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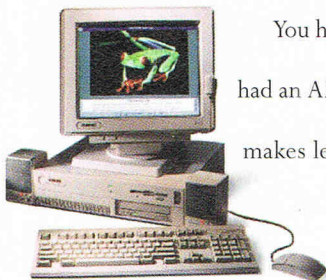
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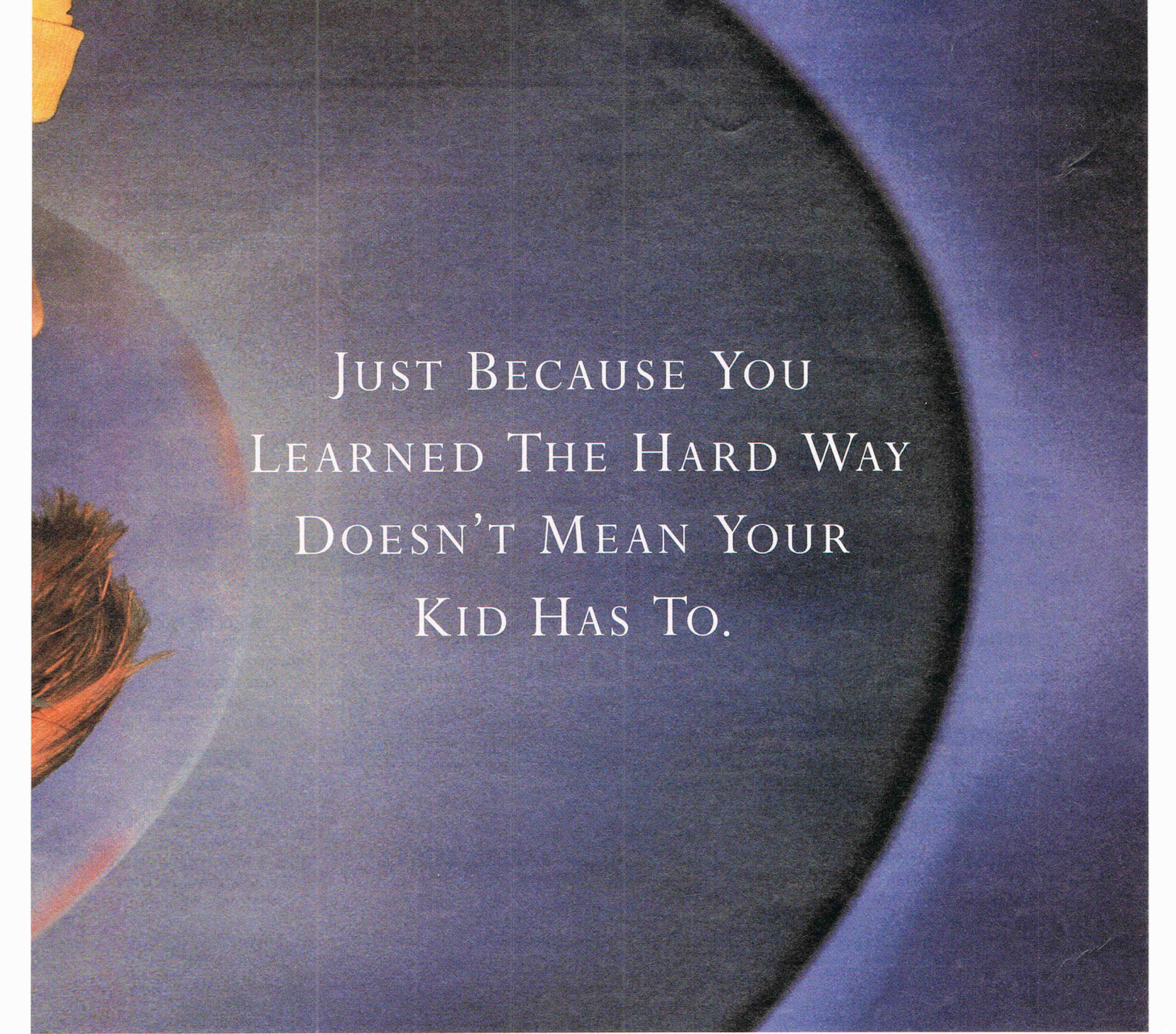
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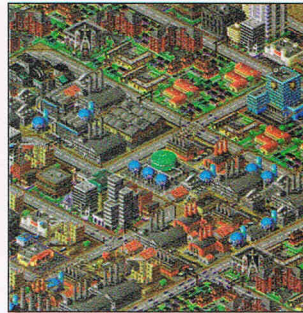
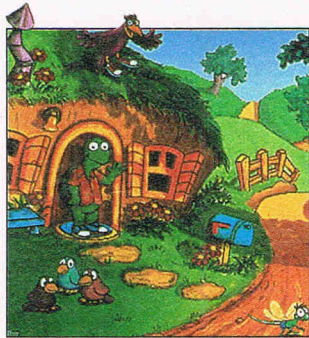
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Clifton Karnes

Pentiums for the people. That was Intel's message this past March when it announced new families of Pentium and 486 chips. Up until now, you've probably thought of the Pentium as a high-speed, high-performance CPU exclusively for workstations, servers, and power users. Until this year, that's been the case, but Intel plans to change all that.

Looking at trends and current statistics, Intel sees the home market as the site for the newest PC boom town, and in the home market poker game, Intel's betting it can put its hottest chips in the millions of PCs consumers are going to buy in 1994 and 1995. Those chips are Pentiums.

So where does the new 486 fit into this plan? Let's talk a little about it first. The new 486 is primarily a clock tripler, called the DX4. The 4 may be a little confusing here, because you'd expect the chip, as a clock tripler, to be called the DX3. Well, as Intel explained to me, the chip does more than just triple the clock speed of a 486. The DX4 has a cache that's twice the size of that of previous 486s, and, on some 486s, the speed increase may be more on the order of just 2½ times.

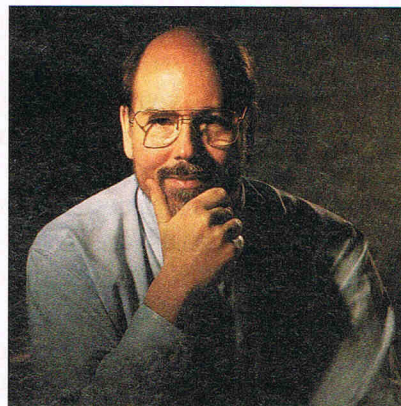
It's worth noting that this speed we're talking about with the DX4 is the internal speed of the chip only. The external speed is the processor's base speed. So a 100-MHz 486DX4 operates on data inside the chip at 100 MHz, but outside the chip, it moves into the slow lane at 33 MHz. Although this chip will appear in some desktop systems, Intel sees it primarily as a mobile CPU, for notebooks and the like.

The two Pentiums Intel is introducing are a 90-MHz model and a 100-MHz model. Intel sees these chips as the new high end, but there's a big difference between these new screamers and the company's previous high-end CPUs. High technology is entering the mainstream faster, and while it took five years for the 386 to get to the \$2,000 price point and four years for the 486 to get to that same place, Intel thinks these new Pentiums will reach that point in a year or less.

This means that you'll see 66-MHz

Pentium-based machines for \$2,000 this Christmas and 90-MHz machines for \$3,000. By this time next year, the 90-MHz Pentiums will be clocking in at \$2,000.

So there's probably a Pentium in your future. If that's the case, just how good are these new chips? Well, they look very good. The new Pentiums are low-power, 3.3-volt CPUs that come with two internal caches and some parallel processing capability. They're also scalar, which means that you can add multiple Pentiums to a system that's designed for this and dramatically improve performance. According to Intel's data, the new 100-MHz Pentium is nearly three times as fast as a 486 DX2-66, the current chip of choice for most PC users.



If you're running Windows, your performance boost probably won't be quite that high, because Windows won't take advantage of many of the chip's high-end capabilities, but the Pentium's raw 64-bit processing power and speed will definitely move Windows into the passing lane.

In addition, the systems that house these Pentiums are going to be faster than the average 486 today. Most of them will come with Intel's PCI local bus and fast hard disks, which should really speed data along these two bottlenecks.

So if you've never thought about buying a Pentium before, now's the time to start. With a Pentium, you may finally be able to kiss that Windows hourglass goodbye. □

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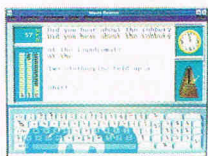
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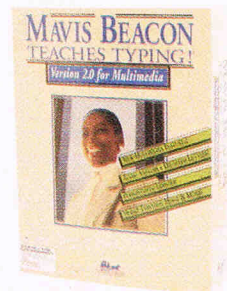
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WINDOWS WORKSHOP

Clifton Karnes

WINDOWS MAGIC

Last time, I talked about the 80x86 family of CPUs and how its architecture has made much of what Windows does possible. This month, I'm going to talk about how Windows exploits 386 enhanced mode. Specifically, I want to discuss how Windows multitasks DOS and Windows applications and how it uses virtual memory.

The 386 and its successors, the 486 and Pentium, have two features that Windows uses to great advantage: virtual 8086 mode and paging. In virtual 8086 mode, also called V86 mode, the CPU emulates several 8086 machines in real mode, and it can multitask these machines. In V86 mode, each DOS program thinks it's running in its own 8086-based PC. It's V86 mode that gives Windows the power to multitask DOS applications so well, and that's one of the things that's accounted for Windows' success.

The other important 386 feature—paging—takes the protected-mode addressing scheme we discussed last month a step further. As you may recall, in protected mode, segment addresses are supplied by selectors, instead of actual segment addresses themselves. Using paging, a selector can refer to an address that's in physical memory, or it can refer to a 4K page of memory that's been swapped to disk. Paging is the key to virtual memory, and, although it sounds complex, it usually works like a charm.

But how does Windows juggle all these elements and get them to work together? That question isn't so easy to answer, but here's the big picture. Before proceeding, though, I want to mention two excellent books that have helped me unravel some of Windows' most closely kept secrets. The first is *Windows In-*

ternals by Matt Pietrek (Addison-Wesley), which gives a byte-level look at how Windows does what it does. The other is *Microsoft's 80386/80486 Programming Guide* by Ross P. Nelson, which explores the 80386 chip's architecture in detail.

Back to our story. In enhanced mode, the real Windows operating system is something called the Virtual Machine Manager, or VMM for short. The VMM is a 32-bit, protected-mode, preemptive multitasking operating system. The VMM's sole job is to create, manage, and destroy virtual machines (VMs).

The first VM the VMM creates is the system VM, which runs *all* Windows applications. When you start a DOS session under Windows, the VMM creates a separate DOS VM, which runs in the 80386's V86 mode. For each additional DOS session, the VMM creates a new VM.

The VMM allocates CPU resources to each VM, and it's ironic that while the VMM multitasks preemptively, the system VM, which runs all the Windows apps, multitasks non-preemptively. Windows, as you may know, employs what is euphemistically called cooperative multitasking. In cooperative multitasking, each application gets as much CPU time as it's willing to take. For a program to be a good citizen in Windows, it needs to take as little time as possible. In a preemptive multitasking system, on the other hand, the operating system decides how much time each task gets. At the highest level, the VMM decides how much time each VM gets, and because of this, all Windows programs, taken as a *group*, are multitasked preemptively. But individually, Windows programs have to work inside a single VM, and they have to work cooperative-

ly. Obviously, preemptive multitasking is better than cooperative multitasking.

I want to discuss paging by beginning with how Windows manages memory in general. When a Windows program needs memory (to load itself, for example), it requests the memory from Windows. If Windows has a chunk of memory in its pool—called the global heap—large enough for the program, it gives the memory to the program. If it doesn't have a chunk of memory available, it rearranges the programs already in memory and consolidates the free space. This is something like defragmenting a hard disk, except that it takes place in memory. If that still can't free enough memory, Windows takes a 4K page of memory from a program that hasn't been run in a while and pages this memory to disk. This paging, which is also called swapping, turns your hard disk into a holding area for memory. As far as the application whose memory was paged to disk is concerned, its code and data are still in physical memory. Windows manages all this stuff behind the scenes, so the applications themselves never have to worry about it.

When you create a permanent swap file, you're telling Windows exactly how much disk space it can use for paging. This magic is possible because of the 386 chip's paging mechanism, which the 286 doesn't support, which is why virtual memory isn't available in standard (286) mode.

The best thing about V86 mode and paging is that you never have to think about them to benefit from what they do. If you're still running Windows in standard mode and you have a 386 or better CPU, turn on the light and switch to 386 enhanced mode. You'll be glad you did. □

The 386 and its successors, the 486 and Pentium, have two features that Windows uses to great advantage.

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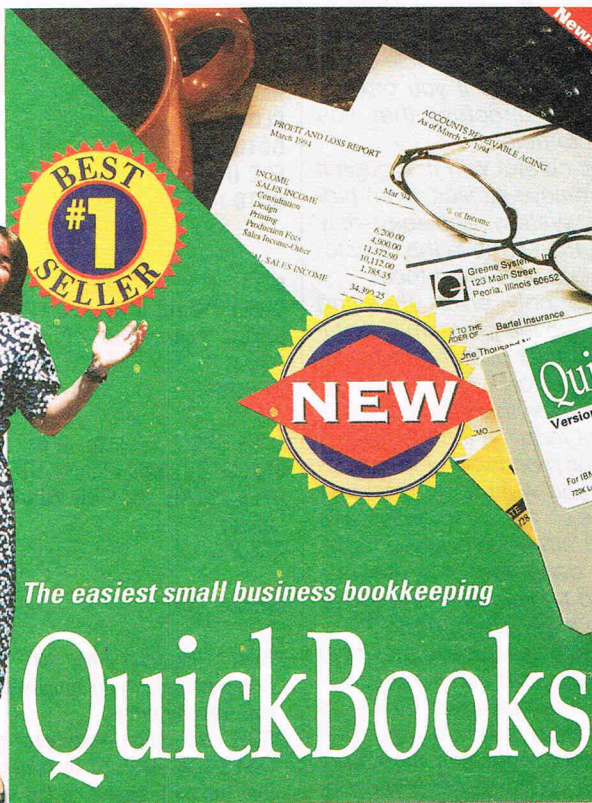
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FEEDBACK

Edited by Robert Bixby

Major Delete

I often install and uninstall whole directories of programs. Deleting subdirectory after subdirectory is tiresome. Is there a simpler way?

JENNIFER BIXBY
GREENVILLE, NC

Sure. If you have DOS 6, use Deltree. If you use DOS 5, here's a program that will rapidly do away with whole directory structures if you provide the top directory that you want to delete.

Be careful with it, though. It will remove all files, even hidden, system, and read-only files, then remove the directories that contained them.

The only error checking built into the program is that it won't start deleting from the root directory (which would destroy everything on the disk), and it requires that you give it the full pathname of the directory you want to eliminate so there's no ambiguity. We can't stress strongly enough how dangerous this program could be with even the slightest typographical error.

Therefore, please test it out on disks that don't matter before attempting to use it on your hard disk. You must always log on to the drive from which you're deleting the subdirectories.

```
INPUT "Complete path of
directory to prune: ", a$
IF LEFT$(a$, 1) <> "\" OR a$ =
"\" THEN GOTO syntax
PRINT "Really? You want me to"
PRINT "eliminate " + a$ + "and"
PRINT "all of its files and"
INPUT "subdirectories"; c$
IF LCASE$(c$) <> "y" THEN END
top:
CHDIR a$
GOSUB sub2
IF LOF(1) <> 0 THEN
LINE INPUT #1, b$
CLOSE 1
ELSE
GOSUB sub1
```

```
RMDIR b$
CLOSE 1
SHELL "del \temp.!!!"
END
END IF
top1:
CLOSE 1
CHDIR b$
GOSUB sub2
IF LOF(1) <> 0 THEN
LINE INPUT #1, b$
ELSE
GOSUB sub1
RMDIR b$
CLOSE 1
GOTO top
END IF
GOTO top1
```

```
sub1:
SHELL "attrib -r -h -a -s *.*"
SHELL "echo y|del *.*"
CHDIR "."
RETURN
```

```
sub2: SHELL "del \temp.!!!"
SHELL "dir /b/ad > \temp.!!!"
OPEN "\temp.!!!" FOR INPUT
AS #1
RETURN
```

```
syntax:
CLS
PRINT "You must enter the
complete path to the subdirectory
you want to prune."
PRINT "You must begin your path
with a backslash (\) to indicate
that the path begins at the root
directory."
PRINT "You have to enter more
than a backslash. This program
wasn't intended to wipe out
every directory on a disk."
PRINT "Use Format for that."
```

Boot Error

Is there a way to initiate computer operation from drive B, instead of first starting up from drive A and then going directly to drive C?

MARC LICHOWSKY
ELLIS PRAIRIE, MO

Some BIOS's look for a boot sector on both floppy drives and then at the hard disk, but

this is relatively rare. You can shift operation immediately to drive B by typing b: at the end of your AUTOEXEC.BAT. Or you could create an AUTOEXEC.BAT containing only instructions to go to drive B and then run a batch file there, which would shift some of the responsibility for the boot process to drive B.

Key Trap

Is there a way to trap the dedicated arrow keys on an extended keyboard and still use the ten-key numeric keypad while using QuickBASIC?

JIM ISOM
GREENBRIER, AR

Key trap uses one parameter to indicate the condition of the Shift keys and one to indicate the keycode. Strangely, this is much better explained in QBASIC than in QuickBASIC. Here's a brief program that traps the left- and right-arrow keys with Num Lock set.

```
KEY 15, CHR$(160) + CHR$(75)
KEY 16, CHR$(160) + CHR$(77)
REM The value of the
REM Num Lock key is 32. The
REM value of the extended
REM keyboard keys is 128; 32
REM plus 128 is 160.
REM The left-arrow keycode is 75
REM and the right-arrow
REM keycode is 77.
ON KEY(15) GOSUB moveright
ON KEY(16) GOSUB moveleft
KEY(15) ON
KEY(16) ON
location = 1
a$ = "JIM ISOM, GREENBRIER,
ARKANSAS"
top:
REM You have to have a main
REM loop, even if it doesn't do
REM anything.
b$ = INKEY$
IF b$ = "q" THEN END
LOCATE 2, 1: PRINT b$
GOTO top
moveleft:
location = location + 1
IF location > 27 THEN
```

Removing trees, booting from B, trapping keys, finding the Mouse Wheel, starting Windows with a macro, avoiding a BASIC error, and rolling the bottle

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Manager Program Item Properties dialog box, Program Manager run box, or any other place you can enter a command), type recorder -h key filename.ext, where filename.ext is the name of the Recorder macro and key is the key combination that normally runs the macro.

For the hot key, use the following symbols, plus the key name.

Key	Symbol
Alt	%
Ctrl	^
Shift	+

For example, if your hot key is Shift-F10 and your macro file is named MYMACROS.REC, you would type recorder -h +f10 mymacros.rec.

To run a specific Recorder macro when Windows starts, do the following.

1. Make your StartUp group active, and select File, New, Program Item.
2. In the Description text box, type start-up macros, or something similar.
3. In the Command Line text box, type recorder -h key macros.rec, where key is your hot-key combination and macros.rec is the name of your macro file. If, for example, your hot key is Ctrl-Shift-Alt-X and your macro file is MYMACROS.REC, you'd type recorder -h ^+%x mymacros.rec in the text box.
4. Check Run Minimized, and click on OK to save your program item.

Ball and Chain

I'm writing a large program in QuickBASIC 4.5. When I tried to compile it into an EXE file, the compiler quit and gave me a program-memory overflow error message.

What does this error mean, and how do I fix it? I still have some things I need to add to the program.

ANDY JOHNSTONE II
 PENNSBURG, PA

Ever hear of a character named Procrustes? The long and short of it is that you're trying to write a program that's too long and the available memory is too short.

We must admit that we've never written a BASIC program ambitious enough to use all of the program memory, but if we had, here are some things we would have considered.

First, are there long series of data statements? You could move these into their own files and have your program load them with the READ file command.

In a similar vein, if you have help screens or long lines of PRINT state-

FEEDBACK

location = 27
 GOTO common
 LOCATE 1, location: PRINT
 MID\$(a\$, location, 4)
 RETURN
 moveright:
 location = location - 1
 IF location < 1 THEN location = 1
 common: CLS
 LOCATE 1, location: PRINT
 MID\$(a\$, location, 4)
 RETURN

A Big Wheel

I'm looking for the Mouse Wheel mentioned by Paul C. Schuytema in the October 1993 issue of COMPUTE ("Gameplay"). I can't find it. Where can I purchase one?

MATT HOEKSTRA
 SURREY, BC, CANADA

Paul Schuytema replies: You can write to Colorado Spectrum, maker of the Mouse Wheel, at 748 Whalers Way, E-201, Fort Collins, Colorado 80525, or you can call the company at (800) 238-5983.

When you get your Mouse Wheel, be sure to track down your mouse's

reference booklet. You'll need to change the mouse's sensitivity for it to feel right when used with a road-racing game. Finding the right sensitivity is a matter of trial and error, and it will vary from game to game.

Once you find the right sensitivity, write it down so you won't forget. Or better yet, write it as part of a batch file that also starts the road-racing game so the correct sensitivity will be set automatically.

Initial Macros

Is there a way to have a group of macros run automatically when I start up Windows?

HAL BIGELOW
 SARATOGA SPRINGS, NY

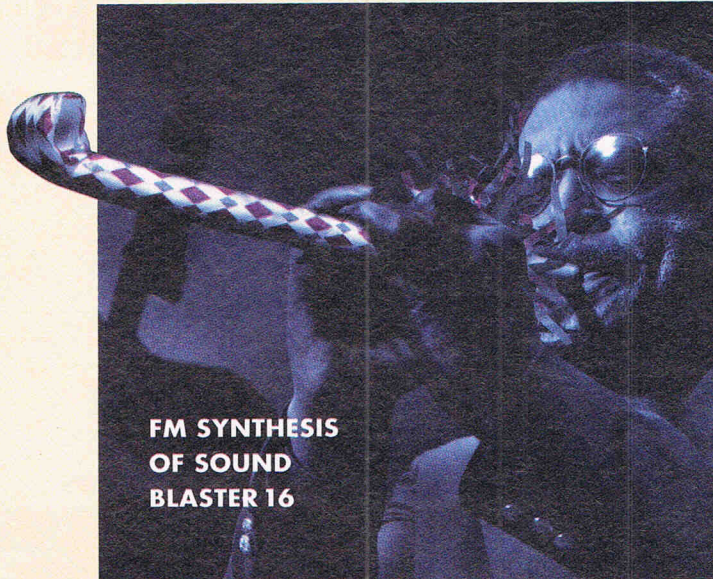
Here's our answer, in two parts. The first part tells you how to start Recorder with a hot key, and the second part tells you how to run a macro automatically when Windows starts.

This tip is from 101 Essential Windows Tips by Clifton Karnes (COMPUTE Books).

To run Recorder and have a specific macro execute, use the hot-key switch.

1. Make sure your macro specifies a hot key.
2. On the command line (in a Program

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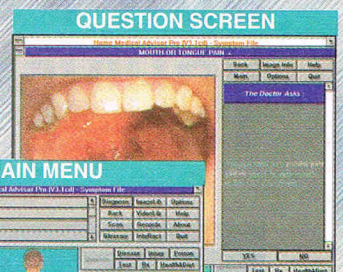
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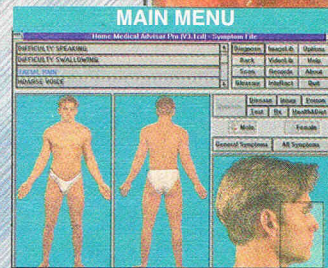
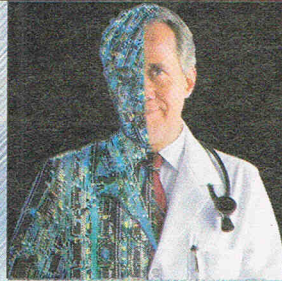
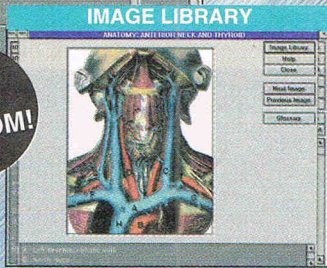
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FEEDBACK

ments, these could be off-loaded into a data file that your program could read. Help screens are an enormous waste of program space.

Next, go through the program looking for routines that could be turned into subroutines or subprograms. If you find yourself writing more than one routine that performs a single function, you could probably figure out a way to combine all of these functions into a single routine.

Finally, we would look into the CHAIN and RUN commands and the COMMON function. CHAIN and RUN allow you to run another BASIC program. You can specify a part of that program to run, or you can run the whole program. COMMON allows you to share variables in common between chained programs. By using CHAIN, you could move one or more self-contained routines into another program file and only call upon them as needed. Our experience with CHAIN has been pretty dismal, though. We couldn't get COMMON to work with compiled programs, and both CHAIN and RUN require you to use CHAIN or RUN to return to the beginning of the

calling program. Then you have to figure out a way to return to your original position in the calling program.

You may be having problems because you're compiling from within the editor, which takes up a huge amount of memory on its own. You might have better luck if you compile from the command line. Use the command BC filename to create an object file (an intermediate file with an OBJ extension) and then LINK /e filename.OBJ to link the file and create your final executable file (filename.EXE).

Modules are another possibility. Move some of your main program into subprograms. By doing this, you multiply the size of your potential program. If all of your program is in a single module, you're limited to 64K of program space. But you can add multiple modules to your program, each of which may be up to 64K in size. That would give you more breathing room.

If it's only at compile time that you experience the problem, consider running the program uncompiled. Another thought: You might have outgrown QuickBASIC. That time comes in every programmer's life, eventually. Maybe it's time to move on to a professional BASIC (like Microsoft BASIC) or to another language (like C or C++).

Roll Out the Bottle

In reference to the recent letter about scanning the label of a bottle, hand scanning seems to be the answer. Just turn the hand scanner on its back and roll the bottle over it. Be sure the bottle contacts the scanner's roller. If you have many bottles to scan, clamp the scanner in place and add a second roller to help support the bottle.

RALPH BATES
KEY WEST, FL

COMPUTE Online

Remember that "Feedback" is available in the COMPUTE area of America Online with additional programs too large to fit in the magazine.

THE EDITORS
GREENSBORO, NC

Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Write to "Feedback" in care of this magazine. Readers whose letters appear in "Feedback" will receive a free COMPUTE baseball cap while supplies last. We regret that we can't provide personal replies to technical questions. □



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PagePlus lets you perform almost any short-document layout task you can think of, easily and inexpensively.

PagePlus 2.0

Windows Magazine **RECOMMENDED** 1993

If all the packages reviewed here, PagePlus is the best bargain. It provides about 80% of the functionality of high priced programs for less than 10% of the cost. PagePlus is the only low-cost product that supports process-color separations, and it has other useful features that make it an enticing alternative to the high-end applications in this review, which can be more expensive and difficult to learn.

PagePlus' ability to perform process-color separations is its most noteworthy feature. It has all the prepress functionality you need, except for traps and spreads. You can compensate for ink build-up, as well as make dot gain corrections. In my tests, PagePlus' color separations were as good as those printed by high-end programs, and even better than Ventura's.

PagePlus offers a powerful table editor, text frames that easily link and jump text, and a ChangeBar that lets you assign line weights, colors and many other attributes with a few mouse clicks. You can move the rulers into your editing area, so you can quickly measure and resize objects.

The \$59.95 price tag is simply incredible. And, for another \$40 you get the PagePlus SuperPack, which includes over 100 TrueType fonts and several hundred clip-art images. Several useful manuals cover the basics of desktop publishing, including some excellent design tips; a vast improvement over last year's documentation.

There's little you can't do with PagePlus. The one major drawback is a lack of automatic page numbering: When you add or delete pages, you must go back and renumber pages by hand.

PagePlus is a great program for small or mid-size businesses that need a powerful short-document DTP package.

William Harrel is a freelance writer and desktop publisher based in Weaverville, Calif. Reach him on WIX as wharrel.

W REPORT CARD

Recommendations...

	Short one-color documents	Long one-color documents	Short spot-color documents	Long spot-color documents	Short process-color documents	Long process-color documents
Easy Working Desktop Publisher	B	B	C	C	D	D
Express Publisher	B	C	C	C	D	D
FrameMaker	B	B	B	B	D	D
PageMaker 5.0	A	A	A	A	A	A
PagePlus 2.0	A	B	A	B	A	B
PFS: Publisher	B	B	C	C	D	D
Publish It! (TimeWorks)	C	C	C	C	D	D
QuarkXPress	A	C	A	C	A	B
Ventura Publisher	B	A	B	A	C	B



Quark Xpress handles process color better than any other program we tested and Ventura Publisher works best for long documents. Neither is a DTP program for all seasons, though. Because it has something for everybody, we've rated PageMaker as the best overall program. It's easy to use, yet provides process color separations and long-document options such as indices and table of contents. PageMaker lets you scan images directly into your layouts. You can place and

manipulate graphics easily, and the stylesheet options are strong. It also has excellent cross-platform compatibility with the Macintosh version of PageMaker.
 Serif's PagePlus is another strong application. It's also a terrific bargain. If you're doing short document publishing, PagePlus provides everything you need and more. It's easy to use and has a wealth of options. The lack of automatic page numbering and a few other long-document features leave it less powerful than PageMaker, but at less than 10% of the price, who's quibbling?

INTRODOS

Tony Roberts

Get along with DOS and your hard disk using these two powerful DOS add-ons.

HELP FOR DOS

This month, let's take a look at a couple of problems faced by anyone who uses DOS. First, it's impossible to remember how to use all the DOS commands, especially those that are used infrequently, and second, how do you cope with a disk that's filling up with files you can't identify and don't know whether you need?

Veteran computer users know that a few commands are all you need most of the time. However, the times when you're faced with an unfamiliar command or procedure and your DOS manual is nowhere in sight can be the most frustrating.

When DOS 5.0 was introduced, Microsoft took steps to alleviate this problem by including a Help utility, which lets you keep a DOS manual online and always available to answer your questions. This Help utility defines various DOS commands and provides usage notes and examples.

As helpful as DOS's Help utility is, however, it pales in comparison to DOS Help! 6.0 (Flambeau Software, 1147 East Broadway, Suite 56, Glendale, California 91205; 800-833-7355; \$49.95), an expansive reference and tutorial.

DOS Help! 6.0 includes more than 2MB of data linked in a smooth hypertext presentation that allows you to move quickly to the information you need. With complete information on the basic commands, excellent DOS tutorials, detailed data on power-user topics, and a hints-and-tips section, DOS Help! 6.0 has an answer for users on every level. If you want to acquire a real understanding of how your computer works and be able to solve problems of all kinds on your own, DOS Help! 6.0 is a necessary resource.

The original version of DOS Help! was introduced in 1985, and the program's been getting bigger, better, and more refined ever since. If you find yourself searching for answers, it's the key. There's no easier way than DOS Help! 6.0 to understand what DOS is doing and why.

Another problem every computer user faces is disk bloat. Hard disks fill up with hundreds and thousands of files, many of which do nothing more than occupy space. Solid Oak Software has come up with a solution. It's called Disk Historian (Solid Oak Software, P.O. Box 6826, Santa Barbara, California 93160; 800-388-2761; \$59).

Disk Historian is a resident program that monitors all file access to your system and keeps a database file to track which files have been accessed. All you do is install the program and let it keep an eye on things. After the database has had a chance to build, you can view the data through an interface that runs under Windows.

This viewer lets you see which files are active and which never get any use. The program allows you to sort and group the data in a variety of ways so you can look at things the way you want. For example, I review a lot of Windows shareware programs, and after a while my C:\WINDOWS\SYSTEM subdirectory is loaded with dynamic link library (DLL) files that have come from who knows where. However, without knowing what program was expecting to access those files, I'd be afraid to delete them.

Disk Historian comes to the rescue. Disk Historian keeps a count of the number of times a file's been accessed, plus it keeps the dates of the first and most recent access. Perusing a Disk Historian list of

DLL files, you can easily see which ones are busy and which ones are doing nothing.

You can either delete the inactive files or compress them with Disk Historian's resident compression utility. This allows you to crunch the file to save some disk space yet keep it nearby in case you're uneasy about throwing it out completely. If in the future a program halts because it can't find the file, just run the Disk Historian interface and decompress the file.

Disk Historian classifies files as active or inactive depending on how many times and how recently they've been used. For example, an active file is one that's been accessed at least once in the last ten days, 5 times in the last month, 10 times in the last quarter, or 25 times in the last six months. If you try to delete a file that Disk Historian classifies as active, the program will warn you before the deletion takes place.

The philosophy behind Disk Historian is that you can save megabytes of space by deleting unnecessary files. Unused files typically occupy between 30 and 70 percent of a hard disk. And if you have data files that you'd like to keep but that haven't been accessed in ages, Disk Historian provides an off-loading option so you can free up space and still have the data available.

For years, I've been making the wildest kind of guesses about which data and application files could be deleted and which had to remain on the disk. Sometimes, I have deleted too much and had to reinstall applications, only to begin the weeding-out process all over again.

But now that I have Disk Historian working, I can eliminate the guesswork and make smart choices when cleaning up my hard disk. □

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PFS: Publisher	B	B	C	C	D	D
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POWER WORD PROCESSORS

Edited by Mike Hudnall
Reviews by William Harrel

Are all three top Windows word processors—Lotus Ami Pro, Microsoft Word, and WordPerfect—created equal? Whether you need simple letters or sophisticated layouts, one of these word-crunching workhorses will get the job done.

Word processing sure isn't what it used to be. Windows has turned our favorite word crunchers into sophisticated document layout workhorses. No longer is it necessary to buy a separate desktop publishing package, such as Aldus PageMaker or Microsoft Publisher, to create all types of publications. From sophisticated reports to newsletters, even lengthy books and manuals, any one of these three Windows word processors can do it all—which leaves you wondering, How do they perform when all you need is a simple letter or memo?

The answer is that word processing is rapidly becoming automatic. If current trends continue, you soon won't have to do any work—the program will do it all.

Creating simple documents has never been easier—once you have a reasonable grasp of Windows conventions, that is. For example, as I type this article, every feature I need is right here in front of me. To italicize a word, I just click on an icon. Changing fonts is as simple as selecting a name from a drop-down list. Why, I can highlight this sentence and drag it anywhere in this document. (Or, since I happen to be using Word for Windows 6.0, I can even drag it into another document.)

And as if all this isn't easy enough, I can customize my word

processor's interface to fit more neatly into my work environment. I can, for example, place almost any function, even macros, on the button bar or on a menu. I can work in several different display modes, such as draft or a graphical page layout view with multiple magnification levels. Tables and columns are created visually, by simply dragging the mouse cursor over a grid. It just doesn't get any easier!

What You See . . .

By now most PC users are tired of hearing about Windows' WYSIWYG (What You See Is What You Get, pronounced "wiz-ee-wig") display. But

that let you create charts and graphs. You'll find everything you need to create one-color newsletters, reports, and just about any other documents. About the only desktop publishing option missing is the ability to create color separations for reproducing your documents at the print shop.

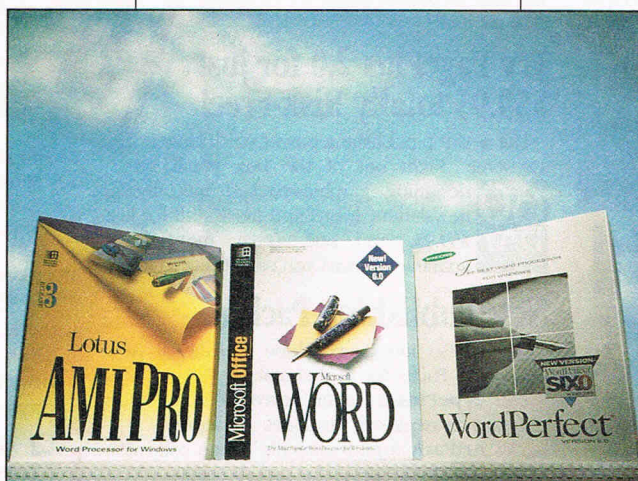
Can You Say OLE?

Another Windows feature making your word-processing tasks less burdensome is object linking and embedding (OLE, pronounced "o-lay"). OLE provides a level of interactivity among applications unheard of in the DOS world. You

can, for example, embed a 1-2-3 chart in your Ami Pro document. The chart remains linked to both your 1-2-3 worksheet and your document. As you make changes in the worksheet that affect the chart, the chart in your word processor is automatically updated. If you generate documents that require periodic updating, you'll find OLE invaluable.

Yet another advantage to OLE is the ability to embed sound and animation files in your documents. Organizations that communicate over networks or distribute documents on disk can use their Windows word processors to create electronic multimedia documents.

(OK, so the mention of multimedia word processing makes your eyes glaze over. Imagine the following scenario: You're making a proposal to your boss in a WordPerfect document. As part of the proposal you must include a process description, such as, say, explaining how a certain gadget works. Wouldn't your boss be much more impressed with a narrated animated demonstration of the gadget in action, rather than a boring several-



there's no denying that Windows' graphical user interface (GUI, pronounced "gooey") is great for document creation. The ability to see font changes and graphics onscreen as you work is unparalleled in the character-based DOS word-processing world—even the new graphical displays of WordPerfect for DOS and Microsoft Word for DOS do not display page layouts as clearly. (See the sidebar on DOS products.)

Creating sophisticated documents resplendent with graphics, tables, and fancy fonts is a breeze. Each of these programs now ships with graphics modules that allow you to create images to embellish your documents. They also have simple charting applets

page description? Say you're trying to sell somebody on an idea. Wouldn't your message be much more influential if you could include film clips with supporting data touted by Peter Jennings? With proper hardware, you can.)

Microsoft Word takes OLE further with its implementation of OLE 2.0, which lets you drag and drop text and graphics between documents. If you have other OLE 2.0 applications, such as Microsoft Excel 5.0 and PowerPoint 4.0, you can also drag and drop between applications. In other words, you can drag a chart from Excel into Word without having to cut and paste—and OLE links are maintained!

The Race Is On

Since these are Windows applications, entering and editing text in each is quite similar. Like programs in most software genres, however, Windows word processors are engaged in a furious features race. The product most recently upgraded is usually ahead. Vendors incorporate all the new features in the competition's latest versions and leapfrog out front by adding several of their own. In one round of upgrades, for example, we saw all three products gain customizable button bars that let you access your favorite features with a mouse click.

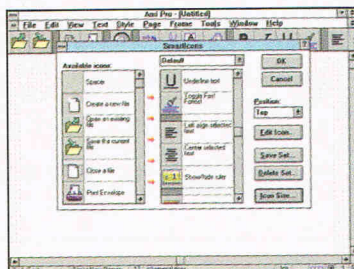
Until late 1993, all three of these programs were primarily on equal footing. Word and WordPerfect have recently been upgraded (both are now at version 6.0), and Word now has a strong lead in the features race. WordPerfect has caught up with Ami Pro in some areas, such as automated templates, and moved slightly ahead in others, like providing context-sensitive help with the right mouse button.

None of this is to say that Ami Pro is not a great program. It's very powerful and easy to use. Lotus is a strong competitor, and an imminent Ami Pro upgrade will undoubtedly catapult it into the lead in the features race. For now, though, Word and WordPerfect sport long-

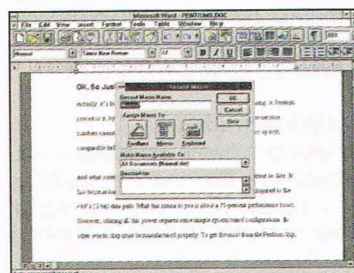
er lists of impressive features, especially in the interface and automation arenas—all adding up to further ease of use.

Interface Magic

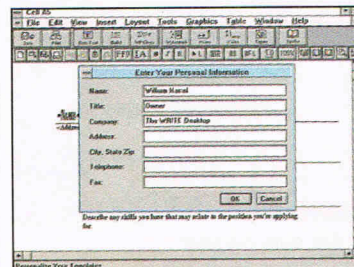
While all three programs sport useful button and icon bars, Word and WordPerfect have upgraded their



Customizable Ami Pro SmartIcons



Word for Windows macro



WordPerfect automated templates

implementations substantially. Both programs now have context-sensitive button bars. When you edit text, the program displays the appropriate icons. When you work with a graphic or chart, the proper shortcut tools pop up. Both programs now offer help in using the icons, by displaying descriptions of each one when you run the mouse cursor over them (a feature Ami Pro already had). Double-click-

ing on an object brings up the tools needed to edit that object, and you can get context-sensitive quick menus by clicking the right mouse button.

Both Word and WordPerfect have also done away with their separate, noneditable print previews. You can now display and edit your documents in a wide range of zoom levels. In Word you can see thumbnail views of multiple pages, so that you can check your layouts—and you can even edit in thumbnail mode!

Automation

Unfortunately, word processors can't compose your documents for you—but these products come pretty close. All three programs provide strong macro features that allow you to record virtually any combination of keystrokes and play the combinations back as often as you like. And with a little programming savvy, you can create macros that make decisions based on variables in your document or based on user input. Depending on your dedication to learning the macro-building facility, you can even add your own dialog boxes that allow you to modify the action a macro takes. Word takes automation to new heights with automatic typing options. And all three programs ship with highly sophisticated automated templates.

Perhaps the most exciting advance in automation is Microsoft's new IntelliSense technology, which provides an exciting new feature (among others) called AutoCorrect that automatically corrects words as you type. The program ships with about ten automatic corrections, to which you can add your own. While WordPerfect can't match AutoCorrect, it does have an option called Abbreviations that lets you store large blocks of text and expand them by typing short two- or three-letter abbreviations. Word and Ami Pro have similar glossary options, but they are not nearly as easy to use.

Windows applications depend increasingly on templates, where

all you do is type; the program takes care of formatting. All three programs have great templates, complete with extensive style sheets that make paragraph formatting all but automatic. However, all three programs now take the idea of templates further by providing automated templates that prompt you for information as you create your document. Again, Word leaps out ahead with Wizards. If you are familiar with other Microsoft programs, such as Publisher or PowerPoint 4.0, you know about Wizards. Wizards are automated templates that literally create documents for you. All you do is type. And if that's not enough, the program comes with several boilerplate letters where all you do is enter the recipient's name and address.

Until voice recognition takes off—when we'll virtually dictate to our computers—it's hard to imagine automation advancing much further.

Word-Crunching Prowess

A disadvantage of Windows word processors is that they require much stronger machines to stretch out. You need enough memory for Windows and the word processor. If you create long documents or use a lot of graphics, your computer can slow down substantially. Each program has a suggested minimum RAM and system requirement; however, these requirements are minimal and do not allow for optimal performance. Here, Ami Pro excels. It requires the least amount of RAM and runs fastest on all systems. Ami Pro proves that there is an advantage to not loading a program down with features.

To get a feel for how well each program uses memory and system resources, I ran them on three different computers: a 25-MHz 386SX with 8MB RAM, a 33-MHz 486DX with 20MB RAM, and a 60-MHz Pentium with 16MB RAM. Performance issues are discussed below in the individual reviews. Suffice it to say, though, that unless you have a 486, you should not attempt to run

TEST LAB PICKS

OK, so you've decided to buy a Windows word processor. Which one is right for you?

Features Champ

Microsoft Word 6.0 for Windows. Its automation features—AutoFormat, AutoCorrect, Wizards, and so on—are matched nowhere.

Speed Champ

Ami Pro 3.01. If you have a 286 or a slow 386 or 486, you'll sacrifice performance using one of the others. Ami Pro is the hands-down speed demon here.

Best All-Around Product (on a reasonably fast machine)

Microsoft Word 6.0 for Windows.

For the best value, buy a suite: either Microsoft Office, Lotus SmartSuite, or Borland Office.

WILLIAM HARREL

WordPerfect 6.0. Word ran passably on the 386, but I would never attempt to run it on a 286. If you're looking for robust performance, Ami Pro leaves the others in the dust.

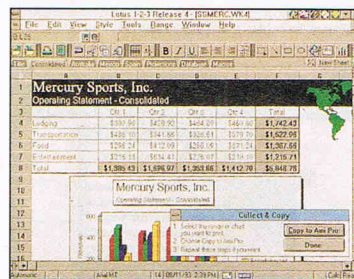
Suite Integration

As with all software applications, you should buy the one that best fits your needs. Keep in mind that all three of these products are strong

find the best integration among products by the same vendor. Ami Pro, for example, has an interface that's almost identical to the interface used by Lotus 1-2-3 and Freelance Graphics. Icon bars are the same, and like actions are performed with the same commands. Furthermore, Ami Pro knows exactly how to handle imported data from other Lotus programs, and vice versa. When you import an Ami Pro outline into Freelance Graphics, for instance, the presentation program instantly turns the outline into a presentation. Each top-level topic becomes a new slide, and lower-level topics become bullet points.

You'll find this same level of integration among Microsoft Word, Excel, and PowerPoint, and among WordPerfect, WordPerfect Presentations, and Borland's Quattro Pro (Borland and WordPerfect Corporation are cooperating to integrate their products). In fact, you can buy these integrated products in bundles called suites. Suites contain word-processing, spreadsheet, presentation, E-mail, and database programs, all in the same low-priced package. The good news is that, if you look around, you can find a Microsoft, Lotus, or WordPerfect/Borland suite for about the same price as one of these word processors.

WILLIAM HARREL



Lotus data transfer

word processors capable of producing almost any kind of document. The two issues you should consider are the power of your system and how you plan to use the product (which includes using it with other programs, such as your spreadsheet and presentation packages).

Along with ease of use and automation, integration is becoming an increasingly important issue for Windows applications. If you plan to use these products in conjunction with other applications, you'll

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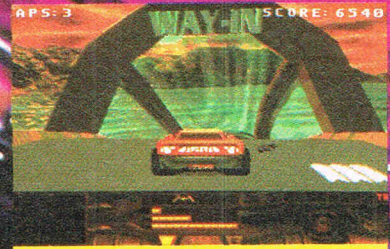


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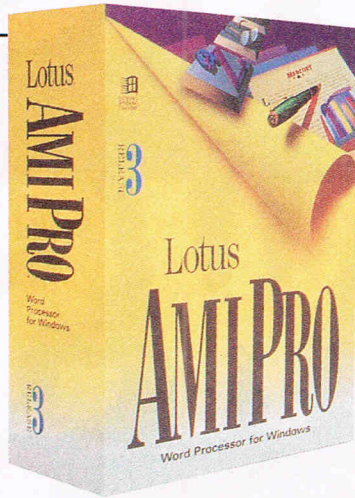
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TEST LAB



LOTUS AMI PRO 3.01

Ami Pro has been the unsung hero among Windows word processors. Although usually a step or two ahead in the features race, providing the most power and ease of use, it has garnered a significantly smaller chunk of the word-processing market share. However, recent upgrades of competing products have put Ami Pro slightly behind the others in features.

While this program has everything that you need to produce mail merges, long documents, legal pleadings, and all other types of documents, Ami Pro excels at page layout. In fact, last year I compared it to three low-end desktop publishing packages, including the popular Microsoft Publisher, and I found it superior in many ways.

Ami Pro uses a framed-object approach to page layout that's similar to the approach taken by Ventura Publisher but not nearly as complicated. You can, for example, place columns in any text frame. You can stack frames and control their stacking order using a procedure that's very similar to the one in PageMaker. Ami Pro automatically (and adroitly) wraps text around graphics; it even contours text around irregularly shaped images—a task that Ventura Publisher has not learned yet.

Need mail merge? Ami Pro makes it almost effortless. All you do is select Merge from the File menu, and a three-step dialog box guides you through the procedure. It prompts you for fields as you cre-

Lotus Ami Pro 3.01
Suggested retail price: \$495, \$795
for SmartSuite

LOTUS DEVELOPMENT
Word-Processing Division
1000 Abernathy Rd., Ste. 1700
Atlanta, GA 30328
(800) 831-9679
(404) 391-0011

In Brief: Ami Pro 3.01 is a strong word processor; upgrades of the other two leading word processors have left it slightly behind in the features race.

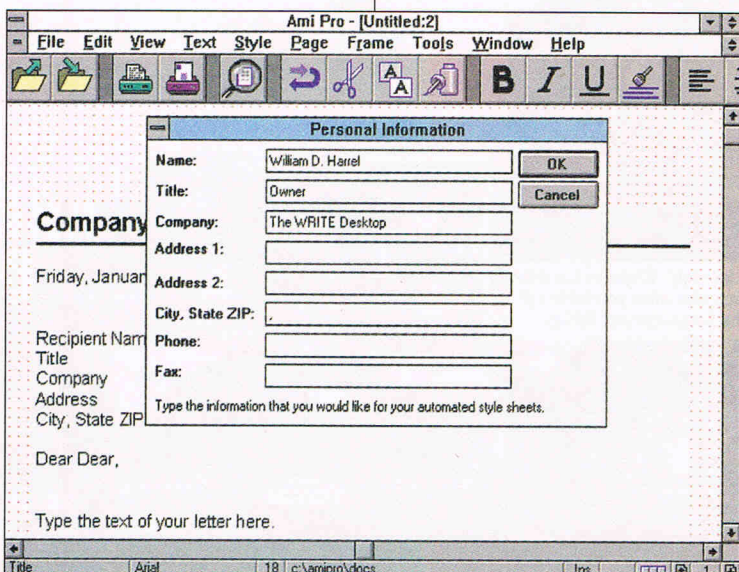
ate the database. Ami Pro keeps your merge fields in a card-file-like database. This feature is so functional that many Ami Pro users use it as a simple flat-file database for contact and address management.

If this doesn't make managing your mail-outs easy enough, consider Ami Pro's envelope-printing interface, which is terrifically graphic. As you create a return address, you see exactly how it's formatted on the envelope. In addition, you can effortlessly save a variety of return addresses.

While Ami Pro does not have right-mouse-button context-sensi-

tive menus, this doesn't mean your right mouse button is useless. When you click the right mouse button on an object, such as, say, a text frame, you get a dialog box for formatting the frame. While I don't find this as functional as the menus that pop up in WordPerfect and Word, it is helpful—and Ami Pro was first to put the right mouse button to use. It was also first to provide context-sensitive descriptions of tools and menu commands. When you pass your mouse cursor over a tool, icon, or menu command, you get a description on the menu bar.

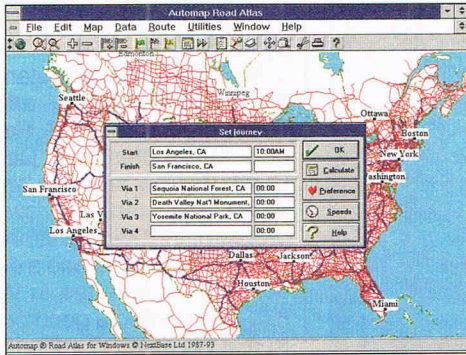
You'll also like how easily the program lets you customize the interface. You can, for example, customize the icon bar (SmartIcons) for working with specific document types. You can create several SmartIcon configurations, such as one for letters, one for newsletters, one for reports, and so on, and use them as needed. The icon bar in Ami Pro is very similar to the ones in 1-2-3 and Freelance, and there's a lot to be said for having all your programs look and feel the same. It can save you a lot of time, which is, after all, one of the primary concepts behind Windows.



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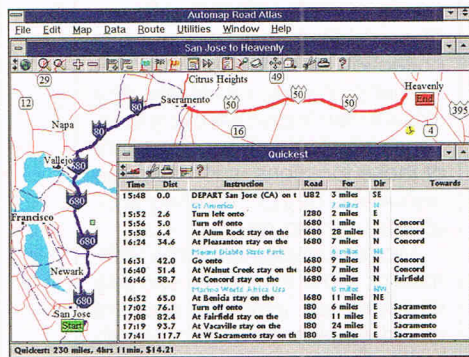
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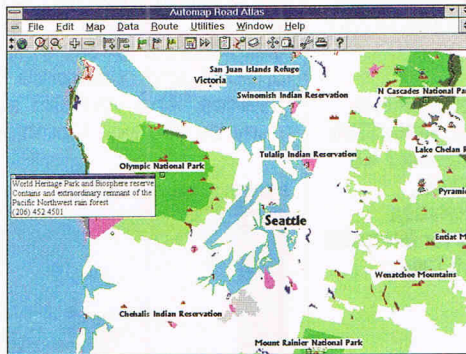
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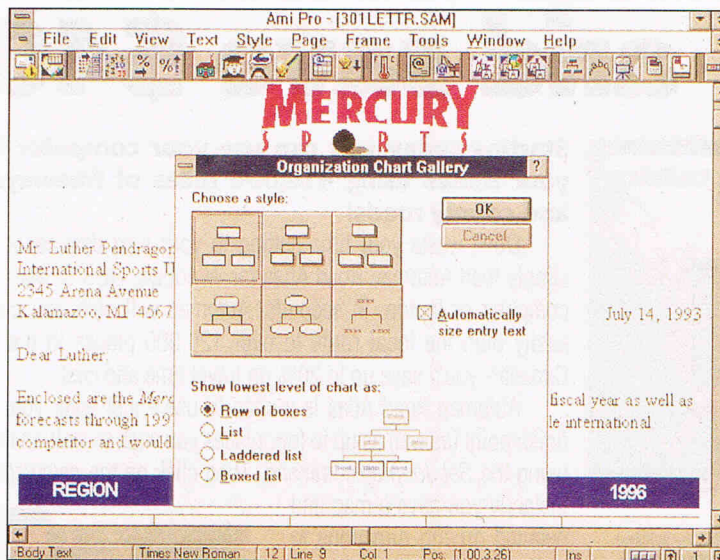
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10:32	At Woodland stay on the	I5	19 miles	N	Tacoma
10:49	At Kelso stay on the	I5	10 miles	N	Tacoma
10:59	At Castle Rock stay on the	I5	28 miles	N	Tacoma
11:25	At Chehalis stay on the	I5	3 miles	N	Tacoma
11:27	At Centralia stay on the	I5	24 miles	N	Tacoma
11:49	At Olympia stay on the	I5	22 miles	N	Tacoma
12:10	Turn off onto	S512	2 miles	E	(Parkland)
12:11	At Parkland stay on the	S512	9 miles	E	(Puyallup)
12:20	At Puyallup go onto	S187	8 miles	N	Renton
12:27	At Algona turn right onto	S18	3 miles	E	(Auburn)
12:29	At Auburn stay on the	S18	23 miles	E	(Issaquah)
12:56	Turn right onto	I90	2 miles	E	Spokane
12:57	Take the	S202	1 mile	N	
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Ami Pro uses Freelance Graphics' org chart feature.

This brings us to ease of use. Ami Pro has terrific documentation, including a helpful section about getting started. But the real story here is the extremely user-friendly online tutorial. The first time you start the program, you'll see a QuickStart tutorial. QuickStart takes you through the basics of using the program and then allows you to review more complex issues such as mail merge, tables, and long documents. You can exit the tutorial at any time, and you can call it up whenever you need to refresh your memory.

If, after going through the great documentation and tutorial, you're still stumped, you'll find that Lotus's technical support is tops. Every time I call, I get a courteous, knowledgeable technician who answers all my questions effortlessly. And I never have to stay on hold long, either.

Ami Pro is a great word processor; the only reason it doesn't stand out as the best program is that recent upgrades to Word and WordPerfect have brought some new features into the mix that Ami Pro doesn't yet have. Still, it has all the power and all the capabilities that most people need.

Circle Reader Service Number 371

MICROSOFT WORD 6.0 FOR WINDOWS

OK, let's get this out of the way first: Microsoft Word is a powerful word processor capable of creating all types of documents. It makes mail merges and long documents a snap. Its easy-to-use-and-configure button bar and ruler make formatting simple. Another

Microsoft Word 6.0 for Windows
Suggested retail price: \$495, \$750 for Microsoft Office Standard 4.0 (Word for Windows, Excel, PowerPoint, and workstation license for Mail), \$899 for Microsoft Office Professional 4.0 (adds Access)

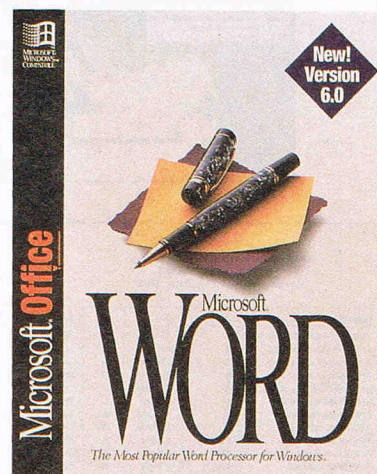
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(206) 882-8080

In Brief: Microsoft Word 6.0 builds upon an already strong word processor; this new version redefines the concepts of ease of use and automated word processing.

er exciting aspect of version 6.0 is its implementation of OLE 2.0, the recent upgrade to Microsoft's object linking and embedding technology. But the real issues in this recent upgrade are automation and ease of use.

Word's ease of use starts with its extensive online tutorials. There are two: "Quick Preview" and "Examples and Demos." Quick Preview provides an interactive, animated overview of the program, including a strong Getting Started section and a description of new features in version 6.0. There is also a good comparison of Word and WordPerfect features that shows you how Word performs similar functions. Examples and Demos is an extensive collection of procedure demonstrations you can run at any time to learn how to perform many functions or just refresh your memory of those functions, such as page layout and design, creating style sheets, and so on.

Microsoft's new IntelliSense technology provides many exciting new features, including the one called AutoCorrect that automatically corrects words as you type. The program ships with ten or so automatic corrections, such as / for i, separate for separte, don't for don,t, and occurrence for oc-currence. And you can add as many as you like. Combine this



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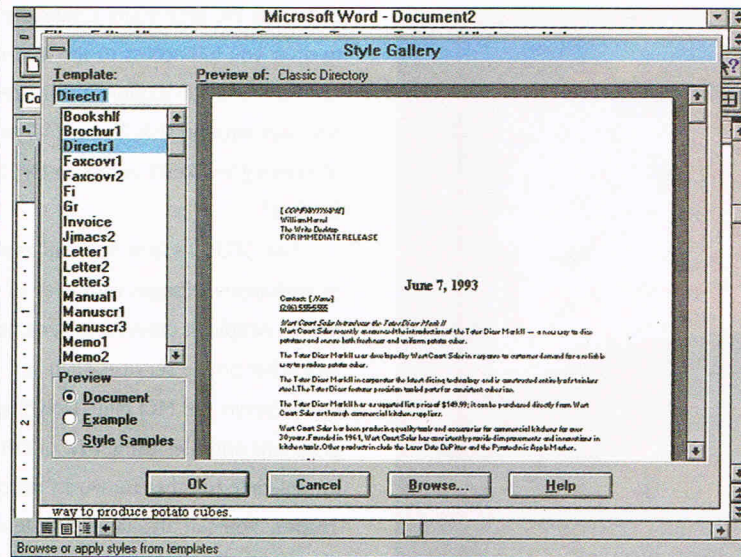
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TEST LAB



Word's AutoFormat feature scans text and formats the letter.

with Word's extensive grammar-checking utility, and you may never make another mistake.

Automation is further enhanced with Wizards. Word has always had powerful, interactive templates that prompt you for information and then format a document based on your answers. The Wizards feature takes this concept into a new realm. The letter Wizard, for example, lets you choose among several different styles, including Modern, Classic, and Business. After prompting you for data, the Wizard then creates your letter template. All you do is type the letter. You can even choose to have Help displayed during the letter creation process. Or you can choose to have Word write the letter for you, from a database of boilerplate letters.

For business letters, for instance, you have a variety of circumstances to choose from: "Apology, delivery delayed," "Credit report request," and many others. These are quite well written and useful.

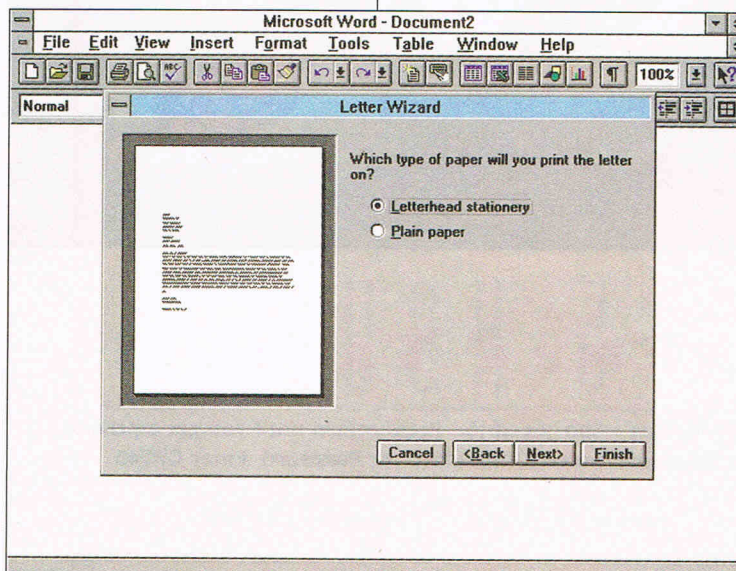
Another feature that will amaze you is AutoFormat. All you do is type unformatted text, and then select the AutoFormat command on the Format menu. Word then

scans the document and lets you select a template from the Style Gallery. Before you select a template, a thumbnail preview can show you how the document will look. Word then formats your document, including paragraphs, layout, fonts, etc. The professionally designed templates create very nice-looking documents—that you and your organization can be

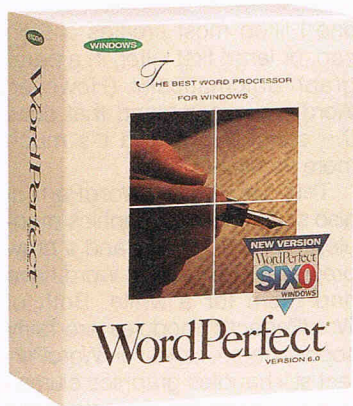
proud of—almost instantly!

Want drag and drop? Word's implementation of OLE 2.0 provides new drag-and-drop features that seem like magic. All three programs reviewed here let you drag text and graphics to anywhere in a document. Word lets you also drag text and graphics between any open documents. Not impressed yet? You can also drag and drop data between Word and any other OLE 2.0 application, such as Excel 5.0 or PowerPoint 4.0, both of which should be available by the time you read this. So far, Word is the only word processor to incorporate this ability.

An area where previous versions of Word fell short of Ami Pro and WordPerfect is the compiling of long documents. Most book and manual writers do not create long documents all in the same document file. Instead, they create a series of chapters or sections. Both Ami Pro and WordPerfect provide master document features that make combining several documents easy. This version of Word not only adds master documents but also improves the procedures for marking text for inclusion in tables of contents and



Word's Wizards are automated, interactive templates.



indices. No longer must you understand Word's complex merge language to create long documents. Simply follow the procedures laid out in the dialog boxes.

Also improved is Word's implementation of mail merge. No longer is it necessary for you to type complicated merge terms at the beginning of primary merge documents. Word now automates the process by scanning the merge documents and prompting you to enter the proper codes. Mail merge has traditionally been one of Word's more difficult procedures; it's a relief that Microsoft has fixed it.

I could go on raving about the new features in Word, but I have only so much space. This is a marvelous program worthy of your consideration, especially if you have a reasonably fast computer or if you use other Microsoft products. Word makes word processing easier and more fun.

If you can't find the help you need in the extensive online tutorials and documentation, you can get excellent support from Microsoft's technical support team. They answer the phone quickly and call back promptly. The technicians are well-trained. However, this program puts so much help at your fingertips that you probably won't have to call technical support often. For now, Word 6.0 is ahead in the features race. If you are not yet using a Windows word processor, this is the one to get.

Circle Reader Service Number 372

WordPerfect 6.0 for Windows
Suggested retail price: \$495, \$595
for Borland Office

WORDPERFECT
1555 N. Technology Way
Orem, UT 84057
(800) 451-5151
(801) 225-5000

In Brief: WordPerfect 6.0 is a strong word processor, though a little sluggish and rough around the edges. It's the next logical step for the millions of WordPerfect for DOS users moving to Windows.

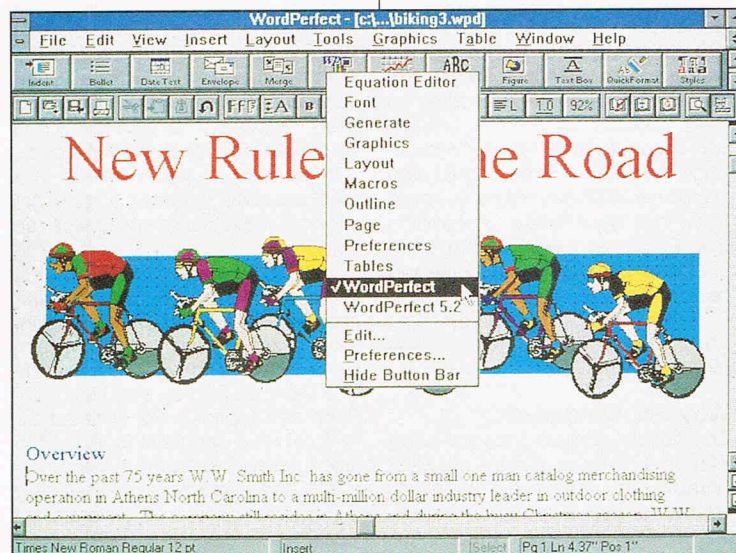
WORDPERFECT 6.0 FOR WINDOWS

In the world of DOS, WordPerfect is the hands-down favorite. The transition to Windows, however, has been difficult for this popular word processor. Version 5.1 was buggy and slow. Version 5.2 fixed many of those problems. Version 6.0 is rich in features, although it's too sluggish for the average computer.

In some ways WordPerfect is still the easiest of the Windows word processors to use, and it ex-

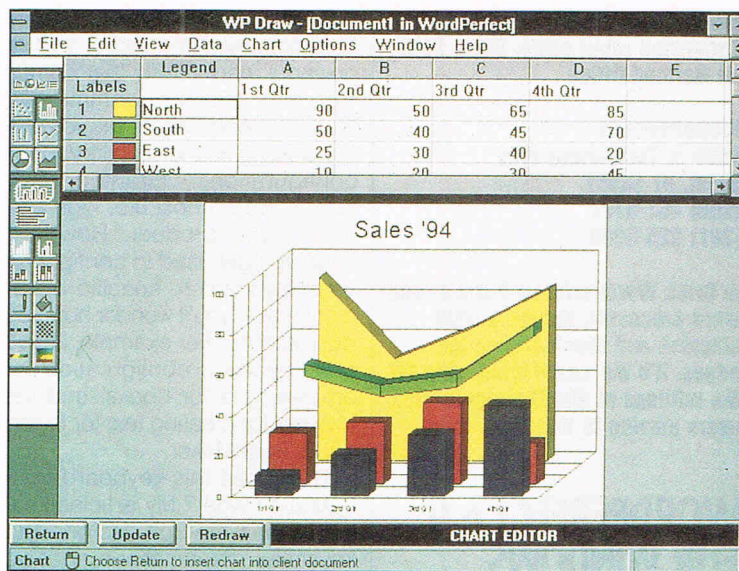
cells in some areas, such as its long document formatting and its powerful macro utility that comes with over 800 new commands. Also, only WordPerfect lets you create and save multiple keyboard configurations. Granted, this seems like an obscure, high-end use of the product. However, once you get used to configuring your keyboard to specific document types, you'll wonder how you did without it. For example, I have one keyboard configuration for articles, one for books, and yet another for creating text for laying out in PageMaker.

How does this keyboard configuration work? My articles keyboard has macros assigned to keystroke combinations specific to formatting and writing articles—combinations, for example, allowing me to create hanging indent bullets with a single keystroke. The book keyboard has special keystrokes for creating numbered lists, inserting figures, marking text for indices, and so on. The page layout keyboard lets me insert style-sheet formatting codes used to format paragraphs in PageMaker. By using the keyboard configuration feature in conjunction with WordPerfect's mul-



Click with the right mouse button for context-sensitive menus.

TEST LAB



WordPerfect includes a charting utility and a draw program.

multiple Button Bars, you can customize this program to work exactly the way you do.

Another big addition to version 6.0 is a collection of automated templates. You can use them to create automatically any number of documents, including resumes,

letters, and reports. Each template prompts you for data that helps make creating the document easier, such as recipient name and address, subject, and so on. This latest version of WordPerfect also offers a bunch of new macros for automating common tasks. The

one I liked most creates a drop cap, or large first letter, in a paragraph automatically. (However, Word has a command that does the same thing, and it's much more versatile.)

This version of WordPerfect also ships with two graphics modules: a charting utility and a draw program. Ami Pro and Word have had them for a while. Both of WordPerfect's modules are fairly sophisticated. However, WordPerfect still handles graphics clumsily. You cannot, for example, draw directly on the document page (except for lines). You must use OLE or Cut and Paste.

WordPerfect ships with a nifty text manipulation utility called TextArt, which is similar to Word's WordArt. With it you can create almost every kind of artistic text you can think of. You can, for example, form text on an arc, a circle, or hundreds of other shapes. I used it to create some impressive drop shadows for a newsletter.

My major objection to WordPerfect is that it's much too sluggish for the average computer, mak-

DOING IT WITH DOS

For one reason or another, not all COMPUTE readers run Windows. I've talked to a number of them who don't want anything to do with a program that requires so much in the way of system resources. They'd rather use DOS applications that fly on their modest machines—usually with considerably fewer performance problems. Those of you who do not run Windows will be happy to know that WordPerfect Corporation and Microsoft have not forgotten you. Both companies have released new DOS versions (both are version 6.0) of their word processors. The good news is that they're both performance screamers.

Why Not Windows?

So what do you give up by not using Windows? Frankly, quite a bit. Most notably, you do not run your programs under a common shell, where all of them can share information. Windows' Cut and Paste,

OLE, and other data-sharing options integrate your various software applications in ways DOS cannot come close to matching. DOS programs also do not provide the multimedia options found in Windows. Even though both Word 6.0 for DOS and WordPerfect 6.0 for DOS allow you to share information with Windows programs when you run them in a DOS box under Windows, if you're going to do that, you may as well run Windows.

You do not give up the WYSIWYG graphics interface any longer, though. Both programs now have Windows-like interfaces that allow you to see how a document will print while you work on it. They also use TrueType and Type 1 fonts quite adroitly. Until now, using soft fonts in DOS applications has been a chore.

What do you gain? Like a finely tuned automobile, a DOS word processor responds quickly and decisively. When you issue a command, it's

carried out. You don't sit there waiting for your computer to perform the millions of calculations required to run the Windows interface in addition to your word processor. And now that both programs sport graphical interfaces, you can use your DOS application to lay out brochures and newsletters.

You also gain about 80 percent of the functionality built into a Windows word processor. Wherever possible, each program provides the same options as its Windows counterpart. The best thing about using these packages is that you don't have to upgrade your system to run them comfortably. And they run almost identically to the Windows versions, which means that when you get ready to switch to Windows, you won't have to relearn the program.

You'll never use Windows, you say? If you continue computing on a PC and evolving with technology—you will use Windows. It's inevitable.

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OUT OF THIS WORLD
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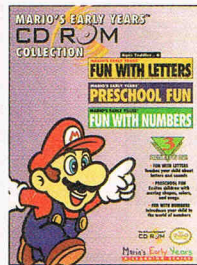
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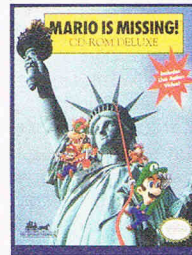


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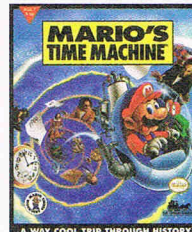
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2nd Prize

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3rd Prize

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The Software Toolworks
OUT OF THIS WORLD Sweepstakes

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To enter: Print your name, address, city, state, zip code, phone number, age and the words: Out Of This World Sweepstakes on a 3"x 5" card or complete this entry blank. Mail entry to The Software Toolworks, Out Of This World Sweepstakes, PO Box 5939, Novato, Ca 94948-5939. All entries must be postmarked no later than 5/31/94.

NO PURCHASE NECESSARY TO ENTER OR CLAIM A PRIZE. 1. HOW TO ENTER: Completely fill out the official entry blank (print only), or on a 3" x 5" card print your complete name and address, telephone number and age, and the words "Out of This World Sweepstakes". P.O. Box 5939, Novato, CA 94948-5939. All entries must be postmarked no later than May 31, 1994 and received by June 30, 1994. Mechanically reproduced entries not eligible. All entries become the exclusive property of The Software Toolworks and will not be returned. Not responsible for printing errors on the entry blank or point of sale display. For incomplete, illegible entries or late, lost, mutilated, for postage due or misdirected mail. 2. JUDGING: Winners will be selected in a random drawing from all entries received on or about July 1, 1994 by Marton-Kane, Inc. an independent judging organization who reserves the exclusive right to interpret all conditions in regard to this promotion without claim for damage or recourse of any kind. By participating in the sweepstakes, entrants agree to be bound by the rules and the decision of the judges which shall be final. All prizes will be awarded. Odds of winning depend upon the number of entries received. Only one prize per person, family, organization or household. 3. NOTIFICATION: Winners will be notified by mail and will be required to sign an Affidavit of Eligibility, and Publicity/Liability Release which must be returned within 21 days from date of notification. If the winner is a minor, the affidavit must be signed by the parent or legal guardian. If the affidavit is not returned within this time period properly executed, or is returned from the post office as undeliverable, an alternative winner(s) will be selected. Winners grant permission to the use of their name, photograph/likeness for advertising and promotion for this and similar promotions without compensation. 4. PRIZES: Prizes and their approximate retail values are: (1) Grand Prize Cynergy™ MPC CD-ROM computer from Swan Technologies that includes 486D/40mbz, 4MB RAM, 2K Write-back and 128K external cache, 1.44 MB (3.5") and 1.2 MB (5.25") floppy drives) 260 MB hard disk, VESA Local Bus (1 MB video), mouse, CD-ROM drive (double-speed), sound card (16 bit), stereo speakers, microphone, 12 month on-site warranty, monitor included. Software includes MS-DOS™ 6.0, MS Windows™ 3.1, MS Money, MS Productivity Pack, MS Entertainment Pack 4, PushButton™ Works and Software Toolworks CD-ROM products including The San Diego Zoo™ Presents The Animals! MPC™, The Software Toolworks® Presents Oceans Below MPC and World Atlas Version 4 MPC and (1) \$1,000 Toy Shopping Spree. Retail value of grand prize is \$3,300. First prize winners will receive one of 20 Schwinn High Plains adult mountain bikes (\$350 each) and one of 20 Schwinn "Z" bikes for kids (\$170). The second prize winners will receive one of twenty sets of Microblade™ in-line skates from Rollerblade and protective safety pack (includes knee pads, elbow pads and wrist guards). Retail value is \$250 each. Third prize winners will receive one of 100 "Flik Flak" watches from the makers of Swatch (value \$25 each). Total value of all the prizes is \$21,000. Chances of winning are determined by the total number of valid entries received. 5. GENERAL CONDITIONS: Winners accepting prizes agree that all prizes are awarded on the condition that The Software Toolworks and their agents, representatives and employees will have no liability whatsoever for any injuries, losses, or damages of any kind resulting from acceptance, possession or use of the prizes. Winners further acknowledge that Software Toolworks has neither made nor is in any manner responsible or liable for any warranty, representation, guarantee expressed or implied, in fact or in law, relative to any prize, including but not limited to, its quality, mechanical condition or fitness. All taxes are the sole responsibility of the winners. No prize substitutions permitted except by sponsor due to unavailability, in which case a prize of equal or greater value will be awarded. Prizes are not transferable. 6. ELIGIBILITY: Sweepstakes open to all persons who are residents of the United States. Employees and their immediate family members of The Software Toolworks, Swan Technologies, Schwinn, Rollerblade, Swatch Watches, their divisions, subsidiaries, affiliates, advertising and promotion agencies, and any other persons or agencies involved with this promotion are not eligible. Void where prohibited by law and subject to applicable federal, state and local laws and regulations. Not sponsored by Nintendo. 7. WINNERS LIST: For the names of the winners, available after July 30, 1994, send a self-addressed stamped envelope to The Software Toolworks Out of This World Sweepstakes Winners, 60 Leventri Court, Novato, CA 94949.

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ing big demands on system resources. You get good results only on a high-end system, such as a fast 486 with lots of RAM or a Pentium. In fact, in my tests some of the tasks, such as changing views, took far too long on the 486. On the 386SX/25? Frankly—forget it! However, if you are a WordPerfect for DOS user, you'll find WordPerfect for Windows easy to use. Both Ami Pro and

Word offer help to users switching from WordPerfect (still the world's most popular word processor). But there's nothing quite like using the real thing—especially if that's what you're used to.

Another advantage to using WordPerfect products is the company's famous support program. WordPerfect Corporation is one of only a handful of software publishers that provide toll-free tech-

nical support. You can call any time—day or night—as often as you want to get help using the product. If you are new to computers or to Windows software in general, this is a valuable feature. Calling Lotus or Microsoft during peak hours can get expensive.

WordPerfect 6.0 is a powerful word processor with a features list topped only by Microsoft Word's.

Circle Reader Service Number 373

DESKTOP PUBLISHING WITH WINDOWS WORD PROCESSORS

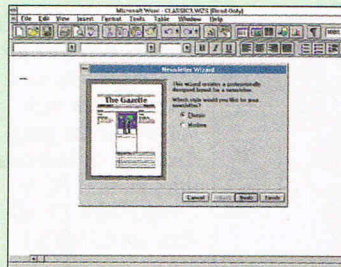
A few years ago, before Windows word processors came of age, whenever people told me they planned to do some desktop publishing with word processing software, I immediately felt sorry for them. Desktop publishing with a character-based word processor is clumsy and unnatural. But with today's strong Windows-based WYSIWYG word processors, the line between word processing and desktop publishing is no longer as distinct. In fact, because word processing software makes such efficient use of the Windows interface, it is often more efficient to lay out certain types of documents in a word processor than in a desktop publishing software package.

The question many would-be desktop publishers surely must be asking themselves is, Why bother with expensive, hard-to-learn page layout software? That's a good question. And the answer is that in many situations you shouldn't. The best reason to use a word processor for page layout is that often it is much easier.

There's a distinct advantage to doing all the work in one program. No matter how strong the support between applications, seldom can you import text from one type of program to another without some reformatting. Formatting a document as you type is highly convenient, which means you save time. Now that PageMaker and Ventura Publisher have spelling checkers and search and replace, you could create text in layout software, but the truth is that today's word processors are faster and just plain easier to use.

Another area where word processors outstrip page layout programs is support for data exchange among

themselves. Word processors can easily swap files. For example, if you create a document—complete with graphics, text boxes, and tables—in Word for Windows and give the document to an associate (who uses WordPerfect for Windows) for editing, he or she can access this document with little or no fuss. And frequently the transfer requires little or no reformatting.



To date, there is no way to open a PageMaker document in Ventura, a QuarkXpress file in FrameMaker, and so on—even with a conversion program. And there probably won't be any time soon. Page layout applications depend heavily on styles (or "tags," as Ventura calls them) for formatting text. A style is simply a set of instructions, including type style, size, alignment, placement on the page—almost any attribute that you can think of. You can even include text color, add rules (lines) above, below, or around a paragraph, and place text in relation to other text. Styles save a great deal of time by letting you tag blocks of text from a style sheet, or list, instead of formatting each paragraph by hand. They also help maintain precision and consistency. Once you have defined

it, a style remembers all of the formatting. You, on the other hand, are liable to forget.

Word processors also have styles—and they are just as powerful as the style sheets in desktop publishing packages. Almost any text attribute you can assign to text in the word processor can be included in a style. Furthermore, other word processors can convert them, and so can PageMaker, though not quite as well. (All the text in the sample documents used to illustrate this article was formatted with styles.) Although some desktop publishing programs have table editors, they are nowhere near as easy to use or as versatile as those found in the top three Windows word processors. Tables are simply combinations of text and graphics, and since they display data in columns and rows of cells, they can also be likened to spreadsheets. To create a table in, say, WordPerfect for Windows, you just click on a button, then select the number of rows and columns. In Ventura you define your table in a clumsy dialog box. PageMaker requires you to use another program (Table Editor) altogether and then import the table as a graphics file, which means it cannot be edited. And in the top three Windows word processors, you can link word processor tables to spreadsheets, so that data is updated automatically when the spreadsheet changes.

Where word processors fall short is in support for high-end layout features, such as color separations for printing presses and delicate type manipulation. But you really can get by with your word cruncher in most cases.



CAN'T LIVE WITHOUT IT!



M. Collier '94

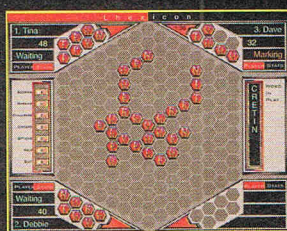
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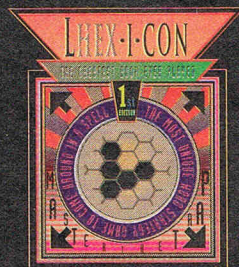


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Price	\$495	\$495	\$495
Full installation disk space	13MB	13MB	33MB
Minimum installation disk space	4MB	5MB	10.5MB
Minimum RAM requirement	2MB	4MB	4MB*
Ease-of-learning features			
Online tutorial	yes	yes	no
Programmable coaches or Wizards	no	yes	yes
Interface features			
Right-mouse context-sensitive menus	no	yes	yes
Context-sensitive button bars	no	yes	yes
Thumbnail print preview	no	yes	no
Editing and formatting features			
Number of templates	57	54	72
Automatic spelling correction	no	yes	no
Automatic formatting	no	yes	no
Drag and drop between documents	no	yes	no
Drag and drop between applications	no	yes	no
View formatting codes	no	yes	yes
Graphics features			
Clip art images included	yes	yes	yes
Draw on page	no	yes	no**
Graphics styles	no	no	yes
Rotate text as graphics	no	yes	yes
Spreadsheetlike tables	no	no	yes
Automation features			
OLE 2.0	no	yes	no
Record macro while editing	no	no	yes
Automated templates	yes	yes	yes
Place macro buttons in documents	no	yes	yes
*WordPerfect Corporation strongly suggests 6-8MB.			
**You can draw rules (lines) only.			

Just looking at Myst is an adventure

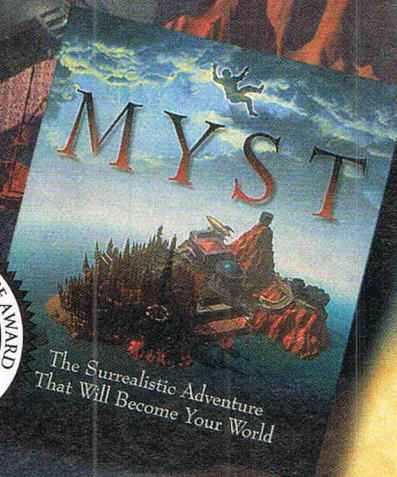
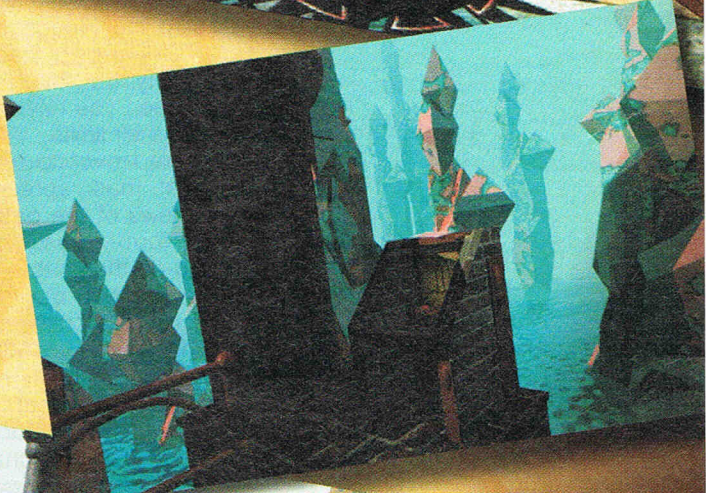
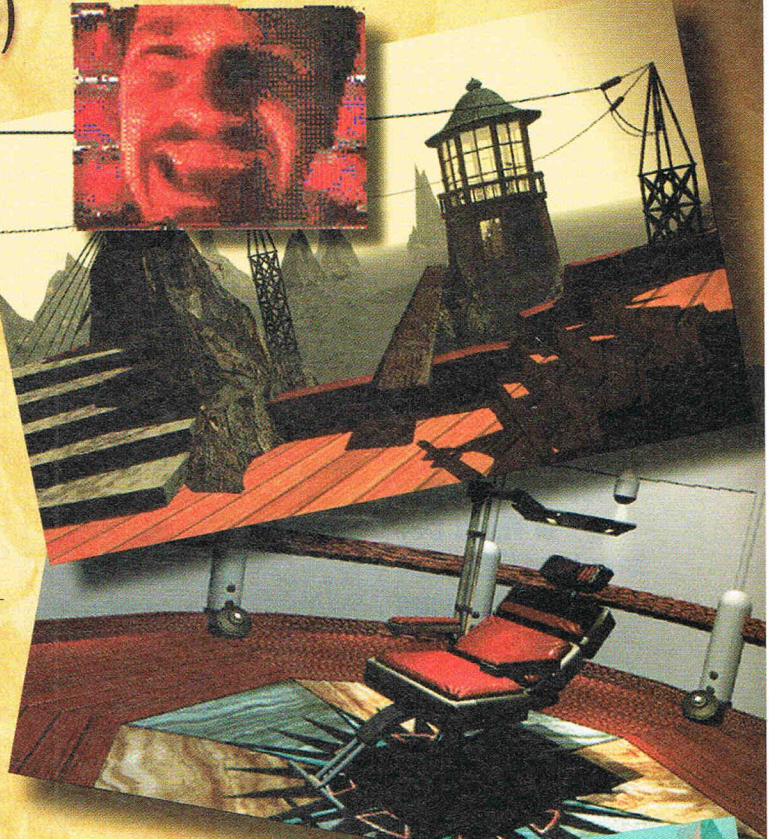
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Circle Reader Service Number 192

PROGRAMMING POWER

Tom Campbell

TAKING A LOOK AT VISUAL C++

Visual C++ is probably not news to you. Microsoft released it a year ago, but I held off talking about it until I'd done some real-life projects with it. Too many reviews of Visual C++ have been little more than reprinted press releases, because Visual C++ is a massive product and it takes a while for anyone to grow accustomed to such a revolutionary change of environment.

For those of you who have just been released from Biosphere II and don't know about Visual C++, here's a thumbnail sketch. Visual C++ is a complete revamping of the Microsoft C/C++ development environment, almost all Windows hosted (at last) and emphasizing C++ over C. In effect, the astounding Microsoft Foundation Classes (MFC) C++ class library is the new Windows API. A number of incredibly useful tools called Wizards will step you through the creation of C++ apps of medium complexity, but they fail miserably when you have to step outside their limits.

For example, I'm writing a database that has spreadsheetlike views of the data, along with form views. The best way to do that is to use MDI child windows, but the Class Wizard tools only support a single type of MDI child, though MFC suffers no such limitations. The creation of Windows resources (such as dialogs, cursors, icons, bitmaps, and even the Alt-accelerator keys) and their mad-denyingly complicated resource scripts is handled beautifully by AppStudio, as revolutionary a departure from resource creation compared to the old C SDK tools as Visual Basic is from C. The price of all these toys is 50 to 60 mega-

bytes of disk space, perhaps even more, for a typical development system. Don't skimp on RAM, either. You won't like developing on a 4-meg machine. It's just too slow.

I still haven't completed any major Windows applications using MFC, but I'll stick my neck out and say that it's the best class library I've seen for Windows. I noticed no speed degradation in my apps, and the extra 100K it adds to a typical program is more than justified. Even juicier, not long after you read this, your MFC applications will run unchanged on the Macintosh. (So will your Visual Basic programs, for that matter, but those using custom VBX controls won't.)

To Microsoft's credit, while it strongly encourages the use of C++, Visual C++ has made creating C applications easier than ever. I reluctantly moved a sizable C project to the Visual C++ environment and was duly rewarded by background compilation, a decent if not spectacular editor, and the incredible luxury of AppStudio.

I found few bugs in the development environment and none in the compiler. AppStudio allows you to open up as many windows as you like. While attempting to steal enough artwork from my Visual Basic icons to create an icon for my own program, I found that AppStudio died if I opened a dozen or so icons at once. This bug will no doubt have been fixed by the time you buy Visual C++.

Another "bug," already widely remarked on, is the lack of template support. If you do an FC on the source for Visual C++'s dynamic array classes for bytes, integers, words, strings, and so on, you'll notice that they're exactly the same except for changes in the names of data types. This is not just a matter for reviewers' checklists. It bespeaks a

very real maintenance issue. Anytime code is duplicated like that, you can expect problems to occur down the line when one file is changed but not another. Templates would eliminate that concern here.

On the plus side (if I may be permitted an obvious pun), and far outweighing the maintenance problem, is the very fact that the MFC source is provided and even licensed to other C++ vendors. That was a stroke of pure inspiration and a great relief to underfunded developers like you and me.

So that's what Visual C++ is—by far the best Windows and Macintosh C++ development environment I've used. Here's what Visual C++ is not. It's not a Visual Basic equivalent, despite the name. Visual Basic allows you to dispense completely with anything remotely like the Windows API for the window and control logic of a typical application. Visual C++ is also not for Windows programming neophytes. There's no equivalent to Charles Petzold's classic *Programming Windows* book in the package. There's a very good C++ tutorial. And the walk-through of the construction of a sample MFC app is also very good—if you already know the Windows API. Otherwise, it's just a good exercise in typing.

If you want to learn how to program Windows with MFC, I strongly recommend David Kruglinski's *Inside Visual C++*, a 1993 book from Microsoft Press. It's a superb primer on MFC, and it doesn't assume you're a C++ expert. I can't recommend it highly enough. I only hope that he writes a book on OLE 2.0.

Visual C++ is a brilliantly conceived development environment for C++ with a great class library for Windows programming. Easy to learn? No. Easy to use? Absolutely. □

Too many reviews of Visual C++ have been little more than reprinted press releases.

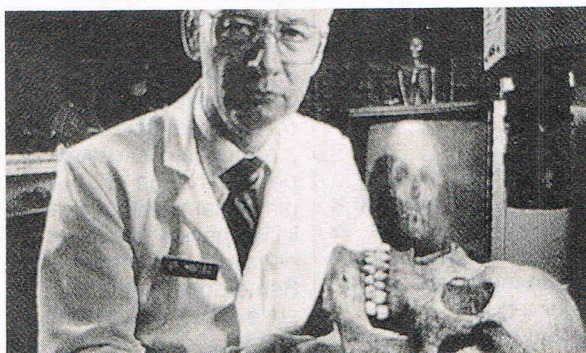
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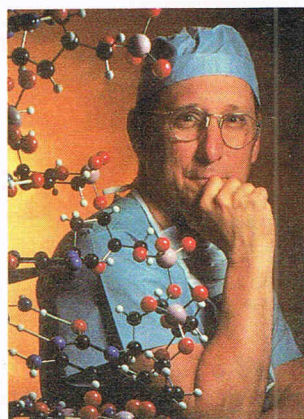
TAKING THE ITCH OUT OF POISON IVY

Good news for the 87 million Americans susceptible to the blistering rash and painful itching of poison ivy: Researchers from the University of Mississippi's Research Institute of Pharmaceutical Sciences have come up with a vaccine for the nasty stuff.



MURDERS FROM THE PAST

An electric saw buzzed through a lead container that had been sealed for 150 years. Slowly, the liner lid was removed, exposing the remains of Zachary Taylor, the twelfth president of the United States. Face to face with the former president, a blue-ribbon panel of investigators was surprised to see a thick mass of dark hair and a large cloth bow under the chin. Since the president's visit was meant to be brief, his hosts went to work immediately. University of Florida forensic anthropologist Bill Maples methodically cut away the president's clothing, finding abundant body hair beneath the one-piece, pleated shroud.



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TIPS & TOOLS

Edited by Richard C. Leinecker

Running your PC at a fraction of its speed, searching for files in all the right places, and using WordPerfect styles with élan

Slow Down Your PC

I still like to run some of the old classic PC games that were created when machines were slower. The problem is that these games run way too fast on my 386. To slow things down, I use a program called AT-SLOW. It uses the x86 realtime clock at interrupt 70h to smoothly slow things down.

AT-SLOW can be found on most online services and bulletin boards. You can also order it from shareware distributors.

DEAN C. JOHNSON
PROVO, UT

Slow Down Redux

I wrote my own small TSR that does a pretty good job of chewing up CPU time so that programs run more slowly. My program is called Slow, and to run it, all you have to do is type *slow* at the command line.

You can type in Slow using the DOS Debug command. Make sure the DOS program called Debug is in your path or the current directory. In these examples, the italic text is what the computer prints; the roman text is what you should type. One way to be sure you get these programs exactly right is to have someone read the numbers to you as you type them in. Another way suggested by one of our readers is to read the numbers into a tape recorder and then play them back as you enter the program code.

debug slow.com

File not found

-e 100 FA 33 C0 8E D8 C7 06 70

-e 108 00 15 01 8C 0E 72 00 FB

-e 110 BA 24 01 CD 27 51 B9 90

-e 118 00 51 B9 00 03 E2 FE 59

-e 120 E2 F7 59 CF

-RCX

CX 0000

:0024

-W

Writing 0024 bytes

-Q

The checksum value (see the July 1993 "Tips & Tools" column) is 04193.

If this doesn't give you the results you want, change the value used to determine the number of clock cycles that are wasted. The last byte in the third line has the value of 90. That's actually 90 hex, which has a decimal value of 144. The greater this number is, the more slowly your computer will go. The smaller it is, the faster your computer will go.

RICHARD C. LEINECKER
REIDSVILLE, NC

Easy Searches

Congratulations. You have a great magazine. "Tips & Tools" is very helpful, since it contains so much useful information for readers.

I wrote a batch file that I'd like to share with you. It's called SEARCH.BAT, and it gives you an easy way to look for a file on a disk. To use it, just type *search c: filename.ext*. It's very important not to forget the colon after the drive letter and the space between the drive designation and the filename. (*Editor's note: An indented line is a continuation of the preceding line.*)

@ECHO OFF

**REM First, check to see if we
REM have two command line
REM arguments.**

IF "%1"==" " GOTO NoParam

IF "%2"==" " GOTO NoParam

**REM Display what we're searching
REM for.**

ECHO Search %2

**REM Let the Dir command do
REM the actual search with the
REM /s, /p, and /b switches.
DIR %1%\%2/s/p/b**

GOTO END

**REM Display the syntax and usage
REM for the batch file if user
REM didn't give two command
REM line arguments.**

:NoParam

ECHO Parameter missing!

ECHO Usage: SEARCH

[searchdrive]: [file]

:END

JAVIER ANGEL PALOMINO C.
CHIHUAHUA, MEXICO

Spaced-out Styles

WordPerfect for Windows' defined list of styles is always alphabetized no matter in what order the individual styles were created. To force a frequently used style to appear at the top of the list, begin its name with a space. An initial space character is alphabetized ahead of the letter A. Remember that you name a style when you create it. To create a style, select Layout, Styles, Create, or press Alt-F8 and select Create.

WILLIAM WOLFE
CHAMPAIGN, IL

Even Less Time

In the November 1993 "Tips & Tools" column, I saw a tip for having the time and date appear as the prompt. I wrote a batch file that does it even better. It's called LESSTIME.BAT.

@ECHO OFF

**SET OP=%PROMPT%
SET PROMPT=\$T\$_\$D\$_
ECHO ON**

@ECHO OFF

**SET PROMPT=%OP%
SET OP=**

DAVID W. DUFFEY
SALINA, KS

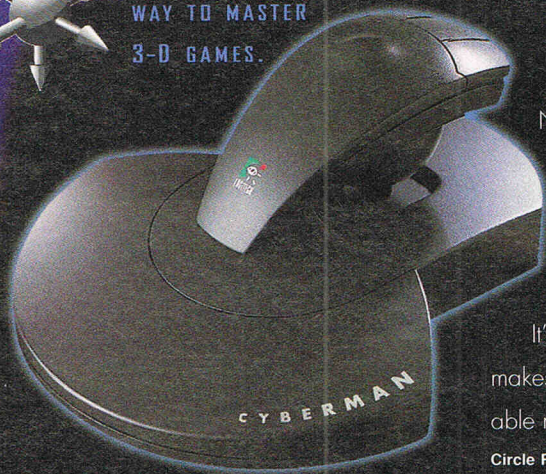
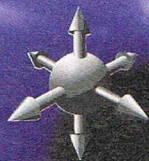
Word 6 Tools

Here are two macros that I've found very useful when working with Word for Windows

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TIPS & TOOLS

6.0. The first counts the total number of lines in a document excluding blank lines, and the second saves the current document and then displays the number of words in it. These macros are from my forthcoming COMPUTE book, *Essential Word for Windows Tools*.

```
Sub MAIN
counter = 0
StartOfDocument
topofloop:
StartOfLine
EndOfLine 1
If Len(Selection$()) > 1 Then
counter = counter + 1
CharLeft
If LineDown() <> 0 Then
Goto topofloop
EndIf
Print counter; " lines in
```

```
document"
End Sub

Sub MAIN
FileSave
ToolsWordCount
Dim dlg As ToolsWordCount
GetCurValues dlg
MsgBox "Current word count: "
+ dlg.Words
End Sub
```

Another good way to get information about your document is to check the document summary with the FileSummaryInfo command.

ROBERT BIXBY
GREENSBORO, NC

Better Backups

Alex Freiberg's QBACK.BAT (from the November 1993 "Tips & Tools") is great for

quick backups that don't take much disk space. I found, however, that I needed something more substantial for my data. I also wanted more flexibility.

I wrote BACK.BAT to take advantage of PKZIP's disk-spanning and subdirectory-recursion features, since my data files are usually large. And very often the data I must back up is located in several directories.

Before you use BACK.BAT, make sure PKZIP is in your path. In the batch file, the -&v switch causes PKZIP to use multiple disks and turns DOS verify on. (*Editor's note: The multiple disk option is only available on registered copies of PKZIP. You are strongly encour-*

aged to register your shareware, but a solution for the unregistered shareware version will follow next month.) The -rp switches recurse subdirectories and store the directory names in the ZIP file.

For added reliability, BACK.BAT uses Chkdsk /f to ensure that the backup disk contains no errors before and after the backup. In case your backup takes more than one disk, the file LAST.DSK will be created on the last floppy disk you use. Because of this you'll need to keep your disks numbered. Here is BACK.BAT.

@ECHO OFF

ECHO.

IF "%1"==" " GOTO NOPARAMS




```

IF "%1"=="a:" GOTO BACKUP
IF "%1"=="A:" GOTO BACKUP
IF "%1"=="b:" GOTO BACKUP
IF "%1"=="B:" GOTO BACKUP
GOTO BAD_DRIVE
:BACKUP
CLS
ECHO WARNING: Backup
ECHO process may require
ECHO multiple disks!
ECHO.
ECHO Insert backup disk
ECHO in drive %1.
PAUSE
ECHO.
ECHO Performing disk
ECHO diagnostics on backup
ECHO media . . .
CHKDSK /f %1

CLS
ECHO.
ECHO Backing up: C:\DATA and
ECHO subdirectories to

```

```

ECHO %1\DATA.ZIP . . .
ECHO.
PKZIP -&v -rp %1DATA
C:\DATA*. *

CLS
ECHO.
ECHO Backing up: C:\TC\WORK
ECHO and subdirectories
ECHO to %1\TC\WORK.ZIP . . .
ECHO.
PKZIP -&v -rp %1TC\WORK
C:\TC\WORK*. *

CLS
ECHO.
ECHO Backing up: C:\SCHOOL
ECHO and subdirectories
ECHO to %1\SCHOOL.ZIP . . .

ECHO.
PKZIP -&v -rp %1SCHOOL
C:\SCHOOL*.TXT
ECHO.

```

```

ECHO Done!
ECHO Last disk of the
backup>%1LAST.DISK.

ECHO.
ECHO Performing disk
ECHO diagnostics on backup
ECHO media . . .
CHKDSK /f %1
DIR %1
GOTO END

:BAD_DRIVE
ECHO Nonremovable media as a
ECHO destination is not
ECHO supported.
GOTO END

:NOPARAMS
ECHO Usage: BACK [DESTDRIVE]

:END

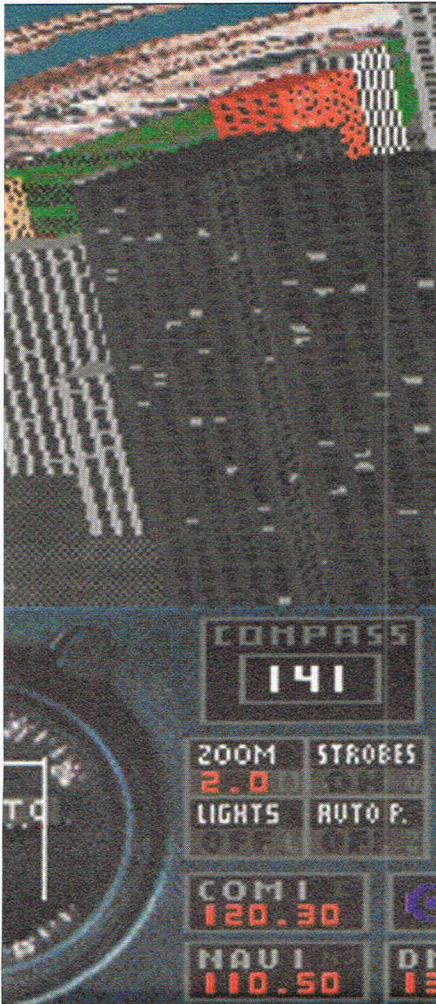
You'll have to edit the

```

batch file for your needs. Add a section for each directory you need to back up and remove the ones from this example that you won't need.

KIRILL SEMENOV
THORNHILL, ON

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's Tips & Tools, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. For each tip we publish, we'll pay you \$25-\$50. All tips submitted become the property of General Media International. □



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HARDWARE CLINIC

Mark Minasi

SCSI CABLING AND TERMINATION

In previous columns, I've discussed choosing SCSI host adapters, setting SCSI ID values, and enabling or disabling SCSI parity.

This month, we'll tackle the last two steps of physically installing a SCSI subsystem: cabling it and setting up its terminators.

Many of you will put only one or two SCSI devices on a PC, but SCSI can easily support seven peripherals off a single SCSI host adapter. (A single SCSI host adapter can actually support tens of thousands of devices—in theory. But I wouldn't try it.)

Multiple devices are attached to a single SCSI host adapter via daisy chaining over several kinds of cables: a 50-conductor Centronics connector, a DB25 connector, a miniature DB50 connector, and a 50-pin ribbon cable. A 50-conductor Centronics connector looks like the connector on the printer end of your parallel cable, only larger—your printer uses a 37-conductor connector. A DB25 connector is the kind that you find on a serial port or on a parallel cable—on the PC end. Miniature DB50s look somewhat like DB25s, but there are 50 small pins or holes in the same space that the DB25 uses for 25 pins or holes. Also, DB50 connectors generally have buttons that you must press to connect or disconnect them.

Some external SCSI devices have two Centronics 50 connectors on the backs of their cases—two connectors so that they can be part of a daisy chain. Older SCSI devices—CD-ROM drives that follow the pre-SCSI-2 standard, mostly—are the only devices that use the DB25. The miniature DB50

shows up on the backs of some SCSI host adapters and on a few devices. For example, the Hewlett-Packard ScanJet IIc has a miniature DB50 connector.

You can pretty much ignore the DB25, but you can't ignore the Centronics 50 and the miniature DB50, so there are three possible kinds of SCSI cable you might have to lay your hands on: miniature-DB50-to-miniature-DB50, miniature-DB50-to-Centronics-50, and Centronics-50-to-Centronics-50 cables. And you have to be careful where you get them. To explain that, let me relate a short war story.

I installed a CD-ROM drive on a server so that I could install Windows NT Advanced Server on my LAN. (Windows NT Advanced Server is terrific, by the way; if you're thinking about moving to it, don't hesitate.) The CD-ROM drive used the Centronics 50 connector, so I pulled a standard SCSI cable with a Centronics 50 connector on each end out of my cable pile. I plugged the CD-ROM drive into the SCSI adapter's interface port on the back of my PC, and the problems started. My tape drive and hard disk started acting up. Running Chkdsk revealed lost clusters and invalid subdirectories on my hard disk—but the messages referred to different parts of the disk every time I ran Chkdsk! The tape drive wasn't recognized about half of the times I booted the system, although it had been working fine for months—clearly, the new guy on the block (the CD-ROM drive) was causing trouble.

I changed the host adapter to SCSI, giving up SCSI parity in the process and engendering a sense of deep foreboding. Then I turned to installing Windows NT Advanced Server. The README file that came with it said, "The SCSI

and CD-ROM support built into Windows NT 3.1 requires that CD-ROMs provide SCSI parity to function properly." Oops.

I started fussing with the SCSI devices to get the CD-ROM drive to support SCSI parity. There was a jumper included on the CD-ROM drive to control whether or not SCSI parity would be used, so why wouldn't it support SCSI parity?

On the off chance that I had a bad cable, I went back to the cable pile to see what else I had. I found another dual Centronics 50 cable identical to the cable that I was using and another dual Centronics 50 cable that was about twice as thick as the first two. I tried swapping the original thin cable for the other thin cable. No difference. But when I used the thicker cable, everything started working! I got full SCSI-2 support, as well as SCSI parity.

A few calls to cable places confirmed that there were two kinds of dual Centronics 50 cables. The thin ones work fine for SCSI but not for SCSI-2. The thick ones are good for both. Look for cables from Amphenol, Quintec, and Icontec, and your cables should work fine under SCSI-2.

External devices, as I've said, tend to have two SCSI connections on them so that they can support the SCSI daisy chain. Internal devices, by contrast, use only a single 50-pin header connector. Internal SCSI cables are just 50-conductor ribbon cables, looking somewhat like fatter-than-usual hard disk cables.

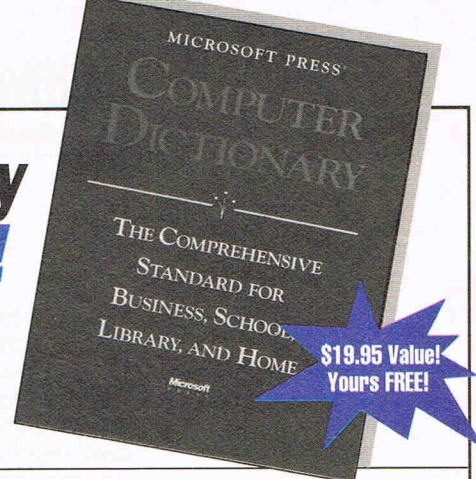
Now that you know about cabling, before popping the top back on your PC, there's one more thing that needs doing. You must terminate the SCSI chain.

To terminate is to provide a voltage and resistance on either end of a cable, so that the

Cabling and termination determine the performance of your SCSI-2 system.

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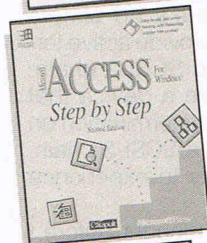
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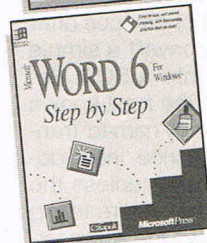
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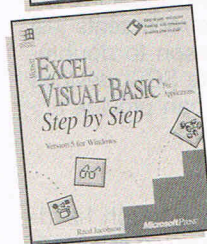
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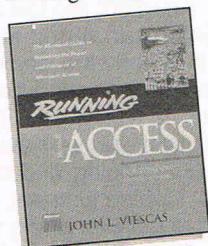


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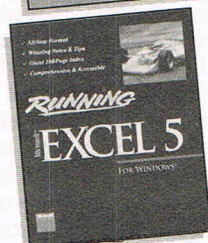
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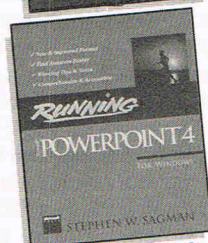
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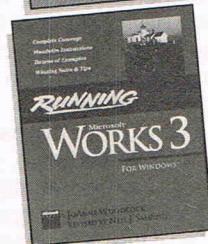
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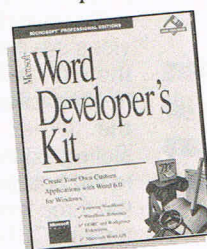
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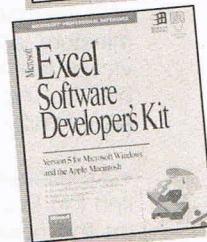
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Newer host adapters can terminate (or not) with a software command.

entire bus has a particular set of electrical characteristics. Without this resistance, the SCSI cables cannot transport data around without significant error rates. (This process will work sometimes, despite what some people claim, but it won't work reliably.) Complicating things a bit, as you'll see, is the fact that there are two kinds of termination, and they aren't really compatible. Passive termination is employed by earlier SCSI devices. Active termination is employed by SCSI-2 devices.

I've said that some SCSI devices are installed internally in the PC and connect to the host adapter with a ribbon cable. Other devices are installed externally and connect to the host adapter with one of the three kinds of common external SCSI cables. There are also internal and external terminators, as well as SCSI devices that have terminators built in. The terminators you'll see include the following.

- An internal SIPP (Single In-line Pin Package) terminator on the host adapter and/or hard disk
- A separate external SCSI terminator (reliable only under SCSI, not SCSI-2)
- A device with built-in termination that's enabled or disabled with a DIP switch or a jumper
- A device with built-in termination that cannot be disabled

An internal SIPP terminator looks like a colored plastic blob with a row of little metal legs sticking out of it. You'll find SIPP-type adapters usually on SCSI hard disks or host adapters. SIPPs often show up on the host adapter itself because it needs termination, and SIPPs don't take up much space. If you have a device that terminates with SIPPs, you'll probably see three of

these SIPPs on a host adapter. If you don't need termination on a device equipped with SIPPs, just remove them (gently—you may need to reinstall them one day) by working them out with needle-nosed pliers. Once you've done that, put them in an envelope, seal it, label it "SCSI terminators," and put it with your valuables.

Newer host adapters don't terminate with SIPPs, however. Adapters like the Adaptec 1542C can terminate or not with a software command. If this doesn't sound like manna from heaven to you, it's a sure bet that you've never spent hours opening and closing a PC, flipping jumpers, and trying to get everything working. This simplicity is a feature I'd look for in a host adapter.

Older SCSI systems make use of external SCSI terminators, terminators that can attach to one of the Centronics 50 connectors on the back of a SCSI device. External terminators look like Centronics connectors without cables attached to them. They clip onto one of the Centronics connectors on the back of the last external device on your SCSI daisy-chain. The external Centronics 50 connector terminator may not work in a SCSI-2 environment. You're best off these days looking for SCSI devices that offer active termination. The explanation is coming up.

If you look at the back of an external SCSI device, you may notice a switch labeled *Termination*. It can be flipped on or off, so if this SCSI device is the last on the chain, all you need to do is flip the switch on. If this device isn't the last device on the chain, flip it off.

You've already read that SCSI uses passive termination, and SCSI-2 uses active termination. What's the difference? Are they compatible?

First, the differences. Passive termination employs two resistors on either end of the SCSI bus. A 220-ohm resistor is tied to the termination voltage (one of the SCSI lines), and a 330-ohm resistor is tied to a ground. Active termination is a more reliable approach that uses a single 110-ohm resistor to the termination line.

Second, what about compatibility? While you may experience different results, most of the SCSI-2 setups I've worked with require active termination. If you use one of the old plug-type terminators, SCSI-2 may not work. Active termination requires electrical power provided by some device (the SCSI drive, the host adapter, or whatever), so there's no simple plug that will provide active termination on a SCSI-2 chain. You must have a device that supports active termination on both ends of a SCSI-2 chain, or you're likely to experience problems.

One more thought before I go: A number of devices offer the ability to convert a simple parallel port into a SCSI device; perhaps the best known is from a company named Trantor. In my experience, these devices will not work unless the SCSI device that you're trying to attach can provide active termination. This represents just one more reason to double-check that the SCSI devices that you buy can provide active termination.

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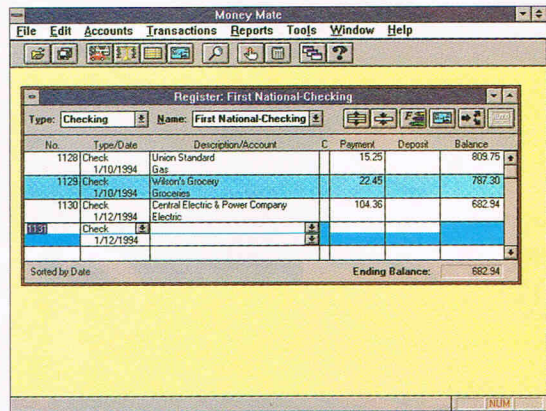
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By Phillip Morgan

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A few months ago, I made a list of my computer hardware and software for my homeowner's policy and was surprised to see that the value of my software exceeded that of my hardware, cables, accessories, blank floppy disks, disk boxes, labels, desk, file cabinet, chair, and several other office furnishings combined. In short, a little software can soak up a lot of hard cash.

It only makes sense that we invest a lot of money in software, since without it, the best computer isn't worth much. But there's no sense in paying more than you have to. I've adopted the motto that a full-priced program is an overpriced program, and I rarely pay full price for one.

There are many ways to avoid paying full price, and I've listed some of the best ones here. You may not be able to take advantage of all of them—competitive upgrades and educational discounts have limited applicability. But you'll probably find at least one way you could have saved money on the last package you bought at full price. And because most software

publishers offer financial incentives for current users to follow the upgrade path, you're bound to save money on the next software package you buy.

Mail Order

Retail salespeople are fond of mail-order horror stories and will gladly tell them to you. They'll conclude their stories with a warning that mail order is risky at best and the money you might save won't be worth the loss of convenience and customer service you expect and get from stores. But if mail order ever deserved a poor reputation for dishonesty or lack of service, it certainly doesn't anymore. Competition among mail-order companies has forced them to become more service oriented, particularly in the way of product training for their technical support personnel and salespeople. In the process, they've become even more competitive with computer and software stores than ever before.

At the same time that mail order has become more service oriented, retail stores have become less so. We expect software salespeople to answer all our questions and sell us exactly the applications we need. But retail stores often can't pay high enough wages to keep a technically proficient staff, capable of offering more than the most basic advice or technical

support. You can find knowledgeable salespeople in stores—many are computer enthusiasts who learn programs on their own initiative—but the facts of retail sales are low wages, high turnover, and little formal product training.

Mail-order companies have lower overhead than stores and have national, if not international, access to consumers. Large mail-order companies can afford to pay their salespeople higher wages and commissions and to conduct more product training than stores can. Customer service and selling philosophies vary, but with many mail-order companies you can expect the salesperson you call to be able to sell you a product rather than simply take your address and credit card number. "They're not just order takers," says Valerie Paxton, vice president of marketing for a mail-order company based in Arizona. During more than 100 hours of initial training, new salespeople at Paxton's company learn a variety of the applications they'll sell.

Whether they're in stores or on the phone, salespeople can't claim to be familiar with every application available. At best, they can speak intelligently about most types of applications—word processors, spread-

sheets, utilities, games, databases—and have a specialty or two in which they can discuss competitive products in detail. It's true that a mail-order salesperson can't show a program to you, but the same is often true in stores. A limited number of programs are loaded onto a store's demo computers. Even then, salespeople may or may not be able to demonstrate those programs to you.

Competition and consumer demands have prompted some mail-order companies to offer more than the lowest price. More and more companies are offering toll-free customer service and technical support lines. One New Hampshire-based company offers \$5 overnight shipping on any package sent anywhere in the continental United States. That may not be quite as quick as driving to a local store, but if you can save \$30 to \$40 or more, a day seems like a reasonable wait.

To figure how much money you'll save ordering by mail, don't forget to take into account sales tax and shipping and handling charges. A mail-order company is required to collect sales tax only in states where it has a physical presence—such as a warehouse or business office. However, your state may require you to pay sales tax on your mail-order purchases. Check with your state's taxing authority for details.

Shipping and handling charges vary widely from company to company, so it's important for you to ask the salesperson exactly how much you'll be charged, who the courier will be, and when you can expect the package. Some companies have set handling charges, which they add to the courier's charge; others set a standard charge for all packages—generally from \$5 to \$10—to cover both shipping and handling. You should never have to spend more than \$10 for normal shipping of a software package within the continental United States.

Mail-order returns can be a bit more troublesome than taking software back to a store. It used to be that, no matter where you bought a program, once you broke the seal on the disk pack, you owned that program—no refunds. Large chain stores have since loosened their return policies, and several now offer one-week or even 30-day satisfaction guarantees. For the most part, mail-order companies are still reluctant to take back opened, nondefective software; however, they too have become more flexible, depending on individual circumstances and manufacturers' policies. More and more manufacturers are offering satisfaction guarantees,

which at least some mail-order companies honor.

Several companies have reduced the hassle and delay of returns by offering toll-free customer service, reimbursement of return postage for defective items, and free shipment of replacements. With preauthorized returns, some companies have reduced the delay of exchanging defective products to a day or two by shipping your replacement before they receive your return. Defective software is rare, though, so it's likely you'll never have to return a defective program.

If you've never used a mail-order company before, don't just order from the first ad you see. Look at the ads of several companies to compare policies and prices. You can expect a substantial price difference between mail-order and store prices, but beware of mail-order companies with significantly lower prices than the rest. You can generally judge a company by the size of its ad; the bigger the ad, the bigger the company, and the bigger the company, the better it can afford good customer service.

If you don't know exactly what you want, at least try to know enough to be able to ask specific questions about the type of software for which you're looking. You're asking for trouble if you tell a salesperson, "I just bought a computer. What software do I need?"

Competitive Upgrades and Introductory Offers

When software companies release new applications or new versions of old applications, they naturally wish to attract new users—preferably at the expense of their competition. A company often talks about increasing its market share, which is the percentage of total sales it achieves in a given application market. Microsoft, Borland, and Lotus (among others) favor competitive upgrades and introductory offers for increasing their market shares and putting users on the upgrade path—that 6- to 18-month cycle of version upgrades. What could be more valuable to a company than knowing that every year or so a significant portion of former purchasers will go out and buy a new version of its product?

These discounts are also used to reposition an existing product—usually in the form of a new version—to go after the market leader. When Adobe Systems introduced Illustrator for Windows, it offered a competitive upgrade to challenge CorelDRAW!, the leading Windows draw program. More recently, Microsoft released Money with a suggested retail price

(SRP) of \$69.95 and a street price of \$15.00. The target was Intuit's phenomenally successful Quicken. Computer Associates then topped Microsoft by offering the first 1 million copies of Kiplinger's CA-Simply Money for only a shipping and handling charge, which it followed up last fall with a free offering of CA-Simply Tax through April of this year. (It's perhaps the ultimate introductory offer, unless, of course, someone starts bundling free software with cash.)

Competitive upgrades are available to you only if you're using a competitor's product, while you can always take advantage of an introductory offer. To be eligible for a competitive upgrade, you must usually provide a page out of the competing product's manual or its original number 1 program disk. Some companies will accept copies of either of these or a copy of the completed registration card. A few companies ask only that you sign an affidavit of eligibility.

John Brandon, national sales manager for Adobe, advises any consumer contemplating a specially priced offer to consider two questions about the application: (1) Does it do what it promises? and (2) Does it offer appropriate features? These questions are particularly pertinent if you're considering a competitive upgrade. Although the new package may offer features you don't currently have, they may not be features you'll need or use. If you have no complaints about your existing software, you probably don't need to change products. If you're looking for new features, the odds are that your current program will be upgraded soon. Upgrading to a new version of your old software will save you the time of learning an entirely new program and may even cost less than the competitive offer.

However, competitive upgrades are less risky than introductory offers in some ways. They generally coincide with major upgrades, so you can be reasonably sure you won't be tempted by another upgrade in a few months. Since applications are sold at a regular price at the same time that they carry the competitive offer, you know you're getting a genuine discount. With an introductory offer you can be certain of neither. You don't know if you're really getting a \$500 program for \$99 or a \$99 program with an inflated \$500 SRP. Will the program ever sell for more than the introductory price? Such offers are often extended, and some never have expiration dates to begin with. Companies might be preparing upgrades even before they introduce a new program. Computer

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Associates planned its upgrade of CA-Simply Money to hit the shelves six months after the release of its free introductory packages. And software industry insiders joked that another manufacturer's \$99 introductory package was so buggy that users would

have to buy the upgrade just to run the program.

If you're looking for a word processor, spreadsheet, database, or financial planning program, it's a good idea to check for these money-saving offers. You should keep in mind, however, that "discounts" are marketing schemes designed to get you to spend money, not save it. You're saving money only if you planned to buy the program in the first place or would be willing to pay full price without the offer.

Buying Used Software

One generally overlooked way to get inexpensive software is to buy it used. You may not know it, but many software companies will allow a registered user to transfer his or her license to you. The process is fairly simple and usually free. The registered user simply writes a brief letter to the company stating that he or she has given you the program and has not retained any copies installed or on floppies. The company then verifies the information with you and records you as the new licensee. You're entitled to the same technical support and upgrade offers as if you'd purchased the program new.

The key to license transfers is that a copy of a program can be licensed

to only one person or business at a time. If, for example, you buy a used computer with software installed, you should contact the software companies and try to have the licenses transferred. If the license numbers are listed within the programs, the companies can trace them, contact the registered users, and ask for their consent to transfer the licenses. If the licenses can't be transferred or you make no attempt to do so, you're obliged by law to erase them from your hard drive or floppies. Using them would constitute piracy.

Computer games are rarely registered because when game manufacturers introduce new versions, they seldom offer registered users special upgrade prices. As long as you have the original disks and documentation, you generally don't have to worry about registration or license transfer. People get tired of games and give them to friends or sell them. As long as copies aren't made, there's generally no problem.

As the popularity of Windows increases, many people are replacing their DOS applications. If you like working in DOS, now is a good time to buy used DOS applications and have the licenses transferred. Some of the best sources for these programs are friends or acquaintances who buy competitive upgrades to go from DOS to Windows. Version upgrades usually forbid selling or giving away the old version, but competitive upgrades typically have no such restriction. Make certain your friends read their upgrade license agreements to be sure.

However and from whomever you buy used software, you should always try to get the original manuals. But if you buy an application from someone who bought it preinstalled on a new computer, you may not be able to get the original manual or disks. Although manufacturers are reluctant to distribute manuals separately, they'll usually sell them to you once you transfer the application's license.

New Copies of Old Versions

Inventory control isn't too much of a problem for software companies. They can usually produce packages quickly and inexpensively and have production runs only when necessary. Releases of new versions are carefully planned so that companies, distributors, and resellers aren't loaded down with old versions that have to be cleared out at reduced prices.

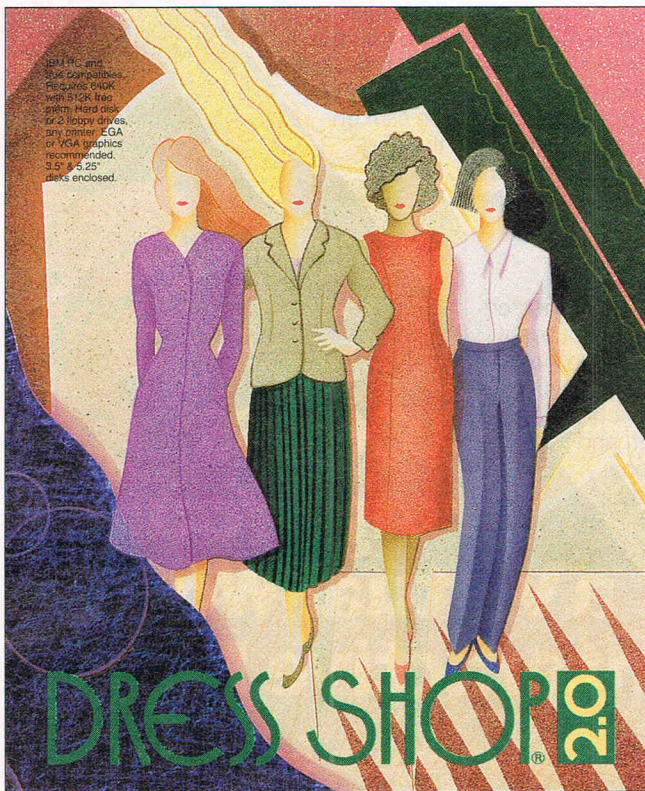
Companies will sometimes carry old versions for customers with special needs. WordPerfect 4.2 is still available from the company even



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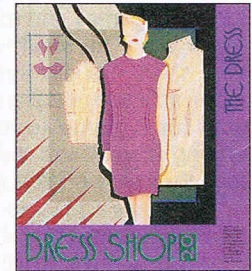
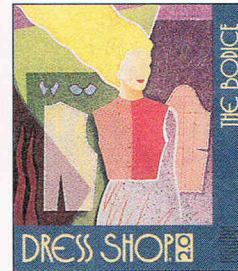
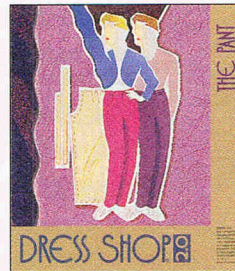
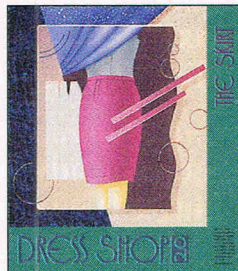
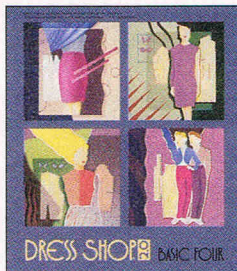
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though version 6.0 was released about a year ago. But most old versions aren't reduced in price significantly, if at all. WordPerfect still sells versions 4.2, 5.0, and 5.1 at full retail. Aldus sells PageMaker 4.0 and 4.2 at full retail. MECA keeps an inventory of tax preparation packages covering the past two or three years, which it sells at full price to people who need to refigure taxes from previous years. One industry spokesman told me he would rather take a loss on unsold packages of old versions than discount them and take away from sales of the new version.

Occasionally, though, a company will choose to actively market a discounted old version. When Corel introduced CorelDRAW! 4.0, it chose to reposition CorelDRAW! 3.0 to capture a new segment of the market. For those who were scared off by CorelDRAW! 3.0's \$595 SRP, the program now sells for about \$140 (street price), while version 4.0 costs around \$390. What's more, the upgrade to version 4.0 is around \$225, making version 4.0 less expensive for those who buy version 3.0 first. The hassle and delay of upgrading may not be worth the savings if you want 4.0 to begin with, but if you get 3.0 first and it does everything you want to do, you've saved about \$250. If you need to upgrade, you won't lose any money—instead, you will save a little.

Some types of programs are more likely than others to be discounted for clearance when they become dated. Most software stores have a bargain bin full of games and miscellaneous old programs. The shelf life of games is very short—usually three months or less—so if you're patient, you might wait for a game to lose favor among buyers and then get it for a third of its original price.

Tax packages are virtually guaranteed to be discounted on April 16. New versions are released each year, and old versions aren't upgradable. This may not help

the majority of computerized taxpayers, but if you're eligible for a deadline extension, you can save \$20 or \$30 by waiting. Mark Bullinger, product manager for MECA's Andrew Tobias' TaxCut, says some people like to use the previous year's program to plan for the current year's taxes, even though tax codes and rates will change. Bullinger says his product usually sells for around \$40 but is often reduced to between \$10 and \$20 after April 15. As mentioned above, this discount doesn't come from MECA, which retains full price on older software, but from merchants and distributors who want to get the program off the shelf.

Educational Discounts

Some of the best discounts on personal productivity and desktop publishing software are available to college faculty, staff, and students. Software companies such as Adobe, Aldus, Microsoft, and WordPerfect offer educational discounts of as much as 80 percent off SRPs—which usually translates into 50 percent or more off street prices. Aldus PageMaker 5.0 for Windows,

example, has an SRP of \$895; with an educational discount, the price is \$199.

Companies use educational discounts to develop product and brand loyalty by getting students to use their applications at home as well as in the classroom. Although profits can be slim on the original

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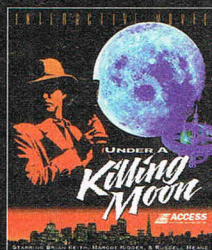
—William Trotter, *PC Entertainment*

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sales, educational sales can put more users on the upgrade path and increase a company's market share.

Educational sales may also help curb piracy, which is often widespread on college campuses. Brandon, from Adobe, says many potential pirates might be encouraged

to stay legitimate if they're offered a low price and a clear conscience.

In most cases, there's no difference between commercial and educational versions, but it's a good idea to ask before you buy. Educational versions are specially packaged and usually channeled only through educational distributors, who in turn sell only to authorized educational dealers. Manufacturers' and distributors' policies vary as to who can be an authorized dealer, but the number of dealers in any one geographical area is generally limited. College bookstores are often licensed to sell educational versions, and mail-order companies are getting into the educational market, too. Prices seldom (if ever) vary, so shopping around for an educational price is probably a waste of time. Call the manufacturer of the package you wish to buy to find the authorized dealer nearest you.

You'll need to show the dealer proof of eligibility—a college ID will usually suffice—and you'll probably have to sign an eligibility affidavit. If you work with grades K-12 as a teacher or staff member, you might also be eligible for the

discount; contact the manufacturer or an educational dealer to find out.

Vendors of Low-Cost Software

If you really want to find inexpensive software, you might look at software publishers that specialize in high performance at low cost. Parsons Technology (One Parsons Drive, P.O. Box 100, Hiawatha, Iowa 52233-0100; 800-223-6925) publishes DOS word processor Quite Write (\$29) and DOS spreadsheet ProCalc 3D (\$49), along with a full line of productivity software products for DOS and Windows with extremely reasonable price tags.

Likewise, Abacus (5370 52nd Street SE, Grand Rapids, Michigan 49512; 616-698-0325) specializes in translating and republishing high-quality German software (and books) for the American market at prices that are frequently a fraction of the cost of similar programs originating in America. For example, you can buy The Frugal Desktop Publisher, which offers a broad range of desktop publishing features, for only \$19.95.

Save Your Money

There are many ways to avoid paying full price for software; I've lined up the best strategies to garner substantial savings. Additional ways to save software dollars are hardware premiums, software premiums, and shareware. Software bundled with hardware is often competitively discounted, if not free; some applications have one or more free programs bundled with them; and shareware programs can be much less expensive and just as powerful as those you buy commercially. No matter where or how you buy your software, a little footwork might very well save you enough for a second application. And after a few months, when you add up how much you've invested in software, you can smile—knowing that the price you paid for your programs is a lot less than what they're worth. □

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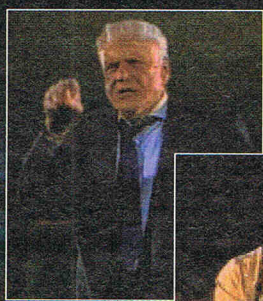
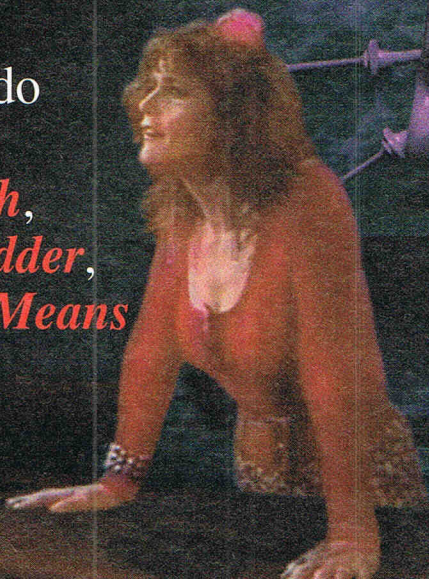
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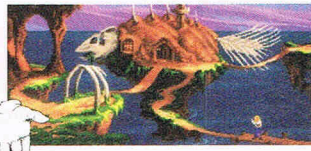
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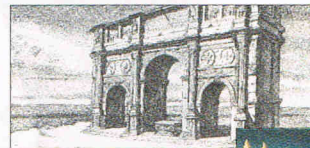
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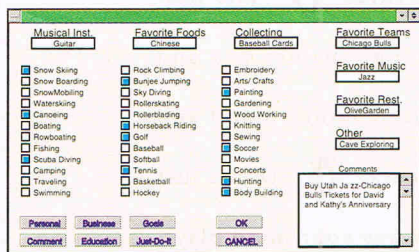


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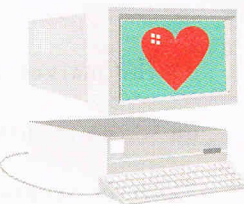
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PORTABLE COMPUTING

WHY GO PORTABLE?

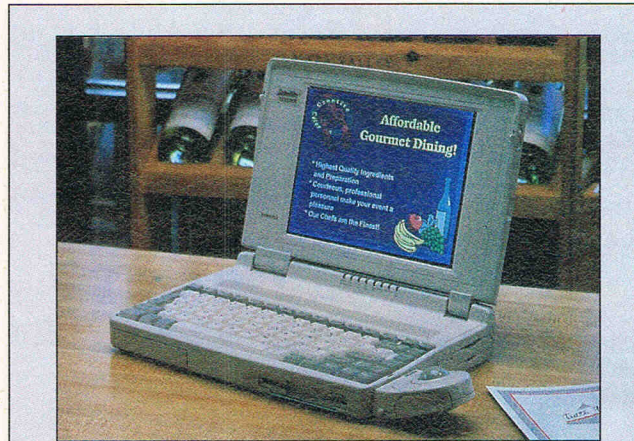
The long-predicted day when we all have a powerful computer as a constant companion is almost here. We don't quite have Dick Tracy wrist computers yet, but we do have pocket-sized units. In reality, we probably won't bother with wrist computers; now that there are practical checkbook-sized units such as the HP100LX, the next generation of users is moving toward the slightly larger PDAs (Personal Digital Assistants) for pocket-sized work.

For serious mobile computing, we're settling on notebook and subnotebook computers, which, while not pocket-sized, are wonders of miniaturization, giving us full desktop abilities in notebook and smaller sizes. (I probably should say "last year's full desktop abilities." This year's desktops are multimedia screamers, with fast CD-ROM drives and booming stereo sound. Only a few laptops offer these features—and at a steep price.)

The Hierarchy of Portables

We classify larger portables (weighing up to about 12 pounds) as laptop computers. Current machines are this big only to offer special features such as multimedia presentation hardware.

The next step down, and the major part of the market, is the notebook computer (weighing up to about six pounds), which is usually phone book-sized or smaller. Its keyboard is usually about 90 percent of normal size, with the function, lock, and cursor keys scrunched tightly around the edges. It has a 486 chip, a hard disk, a VGA LCD video, a floppy disk



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COMPUTE's Getting Started with Portable Computing was written by Richard O. Mann.

drive, and usually a PCMCIA slot or two. These workhorses match desktops feature for feature.

When you go smaller to the subnotebooks (weighing up to about four pounds), you start having to make significant compromises. Keyboards, usually laid out similarly to those of the notebooks, are reduced to the smallest reasonable size for typing—which may or may not be too small for you. Floppy disk drives are usually jettisoned to become sep-

arate, carry-along units. Hard disks are much smaller, and screens are tiny. You need to have a passion for things light and small to use a subnotebook, but they are admirable tools for on-the-go situations not requiring heavy computer use.

At the next level down are palmtops and PDAs, and here the delineation gets fuzzy. A palmtop is a checkbook-sized, under-one-pound computer that can be a full DOS computer, such as the HP100LX, or

a proprietary unit with dedicated software, such as the Psion 3a or Sharp Wizard.

PDAs, the latest innovation, are larger—the size of a large paperback book—and eschew keyboards in favor of pens. They promise wireless transfer to desktops, cellular connections to E-mail services, and other wonders. A Sharp Wizard on steroids, perhaps.

The Portable Appeal

We all seem to be fascinated by the siren call of portable computers. From those who will own only one computer—a fully loaded notebook—to those who also want casual computing power in a subnotebook or smaller unit, millions are buying these exciting carry-out powerhouses each year.

If you're embarking in these waters—or would like to be—check out the articles that follow for the current state of the equipment in all of these categories, some advice on choosing software, and 20 tips to ease you into the happy waters of portable computing.

HOW TO CHOOSE A NOTEBOOK COMPUTER

Most of the action in today's PC market is in the white-hot notebook and subnotebook segment. New generations of notebooks with ever-better features appear every few months, and prices continue to fall. If you've ever thought you might want a portable computer, now is the time to strike—the computers are excellent, and prices are reasonable.

A tour of today's notebooks shows significant changes from just a year ago. All now sport 486 chips and supply pointing devices. Windows comes preinstalled

PORTABLE COMPUTING

(though many now supply Windows for Workgroups 3.11 as an option).

Standard hard drives start at 80MB and go up to 340MB for notebooks; sub-notebooks don't often go above 170MB. Most have at least one PCMCIA slot.

Buying Considerations

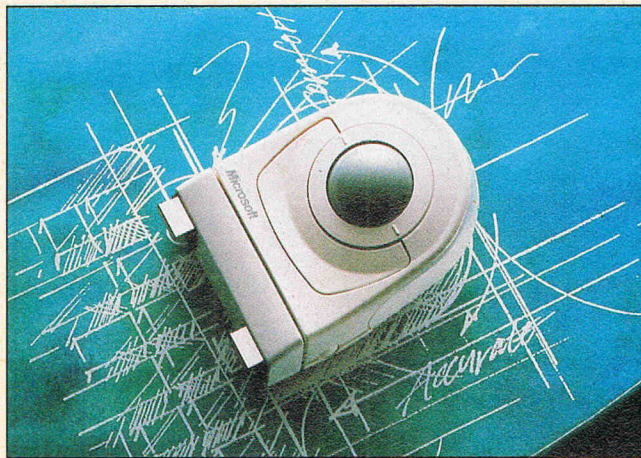
When purchasing a notebook or subnotebook, serious analysis and testing are in order. Consider each of the following factors.

Weight. Determine how big a load you can stand to carry. Don't forget to add in the extras, which are never included in the quoted weight: AC transformer and cords, the carrying case itself, external floppy drive for subnotebooks, and extra batteries, for example.

Brand name. Unknown manufacturers may expose you to service problems. Also, be aware that the battery is going to fail in a year or two. Batteries are almost always built especially for each machine; will your computer vendor be there to sell you a new battery when the time comes?

Battery life. Don't believe manufacturers' claims; it's almost always less, often by half. Test the battery life, if possible, or read an unbiased test report. Determine how important battery life is for your usage patterns before spending a lot for longer battery life. Longer-life NiMH batteries are often available at extra cost.

RAM and RAM upgrades. You'll need at least 4MB of RAM, but get 8MB if possible. Note the price of memory upgrades and whether you'll have to send the



Microsoft Ballpoint Mouse 2.0 is a trackball that directly attaches to many popular notebook computers.

machine to the shop to install the upgrades.

Color screen. If you can afford it, color makes a laptop seem 100 percent more useful and usable. Word around the industry is that within a year, color screens should cost little more than monochromes, but now they run \$400–\$1,500 extra. Nevertheless, color screens are magnificent.

Active matrix color is the real thing, with vivid, bright colors. Passive matrix color uses less power, costs much less, and produces paler colors. The new dual-scan passive matrix screens are a good compromise.

Monochrome screen. If you're going monochrome, go with 64 shades of gray if possible. Look for accessible brightness and contrast controls. The key advice here is to actually work with the screen in realistic lighting before buying. Screens blur, fade, wash out, and render color programs with odd shadings. Your reaction to any gray-scale screen is very individual; you can't predict it without actually trying the machine.

Keyboard. If not the most important factor, the keyboard is at least the second most important factor. First, look for standard key arrangements, particularly with regard to the cursor arrows, PgDn, and so on. Many manufacturers are still piggybacking the PgDn, PgUp, Home, and End keys on the arrow keys, requiring you to press a special Fn key to use them. I will never buy a machine with such a keyboard, though it may not pose as big a problem for you. WordPerfect users may also want true F11 and F12 keys (other programs use them as well).

Keyboard touch is extremely important. Size is critical in considering a subnotebook. Again, you can't tell if it's a keyboard you can live with unless you actually type on it. Test it to see if it's pleasant and comfortable to use.

Pointing device. Almost every system comes with a trackball. They vary wildly in usability, so this, too, is something you'll have to test. A picture of the unit won't tell you if the trackball is tight or loose, properly spaced for

your hands, and so forth. After using a dozen different arrangements this month, however, I can tell you that built-ins are generally more satisfactory than units that hang off the sides.

Power management.

Determine if the unit runs at 3.3 or 5 volts—3.3-volt units have much-superior battery life. Look for power management features built into the 486 chip.

Try Before You Buy

Because so many factors are subjective (screen quality, keyboard touch, and so on), you really need to get your hands on the unit and work with it before you can have any idea whether you'll like it. You wouldn't buy a car without a test drive; don't buy a notebook without test-driving it (or having a 30-day no-questions-asked return period).

The Computers

COMPUTE invited a sampling of the leading notebook and subnotebook manufacturers to submit their products for brief review here. Not all were able to provide computers for review, but this listing is a representative sample of the outstanding notebook and subnotebook computers available today.

Z-Note 433Lnc. (Zenith Data Systems, 800-553-0331, \$4,399) This gorgeous powerhouse is the clear pick of this particular litter of computers. In a gleaming white casing with a breathtaking active matrix color screen, it stops all passersby for an admiring once-over. Not just a pretty face, it has a 200MB drive, 4MB of RAM, a sturdy Notepoint trackball that snaps securely on the front

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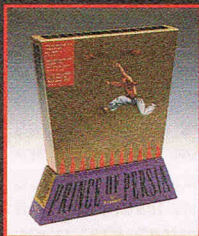
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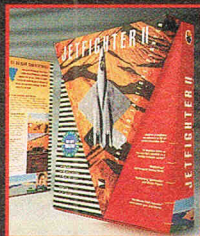
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PORTABLE COMPUTING

HOW TO CHOOSE SOFTWARE FOR YOUR NOTEBOOK COMPUTER

There was a time (not long ago) when choosing software for a notebook computer required an informed but delicate touch. Hard disks were small and disk compression was uncommon, but Windows with its bloated programs was already on the scene. Today the matter is much easier, but unless you have a newer notebook with a healthy-sized hard disk, you still need to be sensitive to the need to conserve disk space.

Conserving Disk Space

First, compress the disk with DoubleSpace or Stacker 4.0. You'll need the space before long.

Then consider disk-wise software. If you must remain compatible with a desktop unit or your office software, you may not have too much choice—but you may have more choice than you realize. To remain compatible with even major Windows applications, you can run sever-

al smaller programs which produce files that can be read into the larger program back at home base.

Go Lean

Try the Works programs—Microsoft Works for Windows, Lotus Works (for DOS), ClarisWorks for Windows—for integrated word-processing, spreadsheet, graphics, and simple database work. Each produces files in formats that mainline applications can easily read. Yet these programs can save 30 or 40 megabytes over installing mainline applications to accomplish the same things. Of course, the Works programs can't do everything the big boys can, but you'll be surprised at their power.

Along the same lines, Symantec's new Q & A for Windows provides word processing combined with a unique database that has been extremely popular as a DOS program.

Even if you're now a

Windows wizard, don't abandon DOS programs when you need to conserve disk space. Why waste megabytes on a Windows communications program, for example, when 650K of Procomm Plus works fine?

Lean DOS utilities such as Norton Commander or QDOS 3 can manage your files beautifully without all the overhead and exotic functions of a massive PC Tools.

Notebook-Specific Programs

Every VGA notebook should run Personics' Laptop UltraVision. By reclaiming that half- to full-inch border that most portables leave unused at the top and bottom of the screen, it makes text and images noticeably larger and easier to read. It also supplies a wealth of attractive screen fonts and a wonderful blinking-box cursor for DOS programs. Get this program.

Unless your notebook is

your only computer, you'll want a file transfer program. The undisputed king of the field is Traveling Software's excellent Lap-Link V, which now also provides file synchronization (copying files between computers so they both have only the latest versions of files).

For Windows, you'll want a cursor enhancer, unless one came with your computer. I like the running-sand-in-the-hourglass animated cursor of Cursorific Professional, though there are a dozen equally fine competitors.

The Diminishing Difference

With each generation of notebook computers, the differences between portable computers and desktops diminish, as does the need for special software. For now, the guidance above should give you enough information to intelligently populate your notebook's hard disk.

of the unit, and preloaded network software. A special ZDS-designed high-speed communications port hooks directly to Ethernet networks. It has the full complement of cursor keys and comes with a NiMH battery.

The Z-Note series starts at \$2,599 for a 25-MHz monochrome model and includes a pair of dual-scan passive matrix models—the 33-MHz version runs \$3,599.

Austin 486DX2/66 Notebook. (Austin Computer Systems, 800-752-1577, \$4,499) This Austin notebook with a 340MB drive, 8MB of RAM, one PCMCIA slot, a

built-in trackball in front of the keyboard, and an active matrix color screen is another gem. The keyboard lacks a dedicated F11 and F12 and takes some getting used to, as you have to reach over the trackball area (it's not wide enough to rest your wrists on). The screen is perfect—with its local-bus video and 8MB of RAM. This notebook runs Windows faster than my comparably equipped desktop.

Austin offers notebooks in many configurations, from a 486SX/25 with a 130MB drive and a monochrome screen for \$1,899 through the unit mentioned above.

Gateway ColorBook.

(Gateway 2000, 800-846-2000, \$1,995) The Gateway ColorBook's dual-scan passive matrix screen produces more-than-adequate color—as long as you haven't just come from an active matrix system.

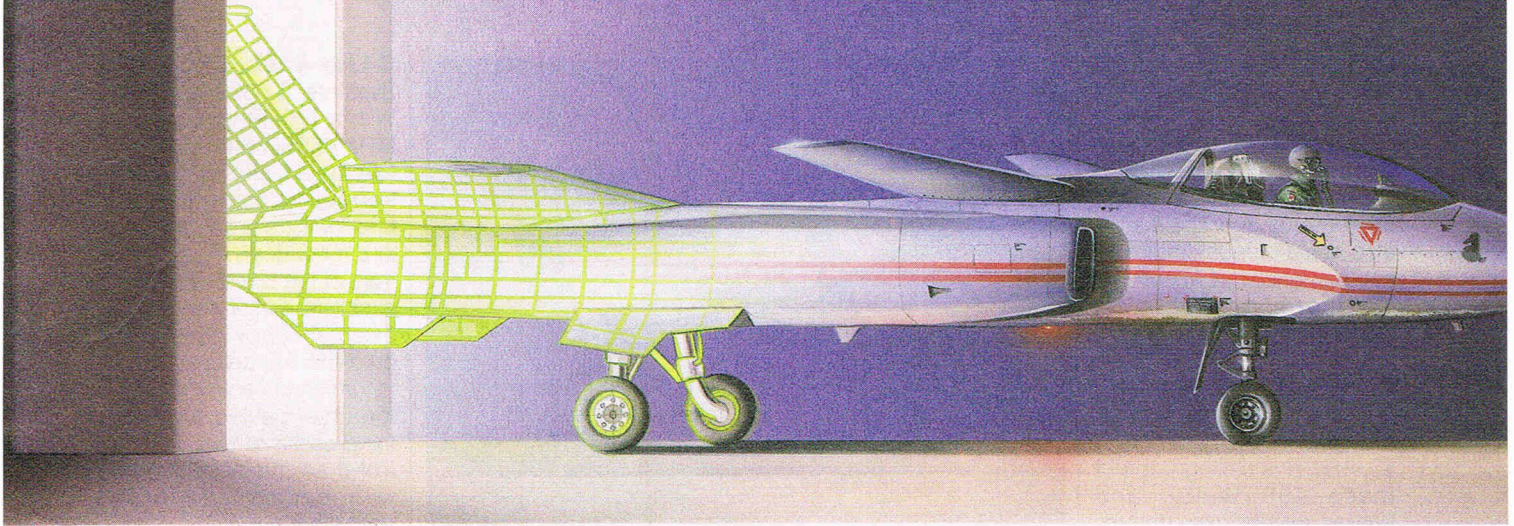
The ColorBook is a 486SX/25 with an 80MB removable drive, 4MB of RAM, and two PCMCIA Type II slots. Its keyboard has an acceptably firm touch and doesn't have piggybacking. Its trackball slides forward from the front of the machine and, although small, gives immediate and positive cursor

control. Two models with faster chips and 170MB drives are available.

Olivetti Philos 44.

(Olivetti, 800-633-9909, \$2,453) This unusual monochrome notebook (also available with color) shows its Italian heritage by offering new and interesting features. It's a 486/25 with an 84MB removable hard drive. It piggybacks the cursor keys and provides an innovative but less-than-totally-successful mouse substitute: a trackball unit on a steel strap that pops out of the right side of the computer. You have to

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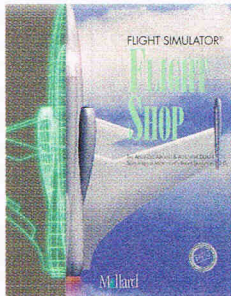


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grasp the unit to hold it still in order to click the switch.

The Philos comes with a Business Audio feature—essentially, it's a digital tape recorder with a built-in microphone and speaker. It also has a unique small ten-key numeric pad above the keyboard. Accountants, take note!

TravelMate 4000E WinSX/25. (Texas Instruments, 800-527-3500, \$2,499) TI is selling a ton of these 486 WinSX and WinDX notebooks, including this pleasant passive matrix color model. (The top of the line, a 50-MHz DX model with active matrix color, runs \$4,999.)

The 400E WinSX/25 comes with a 120MB drive, 4MB of RAM, and a Microsoft BallPoint trackball with QuickPort (meaning cordless attachment off the right side of the unit). The keyboard includes all cursor keys, as well as the F11 and F12 keys. The new keyboard design gives a better-than-average touch.

TI's TravelMates are sleek, lightweight Windows machines.

Toshiba T4600. (Toshiba, 800-334-3445, \$3,299) The Toshiba T4600 is a fast 33-MHz machine with a 120MB drive, 4MB of RAM, and a Microsoft BallPoint trackball with QuickPort attachment. It features two PCMCIA Type II slots and a 150-pin connector for a docking station or SCSI adaptor. The T4600 is available in monochrome or color, with drives of up to 340MB (top-of-the-line price: \$5,499).

Toshiba's notebooks are unfailingly excellent, with full-sized keyboards with the best touch in the business and no piggybacked keys.



Hewlett-Packard's HP100LX palmtop computer offers a full 80- x 25-line display and the ability to run most DOS programs.

Subnotebooks

Quaderno 33. (Olivetti, \$1,750) This one's the smallest—so small that its keyboard isn't quite usable by a person with large hands. Like the Philos, it has sound-recording capabilities, but it has a better trackball. With a 60MB drive, 4MB of RAM, and several built-in applications, it's a full-blown PC in a tiny package.

ZEOS Contenda. (ZEOS International, 800-423-5891, \$1,894) The Contenda is a little larger and has a good-sized, usable keyboard (with piggybacked cursor keys); a bright, sharp (but tiny) screen; and a difficult-to-use trackball at the upper right of the keyboard. With no PCMCIA slots, its expandability is limited.

ActionNote 4000. (Epson America, 800-289-3776, under \$2,000) This one's an impressive little computer, with an excellent keyboard (although the cursor keys are piggybacked) and bright backlit screen. The trackball at the upper right

of the keyboard is only adequate. The largest of the units I saw (almost the size of a notebook), it wasn't the heaviest.

Epson portables feature Epson's Extra Care Road Service, which guarantees a replacement unit overnight if yours needs service. Removable hard disks make using a loaner easy.

HandBook. (Gateway 2000, \$1,495) The HandBook features a keyboard of adequate size and good touch with separate cursor keys. Its screen is larger than that of most of the others while the unit itself is smaller; an enviable achievement. The pointer is a pencil-eraser-like joystick at the right of the keyboard (similar to IBM's popular TrackPoint II on the ThinkPads). The two buttons that go with it are on the front of the unit, where one-handed operation is surprisingly facile. The pointer itself, however, takes some getting used to.

The HandBook is priced right. Its primary drawback is its large, ungainly AC adapter unit—nearly half the size of the computer.

Z-Lite 425L. (Zenith Data Systems, \$1,899 to \$2,499) With a 170MB drive, this 25-MHz 486SL with two PCMCIA Type II slots is ready for serious computing. Its LitePoint trackball attaches in a full-width bar across the front of the unit and provides excellent cursor control. The external floppy drive snaps onto the AC adapter, which in turn snaps onto the side of the unit, making the whole thing easier to use and control than the normal setup with cables and boxes everywhere.

The keyboard gives a slightly cramped feeling, but the key travel and touch is good. There's no piggybacking. The screen is nearly as large as that of a normal notebook. The Z-Lite is, however, quite thin—much thinner than any of the others I tested.

HOW TO BUY A PALMTOP COMPUTER

Unlike PDAs, which are all promise and little performance, palmtop computers are, happily, a working reality. Some question the true usability of these tiny powerhouses, but sales are brisk and the threat of losing out to PDAs seems to remain in the future.

Palmtops are miniature computers with full but tiny QWERTY keyboards, slots for flash memory, basic applications burned into ROM, and built-in links to regular computers.

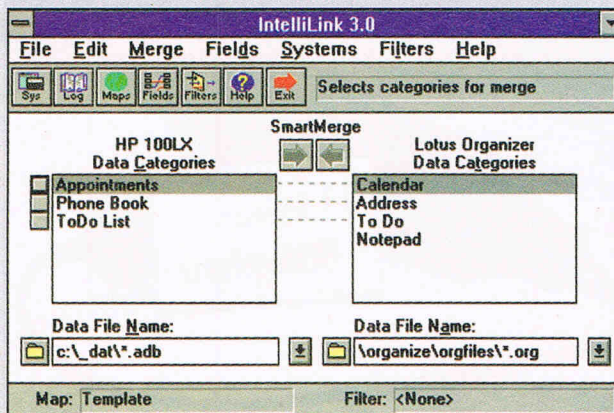
Two years ago, there were a half-dozen offerings in the palmtop market, but only three palmtops survive—three excellent, mature products that have enthusiastic followings. The HP100LX is the updated version of the highly successful HP95LX, the Psion 3a is a British import with

PORTABLE COMPUTING

CAN WE TALK?

You're outfitted for travel with a notebook, palmtop, or PDA—but how do you get your portable computer to share its files with your desktop computer? Most palmtops and PDAs have their own schedule and address programs that save to a proprietary file format. Most notebooks have small hard drives, forcing you to choose smaller programs for your notebook—programs which may not be compatible with the applications you use on your desktop computer.

If you have this problem, check out IntelliLink (IntelliLink, 603-888-0666, \$99.95). It lets you translate and transfer data between your portable computer's proprietary applications and the popular applications you use on



IntelliLink 3.0 lets you translate and transfer data between your portable computer's proprietary applications and the standard applications you use on your desktop computer.

your desktop computer. The transfers are made by hooking your two machines together with a serial cable.

IntelliLink supports a variety of applications, including personal information managers (PIMs), calendar programs, con-

tact managers, databases, word processors, and spreadsheet programs. Portable computers supported include Sharp's Wizard series of palmtops; HP's 95LX and 100LX palmtops, and HP's OmniBook 300 and 425 subnotebooks. The com-

pany plans to add support for Casio's B.O.S.S. series of palmtops, Psion's Series 3 and 3A palmtops, and Casio's and Tandy's PDAs.

For example, you might be using the address book and scheduler in your HP 100LX palmtop when you're on the road, but would like to update your schedule and addresses using Lotus Organizer from your desktop computer when you're in the office. IntelliLink can map your 100LX appointments to Organizer's calendar, your 100LX phone records to Organizer's addresses, and your 100LX To Do tasks to Organizer's To Do. When you're ready to hit the road again, IntelliLink can translate and transfer the files back to the 100LX formats.

—David English

engaging features, and the OZ-9600II is the latest in the long line of popular Wizard organizers.

HP100LX

The HP100LX (Hewlett-Packard, 800-443-1254, \$749) is a checkbook-sized DOS computer running DOS 5. It comes with Lotus 1-2-3 Release 2.4 in ROM, along with a phone and address book database, scheduler and to-do list, financial calculator, text editor, note taker, world clock, stopwatch, and clipboard applications. It also has built-in cc:Mail for E-mail and network communications with cc:Mail-equipped sites. Its standard serial port allows normal file transfers with regular computers and the use of standard modems.

With 1MB of available RAM, the HP100LX allows

you to load other DOS applications as long as they and their data fit in that space (unless you use the PCMCIA slot for a flash card, which serves as a virtual hard disk).

The CGA screen isn't backlit, and its 80 x 25 display is pretty tiny. You can zoom up to larger character sizes, which can be helpful. The keyboard is good, but only unusually talented, small-fingered persons can even dream of touch-typing with it.

Best of all, it runs on two AA batteries for months. If a pocket-sized PC appeals to you, this is your computer.

Psion 3a

The new Psion 3a (Psion, 508-371-0310, \$495 for 256K model, \$595 for 512K model) updates Psion's popular Series 3. Built-ins

include a word processor compatible with Microsoft Word for DOS, a spreadsheet compatible with Lotus 1-2-3, address and phone database, scheduler and to-do list, world clock, calculator, sound recorder, and its own programming language. One of Psion's tricks is to dial phones when you hold the unit up to the phone's mouthpiece. From that basic sound technology, it was an easy step to recording voice, although memory space limits you to only a few seconds of saved recordings.

Linking to a PC requires an optional \$130 program and cable. Flash card memory is also available at extra cost, plugging into either of two proprietary slots (not PCMCIA standard). Two AA batteries can power it for months.

The Psion has a bigger keyboard than the HP100LX, and some claim to have mastered touch-typing on it in limited circumstances. It's possible, but not easy.

What the Psion has is charm. It's fun to play with, fun to show around to people, and fun to use.

OZ-9600II

Most of us think of the Wizard as the original palmtop. While none of the Wizards have been DOS machines, you can buy connectivity kits that include a serial cable and the necessary software to link your Wizard to a PC or Mac.

The latest Wizard is called the OZ-9600II (Sharp Electronics, 800-321-8877, \$649). It retains the excellent keyboard (which is about 75 percent of the size of a normal keyboard), but adds

PORTABLE COMPUTING

several PDA-like features, including a 320- x 200-pixel touch screen, pen input, and a new easy-to-use graphical environment. Using the onscreen icon buttons, screen-based icons, and pull-down menus, you can access the various personal productivity programs, which include a calendar, schedule program, business card directory, word processor, outline processor, scrapbook, calculator, and home and world clocks.

The unit runs on four AAA batteries and uses an additional CR-2032 lithium back-up battery to protect your data for as long as five years.

All this comes in a package that weighs just 15 ounces.

HOW TO CHOOSE A PDA

The world's first operating personal digital assistant, or PDA, Apple's heavily publicized Newton, hit the market last August, followed closely by PDAs from Sharp, Tandy, and Casio.

At the time of this writing, it's apparent that most of what we had been led to expect from these marvelous new tools remains a fairy tale—these PDAs work poorly, don't have many of the promised features, and have been roundly ridiculed in the press. And yet . . . The promise of what this compact tool could be—will be—is still breathtaking. The fulfillment of that promise just isn't here yet. We have its shadow, its prototype.

The Promise

PDAs aren't tiny notebook computers; they're personal information and communication devices—extensions to normal computers. They travel with you to accept jotted-down notes, make



Megahertz offers a variety of PCMCIA modems that let you connect your portable computer to your cellular phone.

appointments, and wirelessly send and receive computer data, E-mail, and faxes from nearly anywhere. They run checkbooks, language and currency translators, online networks, and even games. You write on them with a special pen; the units recognize your writing and respond to it.

The Reality

Handwriting recognition has been the source of most of the hilarity in the press. It's notoriously poor at first; Apple says that the Newton learns your handwriting over a period of months. Few can stand to wait that long.

Communications, especially wireless communications, are still in the future. With a modem, you can access America Online successfully, but the vast promise of casual wireless communications is still nothing but promise.

The Products

The Newton MessagePad (Apple, 800-776-2333, \$899) and the Sharp Expert Pad PI-7000 (Sharp Electronics, 800-993-9737,

\$899), both manufactured by Sharp in Japan, are identical except for the Sharp unit's larger, more protective plastic case. Both come with a serial port, an infrared port for communicating with other Newton and Sharp units, and a PCMCIA Type II slot. Both have a built-in notebook utility for handwritten and drawn material, an address book, a calendar, and to-do list.

One bright spot is the working Assist feature (found in both) that intelligently completes actions you describe or start. Write Fax Andy at 9 a.m., hit the Assist icon, and the Newton (or Sharp) gives you a fax cover sheet to fill out, then attempts the scheduled call—though it's as likely to go to Cindy at 7 a.m. as anywhere else. The handwriting recognition at the core of almost everything just isn't good enough yet.

The Tandy Z-PDA (Tandy, 817-390-3011, \$699) and the Casio Z-7000 (Casio, 201-361-5400, \$899), called the Zoomer, are also identical units. Like the Newton and Sharp, they have serial and infrared ports and a PCMCIA

Type II slot, but add several Game Boy-type buttons for game playing.

After the initial specs, the Tandy and Zoomer are very different from the Newton and Sharp. Their built-ins include a complete personal organizer system, a note taker, a sketch pad, and the GEOS operating system which runs Pocket Quicken and an America Online front end (requiring the optional modem). They contain a wealth of additional information, including a dictionary, thesaurus, 26-language word translator, calculator with currency exchange functions, and much more—even a copy of the Constitution.

Their handwriting recognition is character based, resulting in less amusing but just as awful results as the Newton's word-based recognition. They have a pop-up onscreen QWERTY keyboard which can get things straight, if somewhat slowly. The pen is small and hard to use, and the system runs slowly.

The Bottom Line

PDAs hold magnificent promise, but the ones you can buy today are just not ready for prime time.

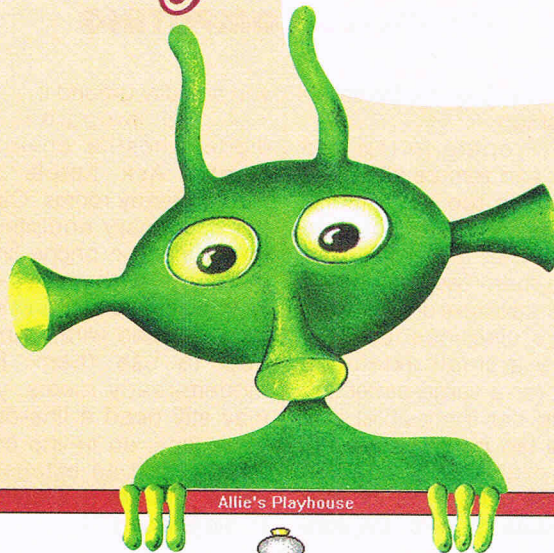
20 TOP PORTABLE COMPUTING TIPS

As you get started with portable computers, there's a lot to learn. Here are 20 tips for traveling with and using a portable computer that can help make your first experiences positive.

What to Take

1. Prepare a packing list of everything needed for a successful out-of-town venture. Make it a word-processing file on your computer—so you won't lose it and so you can modify it on

A Magical World of Learning on CD-Rom



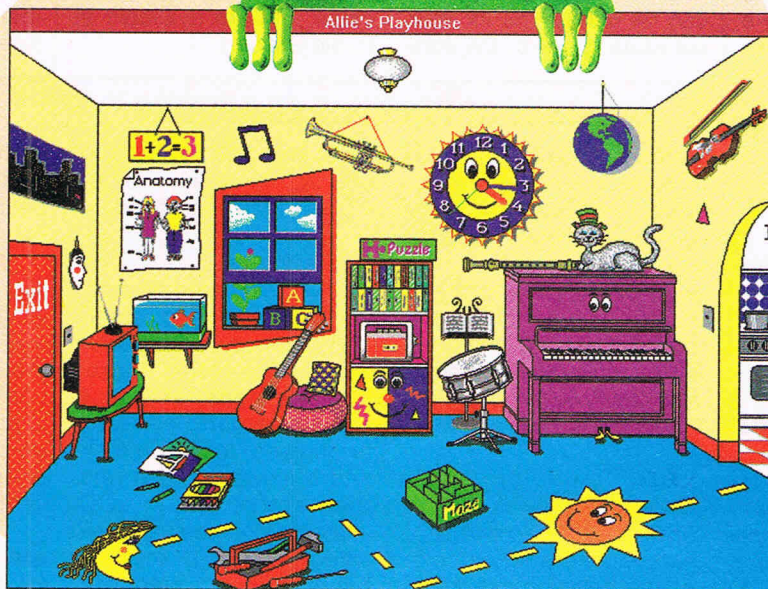
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the road when you discover what you left at home. (Tips 3 and 4 provide items for this list.)

2. Carry critical phone numbers: tech support for the computer and major software programs and online network numbers for cities you visit. Fun-loving guy that I am, I also carry a photographically reduced sheet with copy protection keys needed to play SuperTetris, X-Wing, The Even More Incredible Machine, and other games

that have found a home on my laptop.

3. Prepare to tap into hotel and remote site electricity. In too many hotel rooms, the few outlets available are full—and even then, they're behind the headboard or somewhere else inaccessible. Carry a small extension cord (or a surge-protecting power bar if possible) or a three-tap plug. A three-to-two-prong plug adapter can be handy, but for your computer's sake, be sure

you actually ground it.

4. Be prepared for modem-hostile environments. Ask hotels for modem-ready rooms. Carry the necessary equipment to tap into the phone lines in rooms with no RJ-11 jack: a screwdriver and alligator-clipped wires. Know how to use them. For modem-ready rooms, you may still need a line-doubling jack, an in-line connector, and an extension cable. (All are available at Radio Shack.)

Conserving Disk Space

5. Use disk compression. No hard disk is ever large enough, especially on a laptop. Use DOS 6.2's DoubleSpace or Stacker 4.0 to artificially enlarge the disk, but be sure you've previously installed Windows, to ensure enough uncompressed space for Windows' permanent swap file.

6. Conserve hard disk space with laptop-install options. Many program installation routines offer special laptop options of

GLOSSARY OF PORTABLE COMPUTING

active matrix. A type of LCD that uses a transistor—or three transistors in the case of a color LCD—to drive each pixel. The brightness, contrast, and refresh rate of active matrix LCD screens are generally on a par with those of standard cathode-ray tube (CRT) monitors. See also **LCD** and **passive matrix**.

docking station. Also known as *expansion chassis*. An external box that allows a laptop computer to add a combination of expansion slots and drive bays.

gray scale. The progressive series of grays that a device can produce, ranging from black through white. On a portable computer, the quality of the gray scale is dependent on the video controller (usually CGA, EGA, or VGA) and video display (usually 16- or 64-shade LCD).

laptop computer. A portable computer, usually able to operate from either batteries or AC power, that offers most or all of the functionality of a desktop

computer. Laptop computers are generally considered to be portable computers that weigh 6 to 12 pounds, but the term is also used generically to refer to any portable computer, including notebook and subnotebook computers, that weighs less than about 12 pounds.

LCD. Short for *Liquid Crystal Display*. A type of computer display that sandwiches a liquid compound between two transparent electrodes. LCD screens are found in the vast majority of laptop computers because they consume less power than standard CRT monitors.

notebook computer. A lighter and thinner version of a laptop, usually weighing less than about six pounds. The term is also used to refer to any portable computer, including a subnotebook computer, that weighs less than about six pounds.

palmtop computer. Also known as *hand-held computer*. A computer

small enough to be held in one hand, usually weighing less than one pound.

passive matrix. The type of LCD found on most currently available laptop and notebook computers. Standard passive matrix LCD screens are less expensive and have less brightness, less contrast, and a slower refresh rate than active matrix LCD screens. Double-scan passive matrix LCD screens fall in between standard passive matrix screens and active matrix screens in both cost and quality. See also **LCD** and **active matrix**.

PCMCIA. Short for *Personal Computer Memory Card International Association*. An industry group whose standard allows credit-card-sized expansion cards to be used in a variety of portable computers. These expansion cards, called PCMCIA cards, include memory, fax/data modem, network interface, SCSI interface, sound, and hard drive cards. Some have suggested that PCM-

CIA really stands for *People Can't Memorize Computer Industry Acronyms*.

PDA. Short for *Personal Digital Assistant*. A lightweight palmtop computer that relies on a pen for input rather than a keyboard or mouse. The built-in software in PDAs usually emphasizes personal organization and electronic communication.

submarining. Slang term for the disappearance and reappearance of the mouse cursor as it moves across a slow-refresh LCD screen.

subnotebook. A lighter and thinner version of a notebook, usually weighing about four pounds or less.

transportable computer. Also known as *luggage computer* and *lunchbox computer*. A portable computer that weighs from 12 to 30 pounds and requires AC power. Many have standard CRT monitors built in.

—David English

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leaving out help files, clip art, templates, tutorial files, extra drivers, and so on. You can save whole megabytes of disk space with only minor program sacrifices.

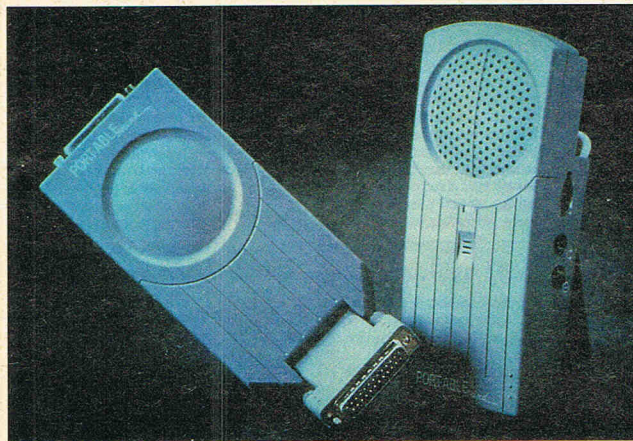
7. If your computer had Windows preinstalled, go back through the Windows Setup routine and remove all the Windows chaff you don't need. (Windows has a laptop-install option too, but the manufacturers install everything.) I routinely delete over 2MB of Windows miscellany from laptops I set up.

Conserving Battery Power

8. Don't let your nicad battery develop a false "memory." Nicads tend to believe they're discharged at any point where they're regularly recharged. If you typically use your three-hour battery for one hour, then recharge it, the memory effect will soon convert it to a one-hour battery. Periodically, leave your computer running till the battery fully discharges.

9. Conserve battery power using the computer's standby feature. Many notebooks have a standby or sleep button, which instantly puts the computer into a deep, power-conserving sleep. It stays asleep until you awaken it with the same button. Use it whenever you're on batteries and have an interruption, even for a minute or two. (It also hides your screen from nosy passersby.)

10. Conserve battery power with the turbo or speed switch. Running the laptop at a lower clock speed uses significantly less power, so run at low speed in situations where extra speed isn't needed. Most word processors, for instance, don't need much speed to keep up with your



Portable Sound Plus from DSP Solutions adds sound to notebook computers. It plugs directly into your notebook's parallel port.

typing. Try your routine tasks at low speed; if they're fast enough, use low speed whenever running on battery.

11. Conserve power by controlling screen colors. Dark backgrounds use less power than light backgrounds. Change the background in Windows in Control Panel's Colors window. Windows provides dozens of preset color schemes, including three designed for LCD screens. Try them to see which gives you the most usable screen, then use the darker background colors when running on battery.

Mouse Matters

12. Don't abandon your real mouse. Sure, you probably can't use a mouse on an airplane, but you certainly can use it in a hotel room, a client's office, or other remote sites. As good as the trackballs are, for me nothing beats a real mouse.

13. Improve the Windows cursor with Mouse Trails. The ordinary mouse cursor, a small white arrow, gets lost too easily on a monochrome screen. Turning on Mouse Trails (a check box in Control Panel's Mouse

window) makes the cursor leave a vanishing trail that's much easier to see.

Other Tips

14. Increase available memory when not using PCMCIA cards by disabling the many drivers necessary to run a PCMCIA slot. DOS 6's multiple configuration feature (type *help multi-config* for instructions) lets you select whether to install the drivers each time you boot.

15. For VGA screens (including color), use Laptop UltraVision (explained in detail in the software article) to expand the amount of screen the computer uses, improve the screen fonts, and provide a blinking-box cursor for DOS. The first thing I put on every laptop is Laptop UltraVision.

16. Don't ignore ergonomics. As a carpal-tunnel victim, I know the value of simple wrist-rest pads. Use one with your laptop. Cut it down to the right size for the laptop, and notch it for front-mounted trackballs. Use it.

17. Back up! Back up! Back up! On the road, your options are pretty limited if there's a problem. It probably isn't worth carrying a full

set of backup disks for your hard drive (unless it's a long trip), but carry a bootable floppy disk with a current AUTOEXEC.BAT and CONFIG.SYS. And for heaven's sake, back up your daily work. I keep a master trip disk in my A drive all the time. Every time I save a file to the hard disk, I also save it to the trip disk. Instant backup.

18. Prepare for printing problems. By loading a few standard printer drivers for Windows and each of your major DOS programs, you can be ready to borrow most printers you'll run across in your travels. Load drivers for PostScript, HP LaserJet II, Epson LQ850 and FX85, and IBM ProPrinter, and you'll be able to print acceptably on 90 percent of the printers you'll encounter. For really limited but necessary printing, send yourself a fax at the hotel office or the office you're visiting.

19. Plan for security. Tape your business card to your computer with an offer of a reward for return of the unit. Put text in your AUTOEXEC.BAT file offering a reward and showing your name, address, and phone number. For important data, consider using software data encryption or passwords.

20. Plan for airport problems. Most authorities say not to X-ray computers, although I've seen it done without harm dozens of times. Ask for a hand check; when security personnel hand-check a computer, they often ask you turn it on (to prove it's a computer, presumably), so have enough battery charge to boot it. This usually takes a few extra minutes at the security area, so allow enough time. □



MULTIMEDIA STARS AT THE **FAST FORWARD** CONSUMER ELECTRONICS SHOW

BY DAVID ENGLISH

With everything from remote-control watches and portable televisions to the latest in Sega and CD-ROM games, the Winter Consumer Electronics Show is nerd heaven. The star of the show was multimedia, with aisle after aisle of exciting new software and hardware.

Some of the most innovative CD-ROMs from CES are set in the future. These include *Under a Killing Moon* from Access (800-800-4880, price not available); *Outpost CD* from Sierra (800-757-7707, \$69.95); *Microcosm* from Psygnosis (617-497-5457, \$79.99); *Star Trek, The Next Generation: Interactive Technical Manual* from Paramount Interactive (415-812-8200, \$99.95); Isaac Asimov's *The Ultimate Robot* from Microsoft (800-426-9400, \$79.95); and *Noctropolis* from Electronic Arts (415-571-7171, \$59.95). *Under a Killing Moon* features the best integration of video characters with 3-D-rendered backgrounds that I've seen so far. *Outpost CD* and *Microcosm* use their 3-D-rendered graphics for movielike sets, complete with futuristic spaceships and highly original designs. *Star Trek, The Next Generation: Interactive Technical Manual* includes user-controlled videos that let you quickly move from room to room aboard the *Enterprise*. You can even move right up to the ship's computers and operate the panels (of course, you can't do everything with the panels that the cast can do on the show). Isaac Asimov's *The Ultimate Robot* is an award-winning Macintosh CD-ROM designed by Ralph McQuarrie, the production designer of *Star Wars*. It's now available under the Microsoft Home label, with a PC version set to ship later this year. Finally, *Noctropolis* is a dark and moody tale set in a surreal city of the future.

Other notable game CD-ROMs from the show include the multimedia versions of *SimCity*, *SimAnt*, and *SimEarth* (Interplay, 800-969-GAME, prices not available), which feature improved sound, higher-resolution graphics, and—in the case of *SimAnt*—incredible animation; *The Lawnmower Man* (Sony Electronic Publishing, 212-702-6273, \$69.95), which includes original footage from the film and a 3-D-modeled world with cinematic fly-throughs; *Operation Airstorm* (Revell-Monogram, 708-966-3500,

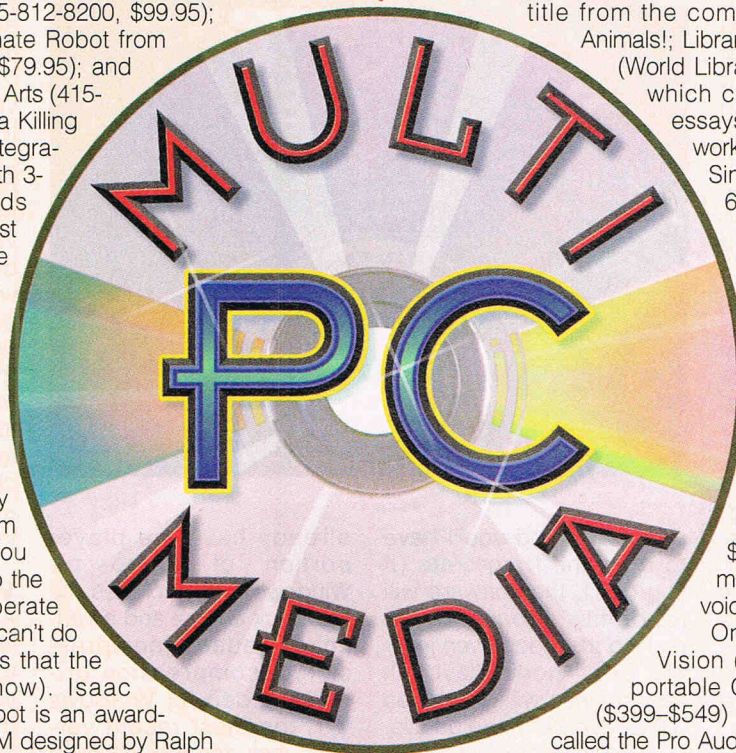
\$69.95), which is the third installment in the *Power Modeler* series—this time, the CD-ROM features four advanced military jets; *Star Trek: 25th Anniversary Enhanced CD-ROM* (Interplay, price not available), which includes the voices of all the major cast members from the original "Star Trek" series; and *The X1th Hour* (Virgin Games, 714-833-1999, price not available), the eagerly awaited sequel to the best-selling game, *The 7th Guest*.

Despite the emphasis on games at CES, there were plenty of educational and reference CD-ROM titles to excite the crowd, including *Daring to Fly! From Icarus to the Red Baron* (Arnowitz Studios, 415-383-2878, \$69.95), the follow-up title from the company that developed *The Animals!*; *Library of the Future, Third Edition* (World Library, 714-748-7197, \$395.00), which crams 3500 stories, novels, essays, poems, and other literary works onto a single disc; *Dr. T's Sing-A-Long* (Dr. T's Software, 617-455-1454, \$39.95), a karaoke program for kids that features 26 classic children's songs; Dennis Miller, *That's News to Me* and Dennis Miller, *That's Geek to Me* (Sanctuary Woods Multimedia, 415-578-6340, \$29.95 each), which unleash Miller's comic wit on current events and computer jargon; and *Tuneland* (7th Level, 214-437-4858, \$49.95), a terrific interactive musical cartoon featuring the voice of Howie Mandel.

On the hardware side, Media Vision (800-845-5870) unveiled a portable CD-ROM drive called *Reno* (\$399–\$549) and a PCMCIA sound card called the *Pro Audio PCMCIA* (\$299). *Reno* can plug into your computer's SCSI or parallel port and can double as a portable audio-CD player. Unlike other PCMCIA sound cards, the *Pro Audio PCMCIA* is full featured—it even has provisions for a joystick port and MIDI out.

Advanced Gravis showed *The Gravis Personal Piano System* (604-431-5020, \$495), which includes a sound card with wave-table synthesis, a MIDI keyboard, powered speakers, and *Musicware Piano*, a Windows-based software package that offers a full year of piano lessons. And MediaMagic (800-624-8654) announced its \$99 16-bit sound card, called the *ISP-16 Audio Board*.

Look for coverage of many of these multimedia products throughout the coming months in COMPUTE. □





By DAVID ENGLISH

Some predictions of the future just won't go away—flying cars, wristwatch telephones, and desktop video. Flying cars will probably never appear in our lifetime, and wristwatch telephones are still about five or ten years away. But desktop video is here now—and about to become a much larger part of everyday computing.

So what is desktop video, how does it work, and how can you use it? Just as a sound card converts analog sound into digital sound that can be manipulated and stored by your PC, a video capture card converts analog video—from a VCR, camcorder, or television—into digital video that your PC can manipulate and store.

There's only one catch. Video contains too much information for a personal computer to deal with. In its raw form, 320- x 240-pixel video at 30 fps (frames per second) with 24-bit color would take up about 6.6 megabytes per second, 395 megabytes per minute, or 2.37 gigabytes per hour. PCs simply can't process that much information at a time. The solution for this problem is compression, without which there would be no desktop video.

The Big Squeeze

As it is, even with compression, we're pushing the limits of our processors, so some compromises have to

be made. Three main factors determine the quality of the video: the speed of the processor, the video's frame rate, and the size of the video window. Increase the processor speed, and you can increase the frame rate (for less jerkiness) or the size of the video window (for a larger image). Increase the size of the video window without increasing the speed of the

processor (even within a compression scheme, there are trade-offs between the amount of compression and the quality of the images)—and you have a complicated balance of component parts.

Fortunately for Windows users, this is all taken care of by Video for Windows. If you have a CD-ROM drive and regularly try out CD-ROM titles, you should

All, with the exception of RLE, are lossy, which means they sacrifice picture quality to achieve higher orders of compression. This quality is permanently lost—when you decompress the file, it doesn't go back to its former quality. RLE, on the other hand, is lossless, which means there's no loss in image quality. As you might guess, the lossy methods achieve much higher compression ratios and allow you to play back your video at higher frame rates or in a larger window.

Because Video for Windows takes care of loading up the correct codec when you run an AVI file, it essentially guarantees that all Video for Windows video input boards will be compatible with all Video for Windows codecs. QuickTime for Windows works pretty much the same way. Its codecs, many of which are identical to ones included with Video for Windows, are also interchangeable and work with any Windows application that supports its MOV files.

Video for the Masses

At this point, you may be wondering what all this has to do with you—after all, you don't plan to develop multimedia applications. Think of it as using text and graphics files with your computer, even if you're not a professional writer or graphic artist.

Many of the new CD-ROM



processor, and you'll have to drop the frame rate (if you don't, the software will randomly drop frames, making the video even jerkier). See "Video Playback Performance with the Indeo 3.0 Codec" for more details.

Add three other factors—the number of video colors (8-bit, 16-bit, or 24-bit color), the quality of the video sound (8-bit or 16-bit), and the type of com-

pression (even within a compression scheme, there are trade-offs between the amount of compression and the quality of the images)—and you have a complicated balance of component parts. Fortunately for Windows users, this is all taken care of by Video for Windows. If you have a CD-ROM drive and regularly try out CD-ROM titles, you should already have the player portion of Video for Windows. This includes the playback engine and a variety of codecs (compression/decompression drivers). Video for Windows 1.1, the most recent version, includes the following codecs: Cinepak from SuperMac, Indeo from Intel, RLE from Microsoft, and Video 1 from Media Vision and Microsoft.

HOW TO USE D

programs use Video for Windows or QuickTime for Windows video files. Popular titles include the major encyclopedias (Microsoft Encarta, Compton's Interactive Encyclopedia, and Grolier's Multimedia Encyclopedia), reference works (Microsoft Cinemania, Movie Madness, 20th Century Video Almanac, and World View), and even complete movies (It's a Wonderful Life and A Hard Day's Night). The video files usually have either AVI extensions (for Video for Windows) or MOV extensions (for QuickTime for Windows). A monthly magazine on CD-ROM, called NautilusCD (Metatec, 800-637-3472, \$137.40 a year in the U.S. and \$222.00 a year outside the U.S.), regularly includes 100 megabytes or more of AVI files, such as music videos from popular groups, multimedia tutorials, and promos for computer products.

To view these files outside your CD-ROM application, you'll need to associate the file's extension with a program that can play the file. For example, if you want to associate AVI files with Windows' Media Player, you would run File Manager, select an AVI file, choose File from File Manager's menu, choose Associate, type `c:\windows\mplayer.exe` under Associate With:, and press the OK button. You should then be able to double-click on any AVI filename from within File Manager to automatically play the file.

(Assuming Windows is set up to handle them, you can associate Media Player with other multimedia files, such as QuickTime for Windows video files and MIDI music sequences.)

Media Player includes a set of VCR-like controls that let you play, stop, fast-forward, and rewind your video sequence. Under the Device menu selection, you can choose Configure and

hard drive. If you're running Stackster or DoubleSpace, video files can take even more space (because video files are already highly compressed, they lower your compression ratio and so appear to take up more room than they really do).

Roll Your Own

Like to create your own video files? No problem. All you need is a video capture

pression scheme that fits your needs. Most of these cards will let you capture video at 320 x 240 at 15 fps and 160 x 120 at 30 fps, compress the video either in realtime or after capture, and store the compressed video to your hard drive as an AVI file. If you don't have a fast 486 and local-bus video, you may have to drop down to 240 x 180 at 15 fps, or even 160 x 120 at 15 fps—otherwise, you'll drop a lot of frames as you capture the video.

The standard video frame rate for television is 30 fps in the U.S. and 28 fps in Europe. Films are shown in movie theaters at 24 fps, though silent films varied from 16 fps to 24 fps. For most uses of desktop video, 15 fps is considered acceptable. With 10 fps, there's a slight jerkiness that—depending on the material—may not be too bad. Any rate under 10 fps causes the video to look like a fast-moving filmstrip.

Almost all video capture cards include the playback and basic editing programs from Video for Windows. Because these cards now ship with the Video for Windows utility programs, Video for Windows 1.1 is sold only to developers.

For anything more than basic cut and paste, you'll need a full-fledged video-editing program, such as Adobe Premiere (Adobe, 415-961-4400, \$295) or MediaMerge (ATI Technologies, 416-882-2600,



experiment with different settings, including doubling the size of the video window and skipping frames when the video falls behind.

If you find a video sequence you like, you can copy it over to your hard drive—assuming you have the space for it. You'll soon notice that even a 30-second compressed video file can take up from three to five megabytes on your

card, such as the Video-Spigot (Creative Labs, 800-998-5227, \$399.95), Pro MovieStudio (Media Vision, 800-845-5870, \$449.00), Smart Video Recorder (Intel, 800-538-3373, \$699.00), Vidiola (Orchid, 510-683-0300, \$399.00), or Video Blaster (Creative Labs, \$499.95). All ship with Video for Windows, so you'll be able to try out the different codecs and select the com-

DESKTOP VIDEO

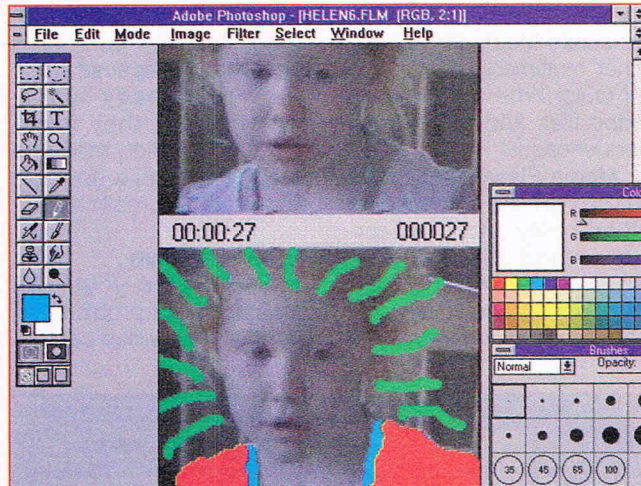


MULTIMEDIA PC

\$295). Both let you combine video clips with a variety of special effects and save the results as a new video file. Both can read Video for Windows and QuickTime for Windows files, but only Adobe Premiere can save in both formats.

Adobe Premiere comes with over 35 image-processing filters, including antialias, brightness/contrast, emboss, radical blur, and sharpen edges, as well as 35 effects and transitions, including cross-dissolve, zoom, band wipe, venetian blinds, and cross-stretch. MediaMerge includes fewer features—it has only 9 transitions, for example—but it comes with a separate WAV file audio editor, an integrated text animator, and a CD-ROM full of useful videos, animations, sounds, photos, and backgrounds you can use in your video productions.

Even though it doesn't have all the features of its \$795 Macintosh cousin, the Windows version of Adobe Premiere is still a powerful program. You can insert one video image into another (for a picture within a picture), create split-screen videos (using mattes of various shapes), customize transitions (using a transition twice to simulate a new transition), intensify the effect of a filter over time (by splitting the clip into several pieces, applying the filter to each individual piece, and rejoining the pieces), superimpose a person against a background (similar to the Chroma key technique used to place a weatherperson in front of a weather map), produce a rotoscop-



Adobe Premiere lets you save a video as a filmstrip, mark it up in Adobe PhotoShop, and bring it back to Premiere as a video.

ing filmstrip (using Adobe PhotoShop to mark up individual video frames and send the video back to Adobe Premiere), and even create a 360-degree video presentation (simulating a three-dimensional space with a movie playing on each of five walls).

Other programs you might find useful for manipulating your desktop videos include Matinee (Access Softek, 510-848-0606,

\$49.95 for disk version and \$59.95 for CD-ROM version), which lets you use your AVI files as a screen saver; SoundTrack (Access Softek, \$79.95), which lets you record and overdub sound onto AVI files; 3D-IT (Electronic Imagery, 305-968-7100, \$99.95), which lets you take ordinary AVI files and convert them to 3-D movies (the kind that need the funny red- and blue-lens glasses); and

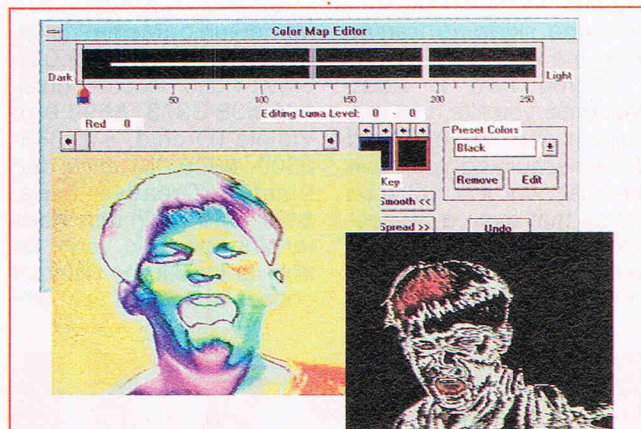
MCS Stereo (Animation Development, 205-591-5715, \$79.95), which lets you add QSound to WAV-format sound files for a true 3-D sound.

Calling Captain Video

Now that you've created a stunning video sequence, what do you do with it? Can you really create the kind of videos that you see on MTV? Currently, you're pretty much restricted to 320 x 240, which is one-fourth of a standard 640 x 480 screen. AuraVision has developed a special chip that can intelligently blow up 320 x 240 videos to full-screen, without the usual big-pixel effect. Orchid's Vidiola line of video capture boards uses this new chip. Hardware-assisted full-screen video is available now, but only in expensive video boards. Look for their prices to fall, providing less expensive boards this year or next.

In the meantime, you can take your video files and embed them into Windows documents with OLE, as well as combine them with other multimedia elements using one of the many new multimedia presentation programs, such as Compel, Action!, Harvard Graphics for Windows, and Astound.

Using OLE, you could write a letter to your sister in Alaska and embed a video clip of your two kids saying, "Wish you were here." Any Windows program that supports OLE can accept an embedded AVI file. Using a presentation program, you could create an interactive training program, a tour of your new business, or a



Studio Magic (Studio Magic, 408-378-3838, \$499.95) combines video capture, output, and special effects in a single card.

The World's First Photorealistic Interactive CD Sci-Fi Adventure



THE JOURNEYMAN PROJECT



6 June 2318, 0651Z.

Attention Temporal Protectorate:

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- **Bronze** -Adult Games

"...the world of interactive gaming is never going to be the same."

Mark Rhodes, Multimedia Editor,
Micropublishing News



Travel through time



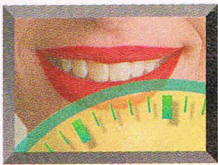
Intense arcade action



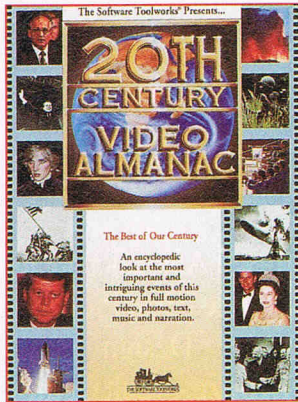
Multi-level challenges

© Copyright 1992, 1993 PrestoStudios, Inc.;
MPC version by Quadra Interactive, Inc.





MULTIMEDIA PC



You can experiment with the video files that come with many CD-ROM applications.

family album including interviews with the eldest members.

One problem: Even with compression, video files can be many megabytes in

Table: Video Playback Performance with the Indeo 3.0 Codec

Processor	640 x 480	320 x 240	160 x 120
486SX/25	1 fps	15 fps	30 fps
486DX/66	10 fps	30 fps	30 fps
Pentium	20 fps	30 fps	30 fps

size, so how do you get that five-megabyte letter to your sister in Alaska? One solution is to use one of the video codecs that let you trade off the degree of compression with the level of quality. Most codecs offer a compressor setting for quality that goes from 0 to 100 percent. It's typically set somewhere between 65 and 85 percent, but you could set it lower and further compress your file. The

other solution would be to optimize the way you send your document. Many backup programs will let you split a large file onto many floppies, or you could send a backup tape to someone who's using the same kind of tape backup system.

At this point, desktop video is still in its infancy. With the initial release of Video for Windows, all you could practically do was

160 x 120 videos. Now, with the improved Video for Windows and QuickTime for Windows codecs, most new PCs can handle 320 x 240 videos, with 640 x 480 videos just around the corner. And with powerful programs such as Adobe Premiere and the soon-to-be-shipping Passport Producer for Windows, the world of PC-based digital video editing is finally opening up to the casual user. □

DESKTOP VIDEO GLOSSARY

AVI. Short for *Audio/Video Interleaved*. The video file format used by Video for Windows.

codec. Short for *compression/decompression*. A driver used by Video for Windows or QuickTime for Windows that compresses and decompresses video files.

compression. The process of reducing the size of a video file either with no loss of quality (lossless) or with some limited loss of quality (lossy). See also **lossy** and **lossless**.

desktop video. Computer-based digital video usually associated with high-end full-screen video production. Much as the term *desktop publishing* is used to describe the ability to cre-

ate, edit, and store text-based documents with a personal computer, *desktop video* is used to describe the ability to record, manipulate, and store video with a personal computer.

fps. Short for *frames per second*. The speed at which a sequence of pictures is played back. Frame rates higher than about 15 fps give the illusion that a series of still pictures is actually a continuously moving image. Standard frame rates include U.S. video at 30 fps, European video at 28 fps, sound film at 24 fps, and silent film at 16 fps to 24 fps.

lossless. A compression method that allows compressed files to be decompressed to their original form with no loss of quality. Because it doesn't sacrifice

quality, a lossless method of compression will generally result in a much larger file than a lossy method of compression. See also **lossy** and **compression**.

lossy. A compression method that compresses files with some limited loss of quality. Because it sacrifices quality, a lossy method of compression will generally result in a much smaller file than a lossless method of compression. See also **lossless** and **compression**.

MOV. Short for *movie*. The video file format used by QuickTime for Windows.

QuickTime for Windows. A set of software programs from Apple that allows Windows to play motion video sequences on a personal computer without

specialized hardware. QuickTime for Windows has its own set of compression/decompression drivers (called codecs), similar to those found in Video for Windows, and plays video files with the MOV extension. See also **codec**, **Video for Windows**, and **MOV**.

Video for Windows. A set of software programs from Microsoft that allows Windows to play motion video sequences on a personal computer without specialized hardware. Video for Windows has its own set of compression/decompression drivers (called codecs), similar to those found in QuickTime for Windows, and plays video files with the AVI extension. See also **codec**, **QuickTime for Windows**, and **AVI**.



Compton's introduces music on CD-ROM. (You may want to upgrade your system.)

Performance video. Personal photos. Exclusive interviews. Digital quality sound. Our music CD-ROMs have arrived.
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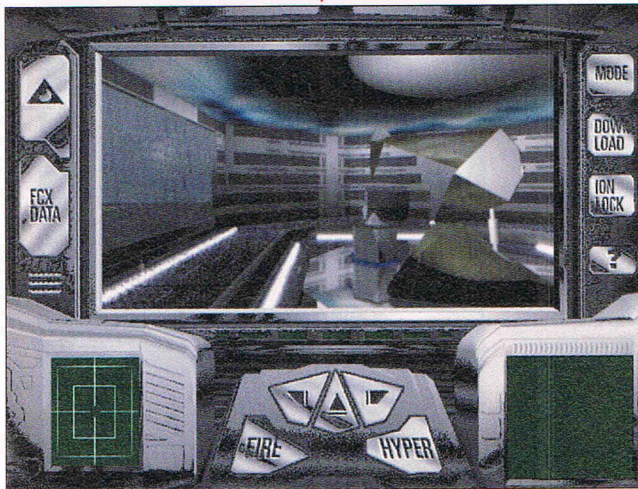
EDITED BY POLLY CILLPAM

Just like the Movies

Calling all science-fiction buffs! The C.H.A.O.S. Continuum is a new CD-ROM science-fiction adventure with an edge. It's the first CD-ROM to use both movie-quality animation and special effects. The techniques used for C.H.A.O.S. are the same techniques that

One of the game's unique features is a random path structure, which triggers a different combination of events each time the game is played.

Creative Multimedia
(503) 241-4351
\$79.99
Circle Reader Service Number 530



The C.H.A.O.S. Continuum from Creative Multimedia

were used to develop the visual effects in *The Abyss*, *Terminator II*, *Batman II*, and *Jurassic Park*.

The game begins in the year 2577, when Titan Colony is being held captive by C.H.A.O.S. (Cybergenetic Holistic Autonomous Orbiting Server). Instead of dramatically boosting the brainpower of the Titan colonists, C.H.A.O.S. has malfunctioned to the point of destroying the colony and trapping its scientist creators in a parallel continuum. The colony's only hope is for the scientists to contact the computer operators—you and me—in the twentieth century, so we can interact with the future, rescue them, and free the colony.

Son of Alien

Game player alert! Dark Seed, winner of the software industry's highest honor, the CODIE Award (for the best fantasy role-playing/adventure game of 1993), is now available in a CD-ROM version.

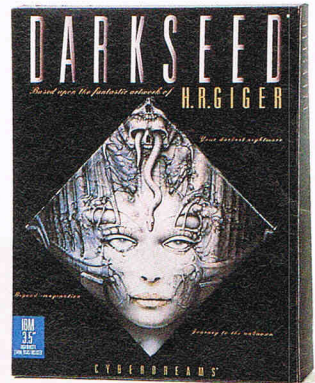
"Dark Seed combines high-resolution, realtime animation within a movie-like story line which features stunning plot twists," says Patrick Ketchum, president and CEO of Cyberdreams. Players can take this game to its maximum potential without taking up hard drive space. There's also the added dimension of digitized speech throughout the game. Cyberdreams is

known for publishing serious science-fiction games where each product is designed, scripted, and storyboarded by gameplay experts and world-famous artists, designers, and writers. One of the artists involved in this project was the famed Swiss surrealist H. R. Giger, winner of an Academy Award for his designs in *Alien*.

Sony Electronic Publishing
(212) 702-6273
\$69.95
Circle Reader Service Number 531

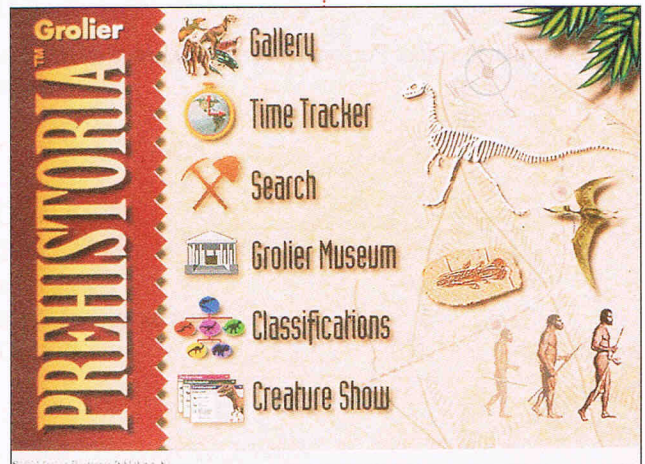
Early Animals

Prehistoria, a new CD-ROM from Grolier Electronic Publishing, is a visual encyclopedia of prehistoric animals. It includes videos, Knowledge Explorer Audio-Visual Essays, pictures, and narrated animations. "Based on content provided by Marshall Editions in the U.K., this multimedia CD-ROM encompasses the evolution of over 600 species of prehistoric animals dating back 500 million years," says David Arganbright, president of Grolier.



Dark Seed on CD-ROM

The program has six graphically oriented entry points allowing you to access a vast amount of information. First, there's the Time Tracker, where you can discover which prehistoric animals and dinosaurs lived during any of the 11 eras in the title. Second, the Grolier Museum lets you explore—through videos, narrated animations, and Knowledge Explorer Audio-Visual Essays—dozens of topics, including fossil studies, a tour of prehistoric earth, prehistoric animal types from birth to extinction, and answers to controversial questions. Third is



Learn about prehistoric animals with Prehistoria.



Altec Lansing's new ACS3 speaker system

the Gallery, where you can use graphical browsing features that group prehistoric animals by similarities. Fourth, the Creature Show allows you to view hundreds of photos and text records at a glance. Full-color pictures, size, location, and zoological classification information are included for all the animals in this segment. Fifth, you have the Classifications, where you can advance through a hierarchy of scientific classifications of the animals. And finally, there's the Search, which features traditional Boolean logic searching.

Grolier Electronic Publishing
(203) 797-3500
\$69.95

Circle Reader Service Number 532

Speak Up

Altec Lansing, a leader in multimedia computer sound, has introduced a new computer speaker system. The ACS3 includes two self-powered, shielded satellite speakers and an amplified subwoofer. The electronically controlled satellite speakers feature a special foldaway design for convenient transporting, making the ACS3 suitable for individual near-field

computer audio, as well as for small-group presentations and multimedia demonstrations.

A unique element of the subwoofer is its extended low-frequency response, which adds drama and bass to multimedia audio. The subwoofer also features a multipath chamber design which enhances sound reproduction.

Altec Lansing
(814) 234-1230
\$200

Circle Reader Service Number 533

Twice the Fun

Procom Technology has announced its PCDS-DS series of affordable, double-speed CD-ROM subsystems. They offer a variety of features for advanced multimedia applications.

The drives provide a low-cost implementation of double-speed technology utilizing AT-bus technology. They include an AT-bus interface card and meet MPC Level 2 standards with support for multisession Photo CDs.

With a 300K-per-second sustained data transfer rate and a 350-millisecond seek time, the Procom drives provide faster access to data and higher video-playback quality than single-speed CD-ROM drives.

The series is available with a 16-bit sound board in both internal and external

configurations. Procom also offers the drive as an MPC upgrade kit, called the Multimedia CD Station, which includes eight premium software titles, a 16-bit sound board, and speakers.

Procom Technology
(714) 852-1000

Prices vary based on configurations and bundling.

Circle Reader Service Number 534

How Low Can You Go?

Here's a sound card that lists for only \$79. AudioBlitz Classic is a full-featured 16-bit sound card that's compatible with the major industry standards, including Sound Blaster, Ad Lib, and Windows Sound System.

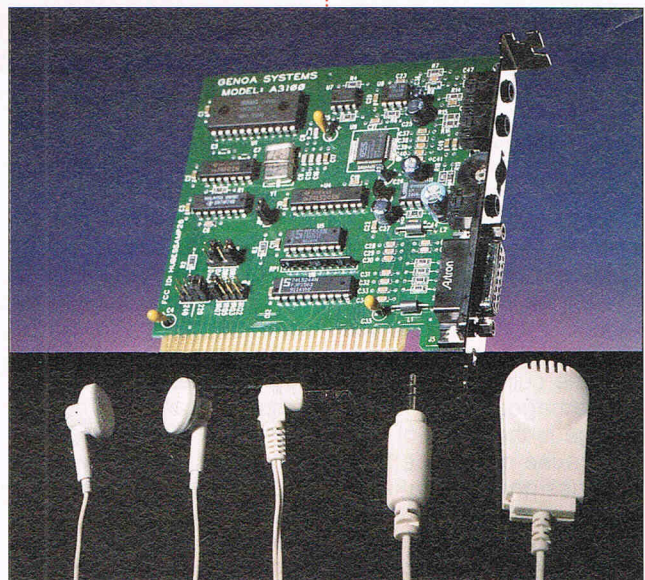
The AudioBlitz Classic model A3100 features recording and playback in both 8- and 16-bit sampling modes. You also have a choice of compression methods (such as PCM and ADPCM) to store sound

files using minimal hard disk space. The card features an FM synthesizer that delivers quality sound with a very low signal-to-noise ratio. In addition, it has a direct line level and microphone input for recording, with output enhanced by an internal four-watt amplifier.

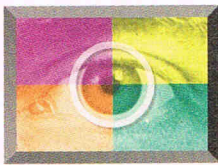
The AudioBlitz Classic is PC-game ready with a joystick port which supports two players. It can also be used as a MIDI interface for recording music directly from keyboards and other electronic instruments. The package includes a microphone, earphones, and a set of software accessories, including Audio Clips Library, Audio Recorder, Audio Reminder, Stopwatch, Time, Talking Calculator, Talking Clock, and Chimes.

Genoa Systems
(408) 432-9090
\$79

Circle Reader Service Number 535



A full-featured 16-bit sound card for just \$79!



MULTIMEDIA SPOTLIGHT

By Scott A. May

THE JOURNEYMAN PROJECT

Explore the past through the eyes of the future in *The Journeyman Project*, a science-fiction adventure from Quadra Interactive. Originally produced for the Macintosh, this award-winning CD-ROM arrives intact for Windows.

The background story is far from original, but intriguing nonetheless. It's the year 2318, and the world has finally found peace. Centuries of senseless hate and destruction are only dark memories now, replaced by the current era of unprecedented social, economic, and political stability. Technology once used for evil now serves the common good, including mankind's inevitable conquest of space. During the colonization of Mars, humans have had their first contact with alien life, a race known as the Cyrollans. The Cyrollans have invited humankind to join the "Symbiotry of Peaceful Beings," a historic alliance of intelligent species.

Unfortunately, not all share in this desire for growth and universal peace. Terrorists have seized the newfound technology of time travel as a means to change the past, thus altering the present and sabotaging earth's potentially bright future. Your job, as an agent of the government's Temporal Protectorate, is to monitor the space-time continuum. If a rift occurs, you must travel back in time to stop the culprits and mend the damage. Because any change in the fabric of time can cause a ripple effect, your assignments take on added urgency.

The game begins on earth's skyborne metropolis of Caldoria. Among your first duties is simply reporting to

work in the top-secret Temporal Security Annex. Along the way you'll make an interesting discovery: The designers of the game, Presto Studios, are absolute fanatics for high-tech gizmos and gadgets. The game is filled with them, and they're incredibly detailed—almost to a fault. Your apartment, for example, is equipped with something called a Hi Rez 4D Environ, a fascinating vision of audiovisual ambiance. Elsewhere, you'll encounter molecular trans-

are far above average. Crisp digitized effects accompany even the most mundane animation, from molecular reconstruction to flushing toilets.

The 3-D ray-traced graphics are exceptionally rendered, enhanced with spot animation and more than 30 minutes of QuickTime for Windows full-motion video. A bitmapped screen overlay—designed to emulate your character's cranial "BioTech Implant"—serves multiple functions, including main view

may indeed wander freely throughout this virtual world, but don't expect to win the game that way. On the other hand, most puzzles and predicaments do offer more than one solution—usually including a peaceful (preferred) and a violent solution—giving the game a fair degree of replay value. Most of the puzzles are of easy-to-medium difficulty, suitable for all levels of players.

Ironically, time is the game's biggest drawback, a problem exemplified by the unusually long initial loading sequence, which takes nearly four minutes to arrive at the main menu. More delays occur at almost every turn—simply walking down a corridor can prove to be an aggravating experience. Movement unfolds at a snail's pace, in single steps, pausing the action each time to update the screen. Each step also produces a momentary break in the background music or sound effects. The results are disappointingly choppy, even on a fast 80486-based machine. Because the game runs completely from CD-ROM, a double-speed CD-ROM drive helps, but it doesn't eliminate this undesirable time lag. It's a curious problem, especially considering the game's 8MB RAM requirement, and it has a negative impact on an otherwise cutting-edge game.

They say good things come to those who wait. The *Journeyman Project* puts this adage to the test with technical problems that could easily spoil a lesser game's fun.

Quadra Interactive
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Repair rips in time with *The Journeyman Project*.

porters, security checks, and particle acceleration (time travel) that literally swims with prolonged futuristic theatrics.

Sound also plays an important role in the game's overall mood. Digitized speech flavors much of the script, including professional actors such as Graham Jarvis, featured on "Star Trek: The Next Generation." Haunting New Age tunes drift lazily in the background during transitional scenes, but as the action heats up, so does the soundtrack. The musical compositions—featuring all original tunes—and technical quality

window, inventory, compass, energy level indicator, movement controls, and game save and resume options. Here, you can access BioChips that you find along the way, letting you perform the special tasks necessary to complete the game.

Gameplay is nicely varied, including dozens of logical puzzles and several sequences of simulated arcade-style action. Although the publisher claims that the plot is nonlinear, items found in certain time zones must be collected if you're to succeed in subsequent travels. You

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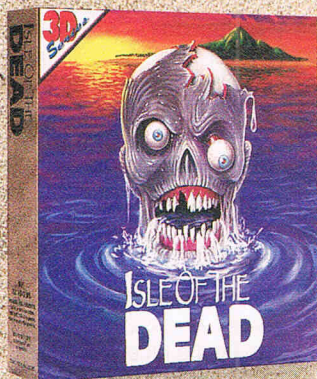
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PRODUCTIVITY CHOICE

Power and flexibility are yours when you log on with this easy-to-use Windows terminal program.

Denny Atkin

QMODEM PRO FOR WINDOWS

Whether you want to explore your local BBS or start surfing the Internet, you won't find a much smoother vehicle for your cyberspace journeys than QmodemPro for Windows. Mustang Software has taken a powerhouse terminal program and wrapped it in an inviting Windows covering, making for one of the best combinations since Reese's covered peanut butter with chocolate.

The original Qmodem was a classic shareware terminal program for DOS. It matured into one of the best PC communications programs available, growing powerful without getting too complex. A couple of years ago, the program was purchased by Mustang Software, publishers of the Wildcat! BBS, and enhanced and re-released as QmodemPro, a commercial terminal program. (Mustang still allows the older Qmodem 4.x versions to be freely distributed as "tryware" for its enhanced commercial offerings.)

QmodemPro for Windows is built on the foundation of its mature DOS ancestor, but it's not a DOS program with a Windows interface carelessly slapped over it; it feels like a Windows program through and through. A well-considered user interface, smooth multitasking capabilities, icon-based dialing capabilities, and drag-and-drop integration with the Windows File Manager make this follow-on superior to its predecessor.

The program has a full set of features for the professional user who needs to log on to corporate mainframes, including Kermit transfer protocol; full emulation of terminals



such as Data General, Hazeltine, Televideo, and DEC VT; and support for using networked modems. But unlike many other commercial terminal programs, QmodemPro provides a complete suite of features for BBS users as well.

Perhaps the best of these is support for RIPscrip, a graphical terminal emulation supported by many BBSs which provides mouse support for menu selections and displays 640 x 350 graphics in 16 colors. Navigating a BBS that has full RIPscrip support is a snap and is a much more visually interesting experience. Other terminal emulations, such as standard IBM ANSI, work flawlessly and provide a number of configuration options such as font and window size. A split-screen option is handy for use in live online chat sessions. My only complaint is that the font size isn't adjustable in RIPscrip, so characters are awfully small on a 1024 x 768 Windows screen.

Transfer protocols include XMODEM (standard, CRC, and 1K variants), YMODEM (standard and -G), ZMODEM, Kermit, ASCII, and CompuServe B+. Options can be adjusted

for each protocol when appropriate, such as 16- or 32-bit CRCs for ZMODEM, and whether to autostart downloads with protocols that support that feature. Protocol transfers were very solid, with no errors encountered on fast V.32bis downloads while multitasking.

An example of the superb integration of QmodemPro into the Windows environment is the ability to drag and drop files from the Windows File Manager into the upload selection dialog box—file selection has never been easier than this.

One nice feature is the ability to view GIF images as they're being downloaded. The GIF viewer supports multiple Zoom levels, printing images, copying them to the system clipboard, and slide-show-style display of multiple images. A file viewer shows files in hexadecimal or ASCII formats, and there's a nice built-in text editor with search and replace, auto-indent, and word-wrap.

QmodemPro has one of the best phone books I've seen in a terminal program; it's packed with features, but it's not overly complex. There are three interfaces for selecting numbers to dial: a traditional

text listing of numbers, an icon-based listing that looks just like a Windows program group, and a combination view which places icons next to the text listing. There's a search function that makes finding a BBS in a long list easier. You can also group any set of entries and then perform an operation on that group. For instance, you could create a group and give it the name *Local BBS numbers*; then you could have the program dial each of those numbers until it connects with one. Each listing in the phone book contains entries for the phone number, device, user ID, notes, emulation, default script to run upon connection, macro key settings, protocol, time and date of last connection, and the number of times you've called. A nice touch is that, as you scroll left and right to view all of these entries, the name of the BBS doesn't scroll from column 1, so you always know which BBS entry you're viewing. If you're upgrading from a DOS terminal program, QmodemPro for Windows will convert Qmodem and QmodemPro for DOS, Procomm Plus 1.1 and 2.0 for DOS, Telix, and Boyan phone books.

You won't find yourself hurting for programmable function keys when using this program. You can program any of 44 keys on the keyboard to perform up to four different functions (normal, Shift, Ctrl, and Shift-Ctrl). There are also ten buttons at the bottom of the terminal window corresponding to the number keys at the top of the main keyboard; each button/key can have up to four programmable functions depending upon which of various combinations of the Alt, Shift, and Ctrl keys are pressed.

That's a total of 216 programmable key combinations, although the 40 provided by the number keys should be plenty for most folks.

You can customize the look of the QmodemPro window, changing the pattern behind the desktop or replacing it with BMP wallpaper. You can also choose to have WAV sounds play when certain operations are complete.

It's easy to review or store your online sessions, thanks to QmodemPro's scroll-back buffer. The contents of the scroll-back buffer, or just the data currently on the screen, can be sent to the system clipboard, a text file, the current capture file, or the printer. You can also copy selected text to or paste it from the system clipboard.

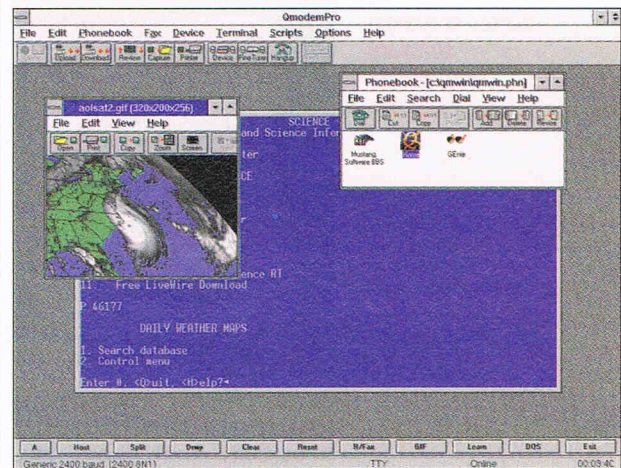
Send- and receive-fax capabilities are built into QmodemPro—rather unusual features for this kind of program. It can send ASCII text files and PCX or BMP graphic files as faxes, complete with a configurable cover sheet. Received faxes can be viewed onscreen or printed, and saved individually for later recall. Fax functionality is fairly limited in this release, though—there's no way to schedule faxes for later sending, and a printer driver isn't included for sending formatted faxes from application software such as Word for Windows. Mustang says it will beef up fax support with a printer driver in a future upgrade.

QmodemPro for Windows has a very complete scripting language called SLIQ. It's actually a structured version of BASIC with telecommunications commands added, so experienced BASIC programmers will find it very easy to pick up. This is a powerful language, and one of the modifi-

able sample scripts is a basic BBS-style host mode that you can use to let others call your computer and leave messages or transfer files. SLIQ is documented in a very complete 236-page reference manual.

The 302-page user guide for QmodemPro is superb. It makes no assumptions of any user knowledge of telecommunications, and it goes beyond the call of duty by not only walking you through your first BBS log-on, but also explaining con-

IBM PC or compatible (80386 compatible), 4MB RAM, Windows 3.1, 3½-inch high-density floppy drive, mouse, modem; supports



cepts like ZIP compression. Kudos to Mustang for providing documentation that's complete, easy to read, and occasionally even witty. If you do encounter a problem not covered in the manual, Mustang provides support on its own BBS and on CompuServe, GEnie, and AOL; there's also a toll-call tech support line.

Best of all, QmodemPro for Windows is one of the most solid 1.0 releases I've ever used. In all my testing, I haven't encountered a single bug or crash. If you want to get online, QmodemPro for Windows makes it as easy as loading up and logging on. □

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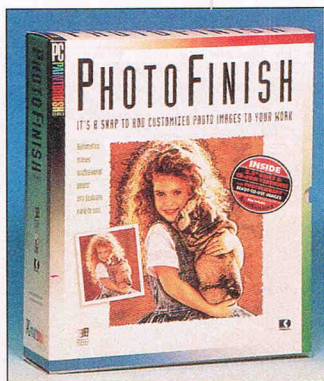
ART WORKS

Robert Bixby

MILK YOUR FONTS

Some say that the Macintosh was the advance that brought power publishing to the masses. Some say it was the laser printer. I say it was font technology that made the biggest difference. Desktop publishing existed long before the Mac or the laser printer, but it was dreadful stuff, usually using typewritten or daisywheel-printed pages as the proofs. Font technology was responsible for the most visible change in the appearance of the printed page—the thing

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that made people with an eye for beautiful printing see the possibility that they, too, could create totally outrageous pages.

First, fonts became standard: Palatino, Times New Roman, Helvetica, and others. Then fonts became beautiful and plentiful. Now, frankly, fonts are getting silly. Altsys (269 West Renner Parkway, Richardson, Texas 75080) has released Font-o-matic, a font "dehancer" that imposes special designs on TrueType and Adobe fonts, such as Holstein cow spots (in fact, for a logo Altsys has adopted a cow saying, "Milk your fonts for all they're worth," which it milks to death), cactus spikes, a shattered appearance, and so forth (15 in all). These special designs can be mixed and

matched for billions of combinations (I estimate that there are 1,307,674,368,000 in all, multiplied by dozens of fine-tunings for each effect).

When you make a change, you can save your font to disk or (to conserve time) save only a snippet of text or some part of a font, such as capitals, lowercase letters, numbers, punctuation, or symbols. Then you can share your custom-designed fonts with your friends and coworkers.

Font-o-matic comes with 14 Adobe Type 1 PostScript fonts. Altsys hints that additional font dehancers may be in the works, in case this product is a success.

Altsys is treating Font-o-matic as an entry-level font-editing program, hoping that when people discover how much fun font editing can be, they'll move up to Fontographer, another Altsys product.

Two programs that I've been using lately have given me a lot of pleasure; they're easy to use, and they have very powerful effects. The first is PhotoFinish from Softkey (formerly WordStar International; 201 Alameda del Prado, Novato, California 94949). You might recall that PhotoFinish was a ZSoft product. WordStar purchased ZSoft, and Softkey purchased WordStar. The program offers all of the darkroom power of CorelPHOTO-PAINT! (which is based on an earlier version of PhotoFinish), but the interface designers have had a couple of extra years to think of ways to make the interaction more fluid. The principal change is that instead of choosing an effect and then making settings in a dialog box, you're presented with a screenful of examples to show the effect of various settings on the current picture. Creating the examples also takes a lot of processor time, so unless you

have at least a 486DX2/50, you might become impatient with this feature (it can be turned off). Other additions to the program include AutoEnhance, which scans, crops, straightens, sharpens, and enhances images in a single step; real media brushes, which give the genuine look and feel of oil paint, crayons, markers, and more; and pressure-sensitive tablet support.

The second program is HSC Digital MORPH from HSC Software (1661 Lincoln Boulevard, Santa Monica, California 90404). Digital MORPH allows you to morph any paint file into any other paint file. You can control what part of the first graphic is morphed and into which part of the second graphic it is morphed. If you don't take rigid control over this, the morph will resemble a lap dissolve, a film technique that causes scenes to blur, one into the next. You can save the morph as a series of still images and then animate them in a movie.

But Digital MORPH doesn't stop there. You can also warp an image—distort it by dragging the control points of an overlaid grid. Warping images is enormous fun.

Neither of these programs takes more than a few minutes to learn, and each of them puts enormous graphical power into your hands.

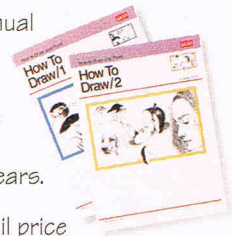
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THE TORTOISE AND THE HARE

Buyer, beware! That's the rule when you go shopping for multimedia CD-ROM titles, as with all other software. The quality of CD-ROM titles varies from mediocre to sensational. Make a bad choice, and you'll end up with a disc the kids would rather use as a Play-Doh mold than use with the computer. Thankfully, there's one series of CD-ROM titles you can trust: Living Books, from Brøderbund. Buy one of these products, and both you and your kids are guaranteed hours of rewarding computer fun.

Living Books are not only electronic storytellers but full multimedia experiences featuring nearly cartoon-quality animation, original music, professional actors, and a heaping helping of wit and cleverness. The latest offering, *The Tortoise and the Hare*, is exceptionally entertaining and rewarding. It comes with demos of the other three titles in the series (*Just Grandma and Me*, *Arthur's Teacher Trouble*, and *The New Kid on the Block*), so you can see and experiment with the first page of each book, in case it hasn't made it into your library yet.

When you run *The Tortoise and the Hare*, the two main characters appear on the screen and introduce themselves. The hare relays a somewhat biased summary of the famous race before zipping off the screen. The tortoise sticks around, however, to guide you through the program, promising that if you follow his instructions, he'll see that you get to hear the real story. He begins by pointing



to the onscreen controls and explaining what each one does. These verbal clues enable even very young children to get the most out of the Living Book.

The options on the main screen include Read to Me, Let Me Play, Options, and Quit. If you select the Read to Me option, you're presented with an animated, cover-to-cover reading of the storybook. On each page, the program highlights the story's words as the digitized voice reads—a great aid for young readers who are polishing their reading skills. The narrator, a bird named Simon, appears on every page and reads the text. It's almost as if Simon is observing the story as it happens, an element that adds an immediacy to the tale that children take to like kittens to catnip.

Movielike sequences interspersed throughout the reading bring the story to life. For example, in the first scene, Simon introduces the tortoise, who yawns and strolls from his house and plops down on a bench to watch the world

go by. When Simon introduces the hare, the hare zips from his house, rushes behind a tree to brush his teeth, hustles across the street to criticize the tortoise for his slowness, and then streaks down the road and out of sight.

In another scene, the hare stops in a garden, where he gorges on vegetables, munching and slobbering as if he's starving. After downing the contents of a basket, he belches and gives Simon a triumphant grin. Of course, with every stop the hare makes—especially the long snooze he takes after his hefty meal—the tortoise catches up more and more. At the end of the race, the hare dashes for the finish line, but he's seconds too late.

When you choose the Let Me Play option, the book not only reads each page to you—complete with the cartoon sequences—but also allows you to play with the items on the screen before moving on to the next page. Click on a flock of birds, for instance, and they break into a perfectly harmonized cappel-

la version of a favorite oldie. Other fun sequences include a chimney that blows its lid with a giant puff of smoke, a mailbox that spits a letter at a snoring mailbox across the street, a young frog that does a painful belly flop into a pond, a fox that buries his snout in a box of popcorn, a muskrat that plays some snazzy bluegrass on his banjo, and much, much more. There are dozens of objects with which to experiment; virtually every item on the screen will do something.

Each page's text is also interactive, allowing you to click on words in order to hear the words spoken. Children can click on the words in any order, so they can build sentences or just add new words to their reading vocabulary. Add the fact that the program can be switched between English and Spanish, and you have a fascinating environment in which children can learn about words and the way they fit together to form sentences. Although children may not understand the Spanish version of the story (or vice versa if their native language is Spanish), they'll nonetheless enjoy hearing the story in a different language, as well as seeing how one language's words relate to another's.

Choose the Options button, and you move to the option screen, where you can choose a particular page in which to play, view the program's credits, or see previews of upcoming Living Books titles. As always, the tortoise is there to guide you in making your selections, describing how to use the arrow buttons to choose a specific page. Even the credits are a delight to watch, featuring sev-

eral zany characters—including a juggling office worker, an incompetent wizard, and a goofy dragon—in entertaining animated sequences.

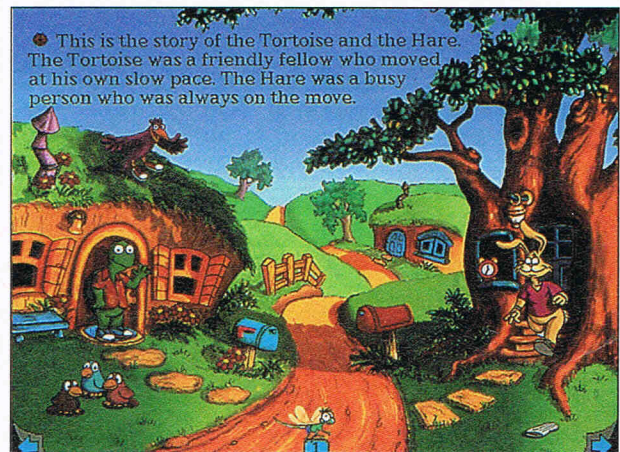
Of course, nothing can quite match the contentment children and adults share when they snuggle up and read a book aloud. So that you can take advantage of this more conventional form of storytelling, The Tortoise and the Hare package includes a fully illustrated, hardcopy book version of the story that almost exactly follows the on-screen version. For the times when you're unavailable to read, your child can follow the story in the book as it's being read on the computer—although it will be tough to ignore the action on the screen!

Like the other books in the Living Books series, The Tortoise and the Hare boasts expertly rendered 256-color Super VGA graphics. The nearly cartoon-quality animation sequences are the state of the art, and they're as fascinating to watch as they are integral to the story. A variety of digital voices (performed by over two dozen actors) and sound effects further enhance the multimedia experience, bringing the tortoise and the hare's contest to life. The majority of the sound is entertaining music, but you'll also get to hear fires crackle, telephones ring, water splash, crowds cheer, birds chirp, doors creak, doorbells chime, and many other realistic sound effects. All the original musical compositions are expertly performed by a six-piece jazz combo and a quartet of singers. The music is absolutely terrific.

The Tortoise and the Hare is as close to perfect as a

piece of software is likely to be. In spite of its reliance on Windows' complicated multimedia extensions, it performed flawlessly on my system the first time I ran it. To run the program, all you must do is put the disc in your CD-ROM drive and click on The Tortoise and the Hare's executable file. You can also install the program in one of your Windows program groups, making it even easier to run. To get the most out of The Tortoise and the Hare, though, you do need a machine that complies with the multimedia

IBM PC or compatible (80386SX compatible), 4MB RAM, Super VGA, CD-ROM drive, mouse, Windows 3.1; supports Sound Blaster, Sound Blaster Pro,



standard. This means an 80386SX or faster processor with Windows 3.1, a CD-ROM drive, a sound card, a Super VGA monitor, and four megabytes of RAM.

A wonderful new item on the long list of excellent Brøderbund titles, The Tortoise and the Hare is a delightful addition to the Living Books series. Once you get started, both you and your child will have a tough time pulling yourselves away from this engaging performance of a venerable classic. □

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GAME INSIDER

Peter Olafson

UP AND COMING

It looks like Tsunami is going to make waves this year. Ring-world II, which continues the exploration of Larry Niven's vast ribbonlike world, will permit control of individual characters. It's also expected to be two to three times larger than the first game, with more challenging puzzles. Also coming is Protostar II, a sequel to the Starflight-like RPG, which adds 3-D sequences.

Perhaps most intriguing is an untitled project, still in its early programming stages, that will permit you to use SimCity 2000 saved-game files to generate 3-D cities—cities which will continue to develop—which you'll navigate (and presumably reduce to smoldering rubble) from the catbird's seat of a giant robot. This action-

and Syndicate), created for Electronic Arts. You put down the attractions, build the little roads leading up to them, and set the prices. You also get to design roller coasters (complete with loops) and hope they stay on the tracks.

Wondering how Sierra's going to top Outpost CD, its new SimCity-in-space spectacular? Possibly with Phantasmagoria. It's still in the early stages of development, and only a few screens from Roberta Williams's in-development horror game were on display at the recent CES, but they looked promising in a larger-than-life way. This game will feature live actors chatting in gorgeous hand-drawn settings. Sierra's also hard at work on King's Quest VII.

The rush is on to hop on the 3-D bandwagon pioneered by Wolfenstein 3-D and Doom. If Bethesda's Rampage, Origin's Shadowcaster, and Apogee's Blake Stone haven't given you enough long hallways filled with interesting wall tiles to explore, look for Capstone's Corridor 7: Alien Invasion (what? a Capstone title not licensed from a TV show or movie?) real soon now, and Rescue 911 (ah, I knew it was just a fluke!) later in the year. They're both built using a variation on the original Wolfenstein engine. While Corridor 7 doesn't have the sharp, clean look of some of its 3-D competitors, the company has the basic playability and shock value down pat.

In the works. Freelancer is coming soon from England's Imagetec (The Humans, Daemonsgate, and the forthcoming Raiden and Evolution). The game sports detailed, Doom-like graphics and a seamless movielike intro animation by Tobias Richter, whom Amiga owners will remember for his splendid "Star Trek" animations. This game

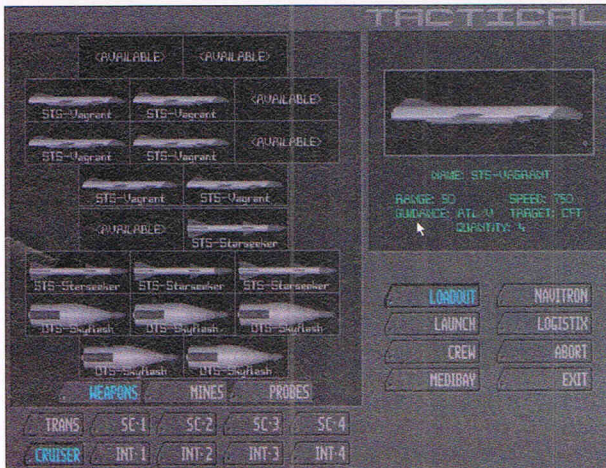
features computer-controlled characters who aren't simple cannon fodder and who have agendas that do not coincide with yours. (In other words, you're going to have to race to beat them to the punch.) The opponents aren't drawn, but filmed, and they move through the game at 25 frames per second.

The news hasn't been good for what looked like a promising entry in the Ultima Underworld school of free-scrolling RPGs. Twin Dolphin Games' Forgotten Castles, which looked dazzling at its unveiling at last summer's CES, has run into the computer-game equivalent of the tuna net. The EA affiliate was to have delivered the game last November, but delays in finishing the 3-D engine and interface ultimately led to the withdrawal of the company's main investor in late October. Matters were further complicated by the departure of the game's chief engineer in early December, according to president Steve Ruzsak. Twin Dolphin Games itself probably won't last beyond the summer, but there are other fish in the sea, and Ruzsak reckons Forgotten Castles—which is 60 to 70 percent complete—may yet surface. Both it and the 3-D engine are for sale as a package, and he's optimistic the company will find a buyer.

Back on track is Battlecruiser 3000, which was originally slated for release last year by Three-Sixty Pacific. The developer, Mission Studios (which will also be bringing out Jetfighter III), has since hooked up with Interplay for distribution, and BC3K should be out by the time you read this. A company representative at Winter CES described the game as "Wing Commander, with Falcon 3.0, some resource management, and a little adventure mixed in." □



Battlecruiser 3000 combines outer-space action, resource management, and more than a few adventure elements.



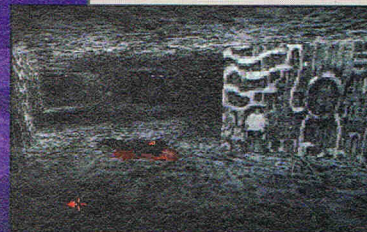
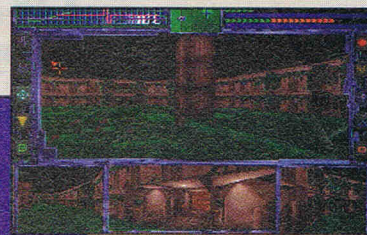
packed simulation will use particle animation (which is to say that shards from exploding objects don't all behave in the same fashion) and so-called voodoo physics (which dictates that heavy and light robots will maneuver differently). The game is slated for release late in the year.

Other themes. Theme Park is the newest sim from England's Bullfrog (the group behind Populous, PowerMonger,

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ENTERTAINMENT CHOICE

Make use of future technology to control the terrain and go underground in the city you create in this detailed, realistic simulation.

Jason Rich

SIMCITY 2000

Finally! It's here. The sequel to the immensely popular SimCity is now on the market. And no bones about it—SimCity 2000 lives up to all the hype. Now you can control the terrain of your cities and even go underground. And when you enter the year 2000, you suddenly have huge populations to consider and new technology to experiment with. Incredibly realistic and fluid, SimCity 2000 doesn't disappoint.

The original SimCity introduced the concept of a software toy, an entertainment package with few predefined objectives and no winner or loser. Released by Maxis in 1989, SimCity lets us experiment and use our imaginations without having to be competitive or expert.

Since SimCity's release, computer technology has taken off, and SimCity 2000 takes advantage of these developments. Far more detailed and advanced in its execution, it provides an unbelievably realistic experience. To create this sequel, Maxis gathered and implemented four years' worth of customer suggestions to ensure that SimCity 2000 would provide a satisfying entertainment experience. You won't be disappointed: SimCity 2000 combines elements of a complex role-playing game, a graphics-based strategy game, and a challenging, fast-paced puzzle to give you unlimited hours of fun.

In SimCity 2000, you're the leader of a city that you must design, build, and manage. It's your job to create and provide your populace with homes, offices, factories, and



all city services, including police and fire departments, electricity, plumbing, mass transit, an educational system, and recreational facilities.

One of the many new features in SimCity 2000 is your total control over the terrain upon which a city is built. The main City screen is made up of tiny square tiles, each appropriately equivalent to one acre of land. Using the built-in Terrain Editor (before the simulation actually begins), you can design the terrain by adding mountains, hills, rivers, and oceans. These options are fun to experiment with—a mountain can be up to 32 tiles high.

You'll also appreciate the Underground Level, a new feature that gives you access to the land under your city. Here, you can build things like a plumbing system and a subway system.

Once the simulation actually begins, you'll be looking at a blank City screen. Your first task is to begin creating and placing residential, commercial, and industrial zones. You

must decide if you want the buildings within each zone to be spread out or placed closely together. When working with residential zones, for instance, you can create a light residential zone, resulting in a community made up of single-family homes, or a dense residential zone, meaning that apartment buildings and condominiums will be built. Based on the location of the zone and the types of services available, the value of the real estate will be determined, and high-, middle-, and low-income areas of your city will be delineated. As you'll quickly discover, the placement of each zone has a major impact on the overall growth potential and success of your city.

Unlike in the original game, these zones are literally painted on the City screen, so it's quite easy to create zones that spread out over many tiles. When electricity is added to each zone, buildings and other structures are

automatically built; however, you're responsible for providing all city services. Using the Query icon, you can get a closeup of any tile and see the dozens of different types of buildings and structures which are created within the various zones.

The zones must be connected with roads so that the population can easily travel by car throughout the city. Your transit system can include highways, bridges, on and off ramps, tunnels (through mountains), bus depots, a railroad system, and a subway system.

Great attention has been paid to detail and realism in SimCity 2000. The graphics are rich in detail, and if you have a sound board, you'll enjoy digitized sound effects. Another detail that makes the game lush is that nearly every decision you make has short- and long-term ramifications. At all times, you must consider every aspect of life in your city, paying careful attention to financial concerns while attempting to provide the citizens with all of the necessary services and continuing steady growth.

Included with the package is a series of scenarios which provide you with specific goals to achieve. During a normal simulation, however, there are no predetermined goals, which means you must continue to expand, experiment, and help your city evolve. As time passes, new inventions are created, offering you additional tools for managing your city. Based on your success, various rewards are made available each time a city reaches a certain population level. When a population exceeds 120,000 (after the year 2000), you can build

Archologies, which are self-contained cities within cities. Archologies allow a city's population to expand into the millions over time.

The superior graphics and digitized sound effects are blended with an easy-to-learn user interface made up of icons, pull-down menus, and pop-up windows. From the beginning, everything you do on the City screen involves the use of commands and features available from the toolbar (made up of graphic-based command icons) and pull-down menus (found at the top of the City screen). Using the mouse, you can quickly activate any of the icon-based commands from the toolbar or click and hold down the mouse button on an icon to reveal submenus, which provide additional options.

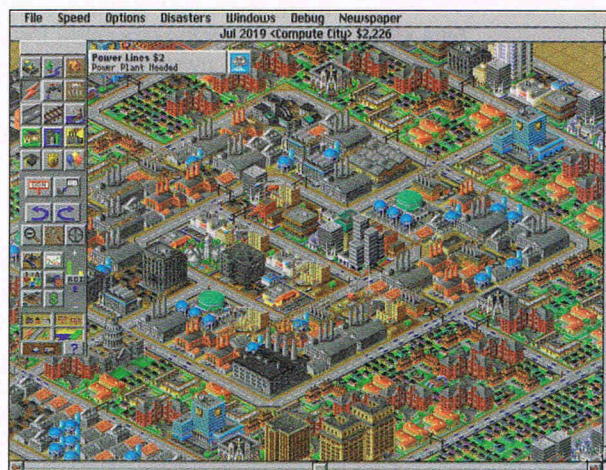
The simulation becomes increasingly more complex as you become acquainted with the package's many options and features. In addition to overseeing the design of cities, you must also manage and maintain them. This involves using the Budget window and City Ordinances window (along with their various subscreens) to collect taxes and manage the cities' finances. Thus, you have to develop short- and long-term strategies as well as constantly look at the overall picture before you make specific decisions.

To add a touch of challenge and excitement, you can set various disasters to occur randomly or at your command. Disasters include everything from nuclear meltdowns to alien invasions and will truly test your city's design, since the police and fire departments, medical facilities, and

military will be put into action.

SimCity 2000 offers three overall levels of difficulty. At the easiest level, you're provided with \$20,000, and you can choose in what year to begin: 1900, 1950, 2000, or 2050. The later the year, the more technologically advanced the city will be. The harder levels give you less money at the start of the game, and there's a greater chance that natural disasters will occur.

IBM PC or compatible (80386 compatible), 4MB RAM, 256-color extended VGA (with 640 × 480 resolution), hard drive with 3.5MB free, mouse;



A great aspect of SimCity—both the original and 2000—is that you can save your cities and trade them with other SimCity players. All of the popular online services offer Maxis support areas where cities are available for downloading. This increases the playability and enjoyment of the simulation even further.

SimCity 2000 offers a truly exceptional and unique entertainment experience. It seemed to be a long time in coming, but it's definitely worth the wait. You have never enjoyed playing God more than you will with this outstanding simulation. □

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GAMEPLAY

Denny Atkin

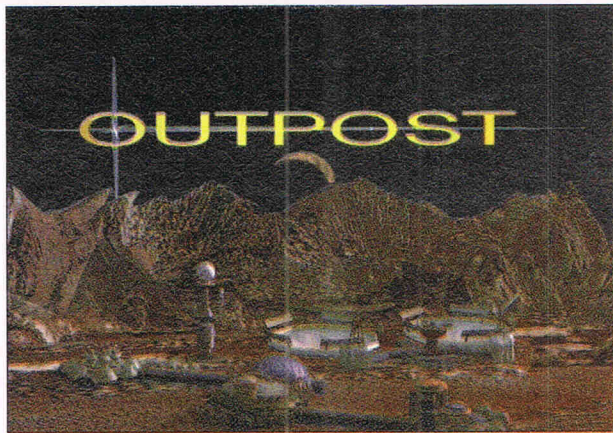
TIE ONE ON

When you and your friends played cops and robbers as kids, did you always want to be a robber? If so, you've got the right mind-set for LucasArts' new space combat simulator, TIE Fighter. In this sequel to the successful X-Wing, you're flying with the Imperial Navy (the bad guys), out to quash the Rebel Alliance's quest for freedom.

The basic structure of the game is similar to that of X-Wing: You fly a series of missions that are part of a larger campaign. But TIE Fighter is more than just X-Wing with you flying for the other side. Designers Lawrence Holland and Edward Kilham have made the simulator look very



Take off in TFX, or colonize space in Outpost CD.



realistic through the use of great-looking Gouraud-shaded spacecraft. My biggest complaint with X-Wing, the linearity of the battles (I often felt like I was playing Lemmings in space), has been addressed, and you can now review briefings from your ship's cockpit.

There are six ships to fly in this one: the TIE fighter, TIE bomber, TIE interceptor, Assault Gunboat, TIE Advanced starfighter, and a mysterious secret TIE craft. The early version I previewed for this column had only the regular TIE

fighter, but a few missions in that showed me that this is a very different game from its predecessor. The TIE is quite maneuverable, but with no shields, new strategies are definitely called for.

Stellar Outpost. If your interstellar interests are more grounded in the realistic than the fanciful, you'll want to be sure to check out Sierra's Outpost CD. This Windows game puts you in command of a colonization ship that holds the last remnants of humanity, searching for a new world after the earth has been destroyed. The game was created by Bruce Balfour, a former NASA employee, and is based upon NASA research in future space projects and on planetary science and theories of interstellar spacecraft design. No warp engines or hyperspace here—you've got to deal with reality.

The animated sequences that introduce the scenario and that segue between portions of the game are among the most impressive I've ever seen on a personal computer. The SVGA animations will likely inspire the same sort of awe that *2001: A Space Odyssey* brought to audiences decades ago.

You start the game by deciding which planet you're going to attempt to colonize and by outfitting your expedition accordingly. After choosing a spot to land on, you must establish a self-supporting colony and use research and manufacturing to expand it. The actual gameplay is reminiscent of that in *SimCity 2000* and *Wesson's Moonbase*, but building a self-sufficient city on a hostile alien planet requires unique strategies. For instance, you'll very likely build most of your colony underground, so you end up keeping track of a multilevel outpost. Space exploration ad-

vocates and environmental simulation fans will likely lose themselves for hours in this challenging, fascinating simulation.

Walk on the Ocean. As I was wrapping up this column, I received two European releases from Ocean that you'll want to be sure to check out; the domestic versions will be available by the time you read this. As a flight simulator fanatic, I've found it difficult to pull my head out of the cockpit of TFX: Tactical Fighter Experiment long enough to finish this column. You'll fly the F-117A Stealth Fighter, the F-22, and the Eurofighter 2000 on missions in Bosnia, Somalia, Libya, and Columbia as part of a UN tactical force. The graphics in this simulation are outstanding, both in performance and detail. The smooth movements as you change your view give the game a "you are there" feel—if you look to the side, the view pans, rather than jumping. I've never seen clouds so realistic in a computer game, and the planes look fantastic. The simulation is no slouch, with good flight modeling and intelligent enemy tactics. Falling between the ultra-realism of *Falcon 3* and the arcade action of *Strike Commander*, this game should appeal to most PC pilots.

Also new from Ocean is *Jurassic Park*. Following the film's story line, you must round up the kids, escape the nasty dinos, and get off the island alive. Unlike the spectacular TFX, *Jurassic Park* is a mixed bag. The game is worth playing just for the fantastic Doom-like texture-mapped corridor scenes where you must evade the 3-D-rendered *T. rex*, velociraptors, and dilophosaurs, but the tedious overhead-view treks around the compound that are interspersed with the breathtaking 3-D segments feel like a dull 8-bit Nintendo game. □

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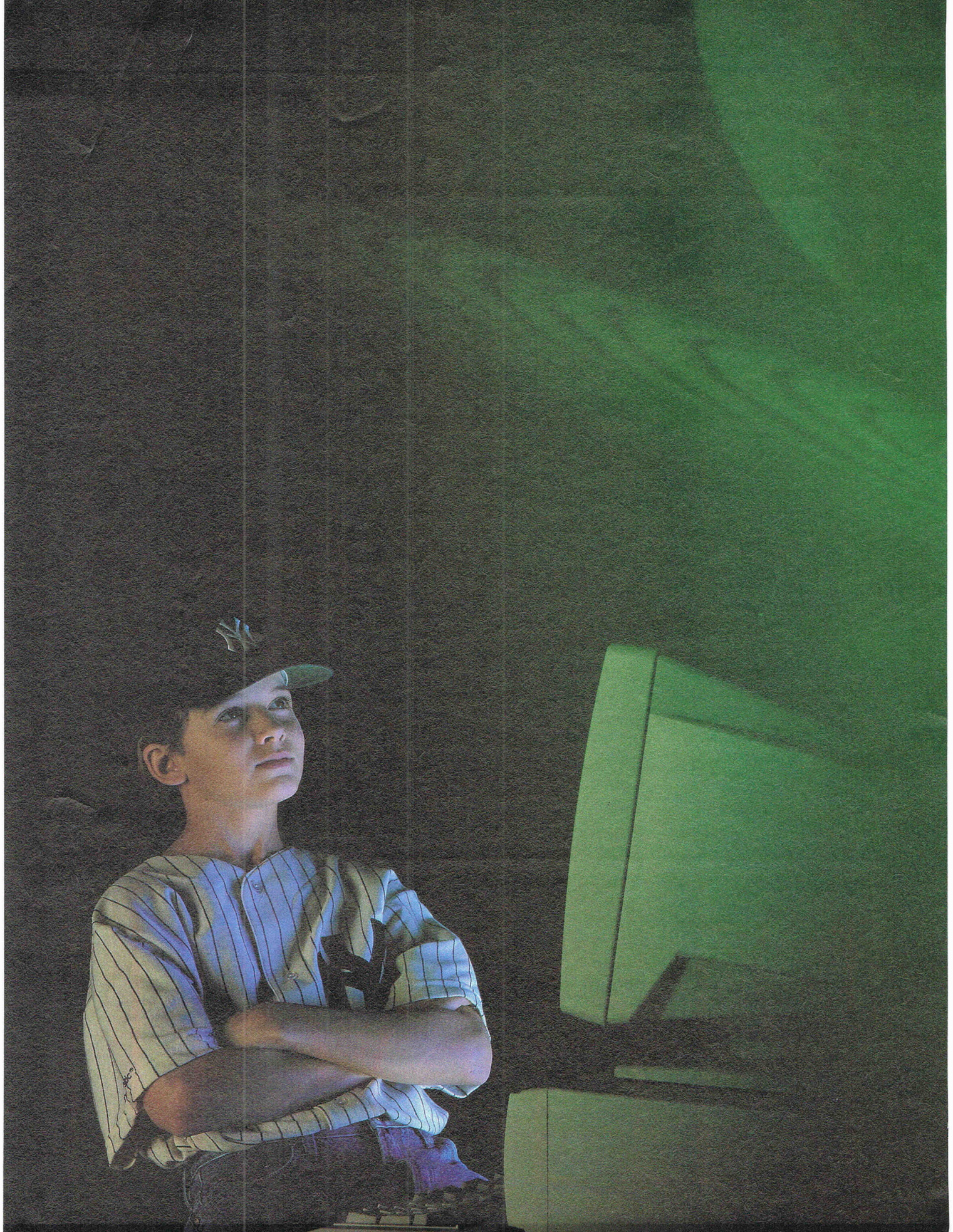
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Circle Reader Service Number 157



New programs targeted at kids make writing fun while helping them develop creative skills.

Write On, Kids

Writing can strike fear in the hearts of children and parents alike. A blank paper or computer screen can be intimidating. It doesn't have to be that way, though. With two new Windows-based programs—Creative Writer from Microsoft and Student Writing Center from The Learning Company—writing can be more manageable, more creative, and more fun.

These programs work their wonders by meeting specific needs of children, such as friendly interfaces, a focus on the kinds of writing children engage in, and an emphasis on the process of writing, not just the end product.

Usability

No matter how many features a program has, if they're too hard to use, they're not worthwhile. To make its software as usable as possible, Microsoft has created a fairly unconventional interface full of friendly characters, zany art, and fun sounds, all designed to foster creativity and make exploring and skill building more interesting. (Microsoft also sells Fine Artist, a paint program for kids which sports a similar interface.)

McZee, the creative spark of Imaginopolis, introduces kids to his friends Max and Maggie, as well as the Looney Library, the crazy building in Creative Writer that serves as

By Mike Hudnall

a metaphor for the creative process.

On the Projects floor, children choose a project to create—a banner, a greeting card, or a newsletter. These are kinds of creative activities that kids in Microsoft's target audience (8 to 14 years old) love to work on.

In the Idea Workshop, the Spot Machine (which looks like a slot machine with a fish for a handle) provides 8000 randomly generated story ideas to help students get started with their projects. Or they can go to the Picture Window for visual inspiration. The sentences they create with the Spot Machine and the pictures from the Picture Window can be copied to a notebook for further reference or placed right into their projects.

The Writing Studio is the heart of the program; it's where students create stories, poems, reports, and other works, and as such, it's the primary writing interface in this program. Then, in the Library, children organize, recycle, or mount their creative works on the wall.

Children access features in the Writing Studio by clicking on icons in an icon bar, but these are certainly different from the icons you might find in conventional Windows programs. When you click on one of them, it produces a row of associated icons beneath the icon bar. For example, click on the Word Tool icon, and you'll see on the row below a series of icons that let you control font styles, sizes, colors, and characteristics; line justification; insertion; special effects; spacing; indents; and so forth.

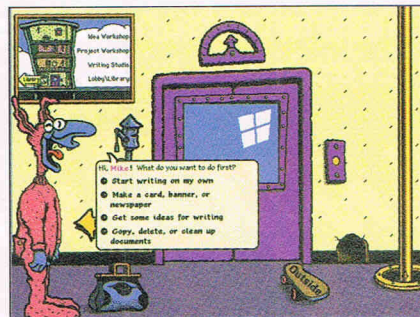
Another fun icon is the Sticker Picker, which allows you to choose from more than 100 pieces of clip art that are presented as stickers on a roll. There's also a Sound Picker, Page Stuff (backgrounds, number of columns, margins, page numbering, and so forth), Speller and Replacer, Undo Egg, Transformers, Page Viewers, Print (which looks like a toaster), and McZee's Carpet Bag, which is rather like a Windows File menu. You can use it to start a new document, save a document, open a file in your portfolio, look at your ideas notebook, and so forth. And whenever you click on an icon from the bag, McZee—who provides Creative Writer's online help—tells you what it does and offers advice and options.

Creative Writer is full of surprises and interesting effects to keep students working with the program and inspire them to progress with their projects. For example, there are lots of fun sounds associated with clicking on objects in the program. Click on the exit door, and you get the sounds

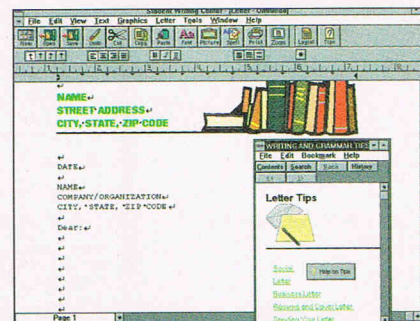
of a door opening and a dog barking (along with a kind of dialog box in which Spike the dog lets you choose what to do next). Click on Undo Egg, and you hear a cracking egg sound. Mouse squeaks, elephant trumpets, giggles, and typing sounds are just a few of the sounds children will delight in finding.

There are also jokes children can call up, as well as surprising animations. Take the sliding pole to the dark basement, and whenever you click, a "match" illuminates a funny surprise. Click on the magic wand and then click on the mouse hole, and surprising animations emerge.

Despite its zany and unconventional approach, Creative Writer offers a surprisingly rich set of features, allow-



McZee guides you in Creative Writer.



Student Writing Center makes writing easy.

ing children to zoom in and out, set justification, change page orientation, change page views, number pages, choose the number of columns to use, wrap text around pictures, and so on. Creative Writer is about writing, to be sure, but it's also about creativity and fun, and those are major strengths of this program.

A Different Approach

The Learning Company's writing software takes a fairly conventional Windows interface and adapts it to the particular needs of children ages 10 and up.

As in so many Windows word processors, there's a title bar, a menu bar, an icon bar, and a ruler you can hide or bring into view. And as in

other Windows applications, the menu choices, icons, and other buttons change according to the kind of document you're working on. The adaptation is apparent in what Student Writing Center for Windows excludes and includes.

Excluded are features that kids don't really need, such as mail merge, envelope printing, tables, and so forth. Student Writing Center includes—in addition to essentials like cut, paste, fonts, open, save, spelling, and printing—features associated with the document types that the program focuses upon. If, for instance, you choose to work in your journal, a special menu called Journal allows you to set margins, insert a date automatically, set a page break, and bring up a calendar dialog box. To provide security for your journal, the icon bar includes an icon for a password, and you'll find a button to do a search (which you can limit by specific dates) as well as a button to bring up a calendar.

In a similar manner, there are special menus for each of the other Student Writing Center document types—report, letter, newsletter, and sign—as well as special choices within common menus and special icons and ruler buttons. Some reports, for example, require documentation, so there's an icon labeled Biblio for students working on research reports. Press the button, and a dialog box helps identify the kind of work being cited as well as the appropriate format. Fill in the information, and the program creates a Works Cited section at the end of the paper, formats the entry, and places it properly, according to the requirements of the Modern Language Association. If you write a letter or a newsletter, you'll find a Layout icon; pressing the button brings up a dialog box with choices and examples appropriate to the particular kind of document you're working on. The newsletter Layout dialog box lets you choose the number of columns to use and whether or not to use a masthead, while the Layout dialog box for letters lets you choose whether or not to use a letterhead.

The Tips icon appears throughout, but the information it leads to is customized according to the document type. If you click on it while working on a report, you'll find information about kinds of reports and how to write them. The information is presented using Windows' standard Help dialog format with the menus, buttons, and text links you've used and come to expect in other programs. These run several levels deep, and there's quite a bit of useful information. You can

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also access these tips through the Tools menu, which is also customized according to the document type. More general help with the program interface and moving around in documents is available through the Help menu, which doesn't change from one document type to the next. You can also find plenty of information in the excellent 252-page manual that comes with the program, although I expect that most kids will opt to use the extensive online help.

Student Writing Center has a spelling checker with over 100,000 words; a thesaurus with over 660,000 words; and a word counter—handy for those assignments with specific word limits. Students who need help with grammar will find online tips on punctuation, capitalization, plurals, abbreviations, numbers, and using the right word.

And as with adult writing software, Student Writing Center lets you place pictures in your document, providing a library of more than 120 school-related pictures which you can manipulate a number of ways. You can also adjust font characteristics and zoom in and out on your text. According to The Learning Company, an upcoming CD-ROM version of the product will provide over 400 scalable clip art pictures, 30 specially designed letterheads and sign borders, and more.

Student Writing Center's fairly conventional Windows interface should work well for the 10-and-up crowd and ease the migration to more powerful writing software when the student's needs change, while providing plenty of power for most student writing for years to come.

Process Versus Product

These days, writing is taught as a process, not just a product, and this emphasis is reflected in Creative Writer and Student Writing Center.

Creative Writer helps children choose projects and uses the Idea Workshop and Idea Notebook to help them come up with plans for their projects. The tools in the Writing Studio help children create a draft and then refine that draft using the spelling, copy, cut, paste, and layout tools.

The process approach to writing in Student Writing Center receives attention in the tips for each kind of writing. For something like writing in a journal, the tip for getting started is as simple as finding a comfortable place and time to write and picking a topic of interest to you.

In the report section of the program, there are more tips related to the process of writing because there

Product Information

Microsoft Creative Writer
\$64.95

Requirements: 2MB RAM (4MB recommended), VGA or better graphics, hard drive with 8MB free, 3½-inch floppy drive, Windows 3.1 or higher

Microsoft
One Microsoft Way
Redmond, WA 98052-6399
(800) 426-9400
(206) 882-8080

Student Writing Center for Windows
\$79.95 (disk), \$89.95 (CD-ROM)
Requirements: 2MB RAM, VGA or better graphics, hard drive with 8MB free, Windows 3.1 or higher, CD-ROM drive and MPC compatibility (for CD-ROM version)

The Learning Company
6493 Kaiser Dr.
Fremont, CA 94555
(800) 852-2255

are more subcategories of writing, including essays, classroom reports, research papers, book reports, and essays. In each case, you can find tips on getting started and following through with the process. Research papers, for example, become more manageable when broken into the steps presented in the tips: prewriting,

researching and outlining, writing the first draft, documenting sources, revising, editing, and finishing the paper. Then for each of these steps, there are substeps and explanations of those substeps.

Student Writing Center aids in the process of writing, too, by including tools that make it easier to revise, edit, and finish a paper. In addition to the copy, cut, and paste functions, you'll find an undo/redo function, a spelling checker, online grammar tips, the documentation feature already mentioned, and (for some of the document types) layout features.

Helping Kids

What can you do to help your children develop their writing skills? According to Stephen Marcus, technology coordinator for the National Writing Project at the University of California at Santa Barbara, parents should stress writing as a process, "support their kids' efforts, and ask honest questions to help clarify what they *think* their kids are trying to put into words." They should also "let kids know where the 'speed bumps' are in the writing—where the reader has to slow down in an awkward sort of way in order to follow the thinking." They also need a hefty dose of support and encouragement from people they respect, such as their parents and teachers.

Good writing inevitably involves hard work, but with the right direction and excellent software like the programs covered here, writing can be much easier. □

Tips to Improve Writing

1. Try invisible writing with a computer. When you're first trying to get your thoughts into words or you're having a bit of a writing block, turn the brightness on your monitor down so you can't see the text appear as you type. Do this for a minute or two at a time (this takes a little practice). Students report that they're freed from the compulsion to fix type—and they can do a better job of keeping their minds on what they're trying to say. They also say they're more interested in seeing what they have to say, and sometimes what they have to say comes more from their subconscious. It's "more true."

2. When you've finished a draft of your piece, copy and paste the first and last sentences of each paragraph into a list. See if there's any sort of flow of topics and transitions.

3. Use the search feature to look for all the occurrences of "weak"

words like *said, is, very*, and so forth. Try to replace them with stronger and more descriptive words.


4. Provide your children with first and last lines of stories, editorials, or poems. (The lines don't actually have to be related, and they can be taken from published writing or made up on the spot.) Challenge them to write the material that connects the two segments. Then give them the segments in the reverse order, and ask them to write something new that connects the two sentences. Example: "He checked his schedule to see what he planned to ruin today. . . . They left him wondering whether the door would close in time."

5. Have kids use their word processors to create material useful to the family: shopping lists, schedules for family members, instructions for baby-sitters, and so forth.

—STEPHEN MARCUS

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TANDY SENSATION

It's an unfortunate fact of life with multimedia PCs: You have to do some of the trickiest operations when you know the least about the system. With boards to install, programs to set up, and device drivers to configure, setting up a system can be a rude introduction to the world of CD-ROMs and multimedia computing.

That's what's so cool about Tandy's 1994 Sensation. With the equivalent of a premium multimedia upgrade kit inside and over 100 megabytes of preloaded software, the Sensation requires you only to unpack the major units and hook up a few cables; then you're ready to get to work, or to play.

With a 33-MHz 486SX CPU, 4MB of RAM, and a 210MB hard disk, the Sensation carries a retail price of \$1,799 (\$1,999 with a 14-inch color monitor). Bare systems with this level of specifications have been spotted lately at prices near \$1,000, but they lack the Sensation's double-speed Panasonic CD-ROM drive, 16-bit Creative Labs sound card, and fax/data modem card with voice-mail capability.

They also lack the software bonanza that comes with the Sensation. There's Microsoft Works for word-processing, spreadsheet, communications, and database operations; Quicken for managing personal finances; and Lotus Organizer, a personal information manager. Macromedia Action SE and Lenel Multimedia Works help in creating multimedia presentations, and a clip art library from Micrografx provides source ma-

terial for graphics projects. Two custom Sensation CD-ROMs are also included, containing backup copies of preloaded software along with some smaller CD-based programs. The only true multimedia CD-ROM included is the 1993 version of Microsoft Bookshelf; this is a fine refer-

single task as easy as possible. For common projects like travel planning, keeping a grade book, and creating greeting cards and name tags, the WinMate programs are basic enough to let adult beginners and kids become productive in a hurry.

Preinstalled multimedia



Tandy's 1994 Sensation sports a 16-bit sound card, double-speed CD-ROM drive, and voice-mail modem.

ence title, but the Sensation would be a lot more fun with one or two exciting entertainment discs.

For the sake of beginning users, Tandy installs its WinMate Desktop program. Windows starts up with this simplified interface instead of the standard Program Manager, but the normal Windows tools are just a couple of clicks away, and it's easy enough to reconfigure Windows for normal operation. WinMate also includes a suite of several dozen simple applications, each making a

hardware and a huge bundle of software make it easy to get started with the Sensation, but the top-quality components inside the case make it easy to keep going. Despite having no external cache for its 486SX CPU, the Sensation is quite snappy at CPU-intensive tasks, and the Western Digital Caviar hard disk is also an excellent performer. For fine DOS and Windows graphics performance, the highly integrated motherboard includes a Cirrus Logic accelerated video chip for SVGA graphics.

Hardware upgrades are an inevitable part of computing, and the Sensation has plenty of upgrade potential. An empty ZIF (Zero Insertion Force) socket will accept a 486DX, 486DX2, or Overdrive processor if more computing power is needed, and there are three empty 72-pin SIMM slots for RAM expansion. Three ISA-bus slots are open for add-on cards, and an empty drive bay can hold a tape backup unit, a second internal hard drive, or a 5¼-inch floppy drive.

With the 1994 Sensation, Tandy has come up with a design for the entire life cycle of the home computer. A complete, preconfigured hardware and software package makes the early days less stressful; premium components provide the power to tackle more sophisticated jobs; and plenty of upgrade options should keep the Sensation from becoming obsolete before its time.

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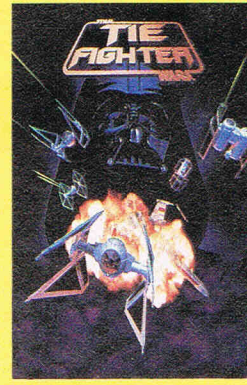
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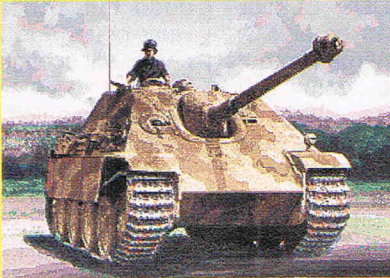
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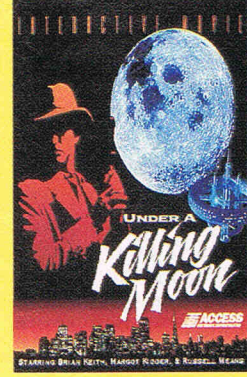
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New and enhanced features in version 3.0 include Day Planner, a PIM with an appointment calendar, a to-do list, and a phone book. There's also a much improved File Viewer, offering WYSIWYG viewing of more than 100 text, spreadsheet, database, graphic, and compressed formats. Built-in support for ZIP 2 compression allows you to quickly compress and decompress a file, a group of files, or an entire directory. You can choose to view compressed files as directories, so you can see and selectively decompress individual files within. This provides an efficient way to keep seldom-used files and directories online for easy access without wast-

ing a lot of valuable space.

NDW comes with new Windows versions of Backup, AntiVirus, Disk Doctor, Speed Disk, and Unerase—all supportive of DOS 6, DoubleSpace, Stacker, and SuperStor. AntiVirus protects your system from 2300 known viruses, offers improved protection against unknown viruses, and scans noticeably faster than before. Speed Disk no longer requires you to exit Windows or disable your disk cache to optimize your disks.

To further protect your system, a new Rescue Disk utility creates and updates a single disk that could save you from catastrophe. The disk backs up important information such as CMOS data,

hard disk partition tables, and boot records.

The point of NDW's features and flexibility isn't just to make Windows look good but also to make it work better and faster. You can easily configure the program to free more desktop space and automate mouse movements and keystrokes. Right-button mouse support enables pop-up menus and click-and-drag selection of multiple files. Extensive drag-and-drop support, configurable menus and toolbars, desktop icons, and a control menu launch list speed your access to utilities, programs, and commands.

If you like to launch and load specific, often-used files from your desktop, you

can use NDW's new Smart Groups. They link to specific directories and automatically create and delete file items based on extensions you specify. You could create a Smart Group, for example, that includes an item for each word processor document in a given directory. Unfortunately, Smart Groups aren't truly object oriented; dragging an item to the trash can simply remove its icon from the group, leaving the file itself intact.

NDW provides file management capabilities from within some applications through a new feature called FileAssist. It expands Open, Save, and Save As dialog boxes that conform to Windows standards, ena-

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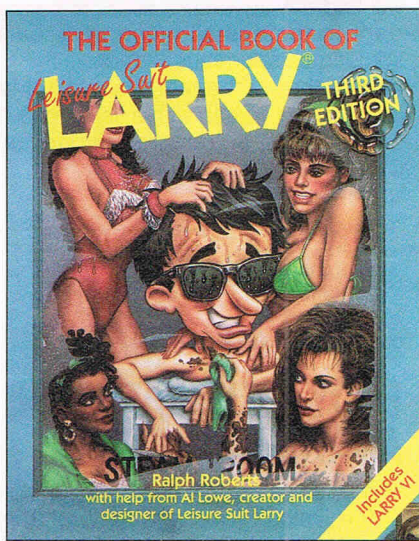
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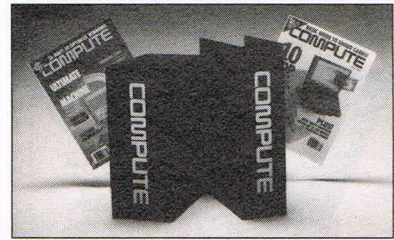
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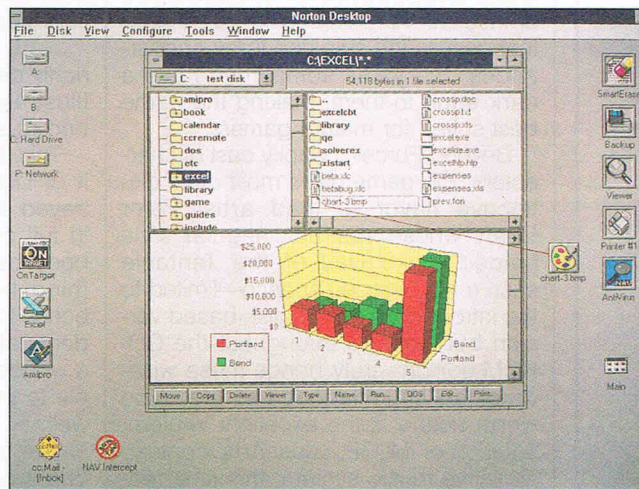
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bling you to create directories and find, view, rename, and delete existing files. File-Assist does cause at least one minor problem in Word 6. Once it's enabled, you won't be able to use Word's list of recently opened files under its File menu. However, this feature is included in FileAssist dialog boxes.

Hardware and software incompatibilities can be a problem with third-party Windows shells. Happily, NDW's version 3.0 seems to cause fewer system conflicts and related General Protection Faults than previous versions. However, if you do have problems, the Uninstall utility can remove all or part of the program and its files from your system. (When I performed an Uninstall, however, some references to NDW were left in my Windows system files.)

At more than 15MB fully installed, NDW is almost as large as Windows itself. That may seem large for a shell, but considering its flex-



The enhanced file manager in The Norton Desktop for Windows 3.0 allows you to view text and graphics files.

ibility and powerful utilities and tools, NDW is well worth your disk space and certainly worth a try.

PHILLIP MORGAN

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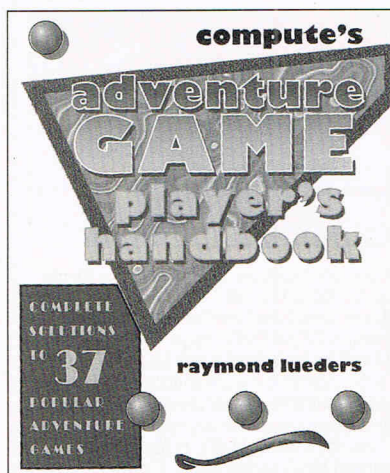
SAM & MAX HIT THE ROAD

Who exactly are Sam and Max? Imagine the good-natured camaraderie of vintage Hope and Crosby crossed with the nineties dementia of Ren and Stimpy. Stir in plenty of cultural in-

jokes, sight gags, and nutty animation, and you get the picture. The characters are actually based on LucasArts' own underground comic strip by Steve Purcell, whose unique style can best be described as Max Fleischer meets R. Crumb. Sam is a portly, good-natured hound dog adorned in Dashiell Hammett-style gumshoe apparel: ill-fitting suit, wide tie, and broad-brimmed hat. Max is his not-terribly-bright little buddy, a "hyperkinetic rabbit thing" with a penchant for wanton destruction. Together, they form an unlikely crime-fighting team, the Freelance Police, enthusiastically solving mysteries, pummeling felons, and eating almost anything.

The story, such as it is, finds our heroes hot on the trail of a runaway carnival Bigfoot. Hop a ride in their DeSoto squad car for a hilarious road trip across America. Visit historic sites like Mount Rushmore, where

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REVIEWS

you can bungee-jump from the presidents' nostrils. Or check out less famous hot spots such as World of Fish, Mystery Vortex, and World's Largest Ball of Twine. Hidden at various locations are several amusing minigames, including Hiway Surfin', Gator Golf,



The Cone of Tragedy is just one of the wacky places you'll visit with Sam & Max.

Wak-a-Rat, and Car Bomb. There are even some zany creativity projects, like Sam & Max Dress-Up Book and Max's Wax Paint by Numbers Book, as well as a built-in screen saver. The dress-up sequence incorporates the game's absurd—but undeniably fun—copy protection scheme. There's little about this game that isn't slightly bent and twisted, but therein lies its charm. The humor is both intelligent and relentlessly clever, yet never self-absorbed or insolent. Parents should be advised that despite the cute and fuzzy appearances, the jokes sometimes have a dark edge to them, making the game best suited for mature gamers.

Beyond Purcell's wacky cast of characters, the game owes most of its distinctive flavor to lead artist Peter Chan, whose abstract, angular style helped make Day of the Tentacle such a hit. Digitized speech—limited to the introduction on the disk-based version but featured throughout the CD-ROM edition—truly brings these wisecracking knuckleheads to life. Also worth noting is the excellent implementation of iMUSE, LucasArts' context-sensitive music system, this time featuring a collection of downright catchy jazz riffs. Puzzles are almost all visually oriented, ranging in difficulty from easy to moderately challenging. As with all of LucasArts' graphic adventures, there are no wrong turns or game-ending mistakes, freeing you to explore every sidesplitting nook and cranny. Interestingly, unlike previous efforts in the genre, this game offers little player-controlled choice of dialogue between characters. Story line interaction appears limited to decisions regarding game pace and direction. Those most likely to enjoy this game

will find the adventure aspects secondary to the overall mood of hip and sometimes scurrilous humor.

With the right agent, Sam and Max could hit the screen with a series of successful road adventures. Hope and Crosby would be proud.

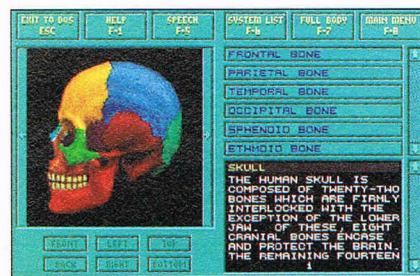
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BODY ILLUSTRATED: THE ANATOMICAL GUIDE

"Know thyself." This cryptic inscription at the Delphic Oracle wasn't referring to our physical bodies, but with Body Illustrated, it takes on a whole new meaning. With this program, you can learn all about what makes your body tick. A



Body Illustrated helps you understand the inner workings of your body.

richly detailed anatomical guide, Body Illustrated teaches you about all the body's systems and structures.

This isn't a superficial overview. Spirit of Discovery has realistically portrayed every major system in the body in full color, with information on 350 body parts. You'll learn about everything from the top of your parietal bones to the tip of your phalanges. Students at the college level will find this a wonderful study aid, yet it's accessible to those at the junior high level as well.

The body's parts are portrayed in bright colors, enabling you to see the shape of each one and how it fits with others. When you click on a part, a digitized voice pronounces its name clearly, so you'll be able to say things like *sternocleidomastoid* with confidence.

There are four modes in the program. Tutorial shows you how to navigate the other modes. Encyclopedia alphabetically lists all the parts; click on a word to see a part's most favorable view and an explanation of its function. Exploration and Lessons are the two teaching modes. In them, individual parts are highlighted within their respective systems, and a text window ex-

plains the selected part's function and location. In Exploration, you can wander through the body, while Lesson focuses on one system at a time.

There's also a game which tests your knowledge. The object is to find a named part before the heart/ECG timer flat-lines. Ten people can play, each racing against the clock. Body Illustrated earns kudos for letting people at different skill levels play together. At the easiest level, you need only double-click on the part named in the system pictured. The hardest level requires you to find the correct system and then the part.

Included with the program are a full-color poster picturing all the anatomical parts and a manual that includes a poster guide, naming each part and explaining it in detail. This makes a handy review guide for students who can't get back to their computers to study.

With its realistic drawings, detailed explanations, digitized pronunciations, and fluid interface, Body Illustrated makes a superb educational package. It encourages exploration and makes it fun to learn about the body.

KAREN LEE SIEPAK

Spirit of Discovery
(619) 929-2036
\$79.95

Circle Reader Service Number 437

MICROSOFT WORKS FOR WINDOWS 3.0

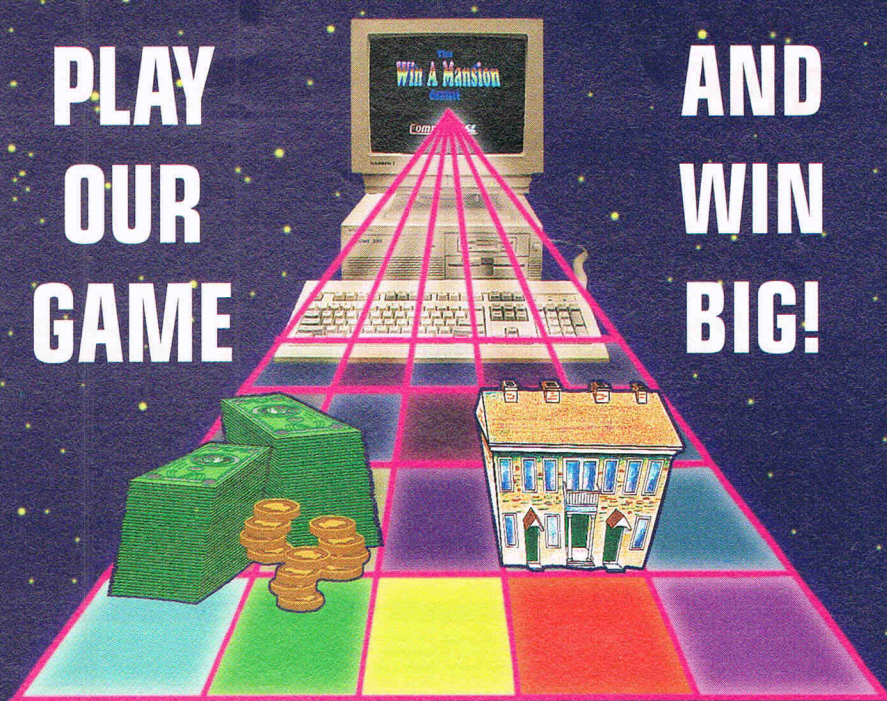
Integrated software packages—called works programs or entry-level suites in nineties parlance—have grown from bare-bones toolkits to all-in-one packages that are powerful enough to serve the bulk of your everyday needs. Microsoft Works for Windows 3.0 is a good example of such growth. It offers many of the best features of the latest word processors, spreadsheets, and databases, and it includes a communications application for easier and faster access to bulletin board services and other computers.

Greater integration was one of Microsoft's upgrade goals. Works' menus are consistent wherever possible, and configurable toolbars throughout let you easily arrange buttons. Features like Spell Check, Undo/Redo, and Zoom are available in the word processor, database, and spreadsheet. The database and word processor now both support Object Linking and Embedding (OLE) 2.0.

OLE allows you to access one application from within another and dynamically tie the object you create in the second application to the document in

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the first. These editable objects can be graphics, spreadsheets, database fields, sounds, or other types of data from OLE applications. Works now supports OLE 2.0 and two new OLE tools, WordArt and Clip-Art Gallery. The program also uses OLE for drag-and-drop editing within and between documents.

Consumer research led Microsoft to add a great deal of online help to all of its products. Works 3.0 not only has more help information but also has more ways to access it. Cue Cards, for example, walk you through the many tools and templates, remaining on your screen and prompting you with step-by-step instructions while you perform a task.

An improved feature set in the word processor makes it easy to format bulleted lists, hanging indents, columns, text wraps, and mail-merge text. Graphic and object placement is easier and more accurate with the new Page Layout edit view and Zoom control. You can also place graphics or objects independently of text. However, Works' text-handling capability is still somewhat limited, and wrapping columned text around graphics can cause alignment problems.

New features give you increased control over the appearance of spreadsheets and database output. Both applications allow using multiple typefaces and sizes, fill patterns, borders, and colors. Alignment and automatic formatting features aid in positioning data and headings. The spreadsheet also includes a Paste function, for inserting one of the program's 76 function formulas, and new charting features such as 3-D rendering. An enhanced Query option in

the database enables you to create multiple queries, each based on up to three search criteria.

While Works is generally a good program, it has a few potential drawbacks. Expanded Help and Cue Cards, the communications module, new clip art, and enhanced

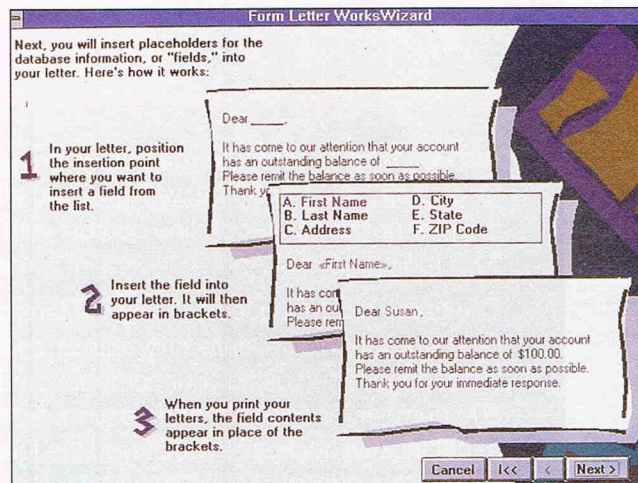
fers good file compatibility with major IBM and Macintosh applications. As an upgrade, Works gives you many of the features that might have tempted you to buy expensive stand-alone applications. Students, teachers, small-business people, and anyone else who

The game stars Teddy, an adorable teddy bear who moves through a fun-filled day. From the moment he awakens, Teddy waits patiently for your child to urge him on with a mouse click or keypress. Prompted, he will brush his teeth, find a birthday cake, dance, fly a helicopter, and complete other entertaining activities.

Animation is smooth and colorful, and Teddy is so adorable that you and your child will laugh and giggle at his antics and expressions. As your child makes the connection that keypresses and mouse clicks prompt Teddy, together you can explore how to control variables such as Teddy's speed.

When older siblings begin begging for computer time, you can lure your preschooler from the game with the incredibly cuddly hands-on teddy bear packaged with the game. This may not be easy, though, as toddlers won't soon tire of controlling Teddy's antics. And if you peek around the corner later, you're liable to see your child helping the stuffed Teddy dance just like the one in Teddy's Big Day.

KAREN LEE SIEPAK



WorksWizards help automate tasks that might otherwise daunt beginners, such as creating form letters.

OLE 2.0 support and tools have more than doubled Works' size to 14MB. Not only is the program large, but it also eats up a good deal of Windows' resources—nearly 25 percent with one small application file open. According to Microsoft, this is not out of line with other applications, but ClarisWorks—a strong competitor—seems to consume a significantly smaller percentage—around 10 percent. Its application package is similar, offering a graphics module instead of a communications module, yet it takes up less than 5MB. ClarisWorks doesn't support OLE, however, which accounts in part for its reduced demand on resources as well as its smaller size.

Works 3.0 looks and feels much like Microsoft's latest high-end programs, and it of-

doesn't need or want the array of options offered in full-blown applications will find Works' feature set more than adequate. The extensive help makes it a powerful program without a daunting learning curve; it's well suited to novice and casual computer users.

PHILLIP MORGAN

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TEDDY'S BIG DAY

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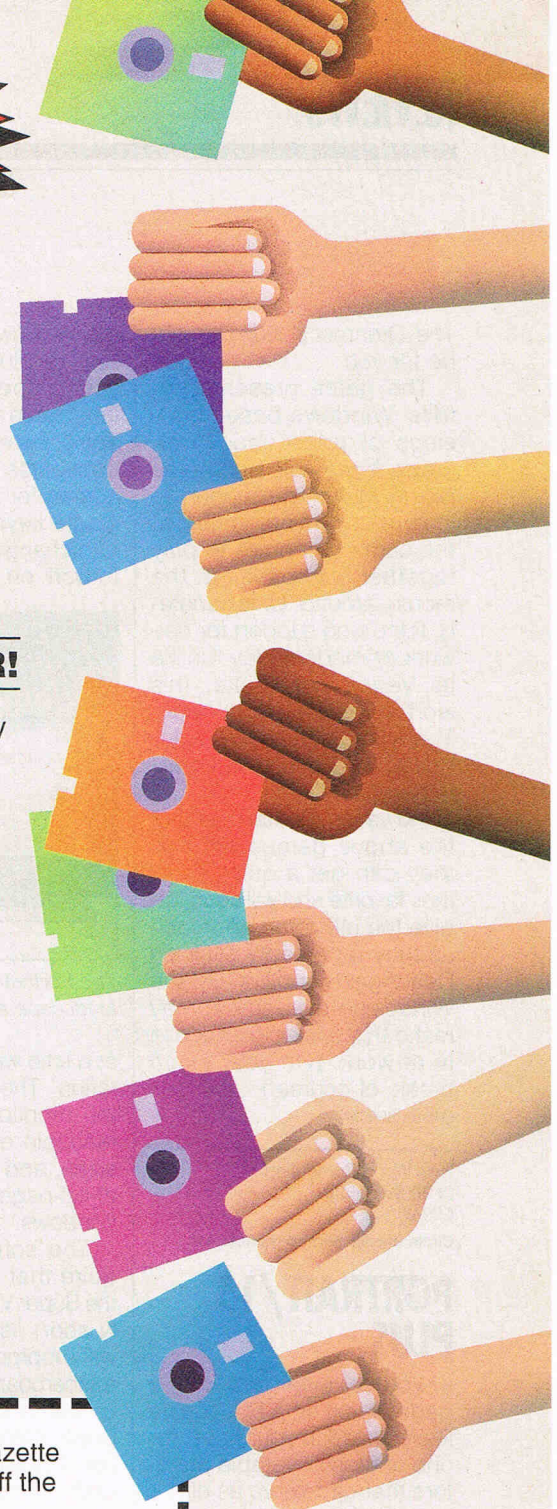
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The game presents no-frills Windows-based versions of poker, baccarat, craps, blackjack, and horse racing. Multiplayer support allows four players sitting at the same computer to play together by passing the mouse around. Unfortunately, there's no support for network or modem play. Unlike its Vegas namesake, this isn't a flashy production. The visuals are just adequate, and sound is sorely underutilized.

However, die-hard fans of the above games will find they can get a quick fix of their favorite and will soon forgive the utilitarian approach as they repeatedly click on Deal Again. Additionally, the Windows environment may make this easier to squeeze in at work. (On your lunch break, of course.)

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PORTRAIT/15 PLUS

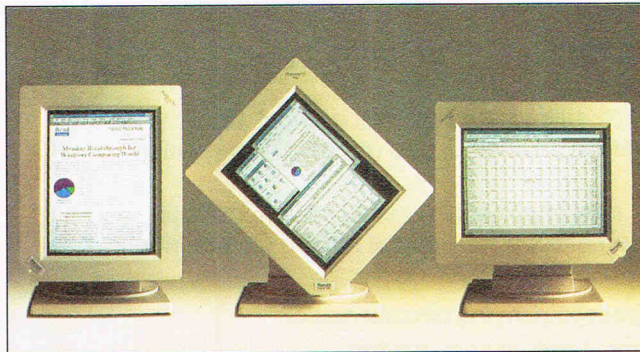
If you've ever laid out a page of text on a PC, you've likely lusted in your heart for one of those rotatable monitors that can serve as either a portrait or a landscape display. Knowing what a whole page looks like—not in some greeked miniature but in full-size, editable type—makes layout less of a chore and more of a joy. Only one thing may have stood in your way: price.

For those who have been waiting for rotatable displays to come within the price range of the individual, Portrait Display Labs has the monitor for you. Using spe-

cial Windows drivers, the Portrait/15 Plus monitor allows you to specify a portrait or landscape view for Windows. The software automatically reconfigures the windows on-screen for each view with a single keypress (which you can change). This allows you to work on a full page of text

fact, the only test the monitor didn't perform perfectly on was screen regulation; the onscreen image changes size depending on the average brightness of the screen, a problem which is very common among computer monitors.

One complaint I have



The Portrait/15 Plus adds a new twist to monitors, supporting both landscape and portrait display modes in full color.

at a time with a portrait orientation. The crystal clarity of the monitor makes the text readable even at very small sizes, and it's easily legible at full-page zoom in Word for Windows.

The software drivers require that you have one of the Super VGA cards on a fairly short list (or a computer with appropriate video on the motherboard). Among the video cards supported are ATI, Boca, Cirrus, Diamond, National Design, Number Nine, Orchid, Radius, S3 Sigma Designs, STB, and Video 7. Contact Portrait Display Labs to find out if your specific card is supported.

The monitor itself offers a very sharp, clear screen. I ran the DisplayMate Video Display Utilities on the monitor to gauge its performance. There appeared to be no distortion at the edges or the corners, and there was no perceptible bloom or barrel distortion. The colors were sharp and clear. In

about the monitor is that I had to constantly adjust the screen when I went back and forth between DOS and Windows. This is common enough on standard monitors—the graphics screen doesn't always occupy the same position as the text screen—but it seemed a particular problem on the Portrait/15 Plus monitor.

ROBERT BIXBY

Portrait Display Labs
(510) 249-0444
\$999

Circle Reader Service Number 441

CD POWER PAK

Corel's CD Power Pak is the Swiss Army Knife of CD-ROM utility packages. Among the tools included with Power Pak are CD-ROM-caching software, image management and manipulation utilities, a collection of Photo CD images and sound files, and a system-sleuth utility to tell you every-

thing you never wanted to know about your PC. There's even a set of Koss earphones to use when listening to audio CDs.

Photo CD Lab lets you load and manipulate Kodak Photo CD images. A hundred images are included here, culled from Corel's sold-separately collection of royalty-free Photo CDs. Lab displays the images individually or as part of a slide show, and it lets you resize, mirror, and rotate images. You can convert Photo CD pictures to BMP, EPS, PCX, or TIF format for use in other applications, but the software fails to provide important data on the destination files (like how much space they will require). Still, for Photo CD newcomers, Lab's moderate power is easy to harness.

System Browser, on the other hand, may overwhelm beginners. It uncovers an abundance of mostly technical information about your system, ranging from DOS device-driver addresses to BIOS strings. That's Greek to most users and useless information to even more. Plus, it all has little to do with CD-ROMs; although it might help find IRQ conflicts when installing a CD-ROM drive, you must have the drive installed before you can install the program. Nevertheless, power users and programmers should find System Browser a great troubleshooting tool.

Mosaic is a graphics-file manager that displays and prints thumbnail views of image collections, such as Photo CDs. A useful tool, Mosaic is especially important here because there's no guide to Power Pak's 100 Photo CD images.

The rest of the package is a mixed bag. Of the two

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CD-ROMs included with Power Pak, one contains a full 600 megabytes of Windows WAV files—mostly sound effects and music clips. An included third-party WAV editor, Voyetra's WinDAT, lets you modify the files. Another utility, CD Audio, plays audio CDs with all the functionality of a true CD player. You can store databases of the tracks on your audio CDs and specify a preferred order for playing those tracks. To take full advantage of both of these tools, you'll need a sound card that supports direct CD audio. Check with the manufacturer of your sound card to see if it supports direct-from-CD play (you may need a special cable).

Finally, the CD-ROM-caching software, which is difficult to configure properly, performs well, but not as well as the new DOS 6.2 version of SMARTDrive. Included with the CD-ROM-caching software is a version of Core!SCSI.

Documentation is sparse, confusing in areas, and seemingly tailored to owners of SCSI CD-ROM drives. Still, every item in CD Power Pak is useful—just not for everyone. This is a package best suited to photographers interested in Photo CD and power users with SCSI CD-ROM drives.

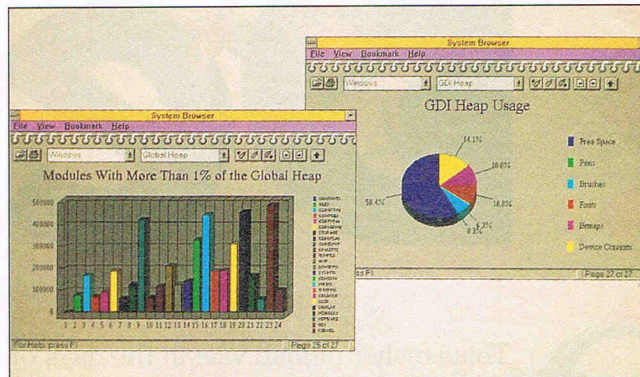
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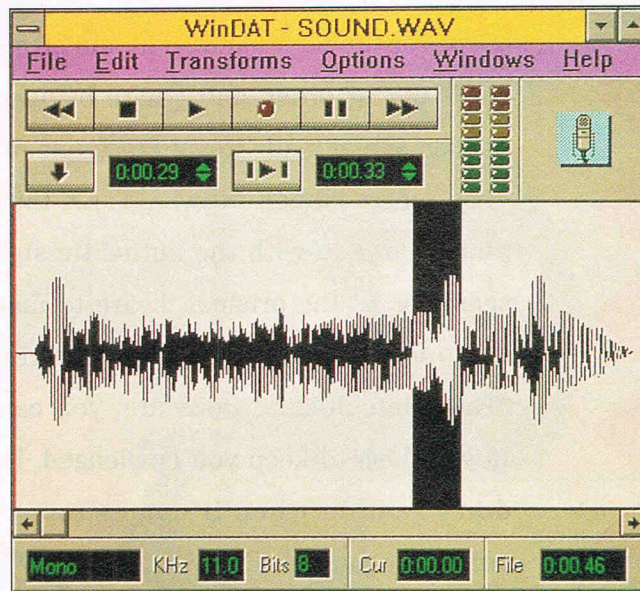
Circle Reader Service Number 442

COMPANIONS OF XANTH

Games based on popular novels have only recently come into their own. Early attempts managed to offend the novel's loyalists by tak-



The System Browser included with CD Power Pak isn't really CD-ROM related, but it may help locate conflicts.



The WinDAT sound editor allows you to edit or add special effects to the 600MB of WAV sound files included with CD Power Pak.

ing too much artistic license, while also putting off gamers by being too bound up with the original book's story line and not having enough innovative gameplay. Eventually, Interplay's Lord of the Rings RPG came along, satisfying Tolkien fans and role-playing gamers alike. Then Dynamix's first attempt at a role-playing game, Betrayal at Krondor, used Raymond E. Feist's Riftwar novels and was a runaway success.

Now the folks at Legend Entertainment, who brought you Spellcasting 101 and Eric the Unready, try their hands at adapting one of Piers Anthony's Xanth books with Companions of Xanth.

Anthony's Xanth novels are not as heavy as those of some of his fantasy-author counterparts; in fact, much of his writing is filled with puns and gleeful wordplay. You'll be able to judge the success of Legend's conver-

sion for yourself, as Companions of Xanth comes with the Anthony novel *Demons Don't Dream*. With Companions of Xanth, Legend has unveiled a new engine for its graphic adventures, making this game slightly less complex and more playable than the company's older games.

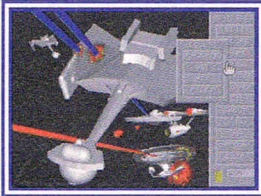
The story revolves around your entry into the world of Xanth through a magical computer game. Two contestants are brought to Xanth in search of a prize, and to help, you need to choose a companion. As in the novel, your alter ego must choose Nada Naga, the serpent woman—the only companion who can guide you safely through the perils of Xanth. Having a companion with you almost gives you the sense of an online hint capability; talking to Nada will give you hints and tips, though some of those hints are frustratingly vague. The story, however, unfolds with a spritely grace—even if your puzzle-solving efforts are unwieldy. The graphics have been spruced up and now appear more Sierra-like than the older, small SVGA images used in earlier Legend games. There's more animation, more color, and more playfulness all around. The verb list on the left side of the display remains from the old Legend interface; click on a verb and an object on the screen, and your action will be translated into reality. The interface is also smart in that it will relate two objects in an appropriate way. Click on the pat of butter, then click on a container, and Companions of Xanth will put the butter in the container.

Just because the interface is easier to use, don't think the game is easy. True

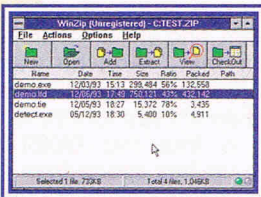
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to Legend's heritage, some of the puzzles—like the pail puzzle in the beginning—are very difficult. I had to log on to CompuServe twice just to get the answer to this one. Paying attention to the puns that abound throughout the game will usually net you a quick, if not necessarily obvious, solution.

Legend ranks with Infocom as one of the few companies to master making funny games really *funny*. Companions of Xanth is a happy excursion into Piers Anthony's world of Xanth that will delight gamers with its light-hearted tone and its serious adventure value.

BERNARD YEE

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Circle Reader Service Number 443

RICOH FAX800

The Ricoh FAX800 is the world's first combination of ink-jet fax machine and printer. It can operate as a standard fax machine, and it can emulate a Canon BJ-10e ink-jet printer.

Ink-jet printers print text beautifully, but they have a problem with banding in graphics, particularly when an ink cartridge has become old (some of the jets may cease functioning because of blockages). Heavy black and dark gray areas become saturated with the liquid ink, causing them to become wrinkled or convex.

The ink-jet printer in the FAX800 is an excellent, fast, and practically silent partner on your desktop. You simply install your software to use a Canon BJ-10e and change the setup in the fax machine to make it emulate that printer, and you're in business.



Companions of Xanth brings an improved, more intuitive interface to Legend's series of fantasy adventure games.



The Ricoh FAX800 packs the functionality of a plain-paper fax machine and an ink-jet printer into a single package.

The fax machine prints out a decent fax with 200- x 200-dpi resolution. The advantage of a plain-paper, ink-jet fax machine is that you can use any kind of paper—even expensive linen paper—so your faxes can be of as high a quality as you can afford. You don't have to worry about buying the special flimsy roll paper that most fax machines use. You can use this machine for a convenience copier as well. Just slip in a sheet of paper as if you were going to fax it, and press the copy button. The copy comes out

looking like a fax because the scanner is of fax quality. Once again, a compromise on quality limits the machine's value. It does a slightly better job of copying grayscale images than a fax machine does, but put the accent on *slightly*.

Two things that would seem logical to include with the system are absent: You can't send a fax with your computer, and you can't scan material with the scanner built into the fax machine and import the image into your computer. This was disappointing, since

the parallel printer connector should be able to import the image easily.

It's a shame that these were left out, because a built-in scanner would have better justified the \$1,845 suggested retail price. When I mentioned to a colleague all that the FAX800 could do, he was impressed. But when I told him the price, he said, "I could buy a PC, a fax/data modem, and an ink-jet printer for that." And he was right. The selling point that Ricoh has chosen to emphasize is that the FAX800 takes up less space than a fax machine and a printer, but this alone doesn't justify the price. The copier is a nice thing to have around (it beats driving to Kinko's every time you need a copy), but you can buy a copier for less than \$500 now.

This is a solid machine that does all it claims to do, but its price needs to be brought down to a point that is under the cost of an inexpensive laser printer. If bought separately, the components of the machine should cost more than the machine itself; otherwise, it doesn't make any sense to buy the combo unit. Although at the time of this writing, Ricoh hasn't reduced the suggested retail price, discount office-equipment supply houses have advertised the product as low as \$649, according to Ricoh's publicist. For an expanded report on the Ricoh FAX800, see the April "Personal Productivity" column in COMPUTE's support area on the America Online network.

ROBERT BIXBY

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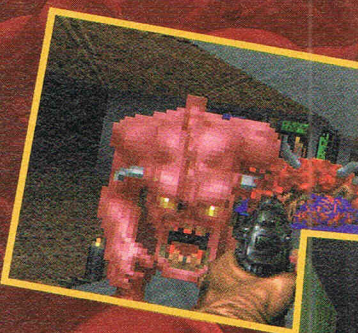
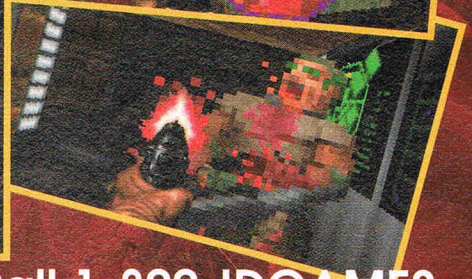
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Requires a 386DX PC compatible or better; hard disk drive; VGA graphics; 4 Megabytes of memory. A 486 is recommended. Multiplayer options require a network which uses the IPX protocol, a modem, or serial link. Digitized sound effects require a 100% Sound Blaster™ compatible card, Gravis Ultra Sound™, or Pro Audio Spectrum™-16. DOOM is a trademark of id Software, ©1993. Other trademarks are the property of their respective companies.

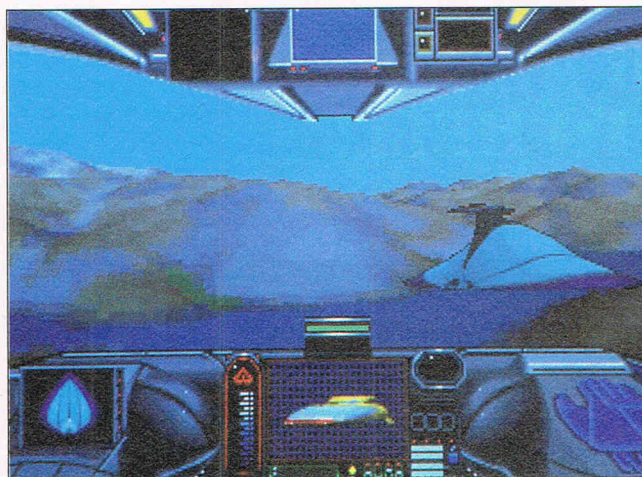
CYBERRACE

Some games just beg to be liked, regardless of any inherent flaws. *CyberRace* is one such product, a stunning 3-D racing simulation determined to win your gaming affections despite several puzzling imperfections. Published by Cyberdreams, this is the company's second title to employ a famous artist for its design foundation. The first, *Dark Seed*, captured the surrealistic imagination of painter H. R. Giger; *CyberRace* draws upon the futuristic visions of Syd Mead, set designer for such films as *Blade Runner*, *Tron*, and *2010*.

The story is set in a far-off future, where interplanetary war has been replaced with the less destructive—but no less hostile—competition known as *CyberRace*. Contestants pilot sleek, heavily armed hovercraft-style vehicles at high speeds over forbidding desert and mountain terrain. To win, you must stay on course, maintain speed, avoid attacks by alien opponents, and dish out punishment of your own. You play the part of Clay Shaw, forced to compete for your unscrupulous government, which holds your girlfriend hostage. Each race nets various credits which can be used to upgrade your vehicle or buy black-market services. Bonus credits are earned for completing certain prerace goals, such as eliminating specified drivers during the race. The branching story line changes according to how well you do.

The first-person race graphics are spectacular, featuring incredibly realistic landscapes that are rendered with Voxel technology—the same graphic style

used in NovaLogic's *Comanche: Maximum Overkill*. At the lowest detail level, the game screams with such speed that, on a fast 486 system, it's almost unplayable. Curiously, when detail levels are set to medium or high, the same system slows to a crawl. There appears to be



CyberRace lets you race around dazzling Voxel-rendered landscapes that look great but can be confusing.

no workable middle ground. The actual race is an exercise in mass confusion. The track—outlined by tiny holographic lights—snakes wildly about the terrain. With dozens of other opponents, air mines, missiles, and constant explosions, staying on track is a major chore. Persistent gamers will eventually get the hang of it, although the rewards rarely seem worth the effort.

The CD-ROM version adds speech to the game, but it does little to enliven the terribly stiff character interaction between races. CD-ROM users will also find the game technically unfriendly, running only from a bare boot disk, sans memory managers, with at least 550K of free base memory. This leaves almost no room to load necessary CD-ROM

drivers, let alone memory-resident sound card drivers. How ironic that a game that feigns cutting-edge design should be so technically backward!

Is it possible to like a game but not really enjoy it? *CyberRace* proves that it is. It's handsome, technological-

will find it worth looking into.

Paradox makes creating and modifying databases simple. It lets you view your data as tables, forms, and even graphs. Improved mouse support in this release makes it easier than ever to change table column widths, place and resize fields in reports and forms, and move around in the database using scroll bars.

Paradox 4.5 has two user interface modes, full-screen and standard. In the latter, you can display your data in 80 × 43 or 50 lines (EGA or VGA resolution, respectively), and with ten popular video cards, you can use an information-packed 132 × 43 display mode. This makes working with large records faster and simpler.

Getting information into and out of Paradox is effortless, and there are plenty of options for ensuring data integrity. Paradox can import and export Quattro, Quattro Pro, 1-2-3, Symphony, dBASE, PFS:File, Reflex, VisiCalc, and delimited ASCII files.

Paradox uses query-by-example to provide information. Just check the columns you want to appear in an answer table and enter an example of the data you'd like to see (such as *MS* in the State column).

Paradox lets you record keystroke macros as editable scripts for subsequent playback. You can chain several together; add them to the Utilities, Report, or Forms menu; or include them in database applications.

Application Workshop lets nonprogrammers create database applications. You create menus and then tell Application Workshop what each menu item should do (play a script, display a table, and so on). Application

ly advanced, and intriguing, but it ultimately fails to realize its true potential.

SCOTT A. MAY

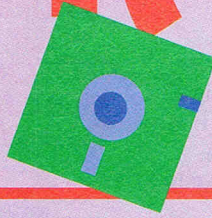
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PARADOX 4.5

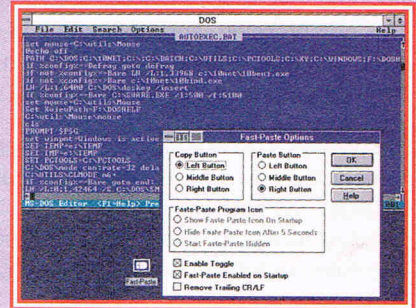
As much of the market begins to shift to Windows for database management, Borland continues to support those who prefer to do database management under DOS. The company didn't abandon its DOS release when it released Paradox for Windows, and DOS users who've been using previous versions will find Paradox 4.5 worth the upgrade fee. Any DOS user who needs a relational database

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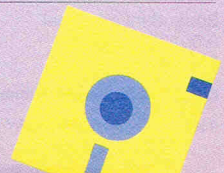
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Workshop actually writes the program code for you.

Version 4.5 adds a new windowed debugger and over 40 new commands to the already robust PAL programming language. Twenty-six existing commands are enhanced, including WAIT, which has 19 new triggers.

Paradox is also available in an excellent Windows version (which can share data with the DOS version). It's a similar but separate product with its own programming language. Paradox for DOS runs fine as a DOS application under Windows.

Paradox is a great product. It's easy to start out with, powerful enough to stay with, and network-ready. Version 4.5 takes a solid product and makes it even better. If you're still using DOS, check it out.

J. BLAKE LAMBERT

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110 COMPUTE MAY 1994



SSI's Fantasy Empires is the first computer-based Dungeons & Dragons game that features a visible dungeon master.

FANTASY EMPIRES

I sat down to evaluate SSI's Fantasy Empires, a Dungeons & Dragons-style game of territorial expansion and medieval combat, and was kidnapped by a villain and taken to the wee hours of the morning. At least, that's the only way I can figure that it went from 6 p.m.

to 2 a.m. so quickly.

Fantasy Empires is that addicting. More like the board game Risk than D&D, Fantasy Empires pits you against one to four opponents (human or computer) in your quest to unite the 98 kingdoms of Mystara.

Your empire starts small, with just one kingdom, and expands with your capture of neighboring territories. The more territories you ac-

quire, the more revenue you generate. More money means more troops, which in turn help you gain even more territories.

Money also buys temples for clerics and magic users, castle fortifications, and troop-building armories, among other things. The troops themselves are standard D&D fare: fighters, elves, dwarves, orcs, and so on. Elite troops, called heroes, may be sent on quests to unearth magical goods.

At some point during your expansion, you'll bump into an opponent (or vice versa), and that's when the fun begins. In combat you can let the computer simulate the melee, or you can storm the battlefield for some hand-to-hand hacking and slashing. The latter, while fun, can be frustrating. You control one of your warriors; the rest of your crew carries out predetermined attack orders. When your warrior confronts a foe, you can do little



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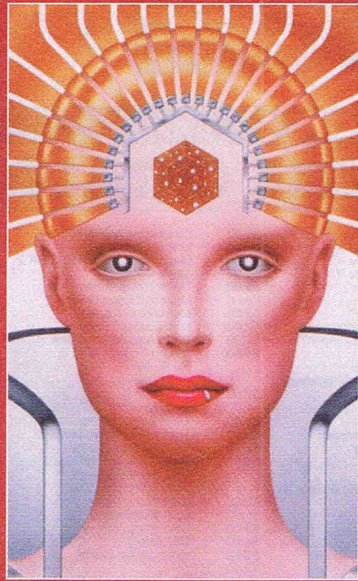
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REVIEWS

more than hold the joystick button while the two hack at each other. These simple and often lengthy encounters detract from an otherwise exciting arcade sequence.

Overseeing the map-based portion of the game is the dungeon master himself, who resides at the top of the screen and mediates gameplay. He also provides verbal guidance when you falter and even takes a snooze if you wait too long to make a move.

Aside from that bit of levity, Fantasy Empires is a serious game of strategy and arcade action, one you won't win in one sitting. Great graphics, sound, and gameplay make Fantasy Empires an addicting winner.

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ICOM Simulations' mixed-bag Windows game, Uninvited, wastes no time casting you into the thick of the plot. You awaken at the wheel of your car, which has plowed into an oak tree on someone's front lawn. Your brother, who was riding shotgun, is nowhere to be found. He must've gone into that spooky old mansion to find a phone. Ah, well, you'll just have to go in and fetch him . . .

So begins ICOM's graphical adventure. To locate your brother and escape from what proves to be a very haunted house, you'll need to explore the place and gather various magical knickknacks, occasionally contending with a few bogeymen.

Standard stuff, and tedious after a while. Yet Uninvited shines with its trite but compelling reminders that your brother is still missing. If nothing else, the game keeps you going just so you can see what the guy looks like.

Featuring 256-color graphics and some nifty sound effects, Uninvited will occasionally give you chills, but it may prove dull for more action-oriented gamers. If you're into mysteries, on the other hand, settle in for a fun, campy adventure. Since it runs under Windows, it can provide a welcome break when you grow frustrated with productivity.

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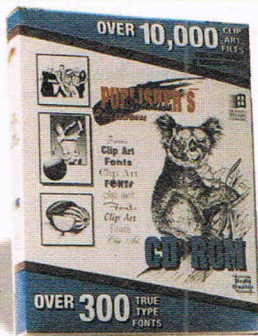
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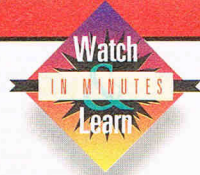


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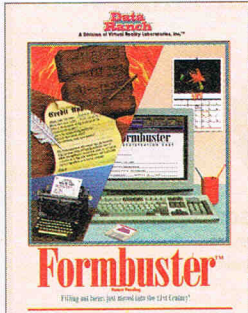
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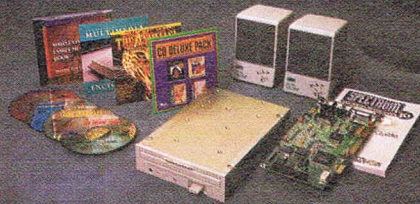
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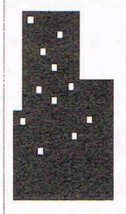
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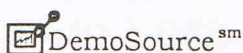


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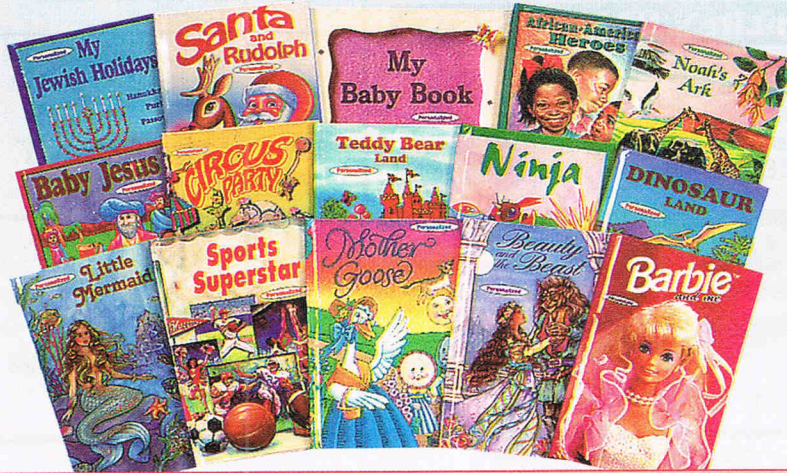
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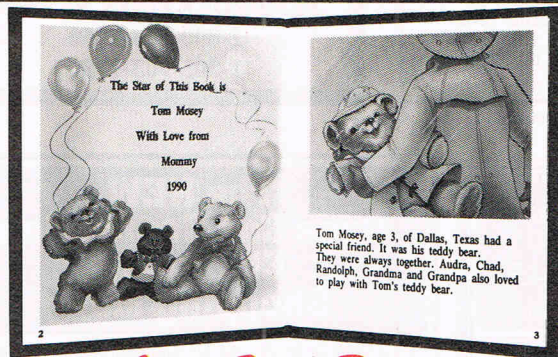


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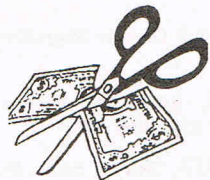
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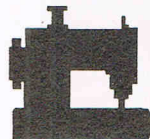
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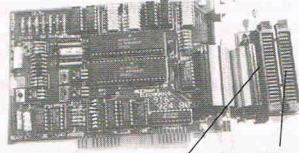
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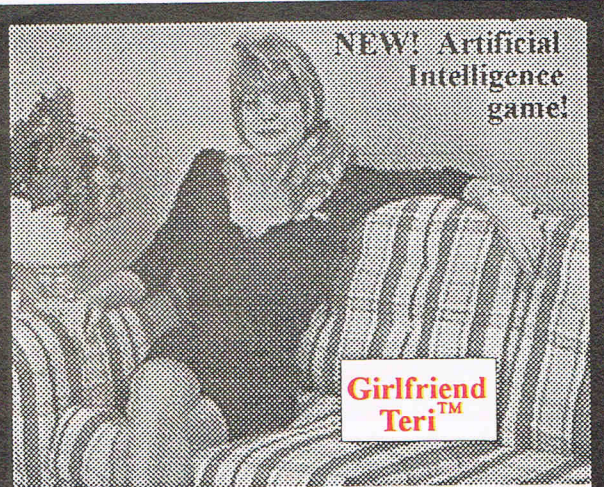


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(continued from page 128)

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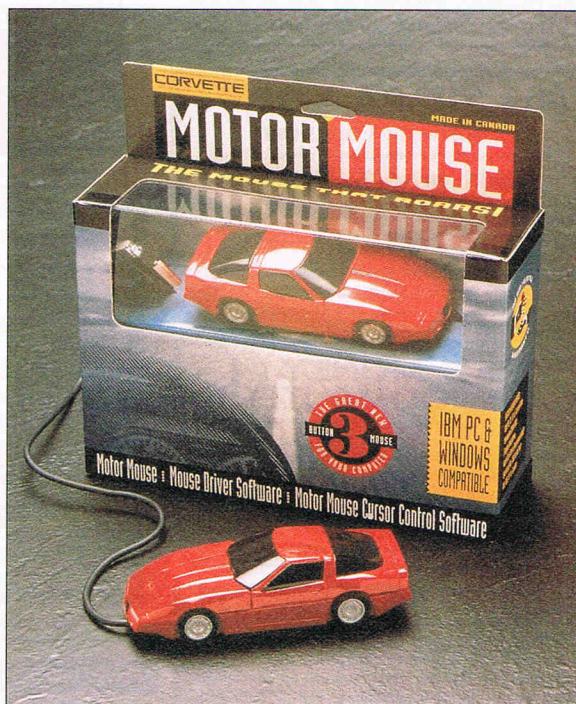
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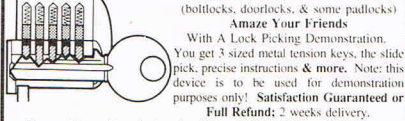
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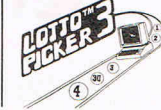
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NEWS & NOTES

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want to bother with moving a mouse, a Menu Mouse feature allows you to use the space bar (replacing the Alt key) to access pull-down menus—again without ever taking your fingers off the letter keys. You should be able to increase your productivity by as much as 30 percent using this keyboard, according to tests conducted by Jefferson Computer. Contact the company at 23454 25th Avenue South, Des Moines, Washington 98198; (206) 824-1111, (206) 824-0941 (fax).

Grab a Card, Any Card

Here's a neat way to organize all those business cards you collect: Turn them into a database with the CardGRABBER from Pacific Crest. You simply slide a business card into the CardGRABBER's scanner. Seconds later, the software displays an image of the card on-screen with the person's name, title, company, address, phone, fax, and other information entered automatically into the appropriate field in a Windows-based address book that you can search, customize, sort, and print. The plug-and-play system connects to any desktop or notebook PC by hooking a cable to the parallel port. The suggested retail price is \$349. Contact Pacific Crest Technologies, 4000 MacArthur Boulevard, Suite 6800, Newport Beach, California 92660; (800) 870-3391, (714) 261-6468 (fax).

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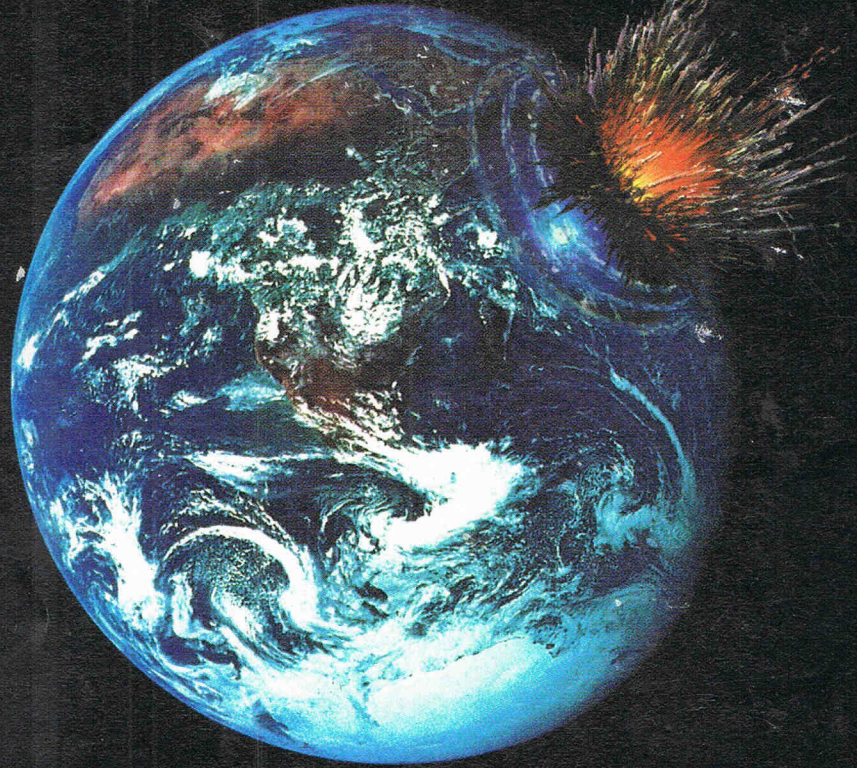
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