes preloaded with Windows and a full suite of Microsoft Windows applications, all on a PCMCIA card. (It has four PCMCIA slots, though two are used for type 3 PCMCIA cards such as a hard disk.

It has a button on the top right with a picture of a mouse on it. Press the button and a mini-mouse (I've been looking for an excuse to say that for years) pops out of the side of the machine. It's tethered by a flat, stiff cable which transfers the mouse move-

ment back to the computer, not anything on the mouse itself.

Battery life is said to be a full working day, and in a pinch you can fit four AA cells to keep you going. Rather than have a sleep mode that either slows everything to a crawl, or keeps the settings on disk so you can reboot the machine to where you were when you quit, it has a processor that stops ticking over, but can keep everything intact. Just switch it on and you're immediately back in your application.

The screen is monochrome VGA with

out backlight. The keyboard feels larger than the small machine will allow. It even has built-in 110 k bits per second infra red serial communications that the maker tips will become standard on its desktop machines and printers in the future. That means you just point it at the other device and you're connected to it. A company spokesperson said it could even be used as the world's most expensive TV remote control as it could be programmed to learn their commands.

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BY GEOF WHEELWRIGHT

Compaq Contura 4/25c

The release of Compaq's Contura range of notebook systems one year ago marked a turning point for the pioneering Houston-based computer maker. After years of selling premium-priced portables and desktop systems, the company announced a whole raft of new machines that would put them back in the price/competitiveness race while leaving them leading the pack in terms of product features.

The more recently-released Compaq Contura 4/25c is a good example of how this philosophy has produced more affordable, high-quality systems. We recently had the opportunity to spend some time with one of these systems and were very sorry to see it go. (But then Compaq wouldn't be declaring record profits if it were to go around leaving evaluation systems in the greedy hands of me and thee).

For the record, the Compaq Contura 4/25c is a 6.7- pound color notebook computer that uses a 25 MHz processor, 4MB of memory and between 120MB and 209MB of hard disk storage. It comes with an "advanced" 9.5-inch, VGA-compatible passive color matrix display and a clip-on trackball. Compaq does have a wonderful built-in trackball (called the EasyPoint) on



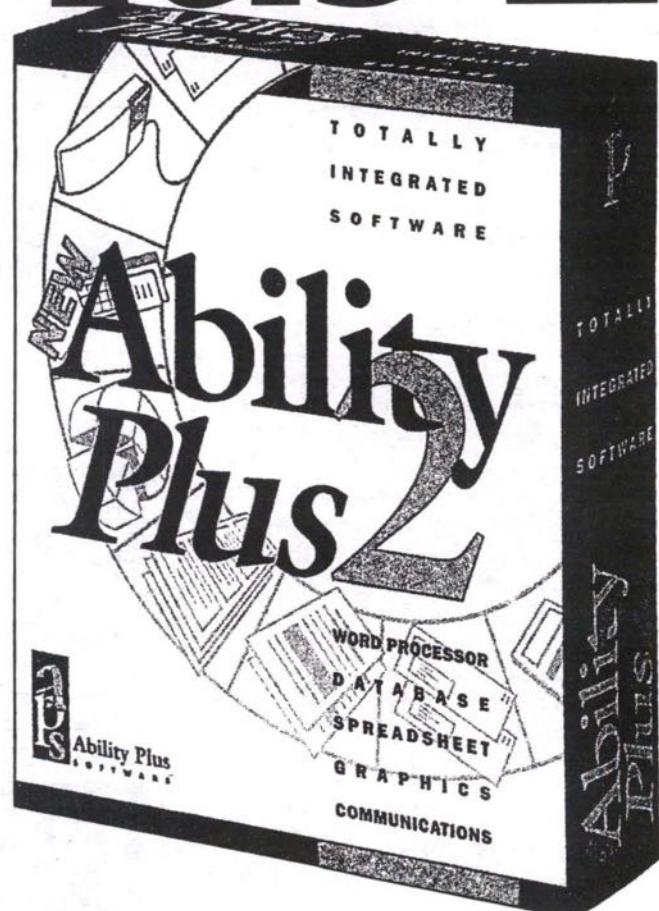
some other models, but only the clip-on trackball is available for use on the Contura 4/25c.

Despite the lack of an EasyPoint built-in trackball, the crisp, clear and truly remarkable color screen on the 4/25c — along with its exceptional performance — make it a hard machine not to like. It goes a long way to passing the test of being able to substitute for a desktop system, with lots of

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power, a great screen, memory expansion available to 20MB and a very sensible design.

The only things that would prevent us from giving this machine a fully-fledged "desktop replacement" guarantee is the expansion options. Compaq's expansion slots are not PCMCIA-compatible, so that any networking, CD-ROM or other interfaces you want to add to this system will have to come via the parallel port.

This machine is a delight to use, a joy to look at and more than powerful enough to meet most people's needs. If you have the extra cash needed to pay for the advanced passive matrix color screen — and it's a good deal less than you might think — this machine has to top your list of nominees.

Eurocom 3500

We looked at two Eurocom machines — both supplied by the Comet Computers division of Vancouver-based Impaq Technology. Once again, the chief attraction of these systems is low price — with prices on the 33 MHz 386DX version of these notebooks starting at less than \$2500.

Our test included both this monochrome entry-level notebook as well as the company's high-end 33 MHz, 486DX2 3500C passive matrix color notebook. In terms of design, they were both identical except for the screen and processors and looked to be of the slightly older school of notebook construction.

While they fit the standard A4 form factor (8.5 x 11 x 2 inches) of most notebook systems, they were slightly heavier (at eight pounds with batteries) and did not include a PCMCIA expansion slot option. Having said that, these machines both did better

than Compaq in offering the options needed to make them credible desktop replacements.

Not only did both provide the standard interfaces for printer, mouse, external keyboard, serial devices and a numeric keypad — along with a built-in trackball — but they also offered a full AT-bus docking station port. This means that with the addition of an optional docking station, the machines can accept any standard AT expansion cards when used at your desk (AC power is required while using the docking station).

Battery life was unexceptional — especially on the color system which didn't seem capable of going more than an hour without being recharged. The speed of both machines, however, was particularly impressive and should make them worthy of note for anyone who needs a high-powered, low-priced notebook.

As for the screens, the monochrome display was on a par with most backlit competitors, while the color offering was somewhat inferior to the Compaq offering. I have since seen a new active matrix color display on one of these machines and it is excellent, but carries a hefty premium for being so. None of this is to say that the Eurocom's passive matrix color display is unacceptable — just that it isn't the best on the market.

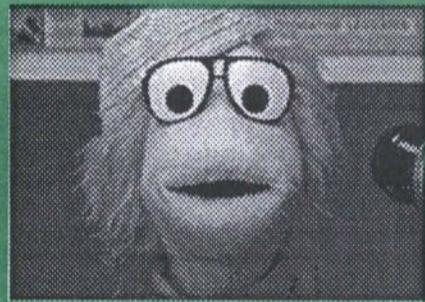
At these prices, however, you may be willing to be a little forgiving. The company's suggested retail price for its starter color system begins at \$4250, and I would bet that the street price will shortly sink below the \$4000 level. That's got to start a few people rethinking their ideas about the cost of color portable computing. ■



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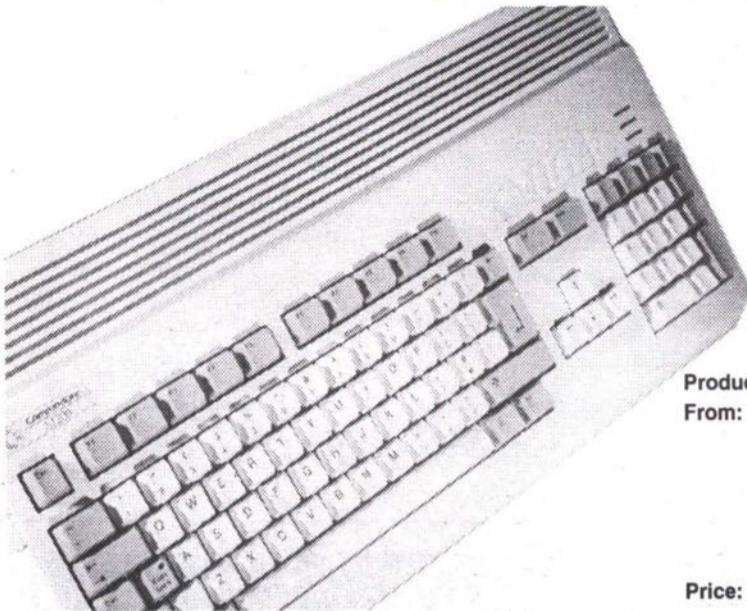
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REVIEW

The Amiga 1200

BY GRAEME BENNETT



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Who might want an Amiga 1200? It's very easy to set up, so presumably it will appeal to computer novices. Plug in the power and the mouse, connect it to a TV, and you're up and running in two minutes flat. It's got an easy-to-use graphical user interface, so it is bound to appeal to users who would otherwise consider a Macintosh or Windows PC.

It's got plenty of color, stereo sound and joystick ports; its packaging and form-

factor suggest that Commodore intends it to appeal to the same mass-market that bought the C64 in droves during the early '80s. It is sure to appeal to game buffs looking to stretch beyond the Nintendo level, as well as creative people who will explore its many graphics, music and animation programs. And did somebody say video?

It has plenty of improvements over earlier Amiga models, and it is much more powerful than 8-bit Commodore models of

years gone by. It will undoubtedly appeal to long-time Commodore fans — especially those who have been waiting for the right time to upgrade. Users with lots of older Amiga software should be prepared for some disappointments, though; a number of old Amiga titles (mostly games) don't work properly on the A1200.

Amigas have proven appeal with "power users." There are many (well, "a vocal minority") who feel it is the best computer, bar none. The Amiga has always had a true multitasking operating system, with powerful and sophisticated graphics capabilities. Yeah, well, the A1200 is better in these areas than previous models.

And, the Amiga 1200 is pretty darned inexpensive. You gotta love that.

Maybe all of these factors will add up to enough sales that the Amiga will stop being the "Rodney Dangerfield of computers." Indeed, the Amiga 1200 deserves a little respect.

Hardware

The CPU (central processing unit), keyboard, floppy disk and hard disk drive are all contained in a single unit not much larger than the standard extended keyboard found on most PCs. A separate power supply attaches at the back, which sports a number of other connectors for mouse, light pen, joystick, stereo audio, printer, modem, external disk drive, etc. Several video output connectors are standard, including RGB, color composite and RF (television) output. Expansion connectors include a "local bus" CPU slot and a PCMCIA (people can't memorize computer industry acronyms) memory/accessory slot. The A1200 can be expanded to a maximum

of 10 megabytes (MB).

Performance

The first thing I noticed was how amazingly fast it seemed. The "WorkBench" graphical user interface appeared in five seconds flat, complete with a snazzy patterned desktop. When you display a long text file, the Amiga's custom "blitter" (bit-block transfer) chip scrolls the screen so fast, it's nothing short of incredible. It's worth checking out, especially if you are familiar with how long it takes on a high-end Mac or PC.

This is all the more impressive considering that the A1200 uses only a 68EC020 microprocessor running at 14MHz. This chip, while more capable and twice the speed of the 7.16 MHz CPU found in Amiga 1000, 2000, 500 and 600 models, is not as powerful as that found in 386SX-based PCs or Macintosh LC II models. Why, then, does the Amiga run circles around these machines in areas like screen performance? Clearly, the Amiga's custom chips handle a lot of the grunt work that bogs down the main CPU in other computers.

Recent releases of AmigaDOS have dramatically improved disk performance, with a faster file system and directory caching. The older file system is still supported.

I tested the A1200 with a Microbotics MBX-12 RAM card with an onboard math coprocessor. It is considerably faster than an Amiga 2500. In benchmark tests, it comes out about 20% faster than a 2500 — an increase at least partially due to the MBX-12's use of 32-bit SIMMs. The A1200 I tested came with a 40MB hard drive, but higher capacities are available. Gene Enrody of VFX Video says he has successfully

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dropped high-capacity IDE drives into the 1200, including the new 2.8-inch Seagate 240-meg unit.

Strangely, there are two blank keys on the 1200's keyboard — at least, the one Commodore sent me for testing. Presumably, these are used in European markets where the Amiga is most popular. One is to the left of the Return key; it does nothing. The other is right of the left-hand Shift key; it duplicates the "<" symbol. Interestingly, the "Keyshow" tool included with the Amiga doesn't even show these keys. Instead, it shows larger Return and Shift keys.

The fact that the A1200 doesn't support high-density (HD) disks may be a problem for those users who plan on exploiting AmigaDOS 3.0's ability to read and translate data from IBM floppies. These days, it is rare to find PC users who still use the older double-density disk format, although all HD drives support the lower density as well.

HD drives support the lower density as well. (The CrossDOS utility included with AmigaDOS 2.1 and 3.0 also includes a translation filter for Macintosh text formats. For the Amiga to read a disk created on a Mac requires that the disk be formatted in an MS-DOS-compatible double-density format using the Apple File Exchange utility bundled with every Macintosh, or an optional utility (PC Exchange, Access PC, DOS Mounter, etc.). CrossDOS also successfully read disks created on an Atari ST—in recent (MS-DOS-compatible) and the older proprietary TOS formats.

On the other hand, virtually all Amiga software is shipped on double-density disks. The Amiga is able to write more to a double-density disk than either MS-DOS or the Mac does (with 880K, 720K and 800K respectively), but nevertheless, I wish Commodore had included the higher capacity HD drive as standard.

These quibbles aside, this latest release of the Amiga's operating system is so much better than versions prior to 2.0, that there's almost no comparison. AmigaDOS 3.0 sports a completely redesigned WorkBench, that looks and acts sort of like a cross between NeXTstep, Motif and Macintosh. In short, it's a fine graphical user interface. Fonts, screen colors, printer choices and numerous other settings are selectable through a drawer of "Prefs" settings. This modular approach is analogous to the extensible control panels found in Windows, Macintosh and Atari computers.

AGA

I was simply amazed at the vast number of screen display modes supported by the A1200's new Advanced Graphics Architecture (AGA) chipset. The ScreenMode panel lists no less than 42 different modes.

I also discovered that you need one heck of a monitor to display them all. It seems that most multiscanning ("multi-sync") RGB monitors can't scan down to the 15KHz level required for NTSC video compatibility. VCR-compatible NTSC monitors, on the other hand, aren't compatible with anything but this 15KHz mode. Some displays, like Commodore's original Amiga RGB monitors, have a switch or button on them that can be used to select NTSC or Analog RGB modes. Older Amiga monitors, however, don't support the higher resolution modes either.

I resorted to performing my tests on a variety of monitors. Because the Amiga is a popular (and wise) choice for video buffs, I

first connected it to my VCR and television. On an RF or composite display, the 1200 supports 18 different screen modes, ranging from 320-by-200 pixels to 1280-by-512. Some of the modes, such as the European PAL standards, also require that you fiddle with the vertical hold on your TV.

Interestingly, each display mode also listed a "maximum size." By clicking the button and entering a new number, I tried changing the number of pixels to the maximum shown and clicked "Use." A few seconds later, I was amazed to find that the

screen now scrolled and panned as I moved my mouse pointer to the edges of the display. Amiga system software does an admirable job of not punishing us for buying a small monitor.

I then hooked the A1200 up to a multi-scan monitor.

The Mitsubishi Diamondscan 17 and 14 monitors, while not capable of all modes (they can't scan down to the 15KHz level mentioned above), are a good choice for high-resolution modes. Commodore's 1960 monitor, however, supports all modes, as

do the Electrohome ECM1400 (14-inch) or ECM2000 (20-inch) monitors.

Commodore recommends a unit that can support all available resolutions, but they are very expensive. Many users will opt for a less expensive multiscanning model and simply connect the TV or a composite monitor when doing video work.

According to Enrody, monitors with digital controls, like the NEC Multisync 4FG and some Hitachi monitors, make a good choice for users who regularly work

Continued on page 42

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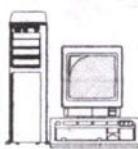
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commtalk BY JAMES MACFARLANE



Modem Standards

The battle begins again for the territory above 14.4 bps

Standards always lag behind technology. Modems are no exception to this rule. Modem manufacturers have been battling each other over standards ever since someone figured out how to do it better than the next guy.

Hayes was one of the first companies to go beyond 2,400bps. They came out with the Hayes 9,600; US Robotics followed with their HST 9,600. As you'd expect, they were not compatible with each other.

A modem history lesson

Other people in the modem industry wanted to jump onto the 9,600bps bandwagon, but having 50 manufacturers, each making their own proprietary 9,600bps standard, didn't make a lot of sense. (Television started off this way too. Each broadcaster had their own transmission standard, requiring a TV set made specifically for that standard)

Modem makers got together under a United Nations body called the CCITT (Consultive Committee for International Telegraphy and Telephony) to iron out some industry-wide standards. The CCITT, which is composed of industry experts, published the V-series of standards as applied to modems.

V.32 was one result of the CCITT efforts. This specified how two devices could talk to each other at 9,600bps, how they would handshake, handle error conditions etc. This allowed a flurry of manufacturers to start making high-speed modems that would talk to any other V.32 modem, even if it was made by someone else.

Hayes and USR joined in on this, but wanted to maintain compatibility with their existing customer base, so they came out with the Hayes Ultra and the USR Dual Standard respectively. These modems could speak both V.32 and their own proprietary standard.

V.32 was technically superior to both of these proprietary standards, but was obviously late into the market, allowing Hayes and USR to maintain an advantage.

Later, USR extended their HST standard to incorporate 14,400 bps. Everyone else wanted to follow suit. Some did, but without the CCITT standard, we were back in the same boat when 9,600 came out: incompatible.

The next standard

Finally the standards caught up with the technology and V.32bis was established. This was a CCITT standard for 14,400bps modem communication and is where we are today. Of course, there are always those

who are a step ahead.

Several manufacturers, including ZyXEL, USR, Motorola Codex and Telebit, are now selling modems that can communicate at speeds faster than 14,400bps. Once again we're back into the incompatibility game.

Right now there's a new standard being examined at the CCITT called V.fast. It will set the standard for communicating at speeds faster than 14,400bps. The details are unknown as of yet, but the standard supposedly incorporates speeds from 16,800 to 19,200 and right up to either 24,400 or 28,800.

Speeds faster than 19,200 are not possible using standard voice-grade telephone lines since this physically exceeds the capacity of most telephone switching equipment. Perhaps phone companies will see us coming and will sell us this extra capacity for a small (yeah, sure) monthly charge, but in the mean time, let's assume the fastest speed is 19,200.

Right now the CCITT standard may be blown clear out of the water because a very large company, namely AT&T, has announced its own 19,200 standard. This standard has been given the code V.32ter and will commonly be referred to as V.32terbo.

Terbo is not spelled wrong; it comes from the suffix "ter", which means "third", just as "bis" meant "second" when used in V.32bis.

There's a difference between AT&T announcing this standard and someone else, say USR, announcing it. AT&T is in the business of selling chips, not selling modems, and they'll sell the chips to anyone who wants to buy them.

There are five major manufacturers of modem chips: AT&T, Exar, Intel, Sierra and Rockwell. The most popular of these at the moment happens to be Rockwell, which is used by Supra, Zoom, GVC, Aceex, Practical Peripherals and a flurry of others. There's nothing stopping these manufacturers from dropping Rockwell and buying into AT&T.

Suddenly we could have everyone and their dog making 19,200 modems. And if these modems aren't compatible with V.fast then too bad — you're outnumbered.

Don't expect to see any V.32ter product until the end of 1993.

What about the rest of us?

If you've bought a recent USR Courier or a ZyXEL U-1496E-plus modem you're in luck. These modems, and units like them, are not designed using anybody's chipset.

Shareware, CD-ROMs and Downloading

BBSes have always been one of the largest providers of shareware, but for people who run BBSes, gathering and cataloging thousands of files can be both time-consuming and expensive. Luckily we have CD-ROMs.

A typical CD-ROM will hold 650 megabytes of software. On top of this, most collections come as compressed files using PKZIP, Stuffit, Compactor and other compression utilities. So you actually get much more than 650 megabytes of software once it's all uncompressed.

You get about 6,000 to 10,000 individual files on most shareware CD-ROMs. If you took 5 minutes to examine each file, it would take an average of 83 working days to try everything out. That's a lot of software. (I won't bother calculating how long it would take to download 650 megabytes using a 2,400 baud modem. Trust me, it's a long time.)

Definite advantages

Whether you buy a shareware collection for your own use, or for use on a BBS, you get a big bang for your buck — most shareware collections sell for under \$80. Not only do you get a pile of files, but you usually get some sort of interactive catalog that will allow you to browse through the file descriptions on the disk and selectively install them, uncompressed, on your hard drive so you can try them out.

One added bonus with shareware collections on CD-ROM — they've often come from a BBS, meaning the files have good descriptions, have usually been pre-scanned for viruses and usually work.

The only major disadvantage of CD-ROM shareware is that it takes time for the disk to be compiled, manufactured and delivered to the customer. The share-

ware on the disk is usually top-notch stuff, but it can often be several months out of date compared to what you'd find on most BBSes.

Going online with CD-ROM

Using a CD-based file section for your BBS is cheap, convenient and means you don't have to prune the file areas every week. It is definitely worth the \$69 for the convenience.

If you're considering installing a CD-ROM on your BBS there are some things you must keep in mind:

- 1) File directories. Shareware collections usually come with some sort of file listing that holds the name of the files on the disk and the accompanying description. Make sure your particular BBS program is compatible with that file format (the most popular one is the PCBoard format) or else you may find yourself typing everything in yourself.
- 2) Disk format. Don't make the mistake of ordering a Macintosh shareware disk without specifying that you won't be using a Mac. Yes, disks come in different formats. Make sure your drive will read the disk you buy. The most popular format is ISO 9660.
- 3) Hardware speed. A small- to medium-sized BBS might have 10-15 lines. If two people started to use the same CD drive the whole thing would slow down to a crawl. The solution is to check with your BBS software vendor to see if they have a program that will copy the file to a temporary directory on the BBS hard drive, then allow the user to download it from there instead of directly. CD-ROMs are s-l-o-w. It makes a world of difference. ■

*BBS operators soon discover that downloading files is a favorite pastime for most modem users. Here we present a short list of CD-ROM titles especially created and pre-archived for BBS use.

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Amiga 1200

Continued from page 39

with a variety of display modes. (NEC's just-announced FGe series also includes these digital controls). You can program these monitors to "remember" your settings, so that you don't need to fiddle with centering the screen, adjusting picture size, etc., each time you change modes.

I tested the A1200 with a variety of monitors. Video buffs will undoubtedly enjoy the Amiga's ability to directly output a variety of NTSC (National Television Standards Committee)-compatible signals. Using an old Commodore 1701 monitor (purchased back in the heyday of the Commodore 64, it's still a great SVHS and composite monitor, doing service next to my VCR), I connected the computer with the supplied RCA cable and flipped the power switch.

During my tests, I managed to verify the existence of a bug in Electronic Arts' DeluxePaint AGA. I found that attempting to play a DeluxePaint AGA animation with a WorkBench screen visible causes DeluxePaint AGA to lock up 100 percent of the time. This occurred on both prerelease and final release versions of AmigaDOS 3.0.

Aside from this annoying bug, I was very impressed with DeluxePaint AGA. I've used DeluxePaint since the very first version was released in the mid-'80s and the program has managed to grow in power and sophistication without losing the ease of use that makes it a favorite with beginners and video professionals alike.

Conclusion

As I've said before, I feel that the Amiga makes an excellent machine for creative users, or those who want an easy-to-use computer and don't require PC or Mac compatibility. Although IBM and Mac emulation options are available for the Amiga (and actually work quite well), I have found that too many people end up frustrated when trying to emulate one computer with another.

That said, I did try the Amax Mac emulator on the A1200. Even the oldest 1.0 release worked fine as I ran the Macintosh System 6.02 and the shareware titles ZTerm and StuffIt 1.5. Amax emulated a Mac Plus at about twice the speed of the "real thing."

I heartily recommend the A1200 to anyone who owns a camcorder or wants to explore multimedia, animation, 3-D graphics, sound or music. Depending on your use, you might not even need a monitor. Just add a genlock (video overlay device) and DeluxePaint AGA, connect the old TV and away you go.

You'll get more bang for your buck than with any other kind of computer, especially when you start to compare prices for professional-quality software titles in these "creativity oriented" areas.

The Amiga's Achilles Heel continues to be its diminutive market presence, compared to the PC and Mac. Because of this, there are less business-oriented (accounting, etc.) software titles and fewer training courses offered. If these areas aren't a priority to you, then take a look at the A1200. It's the best Amiga value yet. ■

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game review

SimCity for Windows

BY MARK WINDER

Product: SimCity for Windows

From: Maxis

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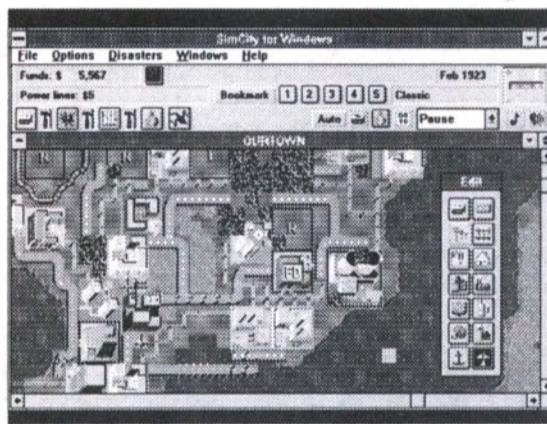
Disk: 2MB + 30K/city

Software: Windows 3.x

Price: about \$60 Canadian

Bless Me Father for I have Simmed

Please take a minute and think about the city or town where you live. What do you like about it? What don't you like? Is it easy to drive in? Are there lots of parks and recreation areas? Is downtown compact or spread out? Do you have good public transit?



Now, after your minute of thought, do you think you can do a better job? If you are up to the challenge, check out SimCity for Windows.

SimCity is a city planning simulator. As mayor of SimCity, you are given a vast tract of land to develop into the utopian city of your dreams. While the power of zoning (dedicating land for a single purpose such as housing or industry) is in your complete control, it would take a mayor a long time to build a city by himself. This is why your city is populated with industrious little computer people (Sims) who actually go about doing all the work. Like most people, Sims build houses, drive to work, shop, pay taxes, and just want to be happy. So if you raise taxes too high there will be an outcry and everyone will leave your city. Forget to build roads from the residential zones to the factories and the Sims can't get to work, causing unemployment to soar. If you don't zone enough residential areas, housing prices skyrocket and the people complain. Do a bad enough job and they will kick you out of office!

As your city grows you will have numerous problems to address. Rising crime rates, fires, earthquakes, downed power lines, a public transit system, designing parks and recreation facilities, building roads, revitalizing rundown districts, and finding land for growth are just a few of the difficulties you will be forced to overcome.

If you don't like building cities, there are also eight pre-designed replicas of real cities that you can take over. If you think

this is easier, think again. These cities have been recreated at times of major disasters such as San Francisco during the Earthquake of 1906 and Hamburg, Germany while it was being bombed in 1944.

SimCity for Windows is installed through Microsoft Windows and comes with both 5 1/4" and 3 1/2" floppies. A windows group and SimCity icon are automatically created.

SimCity supports Windows EGA (640x350), VGA (640x480), and Super VGA (800x600) graphics modes in 16 colors. I found on my 14" monitor that it was hard to read the city map and the many small icons in SVGA mode so I prefer normal VGA (600x480). The screens would look a lot nicer if there were more colors, but the graphics are good and the program conforms to Microsoft Windows standards.

The folks at SimCity strongly suggest that you use a sound card. Their entertaining README file ends with them almost begging you to buy one. The sound effects are great, but I found the background music to be so grating that after five minutes I had to shut it off. Fortunately, the sound effects and background music can be toggled separately.

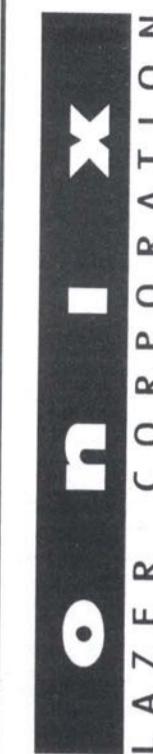
The documentation is complete and is written with a sense of humor. The end of the manual contains interesting information about city planning and points out some good reference books.

If you get tired of the same old terrain and city graphics, you can buy several add-on packages that let you create your own land types (the Terrain Editor) and design buildings from different times (Graphics Sets 1 & 2).

Maxis encourages people to send in suggestions and they offer prizes if you are the first to find and report a bug in the program. I was disappointed to find out that the free offer for a SimCity Planning Guide that was advertised on the outside of the box was not available to Canadians. I thought this was a poor move from a company that seems to value their customers. However, after receiving my letter explaining how Canadians were people too, Maxis went out of their way to make me a happy customer and sent me the booklet after all. It is refreshing to find companies that still care after they have your money. (Incidentally, Mark's letter did not mention that he was writing a review.—Ed.)

SimCity is an excellent game that is both fun to play and educational, too. It is a real challenge to create and keep a thriving city happy. I have to admit that I will think twice now before I complain about my mayor. ■

Mark Winder can be reached at 403-279-9581.



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bookreview

Game Over

How Nintendo Zapped an American Industry, Captured Your Dollars, and Enslaved Your Children

BY KEITH SCHENGILI-ROBERTS

Author: David Sheff
Publisher: Random House of Canada
Price: \$31.50 445 pages Hardcover

The phenomenal growth of Nintendo in the past decade puts most of the rags-to-riches stories that abound in the computer industry to shame. About a third of all households in Japan and in the States currently have a Nintendo game, and in 1991 Nintendo was declared Japan's most successful company, displacing Toyota. In the early 1990s, the company made as much as all of the American film studios combined. The word nintendo translates very roughly from the Japanese into the phrase: "work hard, but in the end it is in heaven's hands."

The word nintendo translates very roughly from the Japanese into the phrase: "work hard, but in the end it is in heaven's hands"

The first Nintendo game which became a hit in North America was the oddly-named "Donkey Kong." This hero of this game, who was later named Mario, soon became the first video game "star." He helped launch a series of incredibly popular video games, a cartoon series and just last month,

Much of the book is devoted to Nintendo in America. After a lot of frustration dealing with the British agent handling the rights to the game, it was decided to negotiate with Moscow directly. It was there that a Nintendo representative was shocked to find that the Soviets had never finalized licensing the rights to the British agent. By this time Tetris was already an arcade game hit around the world. Nintendo eventually bought all the rights

a movie. Sales of various Mario games helped sell the Nintendo Entertainment Unit (a remodeled Famicom), and Nintendo rapidly became the dominant player in the video game market.

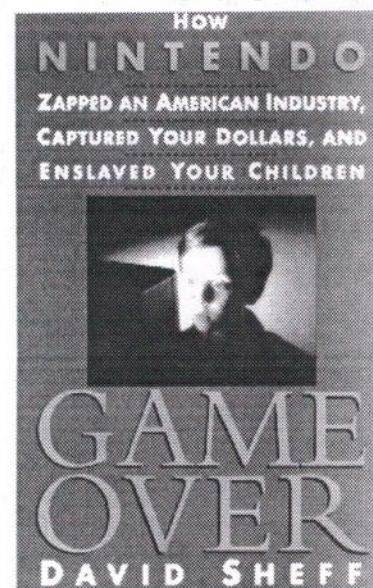
One of the most entertaining sections of

they could get for the game. In the process they scooped other firms like Atari, who suddenly found their immensely profitable version of Tetris taken away from them. The dispute that followed would eventually reach the ears of then Soviet premier Gorbachev, but in the end Nintendo prevailed in the courts. It is estimated that Tetris brought in \$80 million for Nintendo, and helped sell Game Boy, which has made billions of dollars.

Nintendo has not been without its problems. Over the years the company has been sued by MCA and Atari, and became the focus of anti-Japanese sentiments. But Nintendo's strongest challenge in the future will be to keep its place in the market

in the face of new technologies and stiff competition from firms like Sega. Despite the nightmarish-sounding title, *Game Over* rewards the reader with a candid and enjoyable look at how the video game industry operates. Mario would like it. ■

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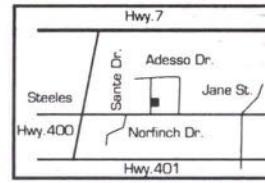
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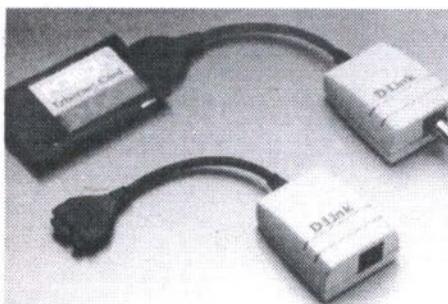
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what's new



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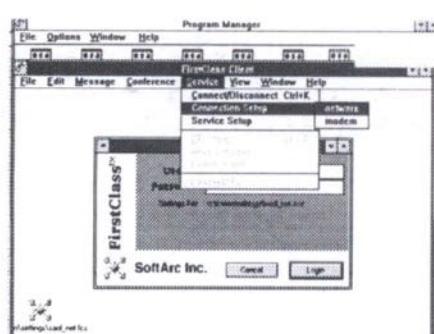
D-Link Canada claims to be the first out the door with an Ethernet adapter for the new PCMCIA Release 2.0 standard. The lightweight, credit-card-sized adapter sells for \$469.

Contact: D-Link (416) 828-0260.

FirstClass Client for Windows Released

SoftArc Inc. of Toronto is now shipping a Windows-based front end for its Macintosh-host FirstClass E-mail/BBS system. The Windows client software is freely distributable and offers most of the functionality of its companion FirstClass Macintosh client software.

Clients on Macintosh or Windows may access the same, non-dedicated FirstClass server without dedicated Novell file servers, routers or other hardware. Network connec-

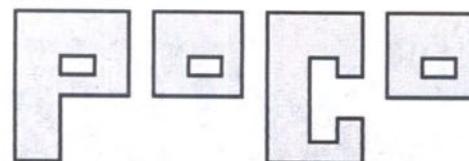


tions to the server from both machine types are made over the same physical Ethernet cable. The FirstClass server accepts logins over PC IPX, AppleTalk and modem at the same time. Up to 250 users of any mixture of connection types may be accommodated simultaneously. One FirstClass server may accommodate more than 20 modems. Mail delivery and "chat" occur in real time.

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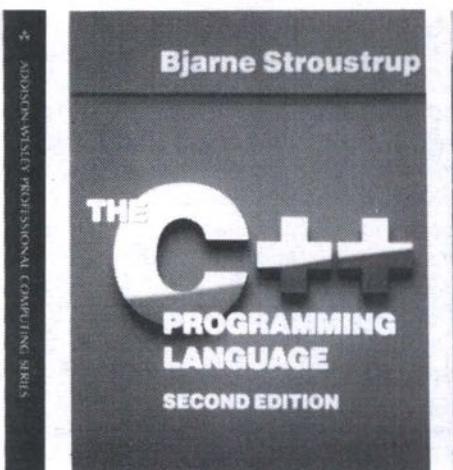
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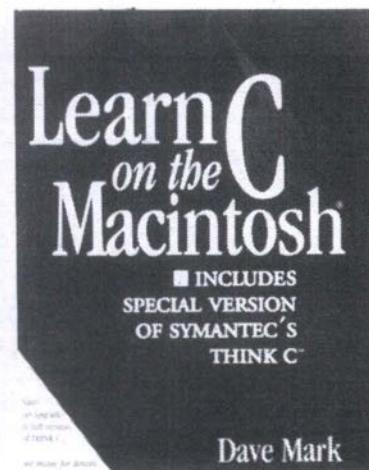


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THE AMIGA AS SEEN BY OUR SERVICE MANAGER

Our Service Manager, Sean Moniz, is by nature a methodical individual, not typically carried away with fanatical enthusiasm. Despite a lot of experience with, and strong technical knowledge of the MS-DOS platform, Sean is an avid Amiga enthusiast. (He also runs an Amiga/IBM BBS, "Techno Zone", (416)282-8634.) We asked him why he likes the Amiga, expecting a well thought out, considered response. Well, we got it, and here it is, in his own words.

"The question has been put to me several times. Why do I like the Amiga? Well this is not an easy question to answer since there are so many things that I like about the Amiga. The Amiga is very different from the typical PC clone, with one of its biggest attractions being the ease with which you can perform operations that would give you a headache when trying to figure them out on a typical clone.

The Amiga's architecture is by far the most advanced in the personal computer market. From the ground up, the Amiga was designed to be easy to use, to multitask, and to be inexpensive. To achieve these goals, a set of three coprocessors chips were developed to take care of specific tasks. These chips work together to handle video, animation, and stereo sound. The chips also operate on their own data bus so that they can operate at the same time as the main processor. This parallel processing capability was previously found only on mini and mainframe computers, and causes a dramatic increase in performance in software which makes use of sound, video, or animation. The result is that a slow Amiga 500 operating at 7 MHz will run a window/icon environment (Workbench) at a speed comparable to a 25 MHz 386DX running OS2/2.0 or Windows 3.1.

EXPANDABILITY

Expanding the Amiga is also made easy with the Amiga's AutoConfigure technology. If you have ever had to plug a card into an MS-DOS machine, you have probably been frustrated by the numerous jumper settings for configuring address space, IRQ levels, DMA channels, and enabling/disabling card features. It's not too bad for your first one or two cards, but when your slots start filling up, your frustration multiplies. On the Amiga, you never have to worry about address space, IRQs, and DMAs since each time the Amiga is turned on, it automatically chooses settings for your cards. The only thing left for you to worry about is enabling or disabling features available on your expansion cards.

The Amiga does not suffer from memory limitations like the MS-DOS based machines. On an Amiga, if you plug in 4 megabytes of RAM, your programs have 4 megabytes of RAM available for use. On an MS-DOS based machine, if you plug in 4 megabytes of RAM, your programs have 640 kilobytes to work with. If you plug 32 megabytes of RAM into your MS-DOS machines, your programs still have only 640 kilobytes to work with. To make use of the extra memory, you have to switch to Windows or OS/2, but then these have problems of their own, as well.

The Amiga's operating system is very efficient. It was originally designed to operate and multitask on a machine with 256 kilobytes of memory, and one floppy drive. The operating system at the time was about 1.5 megabytes in size. The operating system has since grown to about 3 megabytes, but still requires only 256 kilobytes of RAM to run. This compares favourably with Windows which requires about 5 megabytes of your hard drive and at least 2 megabytes of RAM, and OS/2 2.0 which requires between 10 and 30 megabytes of your hard drive space and 4 megabytes of RAM. And yet the Amiga provides equal or greater functionality than either Windows or OS/2.

One of the things that makes the Amiga so efficient in its use of memory and disk space is something called a library. A library is a group of common functions which any program can call upon. This makes it possible to develop small programs with the same level of functionality as much larger programs on other platforms. In addition, several programs can simultaneously access the same functions without loading another copy of the library into memory again. These libraries also reduce development time for programs, ultimately reducing program costs.

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COMPATIBILITY

Despite the many benefits of an Amiga, there are often still times when some people might, for whatever reason, need to run a software package written for another platform. The Amiga has the flexibility to emulate other platforms with the addition of optional hardware and software. Emulators are available for IBM (XT to 486), Macintosh, Commodore 64, Atari ST, and UNIX, with emulators for other platforms on the way. Sometimes these emulators cost much less than buying the machine being emulated. Often these emulators are capable of running programs from other platforms faster than the original platform can run it. One MAC IIx emulator, called the Emplant, will run programs two to four times faster than a real MAC IIx. As a bonus, these emulators will multitask along with Amiga programs, and it is possible to have different platforms multitasking together. No other platform has this much flexibility.

WORDS ALONE CANNOT BEGIN TO DESCRIBE THE AMIGA

I could go on and on about the Amiga, but space is limited. Besides, words do not begin to adequately describe the Amiga. To really see what the Amiga is capable of, drop by your local, full-service Amiga dealer (Amsoft, of course, comes to mind!) for a full demonstration.

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Multimedia Expo Report*Continued from page 16*

Terminator 2, Silicon Graphics was showing off its new computers, including the Iris Indigo2. Taking real-time images from a video camera and combining with an animation program, the Indigo2's monitor showed people walking by their booth oblivious to the fact that animated purple whales were swimming right in front of their faces. There were also impressive displays of real-time 3-D morphing and manipulation of images.

While none of the machines are priced within easy reach of the home user, Silicon Graphics is at the leading edge of visual computing, and point the way for other firms to follow in this field.

Contact: Silicon Graphics, (416) 625-4747.

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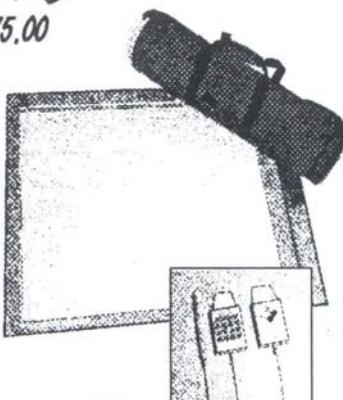
Contact: Better Lifestyle Products Inc, (416) 738-1376.

There were many other impressive displays at the show from firms like Apple, Commodore, Kodak, Saved by Technology and Sony. My only criticism of the show would be its lack of sound-based multimedia vendors, but given the original visual/photographer's bias of show, this is understandable.

This was a very successful show, and it should not be missed when it returns next year. ■

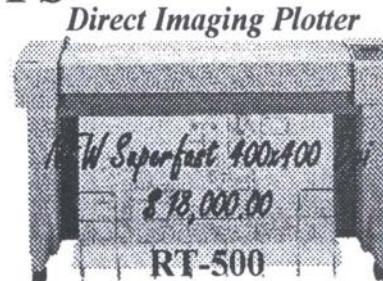
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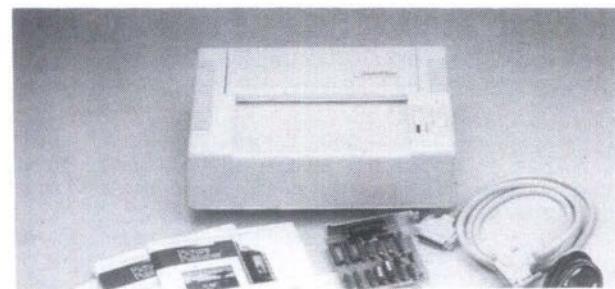
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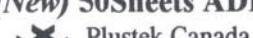
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EXCLUSIVE NEWS

Canadian Product Launch Update

TORONTO, ONTARIO (NB) — This regular feature provides further details for the Canadian market on announcements by international companies that Newsbytes has already covered. This week there has been several announcements from IBM Canada, new Compaq PCs, and Canon's notebook computer with a built-in printer.

Canon Canada has introduced the NoteJet 486, a notebook computer with a built-in ink-jet printer (Newsbytes, April 13), to the Canadian market. The 7.7-pound notebook with a 25-megahertz (MHz) 486SLC processor and a 360 dots-per-inch (dpi), 116 characters-per-second Canon Bubble Jet printer built-in, has a Canadian list price of C\$3,999. Shipments are due to begin in June. Montreal-based Hartco Enterprises, which runs computer stores under the Compucentre, Compucou, MicroAge, and Microvar names, was named exclusive Canadian distributor.

Compaq Canada has unveiled three new LTE Lite notebook computers, all based on 486DX microprocessors (Newsbytes, May 19). The new notebooks are shipping in volume now, except the LTE Lite 4/33C, which is due to ship at the end of May. Canadian prices are C\$3,799 for the LTE Lite 4/25, C\$4,619 for the 4/25e, and C\$6,319 for the 4/33c, all with 120-megabyte (MB) hard drives. Models with 209MB hard drives are also available. A new QuickConnect option, which lets users

attach several peripheral devices to a notebook in one operation, is also shipping at C\$419, the company said.

Compaq also introduced several options for its PC products and cut prices on some existing models.

IBM Canada has announced a host of new products from Adstar, the company's storage systems subsidiary (Newsbytes, May 21). New direct-access storage device (DASD), optical, and tape storage products are included in the announcements, which matched those made by Adstar in the United States.

IBM Canada also enhanced the RISC System/6000 family of workstations and servers (Newsbytes, May 19). Canadian prices and availability are: Powerstation and Powerserver 230, C\$6,335, May 28; Powerstation 23T, C\$11,220, May 28; Powerstation 23W, C\$8,840, May 28; Powerserver 23S, C\$11,745, May 28; Powerstation 36T, C\$28,830, June 4; Powerstation 37T, C\$33,105, June 4; Powerserver 550L, C\$34,665, June 4; 6094 Spaceball Model 030, C\$2,110, June 4; S/370 Channel Emulator/A, C\$4,620, June 25; and the Gt1X Graphics Adapter, C\$1,650, May 28.

Last of the IBM announcements is OS/2 2.1, the new release of the company's personal computer operating system (Newsbytes, May 18). To be available in Canada June 14, OS/2 2.1 will carry a list

price of C\$249. For 90 days, IBM Canada is offering upgrades to users of earlier OS/2 versions and DOS at C\$99 for the CD-ROM version and C\$129 for the diskette version.

Digital Equipment of Canada unveiled the DECpc 433dx MTE and 466d2 MTE personal computers (Newsbytes, May 13). Canadian prices will start at C\$3,999 for the 433dx MTE and C\$4,750 for the 466d2. Both are available right away. DEC said the machines will be built at its Kanata, Ontario plant for the North American market.

IBM's new line of PS/1 computers (Newsbytes, May 10) hit the Canadian market, and IBM Canada also announced it has signed on a number of added retailers to sell the products. Some of the new models are available in Canada right away, while others are due to ship within 30 days. Prices will range from C\$1,799 to C\$3,499, IBM Canada said.

Lotus Development Canada announced 1-2-3 Release 4 for Windows (Newsbytes, May 10). Due to be available in June, the new release of Lotus' main Windows spreadsheet product has a list price of C\$599 in Canada, with upgrades from all other 1-2-3 releases and rival spreadsheets at C\$159. License Pak versions are C\$479. Any customer who buys an existing release of 1-2-3 for Windows between May 11 and 30 days after shipment

can exchange it for the new release free of charge, Lotus said.

Microsoft Canada shipped its Multimedia Viewer Publishing Toolkit Version 2.0 (Newsbytes, April 1). The replacement for Microsoft's Multimedia Development Kit (MDK) has a Canadian list price of C\$649.95 and is available from Microsoft Canada and its resellers across the country.



Canon Canada's NoteJet 486 notebook with built-in ink-jet printer.

Microsoft's Word for MS-DOS Version 6.0 word processor (Newsbytes, May 7) is due to be shipping in English at the beginning of June in Canada, with a French-Canadian version expected by early July. The list price is C\$659.95.

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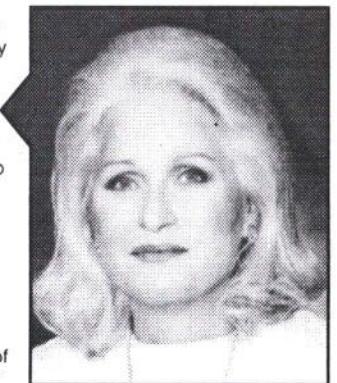
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Pentium overview: a PC boom in the server market

ATLANTA, GEORGIA (NB) — As one vendor told Newsbytes, the Pentium has been the worst kept secret in history. Today, however, Intel's embargo came off the specifications, so out came the manufacturers with their shiny new Pentium-based machines.

The only snag is, with chip production yields reported to be very low, volume shipments of the Intel Pentium chip set aren't expected until October. For this reason, most of the PC manufacturers announcing Pentium-based systems today were also offering upgrade cards for their existing machines.

Still, users will see Pentium-based machines available for purchase in very limited quantities beginning in June and July from just about every major PC manufacturer, including ALR, AST, Compaq, Zenith, and Hewlett-Packard.

Announced prices for the new Pentium machines range widely between \$5,000 to \$36,000. The Symmetrical Multiprocessing (SMP) architecture computers with multiple Pentium microprocessors offered by NCR and AST are at the top of the price range.

Brian Manser, of PC manufacturer Zenith told Newsbytes that the "sweet spot" for the Pentium-based machine is the network server market, at least in the beginning. AST is boasting users can replace their mini or mainframe computer with the Manhattan SMP (which supports up to four Pentium processors) and have the same computing power for the price of the maintenance contract on a mini or mainframe.

Slowdowns in Intel's production schedule caused by yield problems are expected to make the Pentium harder to get until October, when it is expected to ship in production quantities. However, Intel said it expects to ship hundreds of thousands of units this year and in 1994 is predicting it will cross the one million mark.

The Pentium itself comes in a 60 and a 66 megahertz (MHz) version. Intel says 66-MHz Pentium operates at 112 V1.1 Dhrystone million instructions per second (MIPS) and has a SPECint92 rating of 64.6, a SPECfp92 rating of 59.7, and an iCOMP index rating of 567.

The 60-MHz Pentium is about 10 percent slower in performance, Intel added. A Pentium Overdrive or speed doubling chip has also been announced by Intel and is expected to be available in 1994. Pricing in 1,000 unit quantities for the 66-MHz Pentium processor has been announced at \$965 each and the 60-MHz version is \$878 each.

Contact, Intel Pentium Info. Packet, 800-548-4725.

PowerPC-based Mac demoed

SAN JOSE, CALIFORNIA (NB) — Apple Computer demonstrated the first Macintosh PowerPC-based computer at its developers' conference in San Jose.

The company claims that the new machine will be on the market in the first half of next year. The prototype not only zips along at 80 megahertz (MHz), but it also runs Macintosh applications without modification.

PowerPC is the name of the new microprocessor Apple, IBM, and Motorola announced they would begin work design-

ing in October of 1991. "Power" is an acronym based on IBM's Performance Optimization with Enhanced RISC (reduced instruction set computer) technology. The Unix-based operating system announced to go along with the PowerPC is PowerOpen, but no mention of PowerOpen was made in the announcement.

The 80 MHz PowerPC 601-based Macintosh is faster than Apple said it originally intended. According to Apple, the PowerPC 601 was designed to offer a 66MHz clock speed, an obvious reference to

the announced clock speed of the PowerPCs biggest competitor, the Intel Pentium.

Apple says not only will users be able to buy a new PowerPC-based Macintosh, current owners of certain Macintosh systems will be able to upgrade to the PowerPC. The upgradeable Macintoshes include the Centris 610 and 650 computer line, the Macintosh IIvx and IIvi models, the Performa 600 line, and the Quadra 800 systems.

Contact: Apple Canada, 1-800-263-3394.

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VL-Bus Continues To Make Impact

ATLANTA, GEORGIA (NB) — Although the new Intel-backed PCI (Personal Computer Interconnect) local bus video connection standard is just around the corner, support for the VESA (Video Electronics Standards Association) VL-Bus local bus video standard still abounds at this year's Comdex.

Typical of this is the new Grafica 4V1 — that company's first VL-Bus system in this product line. This machine offers not one, but two, VL-Bus local bus slots alongside six 16-bit ISA (Industry Standard Architecture) slots and one eight-bit ISA slot. Despite all these slots, the footprint of the machine isn't overly unwieldy as two of the 16-bit ISA slots piggy-back onto the VL-Bus slots.

There's also a further video enhancement option in the form of DTK's VL-Bus accelerated video adapter with 1 megabyte (MB) of RAM. This will have an estimated street price of \$225.

Digital Equipment, meanwhile, has declared its support for the PCI standard. During a press conference to discuss its recently announced Alpha AXP-based PCs, the company revealed that the machines it announced were the first in a long line of Alpha PCs from Digitak and that it expects the next generation to have local bus video based on PCI.

Contact: DTK Computer Inc., 206-882-8080, Digital Equipment Corp., 508-493-2149.

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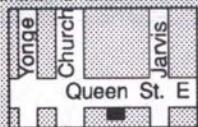
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Spring Comdex Review

ATLANTA, GEORGIA (NB) — Atlanta was the site of the annual Spring Comdex show, which proved to be the most important spring show for the industry in many years.

Three big companies offered the chief headlines at the show. Intel demonstrated its Pentium chips, and major hardware makers like Compaq demonstrated their commitment to it. IBM showed off version 2.1 of its OS/2 operating system, which has won important endorsements from major corporations. Also, Microsoft finally announced its Windows NT operating system, aimed at high-end systems and networks. Digital Equipment showed off a new high-end PC running Windows PC on its Alpha chip.

Beyond that, this Spring Comdex showed off an industry enjoying a new prosperity. Massive price cuts in 1992 brought in a flood of new users, and trade-ups brought in new demand for software. As a result, many companies are reporting strong sales and earnings. This show reflected that prosperity, with more events than at any spring show since the 1980s.

Cirrus Logic said its Crystal Semiconductor unit was a big winner in the Ziff-Davis PC Magazine Editors' Choice Awards. Sound cards using Crystal chips were all winners, including the CompuAdd Multimedia Sound Card, the Media Vision Pro AudioSpectrum 16, and the Turtle

Beach MultiSound board.

Apple, Lotus, Microsoft, Eo, General Magic, and Slate all got together on May 24 to introduce "jot," which they call a new standard for pen computing, which has gotten off to a rocky start in the market.

Acer says it plans to show off its new hardware running Windows NT on its Pentium-based Acerframe 3000MP multi-processor file server and its Acerformula 64-bit MIPS reduced instruction-set computing (RISC)-based workstations.

Acer will also demonstrate Windows NT running on its Acerformula computers systems based on the MIPS R4000 and R4400 RISC processors. Prices for the Acerformula systems start at \$3,600 — lower than those of the Pentium-based machines. The company says the Acerformula systems are two to five times faster than its 486-based 66 MHz personal computers (PCs), depending on the application.

This show also represents a comeback of sorts for the Interface Group, which puts it on. A few years back there were fears that Spring Comdex would be eclipsed as a venue for introducing products by the New York PC Expo, which will come next month. But a deal with Microsoft to call half the show "Windows World" and a new commitment by IBM to the venue appear to have turned the tide.

MS intros Windows NT; to ship end of July

ATLANTA, GEORGIA (NB) — The desktop version of Windows NT will finally ship by the end of July.

According to Microsoft Chairman and CEO Bill Gates' keynote address at Comdex, it will cost as little as \$295 for existing Windows users upgrading to the new operating system (OS) and will be supported by hundreds of developers, value-added resellers, PC manufacturers, and corporate MIS (management information systems) departments.

You will not, however, be able to buy any of these products for at least 60 days. Microsoft has promised to ship the desktop version of Windows NT for both Intel and MIPS platforms by the end of July and the Advanced Server version within 30 days of the desktop product shipping date. Versions of NT for systems based on Digital Equipment's Alpha AXP chip are expected to follow "within two months" of their Intel and MIPS counterparts.

Prices for the Intel/MIPS version of NT

(implementations for both platforms are included in the same box) start at \$295 for an "upgrade" from either OS/2 or Windows 3.1 to the desktop version of Windows NT.

The Windows NT Advanced Server Edition, meanwhile, will go for the commanding price of \$1,495 — and, six months after launch that price will climb to \$2,995.

One surprising announcement was that Microsoft will make the NT source code available to a number of educational institutions for further research and development.

Among the institutions to benefit from this will be Brown, Carnegie Mellon, MIT, University of California Berkeley, University of Washington, Xerox PARC, and Stanford. Some analysts speculate that making source code available in this way is probably designed to give the impression of "openness" that Microsoft is urgently seeking at the moment.

Contact: Microsoft Corporation, 206-882-8080.

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CorelDRAW! 4 Offers Animation, DTP

OTTAWA, ONTARIO (NB) — Corel has announced the newest version of its flagship graphics software package, CorelDRAW! 4. The company says the new version offers the ability to create animations with sound and adds desktop publishing without leaving the product.

The Microsoft Windows-based CorelDRAW! comes with four modules: CorelPHOTO-PAINT, CorelCHART, CorelSHOW, and CorelMOVE. Corel says it has more tightly integrated the modules compared to version 3 for ease of use. The product is also claimed to be network-ready.

While all the modules have added features, CorelMOVE is the new animation portion of the product. The company says CorelMOVE is object-oriented and allows users to animate their own drawings or use professionally pre-drawn actors and backgrounds. Full support for sound is also included.

Other enhancements include improved painting, image-editing, and slide show features for editing illustrations as well as photo retouching and presentation design. Technical drawings can include object data management so sizes, costs, and other ele-

ments can be tracked right along with the drawing. A new Powerline feature also allows users to select wedge, teardrop, or woodcut shapes and draw them on the screen.

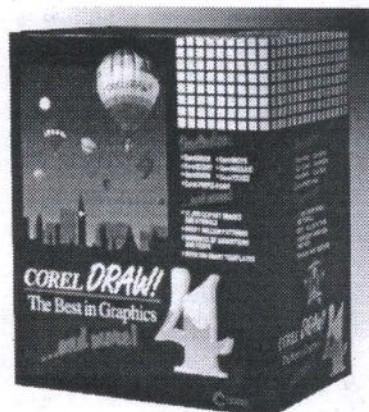
The company plans to support both CorelDRAW! 3 and CorelDRAW! 4 simultaneously, with CorelDRAW! 4 positioned as the premium version of the product.

Version 4 is aimed at desktop professionals, technical illustrators, architects, prepress service bureaus, and corporate users for illustrations, charting, and multimedia presentations.

Retail price for CorelDRAW! 4 is \$595 in the US and \$695 in Canada. Upgrade price is \$249 in the U.S. and \$269 in Canada.

Corel says for each copy sold, it will donate \$1 to one of the charities selected by the registrant on the registration card. If users order the Artshow book of drawings from Corel's annual art competition, the company will donate an additional \$5 to the same charity.

Contact: Corel, tel 613-728-8200 ext 1672, fax 613-728-9790.



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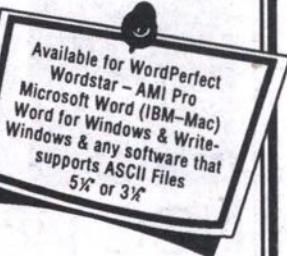
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PROFESSIONAL: W/experience in Ethernet/TkennRing, Windows for Workgroups, TCP/IP, Unix and more seeks network installation projects. 416-601-9058.

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IBM 286 - MINT!: 1MB RAM, 30MB HD, VGA card + monitor, 1.44 MB floppy, mouse, modem, software: DOS 6, Lotus, Windows, games + more \$650. Call John/Rob (416) 249-2681.

IBM PC XT: Ideal for students. Includes software (WP5.1, Printshop, Xtree and games). Hard drive and 5 1/4" dr., mouse, and more included \$800 or o.b.o. call (519) 924-2277.

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IDE: 4MB hard driver 3.5 IN \$170. MFM 20MB hard driver \$120. Call 896-2687.

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LOGITECH: Scanman 400dpi 256 Greyscale. Call Mike 622-4000.

MAG 14" SVGA: .28 dp; 1024x768 non-interlaced; non-glare \$375 o.b.o. Call 492-6102.

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DOS 5: \$20, DOS 6 \$400, Trivial Pursuit daily planner \$20, AQ Plus \$10, Quarterdeck Qram 15. Call (416) 669-3781.

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ORIGINAL: Copies with manuals. Quicken, CPAV anti-virus, PC Tools. Call Rodger 282-0721.

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APPLE MACINTOSH: Wanted with hard disk drive, system software and manuals. Printer optional. Call Sasha 441-1881.

AT SYSTEM: HDD, Call Karl at 298-3000.

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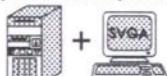


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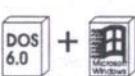
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Canon BJ-330 600cps wide \$569

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CALENDAR OF EVENTS

JULY

COMDEX/CANADA July 13-15, 1993, at the Metro Toronto Convention Centre. The 1993 show is, in a sense, a continuation of the LAN Expo and Windows World. Contact: Kim Pappas, The Interface Group (617) 449-6600.

WINDOWS WORLD CANADA July 13-15, '93, Toronto, ON. Contact: Interface Group: (617) 449-6600.

THE BOTTOM LINE '93 July 21-22 at the Metro Convention Centre, Constitution Hall. The trade show for Canada's accounting and financial professionals. Breakfast workshops include "Breakfast Bytes," July 22nd at 8:00 a.m.: features a discussion of accounting software selection issues. Contact: Reed Exhibition Companies (416) 479-3939, for breakfast meeting call (416) 962-1841.

SEPTEMBER

DOWNSIZING EXPO & OP/EN EXPO September 13-15, 1993 at the Metro Toronto Convention Centre 256 Front St. West. Whether you're downsizing or just getting started, this Expo gives you the information you need today to improve the costs and efficiency of your IS department through the rest of the '90s. Contact: DCI (508) 470-3880.

THE ATLANTIC CANADA COMPUTER SHOW September 15-16, 1993, at the Halifax Metro Centre, World Trade & Convention Centre. 10th show. Business, government and other organizations can find out how computer technology can help them become more productive and profitable. A showcase of the latest products and services. Contact: Fred West, Show Manager (416) 252-7791.

MACWORLD EXPO September 20-22, 1993, at the Metro Toronto Convention Centre. The newest innovations of interest to all MAC users, even bigger than the '92 show! Contact: Brukar International (416) 620-1078.

NETCON '93 September 29-30, 1993, at The Automotive Building, Exhibition Place, Toronto. The only show in Canada dedicated exclusively to networking and connectivity! Sponsored by Plesman Publications Ltd. Contact: Chuck Armitage, Show Manager (416) 497-9562.

OTTAWA BUSINESS & GOVERNMENT COMPUTER SHOW September 29 and 30, 1993, at Lansdowne Park, 1015 Bank Street, Ottawa. Information technology exposition in the National Capital Region, featuring a Pen-Based Computer Showcase, National Master Standing area and a Software Centre. Contact: Industrial Trade & Consumer Shows Inc. (613) 232-0766.

NOVEMBER

CANADIAN COMPUTER SHOW & CONFERENCE November 22-25, 1993 at the Toronto International Centre, 6900 Airport Rd., Mississauga. The 24th Annual Canadian Computer Show & Conference, The Fall Computing Classic. Canada's premiere computer event, featuring all aspects of the desktop and portable technologies, including the newest in personal computers, notebooks, palmtops, software, networking, open systems, communications, OS/2, Windows, pen-based and wireless technology, multimedia, and more. Contact: Deborah Dugan, G.D.E., Show Manager (416) 252-7791 or fax (416) 252-9848.

SEMINARS

HOW TO MANAGE PRIORITIES & MEET DEADLINES A Fred Pryor one-day Seminar. Hamilton-July 20, Kitchener-July 27, London-July 28, Mississauga-July 21, Ottawa-July 8, Toronto-July 22. Call (800) 255-6139.

INTERNATIONAL

ANALYSIS AND DESIGN OF CLIENT-SERVER SYSTEMS. A 3-day seminar presented by Microsoft University. Chicago, June 21-23, Boston, July 12-14, San Diego, Aug 16-18, Dallas, Sept 20-22, Washington, DC, Oct 4-6, Toronto, June 8-10, 1993. To Register call: (310) 394-8305.

TORONTO ISSA MEETING June 22, 1993, 1:30 - 4:30 p.m. at Price Waterhouse, 33rd Floor in First Canadian Place, Toronto. Learn about SAC (Security Auditability & Control). Learn about this informative series of books on security control areas and objectives. Additionally, discover the survey results which helped produce this audit tool Win a free copy of SAC! Contact: Barry Lewis 459-0638.

MANAGING ENTERPRISE ARCHITECTURE PLANNING June 23-25, 1993, Vancouver, Westin Bayshore. Enterprise modeling for business, data, applications and technology. Call DCI (508) 470-3880.

DIGITAL WORLD Conference & DemoCenter. June 23-26, 1993, Beverly Hills, CA. For more info call (800) 433-5200.

DATABASE WORLD CONFERENCE & EXPO. June 29-July 1, 1993, Boston, MA. Show management: Digital Consulting. 508-470-3880.

MACTIVITY. June 29-July 1, 1993, San Jose, CA. Show management: Winehouse Computer Co. 408-354-2500.

PC EXPO. June 29-July 1, 1993, New York, NY. With keynote speaker: Bill Gates. Show management: Nat'l Blenheim Expos Inc. (800) 829-3976.

MACSHOW The Computer Solutions Expo. Centroplex, Chicago, July 8-10, Merchandise Mart. Philadelphia, August 19-21, Civic Center. St. Louis, Sept. 9-11, Cervantes Convention Center. Dallas, Nov. 4-6, Infomart. Miami, Dec. 2-4, Radisson Airport Convention Center. Call 1-800-MACSHOW or Fax: (215) 957-9798.

FUZZY LOGIC '93. July 20-22, 1993, San Francisco, CA. Show management: Pennwell Publishing Company. (508) 392-2124.

SIGGRAPH (ACM). August 3-5, 1993, Anaheim, CA. Contact: ACM/SIGGRAPH: (708) 850-7843.

MACWORLD EXPO-East. August 3-6, 1993, Boston, MA. Contact: Mitch Hall Associates: (617) 361-8000.

SUN OPEN SYSTEMS EXPO-West. August 10-12, 1993, Anaheim, CA. Contact: Publications Comm. Inc. 800-289-3976. Fax: (512) 250-9756.

SCO FORUM '93 University of California, Santa Cruz, August 14-19, 1993. Offering a broad range of courses on the key business, engineering and enterprise computing topics affecting the international information systems industry. Also keynote addresses and panel discussions and a hands-on product exhibition, featuring the latest open systems offerings from the world's leading OEMs and ISVs. To register call: (800) 553-9939 or (415) 966-8440.

INTEROP-Fall. August 23-27, 1993, San Francisco, CA. Contact: Ziff Davis: (415) 941-3399.

HOME OFFICE TECHNOLOGY HOT CONFERENCE & EXPOSITION. August 24 & 25 1993, San Jose Convention Facility, San Jose, CA. For more info Contact: Future Expositions (408) 369-7744.

WINDOWS & OS/2-East. August 24-26, 1993, Boston, MA. Contact: Miller Freeman Expos-West: (415) 905-2200.

WINDOWS SOLUTIONS CONFERENCE & EXPOSITION September 15-18 1993 at the Santa Clara Convention Center. Presented by Seybold Seminars. Contact: Beth Sadler or Robbie Lepides, Seybold Seminars (310) 457-8500.

CASE WORLD October 19-21, 1993 in Boston. The National Application Development Conference & Exposition and announcing O-O EXPO, the Object-Oriented Conference & Exposition. Call (508) 470-3880.

ELECTRONIC IMAGING INT'L Sept. 13-19, '93, Boston, MA. Contact: Miller Freeman Expos-East 800-223-7126.

MULTIMEDIA EXPO-West. Oct 11-13, '93, San Jose, CA. Contact: American Expositions Inc 212-226-4141.

SPA- 9th Annual Conference Oct 10-13, '93, Chicago, IL. Software Publishers Association SPA: 202-452-1600.

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CASE SPECIAL INTEREST GROUP — A special interest group or SIG is currently being formed to help meet the needs of people interested in learning more about CASE. The purpose is to provide a forum where members may share their experiences. Experienced users or those contemplating introducing CASE to their organization are invited to call either Joe Da Silva at 252-1408, or Rob Beckman 928-2694.

CASE — Computer Aided Software Engineering is open to anyone interested in being tool independent, 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.

CLUB CUBASE — Toronto area users of Steinberg Software products, especially their powerhouse sequencer Cubase, now have a forum to share information and develop their 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 fairytales. 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.

IRMAC — Information Resource Management Association of Canada: dedicated to data management, IRM, data dictionaries, CASE, and strategic planning in the corporate environment. Monthly meeting in Toronto, Ottawa, and Victoria. (416) 960-6508.

K.R.D. — 1995 (The Kidstuff Reunion Drive Group For 1995) At 144 Gillard Ave., Riverdale. Tel: 461-1343. Call for meeting dates 11AM Saturdays. Group's focus is to collect 1975-6 Canadian pennies in order to reassert interest by signing a petition to reinstate the 1975-76 CTV Show "Kidstuff". Komputer Kidstuff 1995?? 2005?? Ask for Jeffrey Leitner (415) 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 — An Independent Apple User Group: Provides a support and information network to users at all levels. LOGIC accomplishes this by: holding monthly meetings, hosting Special Interest Group 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 & 3rd Tuesday of the month, North York Centre, 5110 Yonge St., in the Memorial Hall at 7:30 pm. Messages (416) 323-0828 BBS (416) 487-9771.

METRO TORONTO ADAM GROUP (MTAG) — Supporting ADAM, CPM-TDOS Users contact: (416) 424-1352 or write to: P.O. Box 165, 260 Adelaide St. E., Toronto, ON, M5A 1N0. Meetings 2nd Monday of each month, 1485 Albion Rd (Community Centre) and 4th Sat. each month at the Pape Ave. Community Center. Bi Monthly newsletter.

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.

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.

STC — Society for Technical Communication: Dedicated to the advancement of the theory and practice of technical communication in all media. The Toronto chapter has over 250 members. Meetings from Sept.-June, at Sun Life Assurance Company of Canada, 150 King St. W., on the 2nd Tuesday of each month. For more information contact Christine Mills at (416) 595-7690, or George Klima at (416) 448-3623.

TAF (TORONTO ATARI FEDERATION) — Atari users, 3rd Thursday, North York City Centre Library, 5110 Yonge St., (at Park Home) 7:00 pm, public domain library, regular demonstrations & guest speakers, infoline 425-5357, BBS 235-0318. Non-member admission \$2, membership \$30 (incl. newsletters).

THE CANADIAN AUTODESK MULTIMEDIA USER GROUP — Interested Users of Autodesk Multimedia products are invited to call Pia Zimperi at (416) 929-8155.

THE ELITE GROUP OF 3-D PROGRAMMERS — (E.G.3D P) in association with L.T.P.D. Dedicated to Atari users. For more information write to L.T.P.D. c/o (E.G.3D P), 37 Montye Ave., Box #2, Toronto, Ontario M6S 2G8.

THE TORONTO COLOUR COMPUTER GROUP — meets on the 2nd and 4th Mondays of each month. For more information, call Larry Osborne at (416) 972-1809.

TIMEX-SINCLAIR USERS CLUB — All Timex and Sinclair Computers. 1st Wednesday of the month, 14 Richome 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 write: Toronto APL SIG, Box 384, Adelaide Street P.O., Toronto, Ont., M5C 2J5. Contact Ben Best (416) 862-3193.

TORONTO PARADOX GROUP — meets 2nd Thursday of every month at 5:00 pm Free BBS 271-9795. Call for next meeting Loc & list of presentations. Learn about 'PAL' (Paradox Application Language), add-in products, Paradox tips and traps. For membership info., contact Doug Campbell 496-0061.

TORONTO USERS GROUP — User members support of As/400/38 imaging. Meetings held at the Airport Marriott Hotel every two months. Next meeting May 19/93. Please contact Wende Boddy at suite 2550, P.O. Box 77, Toronto Dominion Centre, Tor., ONT, M5K 1E7 for more information, or call (416) 607-2546.

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

TRACE — Toronto Regional AutoCAD Exchange: Presentations on the last Tuesday of every second month. Held at the Malton Community Centre, 3540 Morningstar Drive. For details call Tim Lucas at (416) 750-9765.

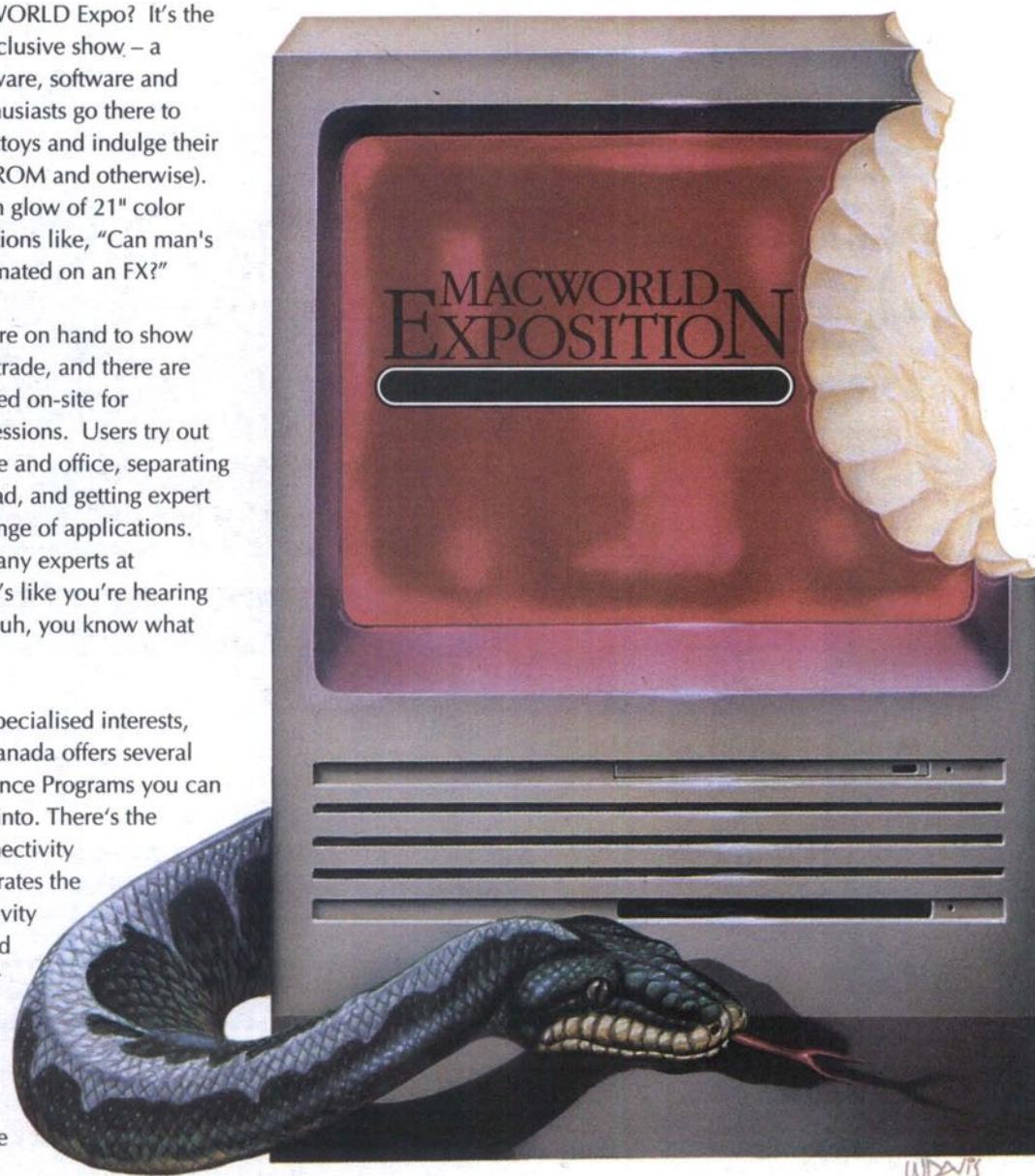
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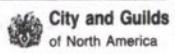
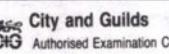
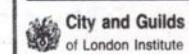
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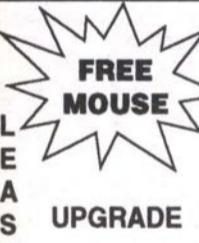
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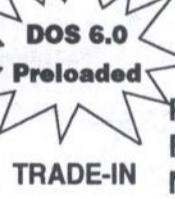
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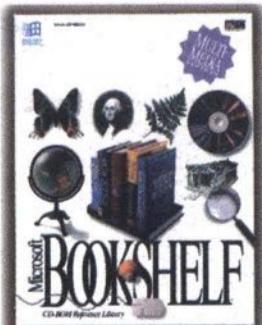




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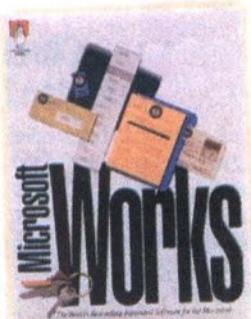
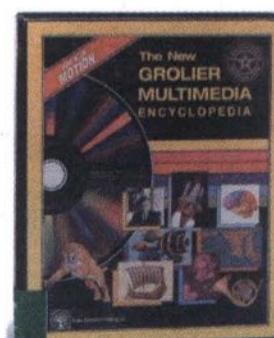
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