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(SEE PAGE 49)**

**7 KEY TECHNOLOGIES TO WATCH IN 1993
POWER STATIONS! 10 VALUE-PACKED 486SX's**

COMPUTE

JANUARY 1993

25 BEST PRODUCTS OF THE YEAR

- 11 PRODUCTIVITY PACKAGES
 - 6 HARDWARE PRODUCTS
 - 8 ENTERTAINMENT TITLES
 - 2 SPECIAL TECHNOLOGY AWARDS
- AND THE ENVELOPE, PLEASE ...**

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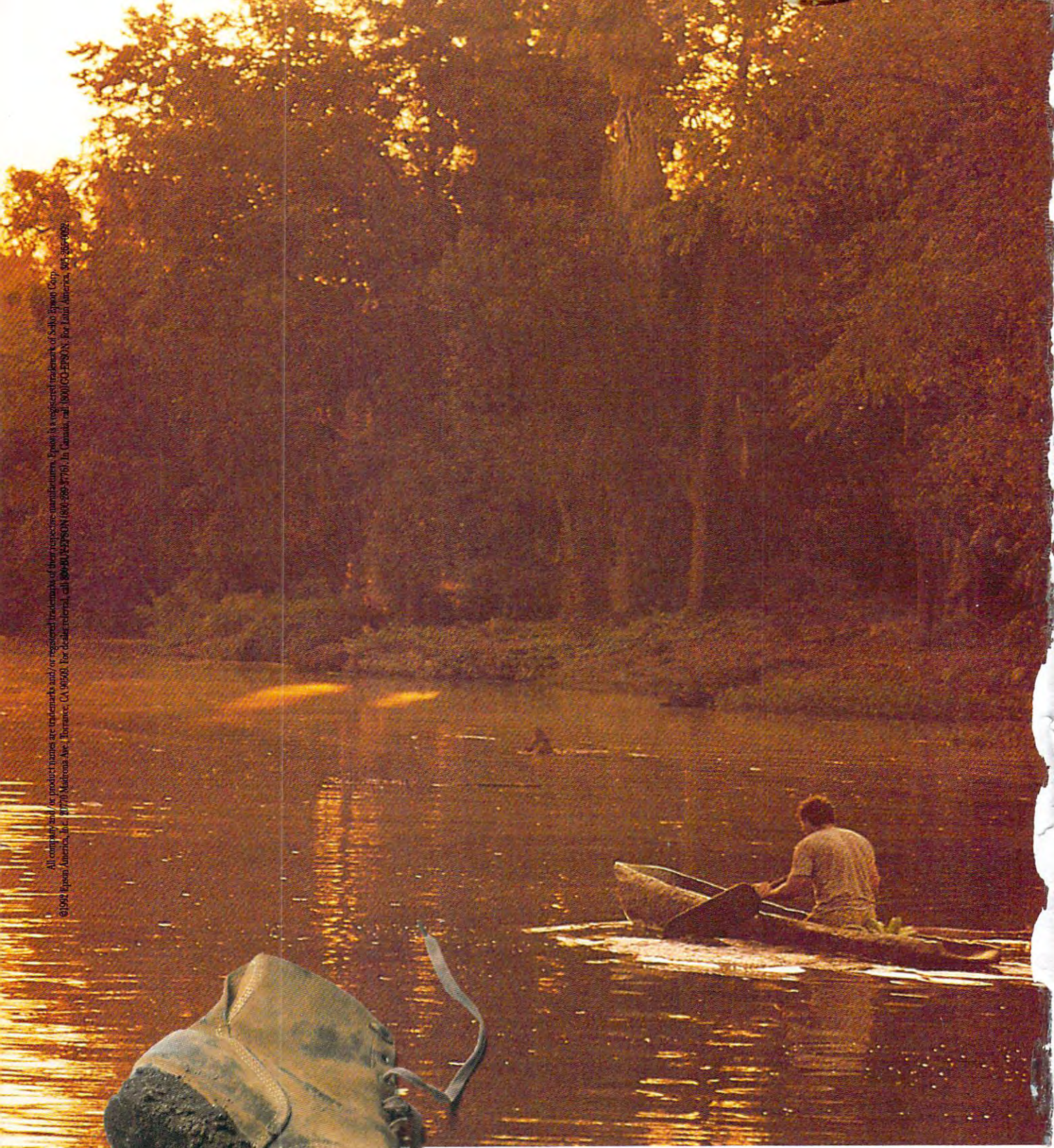


**HOT
WINDOWS STUFF!**

- AMI PRO 3.0
- MICROSOFT SOUND SYSTEM
- BORLAND C++ 3.1



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COMPUTE

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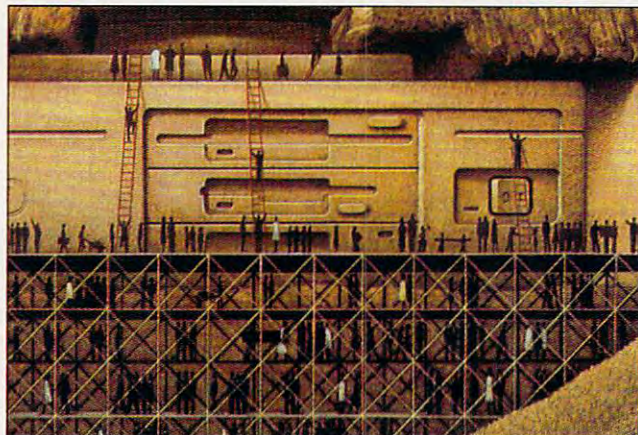
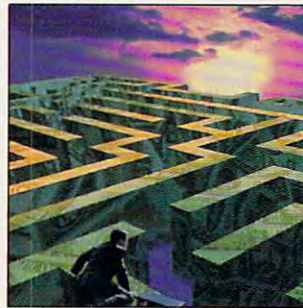
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Clifton Karnes

January is a time for celebration and reflection, and here at COMPUTE we're doing both. We're reflecting on the best hardware and software products of 1992, and we're celebrating the winners with our annual COMPUTE Choice Awards.

If you're new to COMPUTE, here's some background on the awards. Each year, COMPUTE's editors and writers nominate the hardware and software products that they think are the year's best. We study the nominations, and from that list, we choose what we think are the top products.

For this year's awards, we selected 25 categories, everything from Best Word Processor to Best Laptop/Notebook Computer to Best Arcade Game. We took nominations from COMPUTE's editors and writers, and when the smoke cleared, we had a list of 131 products. This list of nominees comprises what we feel are the best products going—a Who's Who of PC software and hardware. And from this group of top contenders, we chose the best of the best.

**This year's
COMPUTE Choice
Awards honor
the 25 best hardware
and software
products of the year.**



Choosing the winners is tough every year, but this year it was harder than ever. The reason is simple: Software and hardware products keep getting better and better. Each year they're more sophisticated, more powerful, and easier to use. And in fact, in one instance, Best Desktop Publishing/Graphics Program, we had to go with a tie.

The point I want to make is that almost all these races were photo finishes. I don't want to take anything away from the winners, but I'd like to stress that being nominated is the real honor. To bring this point home, in this year's Choice Awards feature, we're listing the nominees in each category along with a reader service number for each, so you can get more information about them if you're interested. This is something we've never done before, but we want to recognize the nominees as well as the winners.

We've also added a special technology award this year, and we have two winners: the PCMCIA interface and the VESA local bus. Both of these exciting new technologies are really bus innovations: PCMCIA gives a notebook computer the same expansion options as a desktop, and the VESA local bus offers blinding speed for video. In the future, local bus will make hard disks and almost anything else that normally fits in a slot on your PC lightning fast.

One other aspect of the COMPUTE Choice Awards deserves special mention: our time frame. You may find yourself looking at these products and wondering why something that appeared in December, for example, wasn't nominated. There are several reasons for this. The first is that the January issue actually ap-

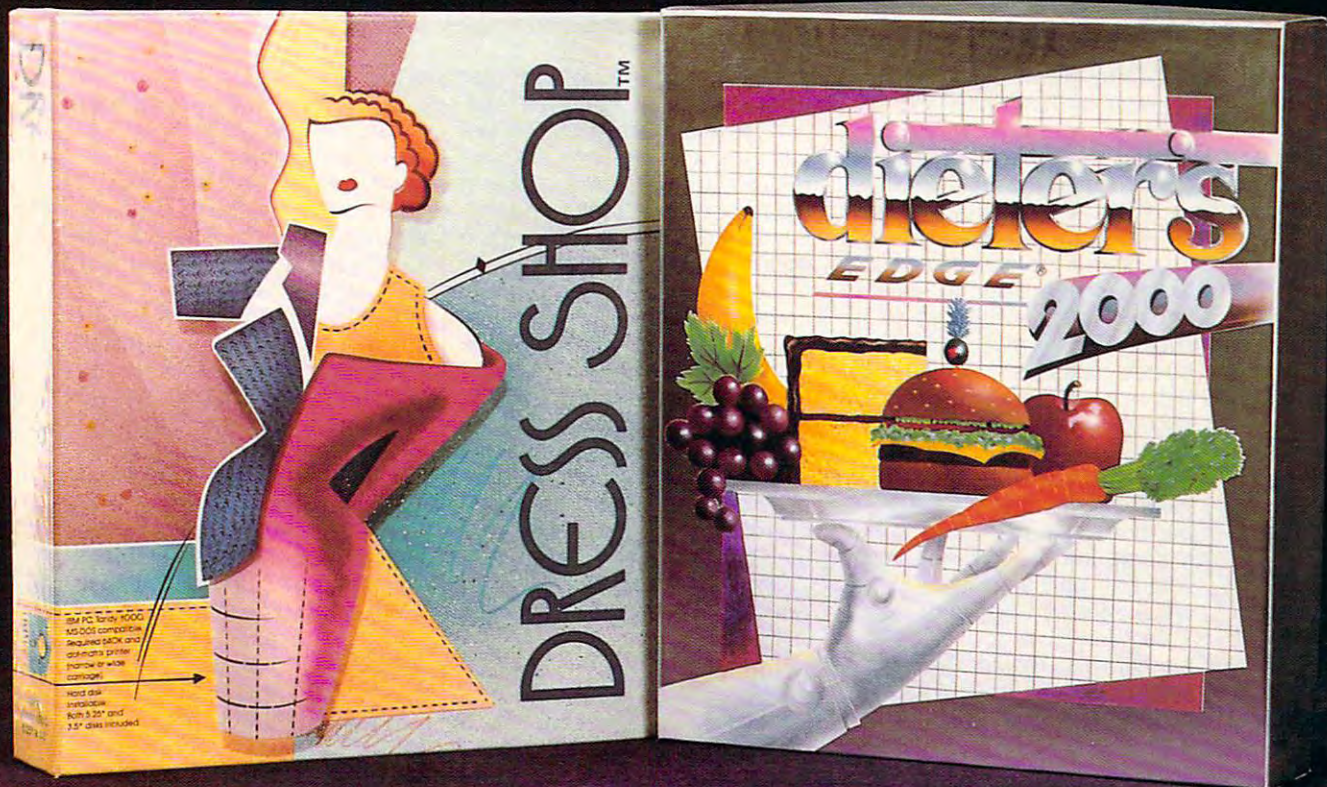
pears on the newsstand on December 15 and goes to subscribers even earlier. We also need at least one month to evaluate any new products for award consideration. Add to that the time it takes to actually produce COMPUTE, and you have a lead time of a few months. For this reason, we've decided to adopt an award year that runs from September 1 to September 1—roughly the same year the auto industry uses.

It's also worth noting that while we allow editors to nominate software products still in beta (prerelease version of the soon-to-be-shipping software), we made a new ruling for this year's awards that only shipping products could win. This eliminated several superb pieces of software, but they'll have a chance at next year's awards.

The last point I'd like to touch on is the categories we chose. The 25 award categories are based on the types of software and hardware that we feel are important to you, our readers. Where do we get the input on what's important to you? From lots of sources, but the most important is from the readership surveys that we run twice a year. In these surveys you tell us not only what you like about COMPUTE and what you'd like to see changed but what types of software and hardware you're interested in. You can see from this how important these surveys are to us at COMPUTE.

In this issue, you'll find 1993's first readership survey to sound off with. Let us know what kind of hardware you have. The software you're using. What you'd like to read about. And, in the comments section at the end, tell us what you think of the COMPUTE Choice Awards. Your vote counts! □

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TEST LAB

Edited by Mike Hudnall
Reviews by Tom Benford

They're powerful, fast, and capacious, these 486SX systems. And undeniably tempting. I know: It's easy to get caught up in the hype and the statistics, for the pulse to quicken and the mouth to water when the subject turns to megahertz, megabytes, megathis, and megathat. But rest assured that buying a 486SX system makes sense.

This month, Test Lab focuses on ten 486SX systems that offer value, power, and room for expansion. It's a great time to buy a computer, and this month's Test Lab can help make you a more informed consumer.

To see just what a great value these systems are, consider the four 386SX systems we covered in the April 1992 Test Lab. List prices ranged from \$1,195 to \$2,348. Less than a year later, eight of the ten 486SX systems featured here have list prices below that of the most expensive 386SX. Decreases in microprocessor prices and increased competition among computer manufacturers have made this very much a buyer's market.

This month's systems offer more than attractive prices, however. They deliver considerable bang for the buck. The 486SX microprocessor has a 32-bit path internally and externally (unlike the 386SX, which has only a 16-bit external path), it runs faster than the 386s we tested, and it contains a highly efficient internal cache.

The only difference between the 486SX and the 486DX is that the 486SX lacks the latter's built-in math coprocessor. So powerful is the 486, in fact, that we had to redesign our application bench-

marks so that they would offer more statistically significant data.

If you're put off by technical discussions and prefer to examine real-world results, take a look at the Test Lab bar graphs. The Norton system benchmarks and the application benchmarks offer realistic pictures of relative performance. You can see, for example, how a particular 486SX system handles a word processor, a spreadsheet, and a database. These benchmarks prove especially useful, however, because they reflect the overall performance of a particular system—the microprocessor, hard drive, and memory all working together.

The system components that work in concert with the powerful

of the systems allow you to install 64MB of RAM, and five others let you install up to 32MB. Several of the systems allow you to upgrade the microprocessor to a 486DX, and most allow you to upgrade the memory on the video adapter if it doesn't already come with a full megabyte of memory.

If the internal cache isn't enough, some of the systems let you add an external cache—up to 256K. Clearly, these system manufacturers are looking to the future, planning for applications that make greater and greater demands on system memory and storage. For all of the distinctive features of these power machines, look to the reviews, which also comment on document-

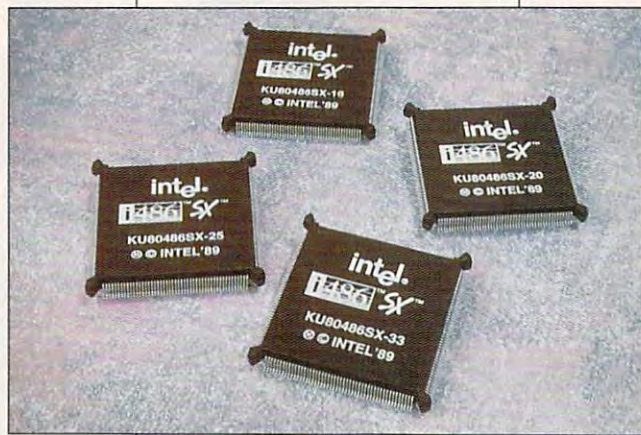
ation, installation, drive bay options, open slots, and many other features you'll want to check out before you buy. For convenient side-by-side comparisons, there's also a features grid.

Most of these systems come standard with Windows 3.1, and you'll really appreciate the snappy performance of Windows

apps on these systems. While a number of Windows programs will work on a 386SX running at 16 MHz, their lack of speed can leave you frustrated, especially if you've had a chance to try the same programs on a 486. For sizzling performance, three of this month's systems offer local bus video.

These 486SX systems pack so much power, performance, and value that your only question may be which system to buy. With reviews, benchmark data, and detailed information about system features, Test Lab can help you make that decision.

MIKE HUDNALL



CUMULUS WORKBOX 486SX/20

If you're in the market for a good entry-level 486SX system that comes ready for work right out of the box, take a look at the Cumulus WorkBox 486SX/20.

With a baby-AT form factor, the WorkBox fits comfortably on the desktop and provides a stable platform for the monitor. The clean, uncluttered front of the unit features a recessed power switch; unobtrusive LEDs for power, floppy drive, and hard drive activity; a keyboard key lock; and a single 3½-inch high-density floppy drive.

This system comes with a 120MB IDE hard drive. The system supports RAM expansion from the standard 4MB configuration up to a maximum of 16MB. For adding peripheral devices to the system, you'll find six available expansion slots.

Cumulus supplies a 16-bit Super VGA adapter populated with 512K of video RAM and fea-

CUMULUS
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List price: \$1,598
Warranty: one year

turing the Trident TVGA-9000 graphics chip. This board can display 16 colors at 1024 × 768 resolution in interlaced mode (but not noninterlaced mode), which is limiting for those users who desire a 256-color palette in the extended VGA ranges.

The CPU is an i486SX running at 20 MHz. If you discover you need more power later, you can install a coprocessor or replace the microprocessor with one of Intel's new upgrade chips.

The WorkBox comes standard with 4MB of RAM on the motherboard, and you can expand up to 8MB directly on the motherboard itself, but expansion beyond that point requires an auxiliary memory board that mounts in a dedicated expansion slot. The memory board is standard equipment



with the WorkBox, but you must fully populate it with 8MB (in eight SIMMs) before the system will recognize the additional board. The system supports configurations of 1MB, 2MB, 4MB, 8MB, or 16MB (but not 10MB or 12MB). Installing the expansion board is quite a simple affair; once you install the SIMMs in their spring-clipped retainers, the expansion board merely slips into the dedicated slot on the motherboard and doesn't require any additional attention.

Cumulus also provides a socket to accept either an Intel or a Weitek 487SX/20-MHz math coprocessor. If you'll be working frequently with spreadsheets, graphs, or other operations that perform complex mathematical calculations, adding a math coprocessor makes a great deal of sense.

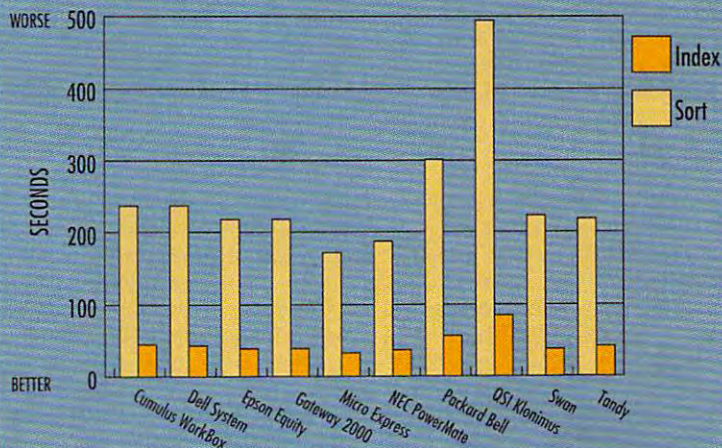
The WorkBox ships with MS-DOS 5.0 and Windows 3.1 already loaded on the system's hard drive, as well as floppy copies with concise versions of the manuals. To get you off to a productive start immediately, Cumulus includes Microsoft Works 2.0 in the WorkBox software bundle, along with video and system utilities.

A two-button Cumulus serial mouse and a comfortable 101-key audible-click keyboard round out the system's standard equipment. Add the monitor of your choice, and you're ready to enter the world of 486SX computing.

Circle Reader Service Number 272

DATABASE TESTS

Our database tests use a 25,636-record database (each record contains 32 fields) which is not indexed. The Index Test records the elapsed time required to index the entire database on a single primary field. The Sort Test times how long it takes to sort this database on a secondary field and create a sorted database.



TEST LAB



DELL SYSTEM 486D/25

A machine with a future is what Dell engineers obviously had in mind when they designed the 486D/25. This system provides plenty of room for expansion as your requirements grow.

The mid-size system case stands a full six inches tall from the desktop, and its excellent interior design allows for six full-length 16-bit expansion slots. Since the drive controller circuitry and the video adapter are integrated into the motherboard itself, slots that would otherwise be occupied by cards for these two essential functions are available for adding user peripherals instead. With so many of today's PCs suffering from "board cramp" because of small case designs, it's refreshing to see a machine that provides plenty of room for expanding the system.

Upgrade the i486SX/25 central processing unit simply by replacing it with a 33-MHz i486DX or faster CPU. And for doing CAD, number crunching, or other tasks that require the extra computational power and speed, you can use the motherboard socket for an optional 25-MHz i487SX math coprocessor. Of course, if you upgrade the CPU to a DX chip, the math coprocessor is built in.

DELL COMPUTER
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(512) 338-4400
List price: \$2,319
Warranty: one year, parts and labor

The standard video setup for the 486D/25, an integrated 16-bit VGA adapter with 512K of video RAM, can be upgraded to a full megabyte of video RAM (an option available for \$49), which transforms the video into a 32-bit system capable of displaying 256 colors at a resolution of 1024 x 768 or 32,768 colors at 640 x 480. The video refresh rate is 70 Hz, non-interlaced, for a crystal-clear display without flicker, whether you're dealing with text or graphics.

The 486D/25 comes standard with 4MB of RAM, expandable to a maximum configuration of 64MB directly on the motherboard itself, so there's plenty of room for growth here, too.

The review unit came equipped with an 80MB IDE hard drive installed, but you can have the 486D/25 factory-configured with larger hard drives in a variety of "flavors": 100MB, 200MB, and 320MB IDE drives; 330MB and 650MB ESDI drives; and 200MB, 330MB, 650MB, and 1.4GB SCSI drives are also available as options.

A Microsoft two-button bus mouse that connects to the 486D/25's PS/2 mouse port came supplied with the review unit, although Dell also gives you a choice of a Microsoft serial mouse, a Dell serial mouse, or a Dell System (PS/2-compatible) mouse. Other options include various tape backup devices and an internal 2400-bps modem.

MS-DOS 5.0 came preinstal-

led, and you can buy the system with or without the operating system disks. If you wish, you can get the 486D/25 with IBM's OS/2 operating system.

I rate Dell's documentation excellent—clearly written and well illustrated, with good organization and layout. Finding particular information about the system's features, settings, and options is easy.

You'll find using the 486D/25 a pure delight, thanks to its excellent Dell Ultrascan monitor and superb 101-key keyboard with great tactile feedback. The i486SX CPU provides snappy performance, which is perfectly mated to the system's fast IDE hard disk. Dell's SmartVu system diagnostics LED display is mounted right on the front of the machine above the conveniently located power and reset switches; it keeps you abreast of system conditions and operations (represented by numeric codes) at all times.

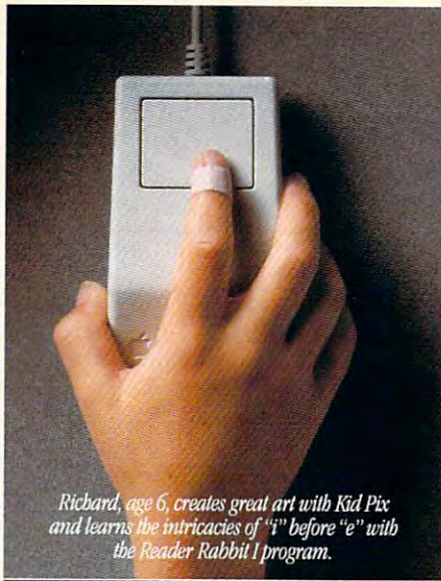
If you expect your present computing needs to grow (and who doesn't?), then you should seriously consider the Dell System 486D/25. This is definitely a machine with a future.

Circle Reader Service Number 273

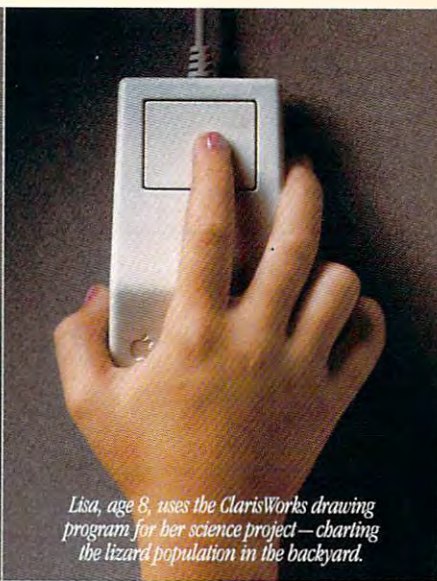
EPSON EQUITY 486SX/25 PLUS

Epson's Equity 486SX/25 Plus offers an attractive combination of 486-based power, integrated components, and room for expansion in an AT-sized desktop case.

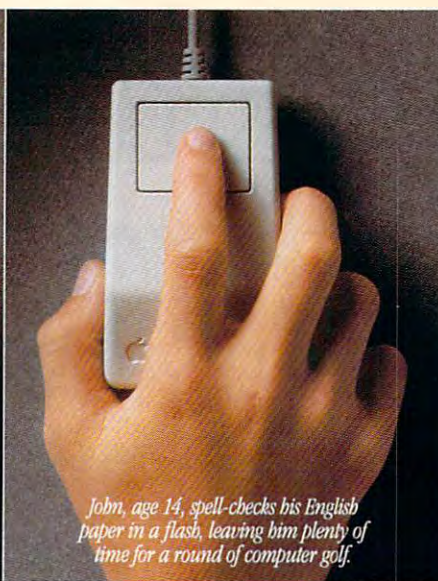
An Intel 80486SX CPU running at 25 MHz provides the computing power on the motherboard, which comes with 4MB of RAM as its standard configuration. One of the unique features of this motherboard is that Epson permanently soldered the RAM into the assembly rather than using removable DRAM chips or SIMMs. You can expand memory 12MB above and beyond this 4MB foundation by using either 256K or 1MB



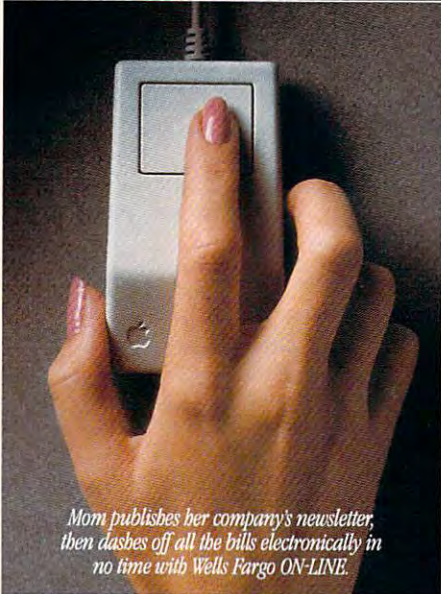
Richard, age 6, creates great art with Kid Pix and learns the intricacies of "i" before "e" with the Reader Rabbit I program.



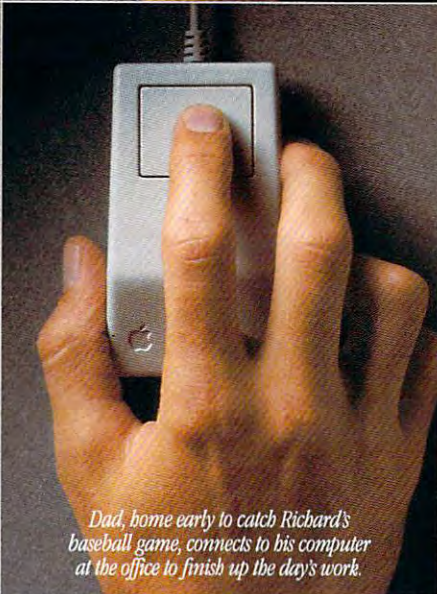
Lisa, age 8, uses the ClarisWorks drawing program for her science project—charting the lizard population in the backyard.



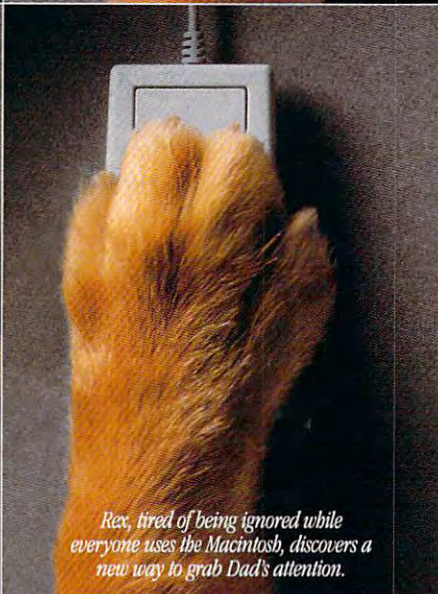
John, age 14, spell-checks his English paper in a flash, leaving him plenty of time for a round of computer golf.



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Dad, home early to catch Richard's baseball game, connects to his computer at the office to finish up the day's work.




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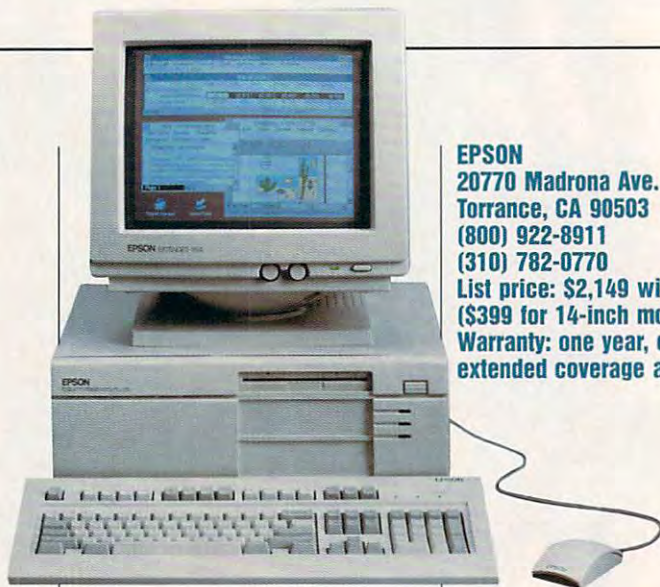


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TEST LAB



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Warranty: one year, on-site;
extended coverage available

SIMMs to achieve a maximum configuration of 16MB. For those computation-intensive applications, just add an 80487SX math coprocessor chip in the slot provided on the motherboard.

In keeping with the current design trend of high-scale integration, Epson has built all of the essential controllers and I/O channels into the motherboard itself, thereby leaving the six expansion slots (five 16-bit, one 8-bit) vacant and available for installing any peripheral cards the user desires. So on the motherboard itself, you'll find the floppy and IDE hard drive controllers as well as the serial, parallel, keyboard, and PS/2-style mouse ports.

The tall case affords a generous amount of room for adding devices in the mass storage bays. The case can accommodate up to five drives in various combinations. The review unit came with a slimline 3½-inch drive mounted topmost in the cabinet, leaving two front-accessible half-height bays available below it. The system's 240MB hard drive is internally mounted inside the case, where you'll find space for adding another unexposed device as well.

The VGA adapter built into the motherboard gets a performance boost from the 1MB of video RAM. The adapter is capable of noninterlaced mode only in 800 × 600 or 1024 × 768 resolutions

with a 16-color palette. The 256-color palette is supported only in 640 × 480 mode, and for resolutions over 640 × 480, you'll need a multifrequency monitor. This is an unfortunate limitation, since you'll have to purchase an aftermarket high-resolution video card if you want 256 colors or more to be displayable at the higher resolutions.

A large 101-key keyboard with audible click provides a comfortable means of inputting data and commands to the system. In ad-

dition to the usual illuminated lock indicators and a top-mounted row of 12 function keys, this keyboard also provides dedicated editing, cursor control, and numeric keypads. The slope and contour of the keyboard are excellent—it's clearly one of the more ergonomically pleasing keyboards I've used.

Both MS-DOS 5.0 and Windows 3.1 come preinstalled on the system's hard drive, and the floppy copies of the programs and full user manuals are also provided. Additional system software consists of a reference disk and three utility disks, all supplied on 3½-inch media.

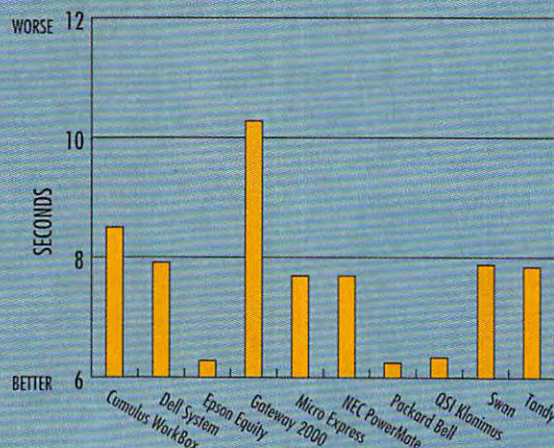
The documentation for the Equity is up to Epson's usual standards for clarity and completeness. I found both the user's manual and the reference guide well organized, clearly written, and rich in illustrations and diagrams.

Overall, the system provides a solid foundation upon which you can expand to meet your future needs while providing an adequate amount of workhorse muscle for today's tasks.

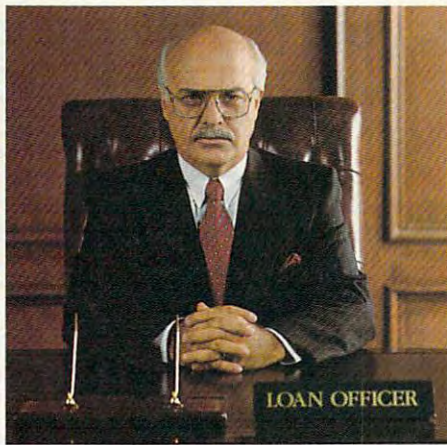
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TEST LAB



GATEWAY 2000 486SX/25

Editor's note: After our laboratory had completed its testing and this review had been written, Gateway announced an updated version of this 486SX system. According to a Gateway representative, the new system will be the same as the system reviewed here, except that it will have a new case (16 x 16.25 x 4.25 inches), offer an optional 340MB IDE drive, use a 1MB DRAM Western Digital video adapter, and offer Microsoft Works as part of the standard package. The price of the new system will actually be lower—\$1,495—when this issue of COMPUTE appears. Please keep in mind that the benchmarks for Gateway reflect the performance of the reviewed system and, because Gateway changed the video adapter, may not reflect the performance of the new system for the graphically oriented tests.

These days quite a few people are unpacking boxes with a distinctive cow-print exterior, and I don't think it's because of Gateway's catchy advertisements. Rather, it's because Gateway knows and delivers what consumers want: quality components, competitive prices, and lots of options. A case in point is this 486SX/25 machine.

The review system came outfit-

GATEWAY 2000
610 Gateway Dr.
N. Sioux City, SD 57049
(800) 523-2000
List price: \$1,795
Warranty: one year, parts and labor

ted with an Intel i80486SX/25-MHz CPU installed on a motherboard manufactured by Micronics, a well-respected name in the industry. The SIMM sockets on the motherboard come populated with 4MB of RAM as the standard configuration, which you can expand to a maximum of 32MB by replacing the standard 1MB SIMMs with 4MB SIMMs. If you need more computing power, just plug a math coprocessor into the socket provided on the motherboard.

The CPU includes an 8K cache, and you can expand this by having an optional cache card installed in the machine. With the card, external caching in sizes of 64K, 128K, or 246K is possible.

Gateway uses top-grade components when it puts a system together, as evidenced by the well-known OEM names: Epson floppy drives, a Western Digital IDE hard drive, an ATI video card, and a Micronics motherboard. Such choice elements endow the system with excellent performance and reliability.

You get two 8-bit and six 16-bit expansion slots on the system board, but only four are available in the standard configuration. For most users this should prove adequate, but if you need more expansion room, you can order the 486SX/25 in a tower case instead of the AT-sized desktop case.

The proprietary Gateway keyboard sports 124 keys. One set of 12 function keys lines the top of the keyboard, and another set forms a double column at the left of the main keyboard. The board includes dedicated keypads for editing, cursor control, and numeric operations, along with three il-

luminated lock indicators and a program LED. You can program the additional keys using the provided software utility to execute macros or use any alternate characters you want.

An ATI Graphics Ultra adapter provides superb 1024 x 768 resolution with 256 colors on the 14-inch high-resolution Gateway CrystalScan noninterlaced monitor that accompanies the system. Color saturation, text resolution (even at small sizes), and overall video display performance were a pleasure to view during the review.

The full-size case provides plenty of room for adding devices such as a hard drive or a tape backup unit. And you'll have plenty of opportunity to customize: Gateway will alter the base configuration to meet your specifications. That's an important factor to consider if you have a special need and can't find a standard model from other manufacturers that has just the configuration you want.

The performance of the system is just what you'd expect when quality is the main consideration in building the machine. The 486SX/25 handles text and graphics applications from both DOS and Windows with ease. MS-DOS 5.0 and Windows 3.1 come pre-installed on the hard drive, and the floppy copies and full manuals are also provided. The user manual, customer support guide, and other included documentation provide a wealth of information in an easy-to-understand format.

If you're looking for a 486SX/25 system with plenty to offer, including options, you'll want to consider the Gateway 2000 486SX/25.

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TEST LAB



MICRO EXPRESS 486-LOCAL BUS/SX/25

As Windows and other GUIs continue to dominate the majority of new software programs, we can expect to see more and more machines using local bus video

MICRO EXPRESS
1801 Carnegie Ave.
Santa Ana, CA 92705
(800) 989-9900
(714) 852-1400
List price: \$2,600 (as reviewed)
Warranty: two years, parts and labor, limited

architecture to provide video performance commensurate with the demands of these applications. Micro Express is responding to these demands with its new local bus-equipped 486SX system.

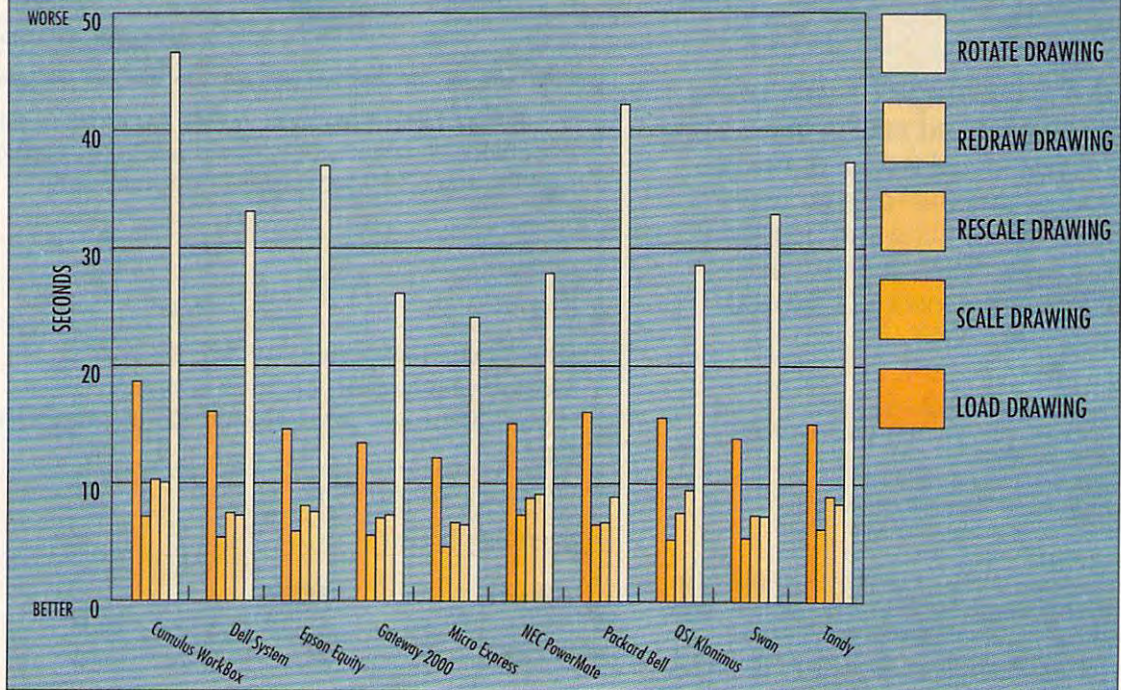
The standard configuration for this system consists of a desktop case equipped with dual floppy drives, a 170MB IDE hard drive, 4MB of RAM on the motherboard, a Super VGA color monitor, and a mouse, along with DOS 5.0 and Windows 3.1. You get all of this

for \$2,175. The system sent for review deviated from this standard base configuration, however, in that it was housed in a minitower case and had a 425MB Quantum IDE hard drive, which increased the price by \$324. All of the other components were the same as for the desktop configuration, including the 4MB RAM complement.

In addition to providing plenty of room for installing additional devices and peripherals, the minitower case provides alternative positioning options that aren't available with desktop cases. For example, with a minitower configuration you can place the system unit next to your desk rather than on top of it to help alleviate clutter and desktop congestion. Of course, it also fits on the desktop itself without taking up much additional room when positioned

CAD TESTS

For the CAD tests, we used Drafix Windows CAD 2.1 to assess the system's ability to handle complex vector-based graphics based on computed mathematical coordinates. The tests time how long the system takes to load a target drawing, to alter its default scaling to two different ratios, to redraw the drawing, and to rotate it 359 degrees.



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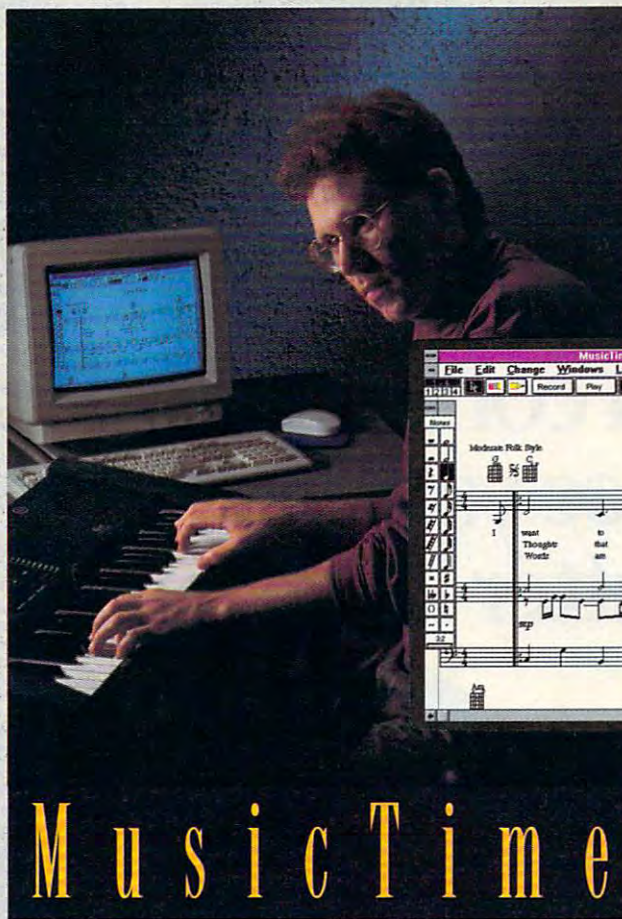
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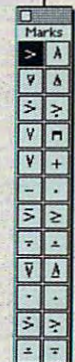
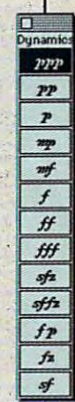
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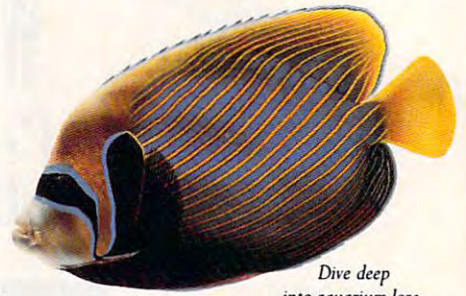
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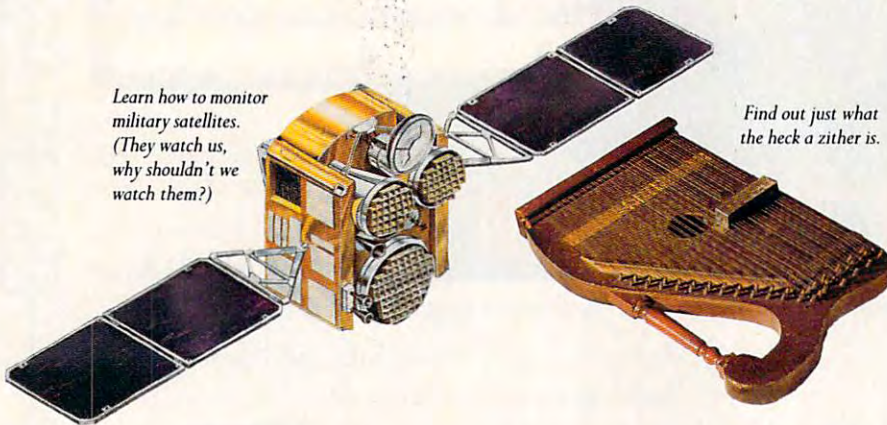
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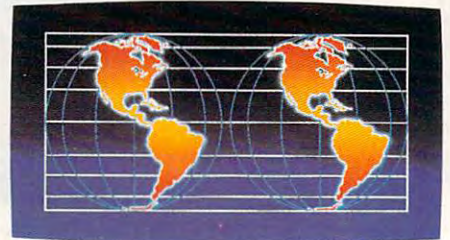


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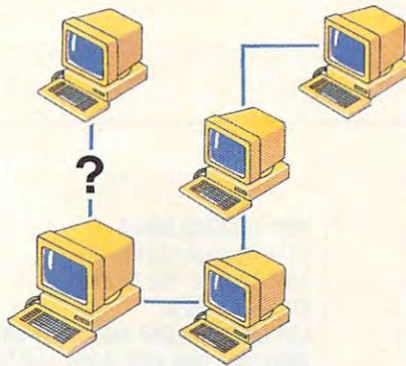
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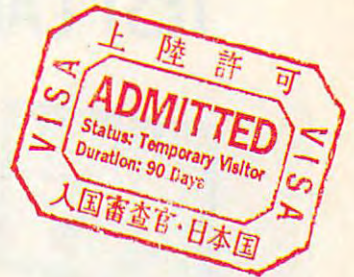
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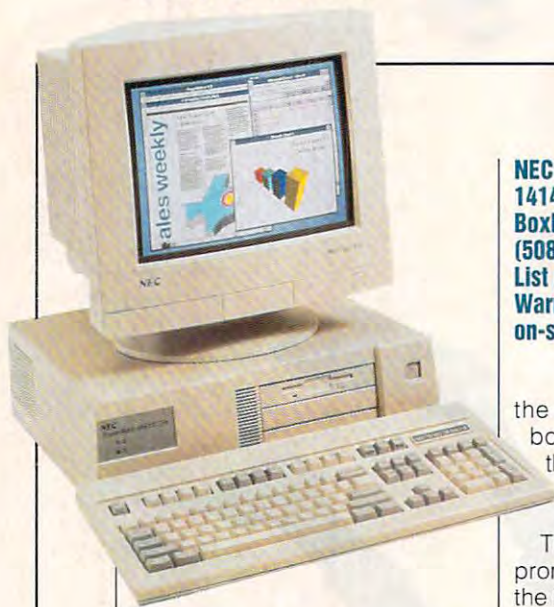
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TEST LAB



next to the monitor. Having used both case configurations extensively, I prefer the minitower design.

The 486SX/25 integrates the local bus graphics architecture into the motherboard and uses the 16-bit Tseng Labs ET4000G graphics chip set to produce extended video modes with resolutions up to 1024 x 768 with 32,768 simultaneous colors. With 1MB of video RAM and local bus, video performance is quite spiffy, as one would expect from such a setup.

The machine also sports 256K of 20-ns write-back cache memory on the motherboard as well as a socket for adding a Weitek 4167 math coprocessor. Expand RAM all the way up to 32MB directly on the motherboard using 70-ns SIMMs. The dual IDE hard disk controllers, dual floppy drive controllers, single parallel port, and dual serial ports are all integrated into the motherboard, which leaves seven full-length 16-bit slots available for expansion.

Expansion and upgrading concern PC purchasers today, and Micro Express has made sure that its 486SX will accommodate upgrading as your needs increase. You can upgrade the microprocessor to a 66-MHz DX-2 CPU by simply replacing it in a lever-activated ZIF (Zero Insertion Force) socket and changing

NEC TECHNOLOGIES
1414 Massachusetts Ave.
Boxborough, MA 01719
(508) 264-8000
List price: \$3,048 (as reviewed)
Warranty: one year, parts and labor, on-site

the clock jumper. The motherboard comes equipped with three clock crystals to generate clock speeds from 20 MHz to 66 MHz.

The system's Flash BIOS also promotes easy upgrading. With the Flash BIOS, you can upgrade the BIOS with a simple disk utility. The BIOS also supports video shadowing and automatic memory-size detection.

I found the documentation quite serviceable and well organized, though not as extensive or as lavish as that supplied with some of the other systems reviewed here.

You get a good 101-key enhanced keyboard as the standard input device supplied with the machine; for a mere \$75 more, you can opt for a programmable keyboard.

Micro Express has done a superb job of integrating all of the most sought-after features into a neat package that lets you upgrade to meet your applications' increasing demands, and it delivers video performance that's sure to bring a smile to even the most jaded power user's face.

Circle Reader Service Number 276

NEC POWERMATE 486SX/25i

NEC maintains its reputation as a producer of high-quality PCs and monitors with its PowerMate series, and the new PowerMate 486SX/25i attests to this. The system provides plenty of i486SX computing power along with good opportunities for upgrading and expansion.

You can upgrade the Power-

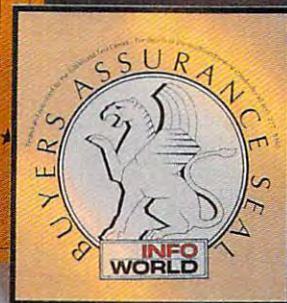
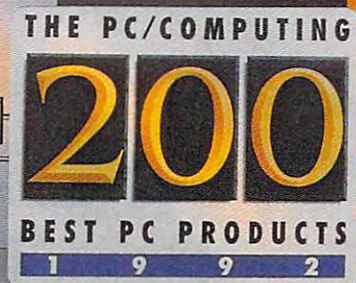
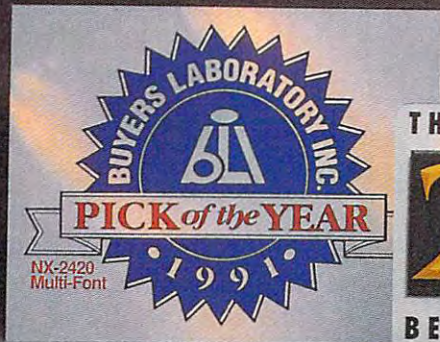
Mate from its 25-MHz i486SX CPU to a 33-MHz i486DX chip by replacing the microprocessor, installing a heat sink, and changing a jumper configuration, so if and when you need the additional computing oomph a DX CPU and higher clock speed have to offer, making the change won't require an engineering degree.

The standard configuration gives you 4MB of RAM, but the motherboard will allow expansion all the way up to 36MB using SIMMs. The motherboard also accommodates optional external secondary memory caches of either 64K or 128K. For even more computing power, you can add an Intel 486SX-25 math coprocessor.

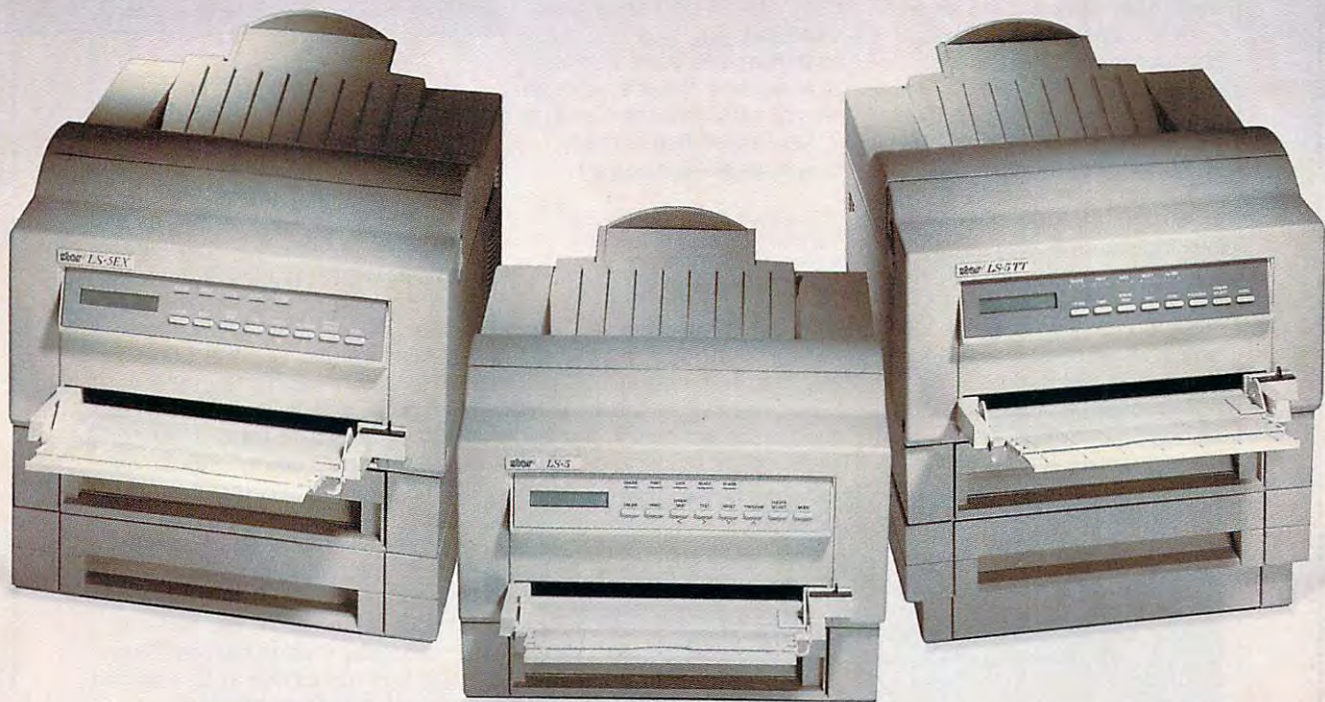
In keeping with current design and technological trends, the PowerMate's motherboard is highly integrated and incorporates all of the necessary electronics—the IDE and floppy controllers, I/O ports, mouse port, and high-resolution VGA controller featuring Image Video (NEC's own dedicated high-speed local bus). Consequently, the motherboard's four expansion slots are all available for accepting your peripheral cards.

NEC's heavy involvement in video hardware would lead you to expect its PCs to provide extraordinary video capability; the PowerMate comes through in this area as well. Equipped with 1MB of video RAM, the integrated VGA controller can provide 1280 x 1024 resolution with 16 colors or 1024 x 768 resolution with 256 colors at express speeds, thanks to the Image Video feature. Another unique feature is NEC's Image-Sync circuitry, which optimizes

Benchmark/performance testing was conducted by Computer Product Testing Services, Inc. CPTS is an independent testing and evaluation laboratory based in Manasquan, NJ. Every effort has been made to ensure the accuracy and completeness of this data as of the date of testing. Performance may vary among samples.



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TEST LAB

the frequency of certain NEC MultiSync FG monitors for exceptionally clear, flicker-free images. The review unit came equipped with an NEC MultiSync 3FGx color monitor, and the resulting video was, in a word, dazzling.

The review unit came equipped with a 240MB IDE hard disk and a 3½-inch slimline floppy drive. You can add another slimline or half-height device to the system cabinet. The front-mounted keyboard and mouse ports offer easy access as well.

DOS 5.0 and Windows 3.1 both come preloaded on the PowerMate's hard drive, and floppy backup copies along with the full versions of the manuals also come with the system.

The very comfortable 101-key keyboard features illuminated lock indicators as well as dedicated editing, cursor, and numeric keypads in addition to 12 top-mounted function keys. The keyboard has an audible click and exceptionally fast action.

The machine delivered surprisingly crisp performance in light of the fact that its heart is only a 25-

PACKARD BELL
9425 Canoga Ave.
Chatsworth, CA 91311
(818) 886-9998 List price: \$1,595
without monitor (\$350 for monitor)
Warranty: one year, on-site, limited

MHz 486SX CPU. Numeric- and text-intensive tasks ran effortlessly, as well as the more demanding graphics, DTP, and art and design programs I tried. The NEC Image Video technology uses the 16-bit Tseng Labs ET4000G graphics chip set to deliver excellent resolution at real-world speeds, so regardless of what tasks you require of it, the PowerMate is ready.

Circle Reader Service Number 277

PACKARD BELL LEGEND 670

If productivity is what you're looking for, then take a look at the Packard Bell Legend 670. This PC comes loaded with productivity software and accessory peripherals, so it's ready to go to work



as soon as you plug it in.

An Intel 80486SX CPU running at 25 MHz gives the Legend 670 plenty of computing punch, which is augmented by the standard 4MB of RAM. If that's not enough memory, you can expand RAM up to 20MB directly on the motherboard. The Intel 486 CPU provides its own internal 8K cache, but the Legend 670 also supports external cache memory expansion on the motherboard to 64K, 128K, or 256K. There's plenty of potential here for boosting the system's capabilities.

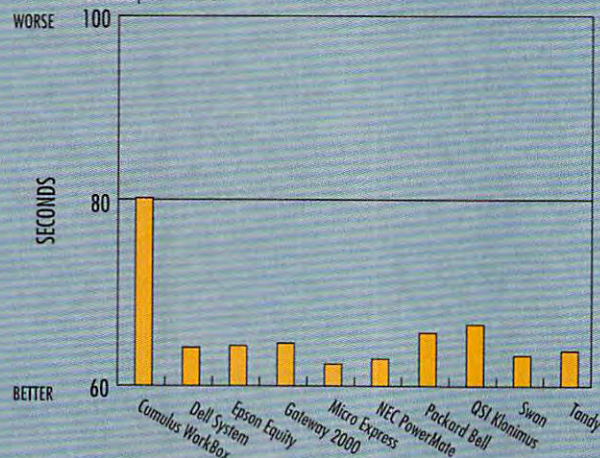
In addition to a good complement of I/O ports (a serial port, a parallel port, a PS/2 mouse port, and a game port), the mid-size case also provides four additional drive bays as well as four available 16-bit expansion slots.

A 1024 x 768 extended VGA video controller integrated into the motherboard comes with 512K of video RAM. You can expand the video RAM to 1MB, which will speed up video processing and increase the color palette from 16 colors to 256 colors in 1024 x 768 mode.

The Legend 670 comes with a comfortable 101-key keyboard sporting 12 function keys in addition to illuminated lock indicators and dedicated cursor, editing, and numeric keypads. I found the tactile feedback excellent, and if you're like most users,

GRAPHICS TEST

The Graphics Test involves timing the load of a highly complex color graphic incorporating thousands of gradient dithered color "washes" within outlined forms. Since the gradients must be calculated on the fly, this test is particularly indicative of the system's floating-point calculation capabilities.



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Predator	*0364901
Predator 2	*0104307
Robin Hood: Prince Of Thieves	*0976803
Scarface (1983)	0216804
Goodfellas	*0969808
The Blues Brothers	0211706
Dune	0211102
Kindergarten Cop	0523407
Lethal Weapon	0630806
Lethal Weapon 2	*0642702
National Lampoon's Animal House	0211508
The Man Who Would Be King	*0085803
The Bible	*0074708
Home Alone	*0104208

The Commitments	0691303
Forbidden Planet	*0844407
The Hunt For Red October	*0825000
Jaws	0100008
Edward Scissorhands	0104604
The African Queen	0051102
Beetlejuice	0633008
American Graffiti	0211300
Blue Velvet	*0515007
Harry Connick, Jr.: Singin' & Swingin'	0968107
Star Trek: The Motion Picture	*0203505
Star Trek II: The Wrath Of Khan	*0201301
Star Trek III: The Search For Spock	*0201608
Star Trek IV: The Voyage Home	*0430603
Star Trek V: The Final Frontier	*0448605
Superman: The Movie	*0001305
Superman II	0601500
Hard To Kill	0953505
Born On The Fourth Of July	*0489104
Field Of Dreams	0920306
Presumed Innocent	*0962100
Road Warrior	0602805
Chinatown	*0202507
Bird On A Wire	*0497305
Beverly Hills Cop	0205302
Beverly Hills Cop II	0431908
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Henry & June	*0499301
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Bugs Bunny Classics	0297705
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North By Northwest	*0844209
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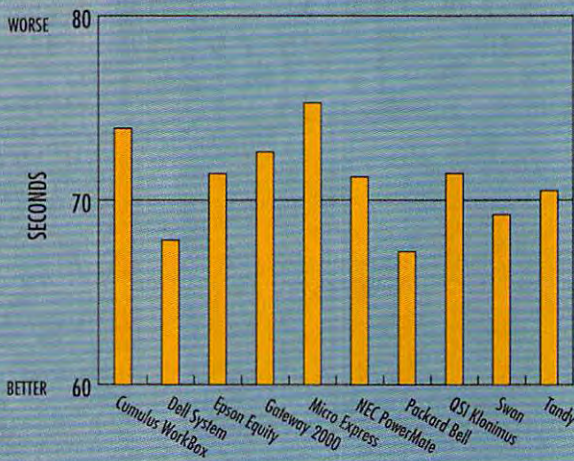
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TEST LAB

TEXT TEST

The Text Test uses a 40-page text document and times how long it takes to search and replace a keyword occurring 691 times throughout the document.



you'll delight in the fast, sure action and good ergonomic design of this keyboard.

Today's applications require lots of hard drive space, and the Legend 670 oblige with a 170MB IDE hard drive featuring a 17-ms access time. It also provides dual floppy drives (both 3½- and 5¼-inch formats), so the data storage and transference capabilities are well covered on this machine.

Also standard on the Legend 670, a sleek two-button high-resolution mouse attaches to the PS/2 mouse port. The mouse looks like a fattened version of the standard Microsoft model, but its button action is slightly stiffer. A pre-installed internal fax/modem gives you data transfer capabilities as soon as you plug the phone cable into a telephone jack.

Packard Bell also provides a generous supply of software on this system. MS-DOS 5.0 and Windows 3.1 come preloaded on the hard disk, along with several other application packages; you'll find floppy copies of all software enclosed for backup purposes.

You get a special Packard Bell version of Lotus 1-2-3 for Windows, the Lotus Write word proc-

essor, a Lotus SmartPics starter kit (a clip art package for Windows applications), Delrina's WinFax, a Prodigy startup kit with one month of free service, and Packard Bell's own graphical support and tutorial modules.

Since virtually everything is already installed and loaded on the system, setup is simply a matter of taking the Legend 670 out of the box, attaching the cables, plugging it in, and turning it on. I rate the documentation very good in its scope, organization, and clarity; you'll probably need it only for occasional reference.

If you're looking for a good 25-MHz 486SX system offering plenty of productivity potential and good expansion capabilities at an affordable price, consider the Legend 670.

Circle Reader Service Number 278

QSI KLONIMUS 486SX/25

QSI builds systems to meet the needs of its customers, so its machines can include components from a variety of manufacturers. The Klonimus 486SX/25

A NOTE ON PRICES

With computer products changing more rapidly than ever and with options more plentiful than ever, computer prices can be a tricky business.

It pays to keep the following points in mind:

Street prices can be considerably lower than list prices. Shopping around helps you find the best price.

Because computer technology evolves so rapidly, a product may have changed by the time our review sees print. Verify configuration details with manufacturers or vendors before you buy.

Because consumers are more sophisticated than ever about what they want in computer products and because manufacturers have responded with more options and configurations than ever, one computer model may be subject to dozens of variations, each with a slightly different price.

At COMPUTE, we make every effort to verify prices and differentiate between the price for a review configuration and the price for a standard configuration. The list price we present is usually for a standard configuration. It's still a good idea, however, to call the manufacturer or vendor to make sure that the configuration you want matches the price you have in mind.

model is an example of such custom-built construction.

The motherboard isn't as highly integrated as those on some of the other machines covered here, which permits some customization and flexibility in the configuration, although this is at the expense of the expansion slots. In the review machine, for example, two of the 16-bit slots were occupied (by the multi-I/O card and the VGA adapter card), leaving five of the 16-bit slots and the one 8-bit slot vacant. The 16-bit video card supports up to 640 × 480 resolution as shipped; adding video RAM (up to a maximum of 1MB) will enable the card to display Super VGA with a 256-color palette and resolutions of up to 1024 × 768.

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The Major BBS Development Team with about 5% of the code they wrote and tested, line by line. From left to right: Bert Love, Edward Bush, Richard Skurnick, Tim Stryker, Bob Stein, Brian Stephens, Sheri Robert, Les Bird, Chris Robert, Scott Brinker, Chris Kotacka

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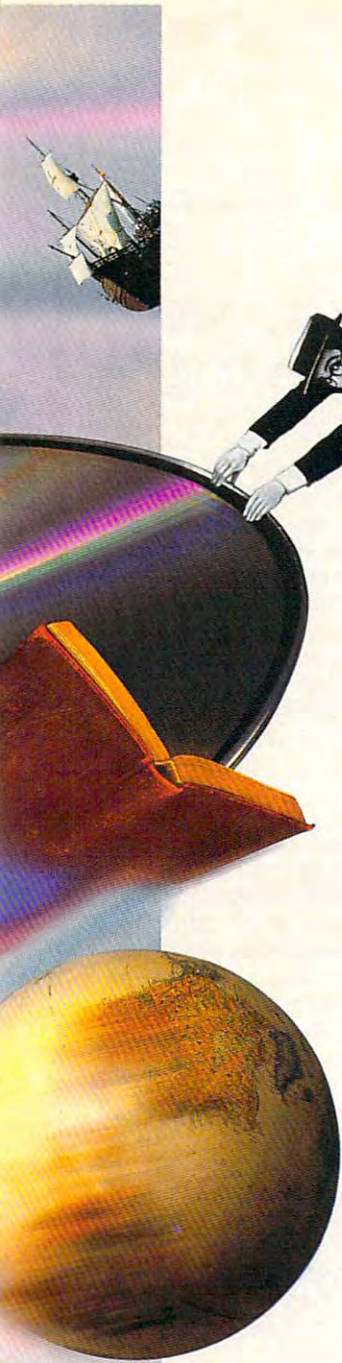
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Herold Lloyd photo courtesy of Herold Lloyd Trust/IPC



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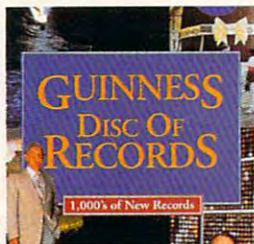
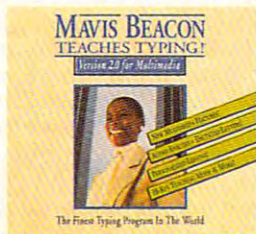
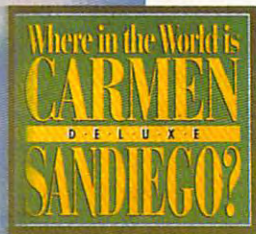
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The motherboard on the review unit came populated with 4MB of RAM. Eight SIMM sockets on the board can accommodate expansion up to a maximum of 32MB using 4MB SIMMs. A socket is also provided on the motherboard for adding a Weitek 4167 math coprocessor.

Two front-accessible half-height bays remain vacant beneath the half-height 5¼-inch high-capacity floppy drive installed top-most in the Klonimus. A high-density 3½-inch floppy drive mounts vertically to the right of the three half-height bays, and a 128MB IDE hard drive mounts internally in the unit.

The documentation for the Klonimus consists of a 50-page booklet entitled *Getting Started with Your Klonimus Computer*. It provides very basic generic information about unpacking and setting up the machine. By *generic*, I mean simply that the information contained in the booklet could apply to virtually any computer, Klonimus or not. I found no machine-specific material in this booklet.

To augment the *Getting Started* booklet, Klonimus ships the OEM (Original Equipment Manufacturer) documentation for the devices or components used in the completed system. The review unit came with a 4-page data sheet on

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(718) 834-4545
List price: \$1,585 with SVGA; \$1,495 with VGA
Warranty: two years, parts; one year, on-site; additional on-site coverage available

the BTC keyboard; a thin booklet entitled 486M 80486 Mainboard User's Manual, which describes the features and setup of the motherboard including CMOS settings and some technical references; a 12-page booklet on the Seagate ST3144A IDE hard drive; and a single-page data sheet on the IDE Plus-V3 multi-function card. A 60-page user's manual for the STB PowerGraph VGA adapter also came with the system, along with a video utilities disk in both 3½- and 5¼-inch formats. In addition, QSI supplied a two-button mouse and a shrink-wrapped copy of Revolution Software's VGA Dimmer utility with its manual.

MS-DOS 5.0 came preinstalled on the system, but QSI did not provide the original floppy disks and the Microsoft documentation.

The performance of the Klonimus was lackluster, to say the least. Many of the applications I ran during the review process moved along at a snail's pace, especially in Windows, when compared with performance on the other systems covered here. I can't offer any explanation for this, but I suspect that the motherboard's nonintegration and slow floppy drives were major contributors to the system's slow performance.

Buying a computer often involves a series of trade-offs, especially when you place price high on your list. If you're a power user looking to upgrade to a high-performance 486SX system, you might want to continue your search for a machine to purchase.

Circle Reader Service Number 279

SWAN 486SX/25DB

If you're wondering what *DB* stands for in Swan's model designation, let me satisfy your curiosity: It stands for *Direct Bus*, Swan's own combination of local bus architecture with the S3 video accelerator chip. While this results in incredibly fast video performance, it's just one of the many noteworthy features of this machine.

Described in the company's literature as "the perfect entry into the 486 family," the 486SX/25DB has an Intel i486SX CPU at its core running at 25 MHz. Just in case you decide you might need more computing power later, there's a socket for adding a Weitek 4167 math coprocessor, and the motherboard can accommodate up to 64MB of RAM directly. The review unit came equipped with the standard 4MB.

Dual floppies and a 120MB IDE drive also come standard with this model. While the system usually includes a Swan 1024 (interlaced) 14-inch VGA monitor, the review unit came with the non-interlaced version of the Swan 1024 monitor, which added \$100 to the usual price of the system. I highly recommend the noninterlaced monitor, however; it's well worth the additional cost, especially since Swan designed this entire system with optimized video performance in mind.

With Swan's Direct Bus video scheme, the video controller connects directly to the CPU via the local bus, which removes the I/O bottlenecks that occur with standard architecture machines. Since the Direct Bus architecture offers a 32-bit path and runs at the same speed as the CPU, there are no wait states in video memory.

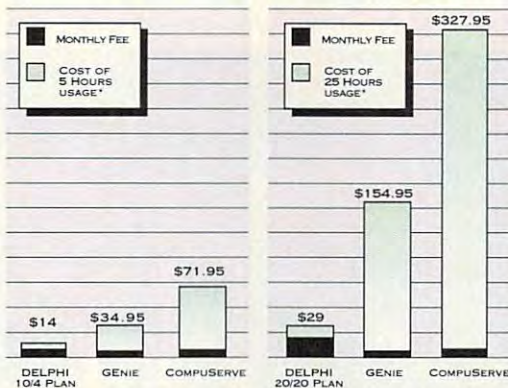
To give the video performance an additional boost, Swan uses the 86C924 chip from S3 Corporation, a second-generation accelerated video engine. The result: virtually instantaneous screen refreshes in any application, including the most sophisticated CAD program.

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Desktop publishing, word processing, spreadsheet, graphing, charting, and paint programs also look and perform better on the 486SX/25DB, thanks to the Direct Bus architecture.

Other features that make the Swan a quality machine include its 200-watt power supply and 128K caching controller, both standard on the DB series, as well as a slimline dual-floppy drive. Swan also gives you a choice of baby AT, desktop, or tower cabinet configurations, as well as your choice of 60MB, 120MB, 200MB, or 400MB IDE hard drives or 400MB or 660MB SCSI hard drives. All of the cases provide ample room for adding peripherals and media devices. The review unit came equipped with a 60MB IDE drive in the standard desktop cabinet, which had five of the system board's six 16-bit full-length expansion slots va-

SWAN
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State College, PA 16801
(800) 468-9044
List price: \$2,195
Warranty: two years, on-site

cant and available for use.

While the video attributes of the system are undoubtedly the main attraction, Swan has taken great pains not to overlook other system areas important to the user as well. The keyboard, a very comfortable 101-key unit, features an audible click (my personal preference); and an excellent software bundle consisting of MS-DOS 5.0, Windows 3.1, Microsoft Works for Windows, Quicken for Windows, and WealthBuilder is included. I found the documentation beyond reproach in any respect—thoroughly indexed and



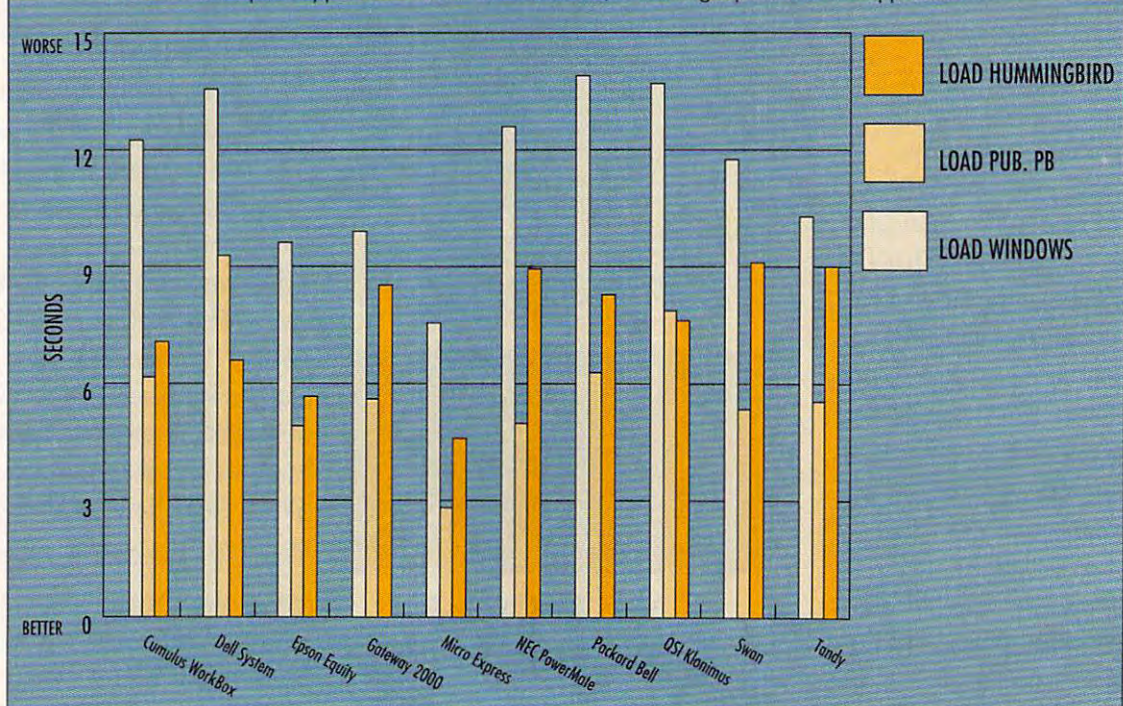
full of outstanding technical references and information.

With today's operating environments and software all directed toward GUIs, it makes sense to consider the video performance of a computer system as an increasingly important factor. The Swan 486SX/25DB provides a combination of features and video performance that's hard to beat.

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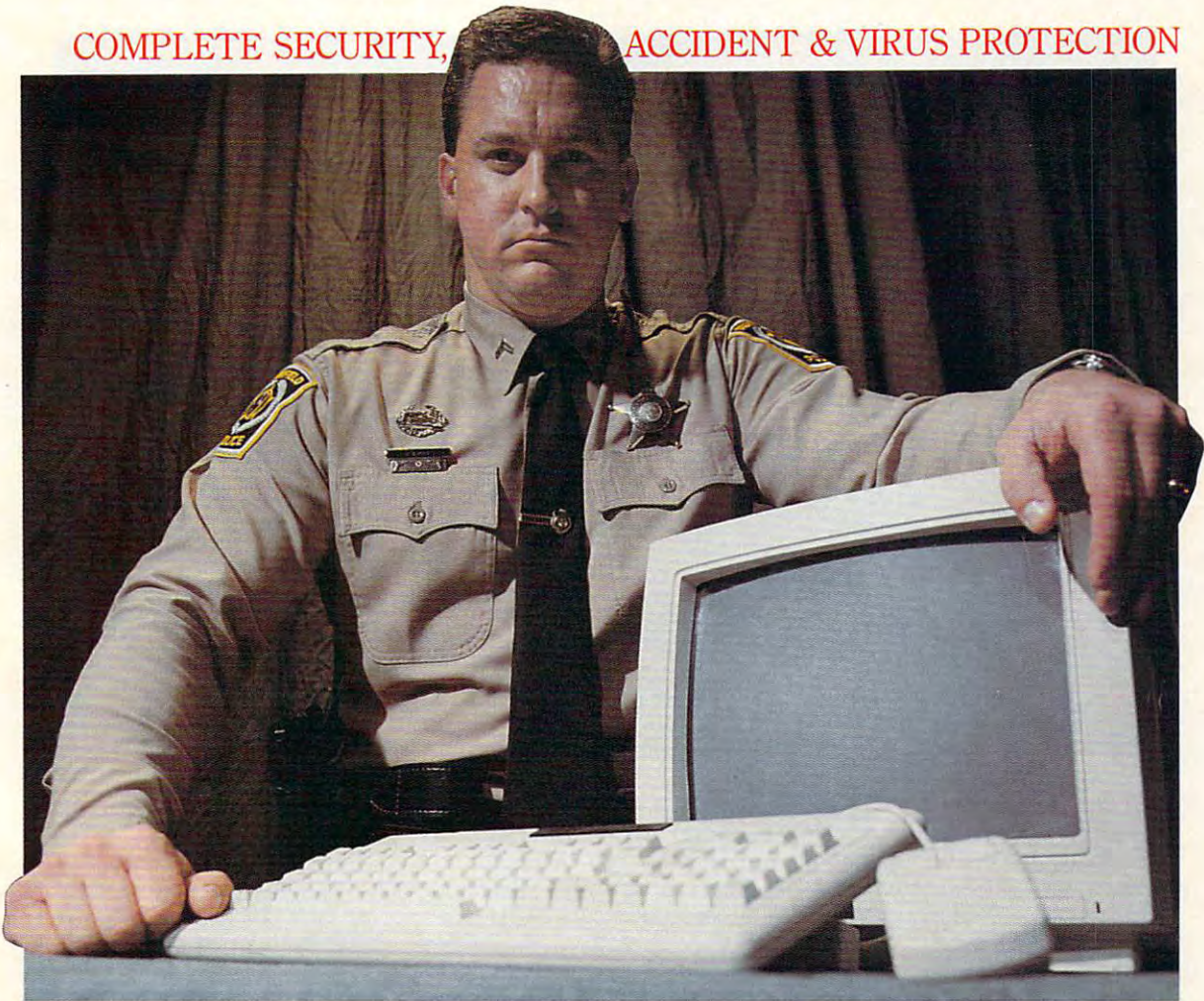
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FEATURES	Cumulus WorkBox 486SX/20	Dell System 486D/25	Epson Equity 486SX/25 Plus	Gateway 2000 486SX/25	Micro Express 486-Local Bus/SX/25
CPU speed	20 MHz	25 MHz	25 MHz	25 MHz	25 MHz
Case type	baby AT	AT	AT	AT	minitower
Coprocessor socket	487	487	487	Weitek 4167	Weitek 4167
Standard RAM	4MB	4MB	4MB	4MB	4MB
Maximum RAM	16MB	64MB	16MB	32MB	32MB
Standard hard drive ¹	120MB	80MB	240MB	120MB	170MB
Floppy drives	1 3½	1 3½, 1 5¼	1 3½, 1 5¼	1 3½, 1 5¼	1 3½, 1 5¼
Serial ports	2	2	1	2	2
Parallel ports	1	1	1	1	1
PS/2 mouse port	0	1	1	0	0
Game port	0	0	0	0	0
Slots	8 16-bit	6 16-bit	5 16-bit, 1 8-bit	6 16-bit, 2 8-bit	7 16-bit
Panel features	reset/turbo buttons, power/drive LEDs, power switch	external reset switch, Dell SmartVu Display, power switch	reset switch, power/drive LEDs, power switch	reset/turbo buttons, power/drive LEDs, power switch	reset/turbo buttons, power/drive LEDs, power switch

¹or the review hard drive if there is no standard

TANDY 4825 SX

The Tandy 4825 SX PC is a good entry-level 486SX system in a slimline baby-AT case.

The 4825 SX system case affords acceptable expansion possibilities despite its compact size. Thanks to a highly integrated moth-

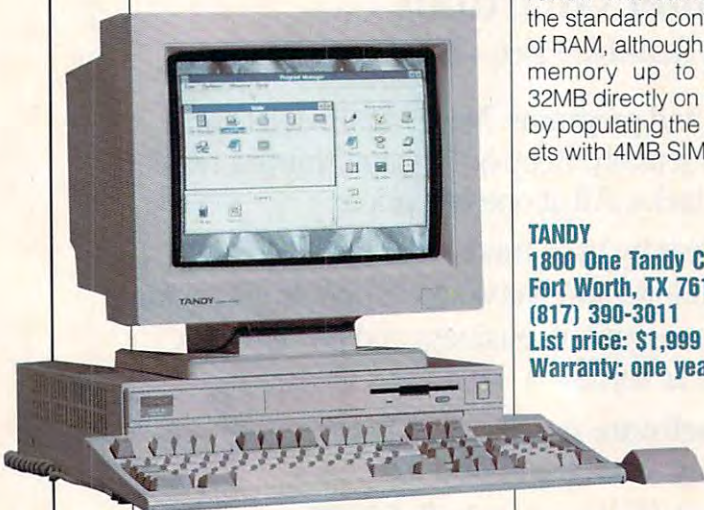
erboard, there are three full 16-bit expansion slots available for adding user-installed peripherals. The motherboard contains the floppy and hard drive controllers, keyboard connector, PS/2-style mouse port, single parallel port, and dual serial ports, in addition to an integrated video controller. The review unit came equipped with the standard configuration of 4MB of RAM, although you can expand memory up to a maximum of 32MB directly on the motherboard by populating the eight SIMM sockets with 4MB SIMMs. You also get

a socket on the motherboard for adding a math coprocessor.

There's room in this system box for you to add two storage devices to the 1.44MB floppy drive and the 120MB hard drive installed as part of the standard system. A single vacant upper drive bay will accommodate a 3½-inch device, while a single vacant lower bay can accept either a 5¼-inch or 3½-inch half-height device.

The built-in Super VGA video adapter with its standard configuration of 512K of video RAM yields noninterlaced 1024 × 768 and 800 × 600 graphics modes with 16-color palettes. An optional upgrade kit from Tandy boosts the video RAM to 1MB, which supports 1024 × 768 noninterlaced graphics in 256 colors.

A Tandy two-button mouse comes supplied with the unit for accessing GUI-based applications. While the mouse is indeed a functional device, it's a far cry from the ergonomically and operationally superior Microsoft two-



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Garry Ray, writing for PC Week, said, “Of these alternative operating environments (OS/2, DesqView and Software Carousel), Carousel may be the best choice of the day.”

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*Open Link Extender is sold separately. †Requires NetBIOS connection.

Circle Reader Service Number 182

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TEST LAB

FEATURES	NEC PowerMate 486SX/25i	Packard Bell Legend 670	QSI Klonimus 486SX/25	Swan 486SX/25DB	Tandy 4825 SX
CPU speed	25 MHz	25 MHz	25 MHz	25 MHz	25 MHz
Case type	AT	AT	AT	AT	slimline AT
Coprocessor socket	487	487	Weitek 4167	Weitek 4167	487
Standard RAM	4MB	4MB	4MB	4MB	4MB
Maximum RAM	36MB	20MB	32MB	64MB	32MB
Standard hard drive ¹	239MB	170MB	120MB	120MB	120MB
Floppy drives	1 3½	1 3½, 1 5¼	1 3½, 1 5¼	1 3½, 1 5¼	1 3½
Serial ports	2	1	2	2	2
Parallel ports	1	1	1	1	1
PS/2 mouse port	1	1	0	0	1
Game port	0	1	1	0	0
Slots	4 16-bit	4 16-bit	7 16-bit, 1 8-bit	6 16-bit	3 16-bit
Panel features	power/drive LEDs, power switch	reset/turbo buttons, power/drive LEDs, power switch	reset/turbo buttons, power/drive LEDs, power switch, key lock	reset/turbo buttons, power/drive LEDs, key lock	reset switch, power/drive LEDs, power switch

¹or the review hard drive if there is no standard

button mouse that I prefer.

The standard 101-key keyboard with audible clicks connects to a dedicated mini-DIN port next to the mouse port, and it makes for fast and comfortable typing and data input, abetted by dedicated numeric, editing, and cursor control keypads. Unfortunately, when the computer arrived, some of the keys had fallen off, and I was forced to use another keyboard.

The 4825 SX ships with MS-DOS 5.0 and Windows 3.1. To help you get off to a productive start as soon as you power the system up, Tandy also gives you Microsoft Works for Windows 2.0 as part of its bundle.

I usually find Tandy's documentation quite good, and the 4825 SX User's Guide and other accompanying documentation doesn't disappoint me. The material is logically organized and well indexed, making it easy to find information on particular areas of interest about the system.

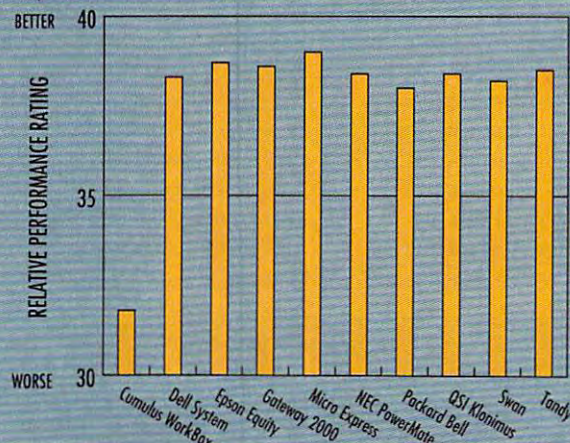
Although the machine's CPU cannot be upgraded to a faster DX processor, the 4825 SX makes a good entry-level machine in its off-the-

shelf configuration while providing a comfortable number of expansion possibilities for most users.

Circle Reader Service Number 313

THE NORTON OVERALL INDEX

The Norton Overall Index factors in microprocessor and disk performance, among other things, to indicate how well a computer performs when compared to a 4.77-MHz IBM XT. The greater the index value, the faster the computer.



WIN

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No purchase required. To enter complete the entry form or hand print your name, address, and phone number on a 3" x 5" piece of paper. Also print the name of the magazine in which you saw this sweepstakes in the lower left corner of your envelope. Mail your entry to: Dodge Dakota Sweepstakes, Box 501, Gibbstown, NJ 08027. Limit one entry per person. Entries must be received by March 1, 1993.

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NEWS & NOTES

Jill Champion

Multistorage for Multimedia

Since *multimedia* has become the catchword for PC users in the 1990s, it only makes sense that manufacturers should come up with innovative means of storing all those disks, tapes, and cartridges that have become necessities for computer users. Two companies have redesigned the standard disk holder—traditionally storing only 5¼- or 3½-inch disks—to incorporate all sorts of media.

Curtis Manufacturing's Multi Media Disk Box provides storage for a combination of

Keep track of your multisized media, design an efficient office, and save space and money with all-in-one hardware.



5¼-inch disks, 3½-inch disks, mini data cartridges, standard data cartridges, and CD-ROMs. Designed with different-sized dividers and tabs, each tray can be customized according to subject. Suggested retail price for the Multi Media Disk Box is \$6.95. To find out more, contact Curtis Manufacturing, 30 Fitzgerald Drive, Jaffrey, New Hampshire 03452; (603) 532-4123.

From Fellowes Manufacturing comes the High Capacity Multi-Media Disk Tray. Retailing for \$14.95, the tray can accommodate up to 165 3½-inch disks or 160 5¼-inch disks, or a combination of both. It also stores other media formats, including CD-

ROMs, data cartridges, and 8-mm tapes. Features include a lock and key for security and a window for quickly viewing contents. For more information, contact Fellowes Manufacturing, 1789 Norwood Avenue, Itasca, Illinois 60143-1095; (800) 945-4545.

Designing Software

Now that you have your media organized, what about your office? New from Autodesk is Office Layout, a PC software package that simplifies space planning and inventory management. If you're responsible for space planning in your office or if you work out of your home, Office Layout gives you the tools to produce an accurate space plan quickly and easily—one that can be modified as your space requirements change. The program is also useful for tracking office-equipment locations and other fixed assets. For companies with very small budgets, the program can actually eliminate any need for a professional space planner. For larger offices, Office Layout will help facilitate communication with architects and planners.

The program has self-guiding menus and online help, so a new user can start creating a space plan within an hour with the more than 200 predrawn precision symbols that include partitions, equipment, work surfaces, desks, tables, and chairs. All are color-coded and available in a range of standard sizes. In addition, you can create custom symbols and add them to your menu for future use. A 25-step undo/redo feature means you don't have to worry about making mistakes. When you're drawing a plan, the program allows you to work on several different layers so the separate elements can easily be identified, and

you can zoom in on sections of the drawing for detail work. Each symbol can be tagged with tracking information such as department, user, manufacturer, style, serial number, price, and up to five custom fields of information. Measurements can be displayed to 1/16 inch—precisely enough to create actual layouts. In addition, plans created in Office Layout can be exported to other computer-aided design (CAD) packages, including AutoCAD and AutoSketch, which permits the exchange of files between architect and client, eliminates the need for redrawing plans, and reduces the chances of making serious errors.

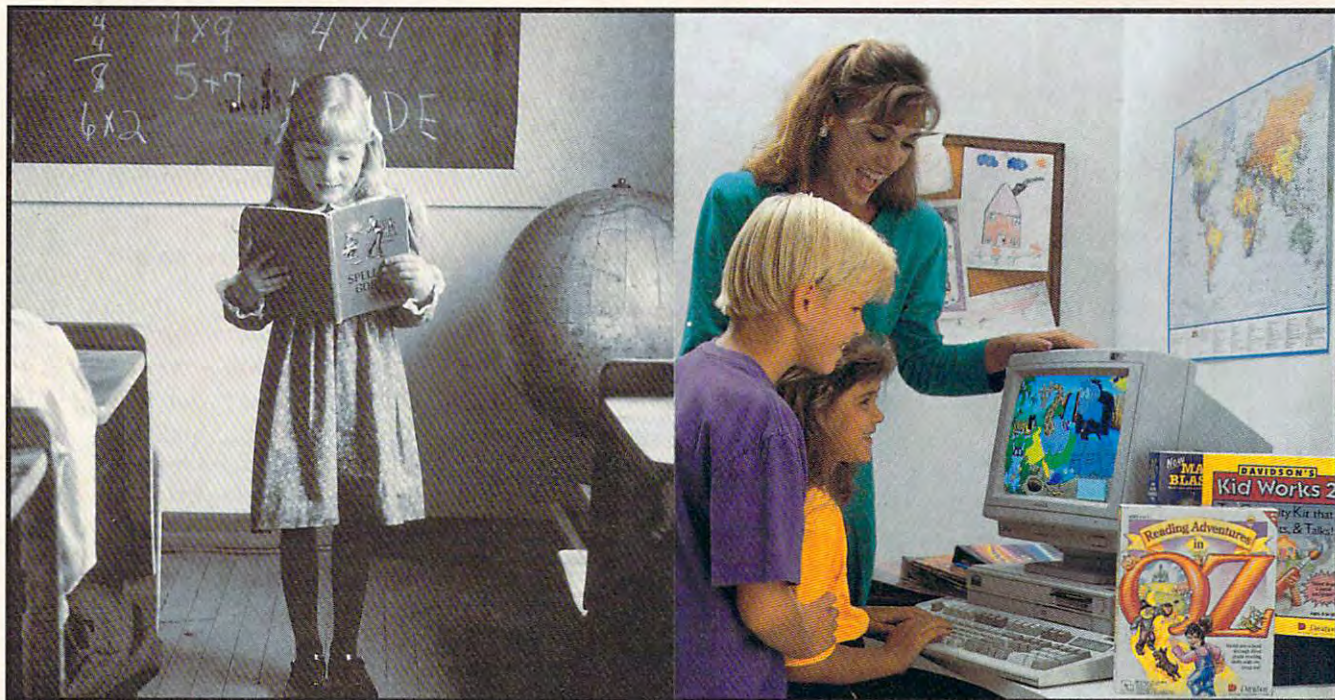
Since you can export physical-asset location information into other programs, Office Layout is very useful for preparing critical business reports such as inventory management, tax depreciation calculations, and insurance assessments. Suggested retail price for the software is \$149.95. For more information, contact Autodesk Retail Products Division, 11911 North Creek Parkway South, Bothell, Washington 98011; (800) 228-3601.

And I Quote . . .

Writers can pick the greatest brains of all time with Quotemaster Plus for Windows, the literary quotation retrieval software package. Quotemaster Plus can search by author or subject, and it lets you add favorite quotations. New version features include an interactive interface with the Windows look and feel. Button bars and icons now direct you through quotation search steps.

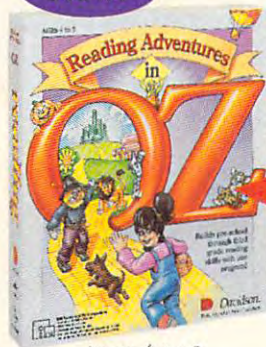
If you can't remember an entire quote but remember specific words, you just type the words in the word list box, and the resulting search

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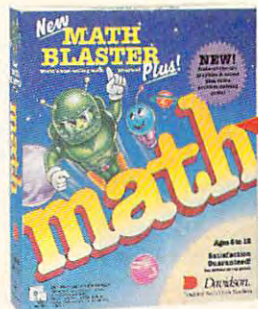
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Everything You Ever Wanted To Know About Writing A Business Plan But Were Afraid To Ask

Ever wish you had a personal mentor who could answer all your questions about successfully running your own business?

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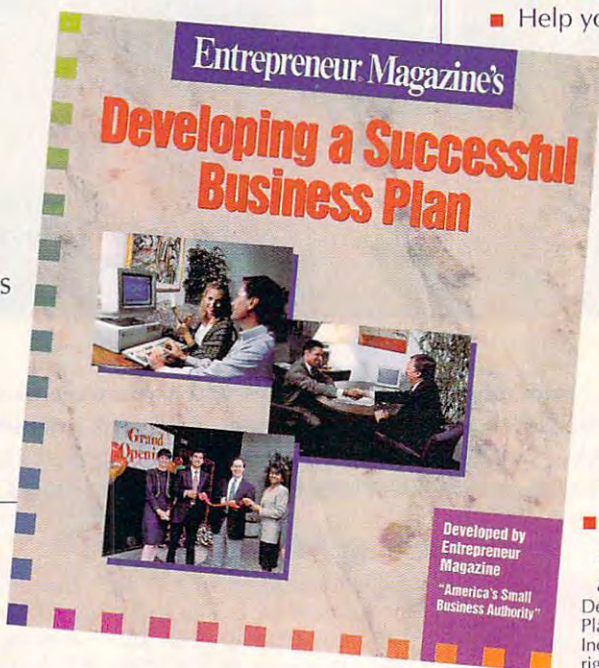
That's where the Entrepreneur Magazine's Developing A Successful Business Plan comes in. The Entrepreneur Business Planner is the most complete easiest-to-use software available to produce your business plan.



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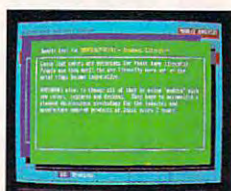
Designed by a panel of successful senior business executives and the editors of Entrepreneur Magazine, the Entrepreneur Business Planner Software will:

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- Help you pinpoint and manage problem areas

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NEWS & NOTES

finds every quotation containing them. The average time to search a subject is $1/20$ second. If the right word escapes you, you can try the hierarchical search, which focuses a broad area of interest into specific words and subjects that will provide numerous quotations on your subject. For instance, *human nature* yields the secondary subject *competition*, which, in turn, yields the word *originality*, which originates a dozen or more quotes for you to choose from.

Individual "quotepacks" are available with even more quotations on specific topics. Four of the newest quotepacks available are Humor, Society, Government/Politics, and Motivational. Suggested retail price for Quotemaster Plus for Windows is \$89. Additional quotepacks are \$60 each. An additional Author Information Base is available for \$45. Suggested retail price for the entire package, including all quotepacks, is \$270. For \$55, current users can upgrade to the base package and receive a free quotepack. For more information, contact PennComp, P.O. Box 271529, Houston, Texas 77277-1529; (800) 326-6145.

Tax Season Returns

One of the benefits of having a PC at home is that it can take the drudgery out of preparing your tax return. AM Software's new AM-Tax is designed as an affordable solution for anyone who wants to fill out tax forms more quickly and more accurately. The software comes in versions for both personal and professional use: AM-Tax Personal and AM-Tax Professional.

The 1992 update of the software expands printing capabilities, adds more forms, provides an easier and quicker user interface for many functions, and increases error checking for certain deduction limitations.

The 1992 version adds a K-1 worksheet that automatically transfers business partnership data to all appropriate forms and schedules. The new update also lets users enter data from multiple W-2s and similar forms at one time without having to return to the main screen. Beginning AM-Tax users pay an initial price for the software package and then pay a lower renewal fee for annual updates.

The AM-Tax product line includes AM-Tax Personal 1 for individuals with standard tax needs; AM-Tax Personal 2 for individuals who require a wider range of forms and features; AM-Tax Professional for accountants, bookkeep-

ers, and other tax preparers; and AM-Tax Electronic Filing for those who want to send files over a modem directly to the IRS or to Nelco, a national electronic filing service. The programs are available directly from AM Software, 1500B NW Vivion Road, Kansas City, Missouri 64118; (816) 426-8361 to order or (816) 741-7848 for more information.

DOC•UMENT IT

New from Okidata is a product that integrates business-quality printing, faxing, copying, and scanning into one compact desktop unit. Called DOC•IT, this is one of the first products in a new category of highly integrated peripherals that make it possible for users to create, manage, and communicate documents of all formats with ease. DOC•IT runs under Windows, providing complete compatibility to existing Windows applications and hundreds of DOS software programs.

If you create documents from multiple sources—whether in text, graphics, image, or facsimile form—you can now access and manipulate information regardless of its format. You can create new documents from this information and then distribute them—all without leaving your PC. For example, DOC•IT lets you scan a graphic, cut and paste it into an existing word processor document, and then fax the document to multiple sites. At the same time, a colleague can make several copies. According to Gartner Group of Stamford, Connecticut, the integrated peripheral market is expected to reach \$8 billion by 1995.

Samuel Bleecker, a workplace expert from Boca Raton, Florida, says the office is changing so fast that "by the end of the 1990s, your office may seem more like an information control room than a place to rest your feet or write memos. Integrated products are here, and they will continue to become more and more powerful."

DOC•IT consists of three elements: a desktop document processor, a controller processor board for insertion into an AT-compatible PC, and desktop document-processing (DDP) management software, called DOC•IT Manager. The image engine can be removed and used as a hand scanner for newspapers, books, and other nonconventional shapes.

Suggested retail price for DOC•IT 3000, designed for presentation-quality printing and copying, is \$3,999; for DOC•IT 4000, which gives even higher-quality output, the suggested retail price is \$4,999. For more information, contact Okidata, 532 Fellowship



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Captains Log: Stardate 1992



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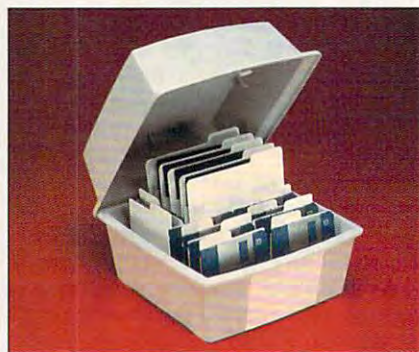
NEWS & NOTES

Road, Mt. Laurel, New Jersey 08054; (609) 235-2600.

A New Kind of Workhorse

Imagine having the power and flexibility of six office machines in one desktop device without sacrificing speed. Thanks to Digital Design, you can. The company's new Gateway Model 3370 PC is a combination of 486 PC, laser printer, plain-paper fax machine, scanner, digital copier, and modem all rolled into one—without the speed-negating bottleneck of serial and parallel ports. You simply plug in your keyboard, monitor, and mouse, and watch the Gateway 3370 perform.

With this remarkable machine, a Gateway 3370 user can issue a single set of directions to extract a document



Curtis's Multi Media Disk Box gives you mass storage.

from internal accounting software, print it, fax it, and save it for future use—all in one operation without leaving the desk.

While you're operating the PC, you can receive an incoming fax without interruption. The fax can be viewed, saved, printed, or diverted to another printer without interrupting the current job. The Gateway 3370 is easy to customize and upgrade without adding new hardware.

Pricing starts at \$3,995. For more information, contact Digital Design, 8400 Baymeadows Way, Jacksonville, Florida 32256; (800) 733-0908.

The Artist's Touch

Your reports, presentations, and newsletters will project a more professional business image with the artist-drawn electronic clip art Series editions from Masterclip Graphics. Based on clip art developed for large corporate users, the Series is a set of 24 topical titles, each sold separately.

Each Series title contains 50 to 60 full-color images relating to a single sub-

ject or theme. Current titles include Americana, Technology, Office, Energy/Natural Resources, Construction, Backgrounds/Borders, Sports, Medical, Humor, Business/Finance, Communications, Education, and more. Since most smaller businesses use a few images for a specific event, report, or presentation, the Series product means you don't have to buy thousands of clip art images to get the three or four you want to use.

Masterclip artists produce hand-drawn clip vector art which can be recolored, resized, and even changed while maintaining its integrity. Most other computer clip art consists of scanned-in images, which lose their integrity, develop jagged lines, and can't be modified. Masterclip images are full color but can be printed in black-and-white without loss of impact or detail. Suggested retail price for a Series title is \$39.95, through retailers or directly from Masterclip. For more information, contact Masterclip, 5201 Ravenswood Road, Suite 111, Fort Lauderdale, Florida 33312-6004; (800) 899-7440.

Message in My Pocket

SkyTel (255 East Pearl Street, Jackson, Mississippi 39201; 800-759-8737) and Ex Machina (45 East 89th Street, #39-A, New York, New York 10128-1232; 800-238-4738) announced a joint marketing agreement for the integration of PC software and wireless messaging services.

Ex Machina's Notify! software will be enhanced to take full advantage of SkyTel's satellite-based wireless messaging network, and SkyTel will market Notify! directly to end users through its nationwide sales organization.

According to David S. Rose, president of Ex Machina, the agreement with SkyTel means that users of Notify!-friendly programs on Macs or on PCs using DOS or Windows can now integrate their desktop applications with pagers and portable and palmtop computers "from Syracuse to Singapore and thousands of points in between." E-mail messages sent from a LAN can appear instantly on a full-text display in a subscriber's pocket, whether across the street or across the world.

Companies or public relations firms with items of interest suitable for "News & Notes" should send information along with a color slide or color transparency to News & Notes, Attn: Jill Champion, COMPUTE Magazine, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

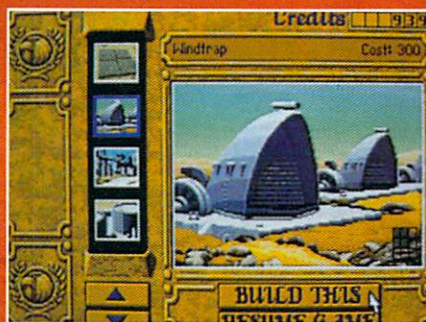
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Time Zoned

I work at Interpol Ottawa, where we have a constant need to know what time it is in various parts of the world. I would like to write a program that would give me the time of day in the major cities of the world.

LEN BABIN
ORLEANS, ON

Here's a program, *Zone*, that reads data statements until it locates a city name that matches what was typed at the command line. It needs to be compiled with QuickBASIC. To add cities to the list, simply insert as many city names as you like in the data line that represents the cities' time zone.

For example, in the first line you would probably want to add Greensboro and Macon and any other major cities you can think of that are in the Eastern time zone. The word end is a delimiter that represents the end of one time zone and the beginning of the next.

When you've compiled the program, type zone city, where city stands for the name of the city where you want to know the time. Don't use the cities in the example list as references. East of Newfoundland and west of British Columbia, we weren't sure about the layout of time zones. We suspect that there's more than one time zone between Tokyo and Singapore, for example. To use this program in a city in a different time zone, simply move as many data statements from the top to the bottom as there are time zones between you and the Eastern time zone.

```
a$ = TIMES: b$ = COMMAND$
itn = 0
a = VAL(LEFT$(a$, 2))
WHILE itn < 24
```

```
itn$ = LTRIM$(STR$(itn))
DO
READ city$
IF UCASE$(city$) =
UCASE$(b$) THEN
a = (a + itn) MOD 12
PRINT a; MID$(a$, 3, 3)
END
END IF
LOOP UNTIL city$ = "end"
itn = itn + 1
WEND
PRINT "City not in
database."
END
DATA "Ottawa","London",
"St. Thomas","Port
Stanley","end"
DATA "Manitoba","end"
DATA "Saskatoon","end"
DATA "Vancouver","end"
DATA "Sitka","end"
DATA "Seward","end"
DATA "Adak","end"
DATA "Tokyo","end"
DATA "Singapore","end"
DATA "New Delhi","end"
DATA "Diego Garcia","end"
DATA "Kabul","end"
DATA "Teheran","end"
DATA "Aden","end"
DATA "Jerusalem","end"
DATA "Istanbul","end"
DATA "Palermo","end"
DATA "Paris","end"
DATA "Greenwich","end"
DATA "Funchal","end"
DATA "Reykjavik","end"
DATA "Godthaab","end"
DATA "Cabo de Sao
Roque","end"
DATA "St. John's","end"
```

Making Passes

I'm running a 386DX with 4MB of RAM, DOS 5.0, and Windows 3.0. Whenever I use Diskcopy it takes me three or four passes to copy a high-density disk, whether I've just booted the system or not. My DOS manual suggests that I don't have enough memory. Where did it go?

DICK FRECH
CASPAR, WY

Your manual is wrong. DOS's Diskcopy only copies 360K at

a time, even in DOS 5.0. If you upgrade to Windows 3.1 and use the File Manager's Copy Disk menu command or obtain a third-party disk copy utility (Dskclone and Cpydisk are two), you can make the copies in a single pass. Lacking these utilities, many people create a directory specifically for copying and use the Xcopy command to copy disks. If you were copying the disk in your A drive, you would use this command.

```
xcopy a:. \copydir /s
```

When all the files are copied, insert a freshly formatted disk in drive A and issue this command.

```
xcopy \copydir\ A: /s.
```

An additional benefit of this process is that it allows you to copy between different capacities and different media, which you can't do with the standard Diskcopy command.

Using dBASE

I have several 360K 5¼-inch disks of software, including dBASE III PLUS, which were used on an IBM XT. Are these disks usable on a 286 clone with its 1.2MB drive? Or do I have to buy an XT to maintain compatibility?

JAMES HOWARD
CHILLICOTHE, OH

You should have no trouble using the lower-capacity disks with your AT. The 1.2MB drive reads 360K disks. There's some additional wear on the heads, though, because of the coarser medium used on the surface of the 360K disks. You should use the disks in your high-capacity drive no more than is absolutely necessary.

You might consider copying the files from the 360K

Globetrotting, making a quick copy, reading your old disks, needing some assembly, and computing on TV

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disks onto 1.2MB disks. Since you'll probably install the program on your hard disk anyway, you aren't likely to use the disks more than once.

Utilities Needed

I need a good assembler and something to capture screens from my PC. Do you have any recommendations?

ROBERT JACKSON
HAMILTON, New Zealand

Borland's Turbo Assembler (popularly known as TASM) and Microsoft's Macro Assembler (MASM) are highly recommended products for learning and writing machine language on the PC. They're provided with the languages published by those companies (Turbo Pascal and QuickC, QuickBASIC, and Macro Assembler 6.0, for example).

There are a number of powerful screen-capture programs available. A favorite is Collage Plus from Inner Media. HiJaak from Inset Systems can not only capture screens but also convert graphics files among many different formats.

Computer TV

I need to get a videotape of my screen display for training purposes.

Is there any way to capture a VGA screen on videotape or in an NTSC composite image?

JAMES JOHNSON
DETROIT, MI

Digital Vision recently introduced a product that converts a VGA signal into a composite signal for capture on a VCR or on a television screen. The product is called TelevEyes. It's an external box that connects between your VGA output and your monitor. Not all VGA monitors will be able to display the screen while TelevEyes is in use. The unit costs \$299.95. Contact Digital Vision at 270 Bridge Street, Dedham, Massachusetts 02026 or call (617) 329-5400.

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POWER PINCHING

In the last two columns, I've looked at laptop battery technologies and suggested some ways to make batteries last longer. But there's a limit to the amount of power that engineers can pack into a battery. Extending laptop life means using less power somehow.

One question I get when I talk about this subject concerns solar power. "Isn't it possible to power a laptop with solar power?" people sometimes ask. The answer is, "Not yet, but eventually." There are solar panels for laptops that can provide about 500 milliamps of power; notebooks need around 3000 milliamps. You'd need a pretty big set of panels to power a laptop.

There's not much we can do about solar-power research, so let's consider a second approach—lowering laptop power requirements. In descending order, the biggest users of juice in your laptop are the display, the hard disk, the RAM, the floppy drive, the CPU and support chips, the keyboard, the system clock, the I/O ports, and the math coprocessor (if present). Let's examine these power porkers in order.

Displays draw the most power. I see that every time I connect my laptop to an external display—the laptop runs for hours and hours off a single charge. Displays would be a lot easier on the batteries if they were (1) slower, (2) lower resolution, and (3) not backlit. Displays must be refreshed many times per second, meaning that an electrical circuit must repaint the image on the LCD screen usually about 50 times per second.

Here's a side note that will be useful for the rest of this article. Any circuit that does things on a regular basis, like

a clock ticking or a video circuit refreshing a screen, is an alternating current (AC) signal. The frequency of that signal affects the circuit's power-consumption rate like so: $P=CV^2f$.

In that formula, C refers to the Capacitance of the circuit, V refers to the Voltage of the circuit, and f refers to the frequency of the circuit. In terms relevant to our current problem—displaying data on a computer screen—the term *frequency* relates to the video refresh rate. Typically, a screen should refresh at about 60 times per second, but 50 is acceptable, and look what it does for the power consumption. Changing the frequency from 60 to 50 reduces display power consumption by 17 percent.

Unfortunately, that refresh clock isn't driven by the number of screens painted per second; it's driven by the number of lines painted on the screen per second. Suppose we're building a CGA-compatible display; CGA screens have 200 horizontal lines on them (as you may know, CGA resolution is 640 x 200). This means that the line clock must tick 200 x 50 times per second. But today's notebooks have at least a VGA resolution, and VGA has 480 lines of horizontal resolution. This means that going from CGA to VGA resolution increases laptop screen power requirements by 240 percent!

The next laptop display problem comes from backlighting. Supertwist LCDs show high resolution, but they really need to be backlit to be visible (in my opinion, that is—there are certainly supertwist LCDs that aren't backlit, but I find them unreadable). The fluorescent light behind a backlit LCD draws substantial juice.

What can be done to keep laptop power consumption down? You can shut down the laptop display altogether dur-

ing inactivity. It's annoying, but if you're like me, you probably get distracted in the middle of battery-powered work by airline seatmates, flight attendants, or the like. Those extra minutes of display downtime can significantly extend battery life. And whenever possible, turn the display brightness down, reducing the amount of power that the fluorescent tube needs.

Today's laptops can't live without hard disks, as evidenced by the fact that you just can't run Windows from floppies. Hard disks have a motor that keeps the disk platter spinning (as well as a voice-coil circuit that moves the read/write head) in addition to having to power the electronics on the hard disk itself.

The really big disk amp-sucker, however, is the action of powering up the hard disk. It takes a lot less power to keep a disk spinning than it does to get it spinning in the first place, which makes me leery about the common laptop practice of shutting down the hard disk when inactive. My laptop came out of the box set to shut down the hard disk after one minute of inactivity, a setting that led to near-constant power ups and downs for the hard disk. Not only does that draw power, but it's just plain no good for the hard disk motor, and surely shortens its life. Consequently, I compromised and set my disk timeout to the maximum allowed by my setup program, 15 minutes.

An interesting bit of good news for laptops comes from an examination of what determines how much power is required to get a disk spinning in the first place. The amount of power needed to get a disk spinning is proportional to the cube of the radius of the disk. If that doesn't seem interesting, consider this—notebook hard disks used to have platter diameters of 3½ inches,

Here's how laptops try to get more power per hour.

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Be careful when you're buying SIMMs.

but most now use a 2-inch-diameter platter. This means that the startup power required for a 2-inch disk is smaller by a factor of $(3.5/2)^3$, or over 530 percent! 1 7/8-inch platters are starting to appear, which will mean even lower power-consumption rates.

Buy laptops with small platters where possible. Don't worry so much about capacity, as that's not as important in power consumption, and from a practical point of view, you should have as much disk space as possible in order to run today's software.

Experiment a bit to find out the best timeout value for your laptop's hard disk. You don't ever want the hard disk to power down while you're scratching your head looking for the right word. Instead, you want the laptop to power down when you've turned away to answer the phone or chat with the person sitting next to you on the airplane.

The next power purloiner is the system's main memory. My notebook must have 16MB of RAM, as I run Windows NT on it. But more memory needs more power . . . usually. While it depends on how the memory is laid out on your laptop, you'll typically find that the fewer the number of memory chips in your system, the lower the power consumption. For example, suppose you have a laptop that can accommodate eight SIMMs (Single In-line Memory Modules). (These are small circuit boards about the size of a stick of gum that are the typical packaging for memory these days). You need 8MB of RAM, and you can either get those 8MB with eight 1MB SIMMs or two 4MB SIMMs. The two 4MB SIMMs will use significantly less power.

Be careful when you're buying those SIMMs. Use the SIMMs that the manufacturer

recommends, or you'll throw away power like crazy. A lot of what makes memory draw power is that it must be refreshed on a regular basis. Think of each memory location as being like a small storage container for colored water. Red colored water represents a 0, and blue colored water represents a 1. A program stores data by putting water of the appropriate color into a container. So far, so good.

Unfortunately, the storage containers are leaky. Many times per second, your memory chips must be refreshed. What I've just described here is a dynamic RAM. The alternative is a static RAM, which is essentially composed of containers that don't leak. You put data in the containers, keep a steady supply of power to those containers, and the data stays there. (Remove the power, and even a static RAM loses its contents.)

The refreshing that the dynamic RAM requires is accomplished by a circuit that constantly rereads the memory, with the resultant side effect that the storage containers get refilled. That process requires a significant amount of power, so many notebooks are built around low-refresh SIMMs, which are memory modules that don't need to be refreshed as often as normal SIMMs. Buy normal SIMMs, and your notebook will run fine, but you'll seriously degrade its battery life. So check with your manufacturer before you buy upgrade memory for your system.

There's not much that can be done about the floppy, as it doesn't require power unless you're accessing it. But what about the CPU and support circuitry? Look once again at the formula relating AC circuits to power consumption. The entire motherboard of your laptop moves to the beat of the cen-

tral system clock. A clock that runs at 20 MHz has a frequency of 20 million cycles per second, and you recall that the higher the frequency, the higher the power drain. Smart laptops detect idle time and drop the clock or, even better, stop the clock altogether. It's not quite as easy as that, however, as many of the memory components inside the CPU itself are dynamic and require refreshing. You can't just stop the clock on many motherboards and expect the data to remain intact. That's why Intel developed the 386SL, a processor basically intended for laptops. You can stop its clock without any trouble.

To see another way to save power, consider this power-consumption formula for direct current (DC): $P=V^2/R$

Here, Power consumption equals Voltage squared divided by Resistance. Traditionally, chips have run at 5 volts. Some manufacturers reduce voltage by just running the chips at a voltage level a bit below their rated values. For example, a circuit that uses three AA batteries would only have 4.5 volts, leading to a nearly 20-percent savings in power in the circuit. Another approach is to use a chip that draws less power. Intel has a 3.3-volt version of the 386SL available, but it hasn't really caught on because vendors seem to be waiting for the 3.3-volt version of the 486.

I'm running out of space, so here are a few more ideas for the lesser power drains. Many notebooks let you disable the serial ports with the setup program that comes with the notebook. As I only need one serial port for my mouse, I disable the other serial port and the parallel port. If you can live without a math coprocessor, do so, as it runs a bit warm, and you know where the power for that heat comes from—your battery. □

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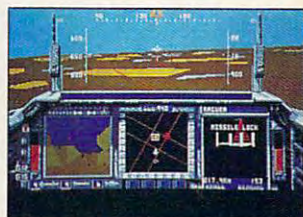
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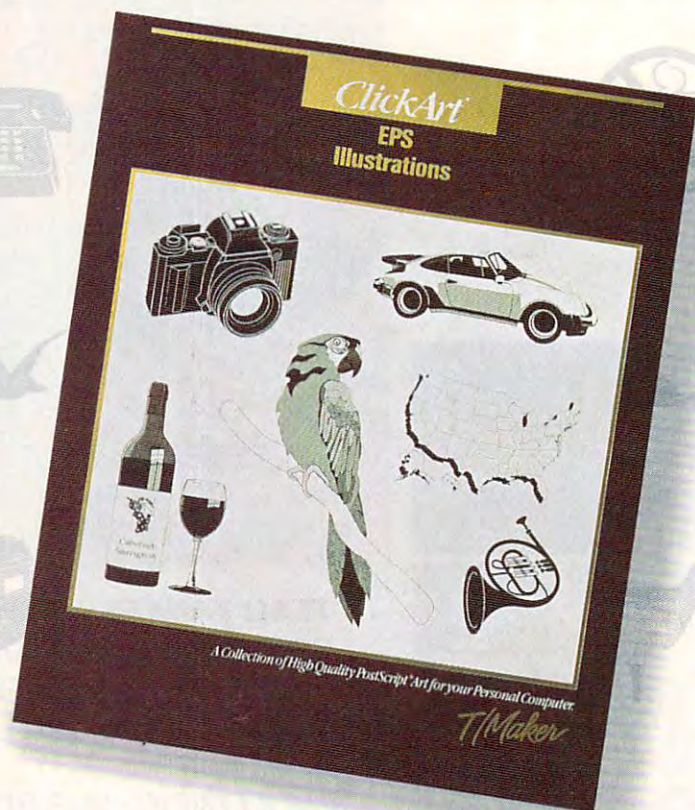
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- Other _____
- I don't own or use a computer.

Which video display system(s) do you use?

- Monochrome
- Hercules
- CGA
- EGA
- VGA
- Super VGA

Which peripheral(s) do you own or use with your computer?

- 5¼-inch disk drive
- 3½-inch disk drive
- CD-ROM drive
- Dot-matrix printer
- Fax/modem
- Hard disk
- Laser printer
- Letter quality printer
- MIDI device
- Modem
- Mouse
- PostScript printer
- Sound card
- Speakers
- Tape backup system

How much memory does your computer have?

- 640K or less
- 1MB
- 2MB
- 4MB
- 8MB
- 16MB

Which operating system(s)/environment(s) do you use?

- DR DOS version _____
- Microsoft Windows
- MS-DOS version _____
- OS/2
- Other _____

Which parts of the magazine do you like the most?

- Art Works
- COMPUTE/NET
- COMPUTE's Getting Started With special sections
- Editorial License
- Features
- Feedback
- GamePlay
- Hardware Clinic
- IntroDOS
- Multimedia PC
- News & Notes
- News Bits
- On Disk
- PathWays
- Personal Productivity
- Programming Power
- Reviews
- SharePak
- Test Lab
- Tips & Tools
- Windows Workshop

Which of the following computer-related topics do you like to read about?

- Databases
- Desktop publishing
- Disk management and MS-DOS
- Education
- Games and entertainment
- Graphics (paint, draw, or CAD)
- How to upgrade your PC

- Integrated software
- Local area networks (LANs)
- Money management
- Multimedia
- New computer technologies
- New hardware
- Pen computing
- Programming
- Spreadsheets
- Telecommunications
- Windows
- Word processing
- Other _____

Where do you use your PC?

- Home
- Work
- School
- Other _____

Where did you get this copy of COMPUTE?

- Subscription
- Newsstand
- Other _____

How long have you been reading COMPUTE?

- Less than two years
- Two years or more

If you have a modem, which online service(s) do you use?

- America Online
- CompuServe
- COMPUTE/NET
- Delphi
- GENie
- Prodigy
- Other _____

Comments _____

WINDOWS WORKSHOP

Clifton Karnes

PROGRAMMING WINDOWS IN C

In last issue's article "Windows Programming from Scratch," Tom Campbell says that Microsoft C/C++ 7.0 is the programming deal of the century. I couldn't agree more. For \$139 you can get one of the best Windows development environments around, complete with a global optimizing compiler, an integrated development environment, and a suite of excellent Windows programming tools.

Borland's Windows-based IDE is light years ahead of Microsoft's Programmer's Workbench, and Borland's compile times are faster.



But what you won't get, in my opinion at least, is the *best* Windows development environment. For that, you'll need to get Borland C++ 3.1 (Borland International, 1800 Green Hills Road, Box 660001, Scotts Valley, California 95066; 408-438-8400; \$495; \$749 with Application Frameworks).

Borland C++ 3.1 contains everything you need to create Windows applications—you don't need to buy Microsoft's Windows Software Development Kit. With Borland C++ 3.1, you'll get a Windows-hosted IDE (Integrated Development Environment), a Windows debugger (that unfortunately runs in DOS character mode only), Resource Workshop (for creating and editing everything from dialog boxes to bitmaps), WinSight (an analysis and de-

bugging tool), WinSpector (a postmortem analyzer), and a boxload of other tools.

Let's start with the Windows IDE. Borland C++ 3.0 came with Turbo C++ for Windows, which let you create Windows programs in a Windows IDE. But if you wanted to optimize your code, you had to compile with the DOS version of the product. Borland C++ 3.1 now has a full-blown Windows IDE for the optimizing Windows compiler. Now you can edit, compile, link, and run your programs from Windows. It's worth noting that BC 3.1 is the *only*

Windows-hosted optimizing compiler available (QuickC for Windows and Turbo C++ for Windows are not globally optimizing compilers).

One of the IDE's best features is syntax highlighting. This technique

(which Borland pioneered) lets you choose colors for language elements. If applied without restraint, syntax highlighting can make your screens look like bad Christmas decorations, but when used creatively, it makes code easier to read and debug.

The IDE also gives you a choice of slightly different interfaces: CUA or Alternate. You'll want to use the Alternate interface, however, because you can customize it with keystroke macros and keyboard reassignments.

You can also map the right mouse button to any of several actions. I've set it to load help and search for the word at the cursor, which is great for checking Windows API functions.

The compiler is full featured, supporting both C and

C++, and you can use it and the integrated linker to create both exe and dll files. You can also use precompiled headers, which create a binary symbol table from a header file, so the whole file doesn't need to be recompiled each time you compile your program. With the `windows.h` header file clocking in at more than 4000 lines, this is a tremendous productivity boost.

In addition to being able to compile Windows exe and dll files, you'll find full support for OLE, multimedia, pen computing, TrueType fonts, and DDE.

As mentioned above, BC 3.1 includes a number of tools that make creating Windows apps easier. First and foremost, there's the Resource Workshop. You can use this resource editor to create and edit dialog boxes, bitmaps, icons, and cursors. And you can edit these resources either as source files or inside exe and dll files. The Resource Workshop also includes several custom controls for placing bitmaps on buttons, creating canvaslike backgrounds, and sculpting a 3-D look for dialogs.

Of the other tools, WinSight is outstanding. In this one tool Borland combines a half-dozen utilities and includes information on window attributes, window messages, and DDE and OLE conversations.

After working for several weeks with both Microsoft and Borland environments, I have to give the nod to Borland. Both compilers produce high-quality code, but Borland's Windows-based IDE is light years ahead of Microsoft's Programmer's Workbench, and Borland's compile times are faster. You can produce great products with either development environment, but with Borland's, you'll get the job done faster, and have much more fun. □

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PROGRAMMING POWER

Tom Campbell

FROM WRITING TO READING

In last month's column, we looked at the Windows routine `WritePrivateProfileString`, which lets you create init files. Init files are read in when your application starts up and contain system variables in this format: [SectionName] EntryName=AddString.

The section name, which appears in brackets, may have more than one entry line. An entry consists of an entry name (called `EntryName` in our example above) and a value (called `AddString` above) for that entry. A typical entry for [Printer] might contain `Port=LPT1` if your printer is connected to the first parallel port, and if you use a Hewlett-Packard LaserJet, it would be `PrinterName=LaserJet IIIP`.

In this month's column, we'll look at the routine `GetPrivateProfileString`, which reads the value for an entry. For example, if you were to pass it the filename `myprog.ini`, the section [Printer], and the entry `Port`, it would pass back `LPT1`. If there were no init file available, it would return the default value you provided when you called the routine.

The code we'll write this month is straightforward and builds on last the code we wrote last month. As each line of code from the init file is read in, the first character is checked to see if it's a left square bracket. If it is, the entire line is assumed to be a section, such as [Printer]. It's then forced to uppercase.

When the routine first started, the requested section name was also forced to uppercase and surrounded with square brackets. If the two sections match, the `SectionFound` flag will be set. As long as it's set, incoming lines will be checked for left square bracket-

ets. If they are present, the search has failed. If they are absent, the lines are assumed to be entries in the format `EntryName=AddString`, and the familiar `Parse$` is used to halve the line.

If Left Side is the requested entry, a match has succeeded, and whatever is on the right side of the line is returned by the function. If the entry is never found, a default value is returned.

Although this routine is modeled after a Windows API call by the same name, it differs in several ways. First, what is called the section here is called the application name by Windows. Calling it an application is a misnomer; it's a holdout from the old days when all Windows apps used their own sections of the `win.ini` file to store configuration values. I'm not sure why the Windows documentation doesn't reflect this change in direction, but I decided not to perpetuate the mistake.

Second, the Windows call has an additional parameter not included with my version: the length of the buffer used to hold the string returned by this function. It may seem like a horrible kludge to BASIC programmers—and it is.

Windows is written in C, and C has no concept of strings; they're nothing more than arrays of characters ending with a zero byte. So if you want to copy a string in C, you have to use a runtime library routine to do it (not the handy-dandy = operator of BASIC), and you have to make sure you've dimensioned a character array big enough to hold the copied string. If you haven't dimensioned that array, C will copy the string anyway, assuring at the least that your program will work improperly and typically causing the system to hang.

Finally, the Windows API

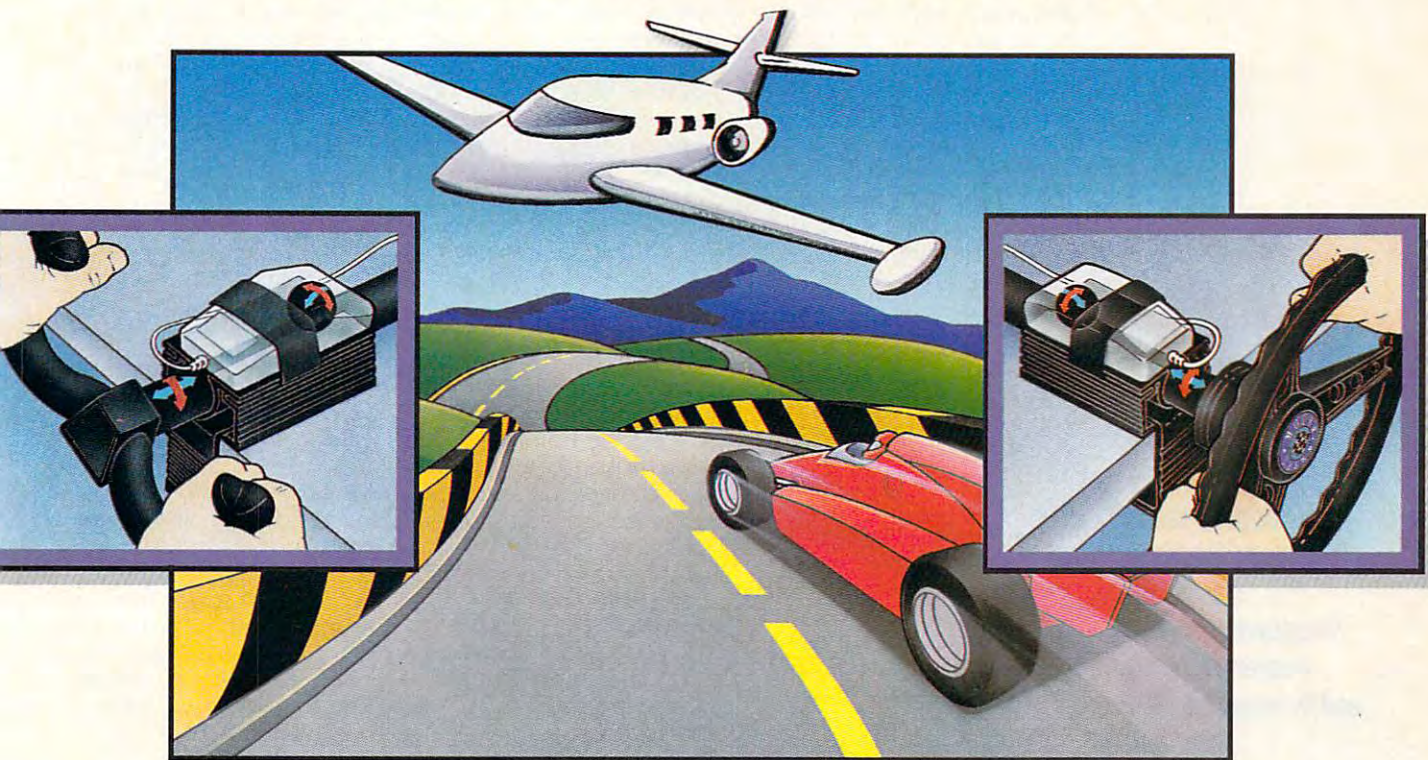
call requires that you pass it a buffer for the value returned from the init file entry. Its size must be less than or equal to the amount passed in the size argument. Again, this parameter is omitted, and the value is returned by the function. And again, a C programmer wouldn't have this flexibility because C doesn't have a string data type, so it doesn't support functions returning strings.

A side note: Windows NT, the higher-end version of Windows for workstations and non-Intel processors, doesn't use init files. (Technically, it can, but doing so is considered bad form, and they are supported only for compatibility.) Because NT was designed with reliability as its most important feature, text files for the purposes of system configuration were ruled out, and a registration database replaces them. The main reason is that it's easy for a text file to be damaged, yet not appear to be so. Suppose, for example, the last line of a configuration file contained the text `Printer=LaserJet IIIP` but the file was accidentally truncated to `Printer=LaserJe`. Windows would look for a printer driver, would not find one matching `LaserJe`, and would return an error, even if the IIIP were connected and ready to run. Using a more descriptive binary file format, NT is able to detect damaged files and proceed accordingly, by attempting an automatic recover or by notifying the system administrator.

Another reason to avoid text files is that binary files offer more flexibility. In an init file, the line `Copies=10` is all text, so you have to use `Val` to convert the string 10 to computer-readable format. More complex data structures are out of the question. A binary file lets any kind of data be represented in its native format. □

A good reason to avoid text files is that binary files offer more flexibility.

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TIPS & TOOLS

Edited by Richard C. Leinecker

Although Mr. Leinecker's home was destroyed by Hurricane Andrew, he has continued to provide COMPUTE with his "Tips & Tools" column on time. Our heartfelt best wishes to the Leinecker family and to all of the individuals and families affected by recent disasters.

No-Squint Cursor

Our office uses numerous laptop computers with LCD screens. Unfortunately, the screens are hard to read sometimes due to glare. And the cursor is the hardest thing to see.

We use WordPerfect 5.0 on all of our laptops. I discovered a program in the WP50 directory named cursor.com. It adjusts the size of the cursor. I put a copy of cursor.com in my root directory and added the line

```
cursor /ah
```

to my autoexec.bat file that automatically loads it. Now, the cursor is larger and much easier to see.

The program keeps the cursor set to the new size. This makes it a nice utility that helps with all of my other laptop computing.

ALBERT NICCOLUCCI
HELENA, MT

Regrouping Windows

I enjoy Windows 3.1 and have gotten carried away with buying Windows applications and installing them on my computer. I recently ran into a problem that had me stumped. After I installed my 41st group, Windows would crash when I tried to run it. Clicking on the Ignore button would simply drop me back down to DOS. I called Microsoft technical support, and they helped me out.

Each group consumes sys-

tem resources. Those include your path, environment variables, files, and buffers. When you have too many groups, they eat up the space that Windows sets aside for the resources. Each computer is different, so while mine had problems at the 41st group, yours might work fine until you add your 60th group.

I edited my ini files and reduced the number of groups to ten. I wouldn't recommend editing your ini files, since the groups may have dependencies and you might end up worse off than when you started. I would recommend grouping things together at install time, though.

Windows works perfectly once again. And it comes up several seconds faster than it did in the old days, now that I have fewer groups.

WILLIAM JAMES WRIGHT
BROOKFIELD, WI

Directory Killer

A handy batch file I've written deletes all of the files in a subdirectory and then deletes the subdirectory. It won't work with embedded subdirectories, but it still saves me a lot of time. To avoid the *Are you sure?* message, I piped a Y character into the Del %1 command. Here's deldir.bat.

```
echo off
if "%1"==" " goto noparam
echo y |del %1
rd %1
goto end
:noparam
echo Parameter missing.
echo Usage: deldir
<directory_name>
:end
```

DENNIS SULLIVAN
DAYTON, OH

Restoring Your Place

Batch files have a major drawback. It's not easy to remember where you are and then

come back to the same place when you're through. You might be in a different directory or even on another drive. I have two batch files that'll help. One is named savedcd.bat and saves your current directory to a disk file. The other is called savedrv.bat and saves your current drive to a disk file.

Before proceeding, I need to make two assumptions. You've got the DOS Debug program in your path, and you have a directory off of your root in your path called batch. If you don't have Debug in your path, then make sure it's there. If you don't have a directory off of your root in your path called batch, then replace those references with any directory you'd like to use that's in your path. You can also create a batch directory. Here is savedcd.bat.

```
echo off
echo cd > c:\batch\restcd.bat
ctty nul
type c:\batch\cdscript |debug
c:\batch\restcd.bat
ctty con
cd >> c:\batch\restcd.bat
```

You'll need a second file to help things along called cdscrip in your batch directory. Here is cdscrip.

```
rcx
3
w
q
```

Here's how it works. The batch file starts off by echoing the text string *cd* plus a space to a file called restcd.bat.

What comes next is piping a file into Debug that strips the carriage return off of the end of the file. We have to do that, since we're getting ready to append the current directory onto the file. If we

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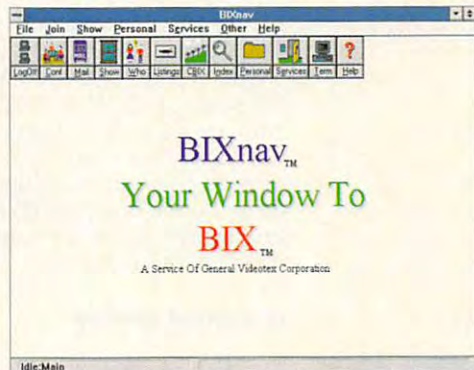
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didn't strip the carriage return, we'd end up with a two-line file that would not set the directory.

The script simply uses the RCX command followed by a 3 to tell Debug to truncate the file to three bytes. That's just enough room for the *cd* and the space, but it removes the carriage return at the end.

Finally, the command to change directory is appended to the file. What results is a single-lined batch file named *restcd.bat* with this line.

```
cd c:\current\directory
```

To return to your point of origin, you just have to type *restcd*. Since it was created in your batch directory, and that directory is in your path, DOS will find it and execute the change directory command so that you'll return to where you started.

Unfortunately, the saved scheme doesn't work when you change drives. You'll need an extra pair of files if you want to save and restore your current drive. Here is *savedrv.bat*.

```
echo off
cd > c:\batch\restdrv.bat
ctty nul
type c:\batch\drvscript | debug
c:\batch\restdrv.bat
ctty con
```

You'll need a second file to help things along called *drvscript* in your batch directory. Here is *drvscript*.

```
e 102
Od
e 103
Oa
rcx
4
w
q
```

This pair of files works similarly. You type *savedrv*, and it

creates a batch file in your batch directory.

The script simply uses the E (Edit) command to make bytes 3 and 4 (102 and 103) into the two codes that represent a carriage return. The entire directory string is part of the file, but all we want is the drive and colon. The RCX command is used to truncate the file to four bytes.

To get back to the drive you were on, just type *restdrv*.

RICHARD C. LEINECKER
MIAMI, FL

Special Deletes

Very often I find myself in the situation where I want to delete everything from a directory except one type of file. If I could just type *del except *.exe* it would be perfect. Everything but the exe files would be deleted.

Now, you can do just that with Deletex. To use Deletex, put it in your DOS directory. Then, from the directory you're in, just type *deletex filemask* where *filemask* can be any legal DOS filemask that you don't want deleted.

You can type in Deletex 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 deletex.com
```

```
File not found
```

```
-e 100 be 80 00 ac 0a c0 74 64
-e 108 ac 3c 0d 74 5f 3c 20 74
-e 110 f7 8b fe 4f ac 3c 0d 74
```

```
-e 118 04 3c 20 75 f7 c6 44 ff
-e 120 00 8b f7 bf 9f 01 b9 0a
-e 128 00 f3 a5 ba 9b 01 bd 70
-e 130 01 b4 2f cd 21 53 2b c9
-e 138 83 c3 1e b4 4e cd 21 72
-e 140 0e 8b d3 ff d5 b4 4f cd
-e 148 21 72 04 ff d5 eb f6 5b
-e 150 81 fd 70 01 75 08 bd 7e
-e 158 01 ba 9f 01 eb d7 81 fd
-e 160 7e 01 75 08 bd 8c 01 ba
-e 168 9b 01 eb c9 b4 4c cd 21
-e 170 b8 00 43 cd 21 80 e1 df
-e 178 b8 01 43 cd 21 c3 b8 00
-e 180 43 cd 21 80 c9 20 b8 01
-e 188 43 cd 21 c3 b8 00 43 cd
-e 190 21 f6 c1 20 75 04 b4 41
-e 198 cd 21 c3 2a 2e 2a 00
-rcx
cx 0000
:9f
-w
Writing 009f bytes
-q
```

If you run Checksum (July 1992 "Tips & Tools") on this com file, 062 should appear on your screen.

RICHARD C. LEINECKER
MIAMI, FL

Missing You

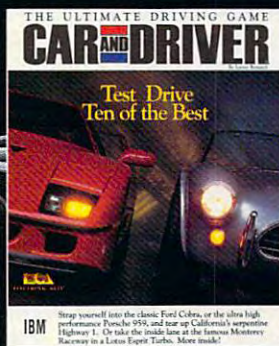
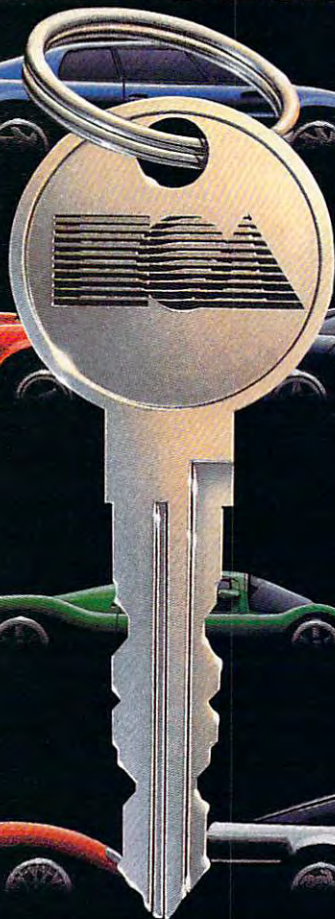
We are looking for the addresses of the following individuals who have had tips published in COMPUTE: Mike Chatel, Winston Wan, Tom Doan, Geoff Bartakovics, and James Steele. If your name is listed, please send your address to Julia Fleming in care of this magazine.

RICHARD C. LEINECKER
MIAMI, FL

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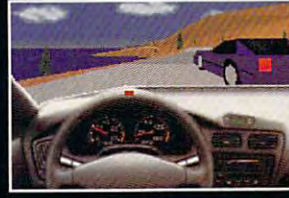
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INTRODOS

Tony Roberts

FOR'S FORTE IS REPETITION

One of my favorite DOS commands is also a power command. The For command lets you perform the same operation several times, or on several files. It's documented in the batch programming section of your DOS manual, so you may think it can only be used in batch files, but that's not so.

Although the syntax is slightly different in each application, For can be used both in batch files and at the command line.

Here's how it works: Let's say you want to list the contents of a set of files—say, your batch files—to the screen. Type `for %f in (*.bat) do type %f`.

The `%f` is a placeholder. When the line is executed, it's replaced in turn by each member of the series indicated by the data in the parentheses. In this case, that series includes every file with a bat extension in the current subdirectory.

You most often see `%f` used as a placeholder, but in practice, any letter will do. When a For command is used in a batch file, the placeholder designation includes two percent signs (`%%f`). When For is used on the command line, only one percent sign (`%f`) is necessary.

For isn't a command you'll use every day, but it's a good option to consider when you're facing a big task. For example, if you want to place a copyright notice at the end of each of 100 text files, you could open each file and type in the new line, but that would get old quickly. The For command can have the job finished in a flash.

First, create a file that contains the copyright notice. Save it with the name `notice`. Then, type the following: `for %f in (*.txt) do copy %f+notice`.

This example combines the

For and Copy commands to append the text in the notice file to every file with the txt extension in the current subdirectory. The plus sign between the `%f` and the filename `notice` activates Copy's append feature.

Before you use this or any For command to modify your important files, make a set of backups of those files. Also, test the syntax on one or two files first. Just as For is powerful enough to get a lot of work done in a hurry, it can also do heavy damage just as quickly if your command isn't constructed just right.

The For command can be used with programs as well as with other DOS commands. I frequently use the For command to update archive files I've created with the PKZIP utility. For instance, you might type `for %f in (*.zip) do pkzip -f %f`.

This invokes the PKZIP utility for each of the zip files in the current subdirectory. The `-f` switch tells PKZIP to freshen the zip files—to replace any file contained in the archive with a newer file of the same name if such a file exists.

Although most uses of the For command involve a series of filenames, there are other ways the command can be used. For example, the following short batch file might come in handy if you're hooked up to a network and want to know which drive designations are in use.

```
@echo off
for %%f in (C D
E F G H I J K L M N O P)
do if exist %%f:\.* echo
Drive %%f is online.
```

This batch file cycles through a list of drive names and checks for the existence of files there to determine whether the drive is available. If the drive is available, a message indicating the fact will be print-

ed onscreen.

You can even use the For command to compare text strings entered by the user. This might allow you to set up a simple password system for running various programs. Here's an example of a batch file that requires a password to run the program `Fungame`.

```
@echo off
for %%f in (cat
dog pig) do if %1==%%f
goto ok
echo Sorry, you didn't
supply a valid password.
goto end
:OK
fungame
:end
```

This batch file fragment requires the user to enter a valid password (in this case `cat`, `dog`, or `pig`) as a parameter when running the batch file. The for line compares the user's input (the `%1`) with each of the three words listed in the series. If there's a match, the program jumps to the OK label and runs `Fungame`. If the password doesn't match up, the batch file prints a message and then ends.

Although this security system won't fool anyone savvy with computers, your kids might get a kick out of having a secret password.

If you have a job for the For command, give it a try, but don't give up if things don't go right the first time. Building a successful For command usually takes experimentation, but if it's set up correctly, it can save you a lot of time.

After you've put in the effort to create a good For command, don't let it go to waste. Document the command—what it does, how to use it, and so on—with rem statements in a batch file, and store it where you can refer to it next time an industrial-strength project crops up. □

The For command works wonders in batch files and on the command line.

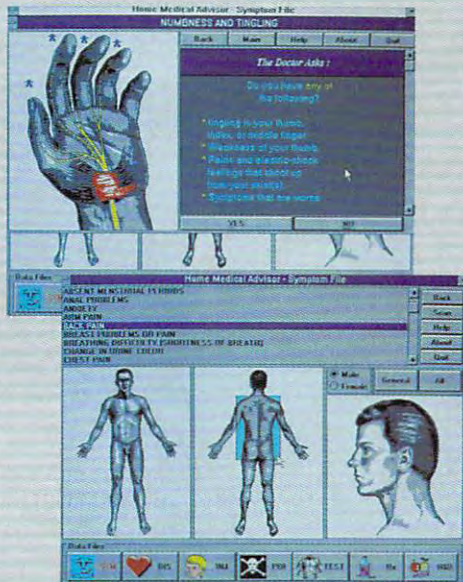
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ON DISK

Tony Roberts

DOS REPLACEMENTS AND WINDOWS ADDITIONS

Before I describe this issue's programs, let me remind you that many of the programs included on COMPUTE's PC Disk are shareware. The authors make this software available so that you may try the program to see if you like it before you buy it. If you find the software useful, please remember to pay the registration fee.

JonDir is really quick, and what's more, it won't clutter your disk with index files.

```
C:\DOS>jd c:\p
1 - C:\ACTTOOLS
2 - C:\NTH
3 - C:\NFZIS
4 - C:\NFZIS\B
5 - C:\NFZIS\B
6 - C:\NFZIS\FRES
7 - C:\NFZIS\FRES
8 - C:\NFZIS\FRES
9 - C:\NFZIS\FRES
10 - C:\NFZIS\FRES
11 - C:\NFZIS\FRES
12 - C:\NFZIS\FRES

Select: 5

C:\NFZIS\FRES>
```

JonDir

Moving around a bulging hard disk with the DOS Chdir command can be quite a challenge. There's got to be a way to get from one subdirectory to another without having to enter long, complicated paths (which are susceptible to typing errors).

JonDir provides a solution. To use this directory changer, simply enter *jd* and the first few letters of the target subdirectory. That's usually all JonDir needs to get you where you want to go. JonDir jumps to the first subdirectory that matches your input. If you have directories with similar names, JonDir can build a menu of matching directories, from which you can select the one you want.

Another feature of JonDir is that it doesn't clutter up your disk with index files. That's

what programmer Jon Snyder had in mind when he wrote the program, which he offers as freeware. JonDir can find your target directory and move you there even if it's on another drive.

Since

Since is a handy utility put together by Robert McCormick. With this program, you can get an instant accounting of all files on your drive modified since a given date.

Enter *since* with yesterday's date, and you'll see a list of all the files that have been modified since midnight.

With *Since*, you can specify times as well as dates. You can use this particular feature to determine whether someone tampered with your computer while you were

away from your desk.

Since is shareware, and it has a \$5 registration fee.

PCOPY

One of the most frequently used of all DOS commands is Copy. Although it's frequently needed, the Copy command is neither efficient nor safe. While the DOS version of Copy gets the job done, PCOPY, from Patri-Soft, gets the job done correctly.

PCOPY has more features than its DOS counterpart. If you attempt to copy over an existing file, PCOPY can rename and save the older version of the file rather than overwriting it. PCOPY can move files to other disks or subdirectories so you don't have to copy and then delete.

If the target directory for your copy doesn't exist, PCOPY can automatically cre-

ate it. PCOPY allows files to be selected and processed based on names or dates. You can even instruct PCOPY to begin with a specified file in a subdirectory and continue until it reaches another specified file.

If you're copying files to floppy disks, PCOPY helps there, too. First, it checks to make sure there's enough room on the target disk for the selected file, and if not, it will prompt you for another disk. Second, if you have several files to copy onto several disks, PCOPY can select the most efficient combination of files to go on each disk.

PCOPY includes dozens of switches and options so you can get just the results you want. If you're not sure that you've specified everything correctly, though, run PCOPY in test mode, and the program will show you how it interprets your command. If everything is as expected, you can actually execute the command; otherwise, refine your command and try again.

PCOPY has been around for several years, so it's been tested and polished. The program is shareware and carries a registration fee of \$20.

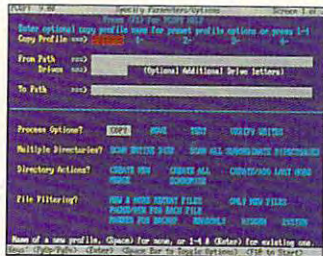
Red Button

When trying to exit from Microsoft Windows, you're always confronted with one of computing's little annoyances: one last dialog box asking if you're sure you want to exit.

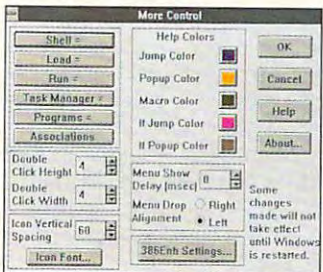
Red Button lets you close up your Windows show in a hurry. The bright red icon sits minimized at the bottom of your screen. When it's time to quit, a simple double-click will get you out of Windows and back to DOS.

If any of the active Windows applications have unsaved files, you'll be given the option of saving those files.

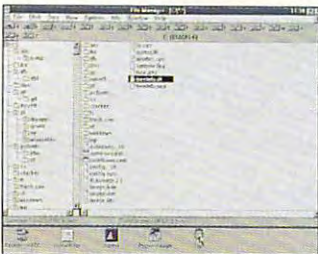
Besides being a faster exit



PCOPY



More Control



Trash Manager



Speaker Driver

from Windows, the iconic Red Button is much easier to access than the Close entry on the Control Menu. Red Button is shareware and carries a \$15 registration fee.

More Control

Helpful as the Control Panel is, it doesn't provide access to all functions.

With More Control, you can easily change the colors used by the Windows help engine in displaying hypertext; the alignment of drop-down menus; the vertical spacing between icons; the font used to display icon titles; the contents of the run=, load=, and shell= lines; plus many other settings.

More Control is freeware from Sloop Software.

Trash Manager

Trash Manager works hand in hand with the Windows 3.1 File Manager to make your disk cleanup chores safer and easier.

Simply drag files to the Trash Manager icon, where they're stored until you either restore them or empty the trash. If files are in the trash can, the program displays a bloated trash can icon as a reminder. Trash Manager will keep track of your deleted files even after a reboot.

If your system has sound capabilities, Trash Manager can associate waveform sounds with each of its three specific events: deleting a file, restoring a file, or emptying the trash.

Trash Manager, distributed by Checkbox Software, carries a \$25 registration fee.

Speaker Driver

In Windows 3.1, Microsoft ramped up its support for hardware and software that make use of sound. Even if you don't have a sound board, it's still possible to tap into some of the excitement of Windows 3.1 sound.

ICOM Simulations has created a speaker driver that lets you play waveform sounds through your PC's internal speaker. ICOM, the creator of the popular Intermission screen saver program, requires no registration fee for the speaker driver.

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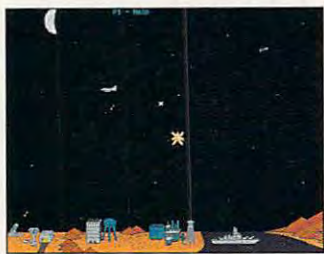
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Steve Draper

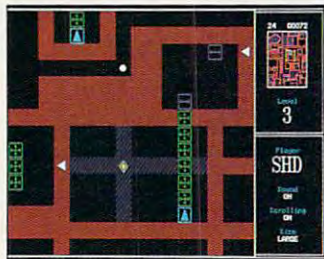
NEW RESOLUTIONS

January's SharePak offers three programs that are guaranteed to please. First, Sand Storm gives you the opportunity to use Patriot and Tomahawk missiles to stop the tyrannical Saddam Hussein and sharpens your reflexes at the same time. MicroCAD combines the ease of use of a paint program with the power of a CAD package to bring out your creative powers. Finally, Cyberbox II will give puzzle lov-

Sharpen your wits and reflexes with January's SharePak.



Kick sand in Saddam's face in Sand Storm.



Cyberbox II is the ultimate in mental exercise.

ers all the addictive fun they can handle while raising their level of reasoning.

COMPUTE's monthly SharePak disk contains the best of PC shareware. We look at hundreds of titles, select programs with reader appeal, test them, and pick only the very best.

Sand Storm

Here's the chance you've been waiting for: the chance to go head to head with the

Bully of Baghdad himself, Saddam Hussein. This is the fully functional shareware version of the popular commercial game by MVP Software.

Your mission is to protect potential enemy targets such as hospitals, oil refineries, and ships from Iraqi Scud and bomber attacks. Your only weapon against these threats is the untested Patriot missile. The alarm sounds, and as you take the gunner's position, the sky begins to fill with Scud missiles. On top of that, squadrons of Iraqi jets start dropping bombs on your position. You'll have to have a sharp eye and a quick hand to survive this assignment, and this is just the first scenario!

Sand Storm includes two other scenarios. The Jet scenario is similar to the Scud missions, but you have more jets than before. In the Tomahawk scenario, you must guide Tomahawk cruise missiles through brutal AA fire to strike chemical weapons plants and mobile Scud launchers deep in enemy territory. In all, there are 20 different missions to challenge you for hours on end.

Sand Storm requires an IBM PC or compatible with 384K RAM, VGA or SVGA graphics, and a Microsoft-compatible mouse. The registration price is \$15.

MicroCAD

MicroCAD is an easy-to-use CAD program that's packed with all the features you'd expect to find in expensive commercial CAD programs. The main feature of this program is its unusual icon-based interface. MicroCAD has the look and feel of a paint program, and it's just as easy to use. This type of interface eliminates the multiple commands, pull-down menus, and keyboard entries that are

required in other graphical design programs.

With MicroCAD, unlike some other programs, easy does not mean "less." MicroCAD allows for the creation of detailed two- and three-dimensional objects that can be manipulated in 3-D and shown from any perspective. The list of features in this program is much too extensive to include here, but it's covered in detail in the program documentation. This program packs a lot of power in a small package and is well worth a look.

MicroCAD requires an IBM PC or compatible, DOS or OS/2, VGA graphics, and a mouse. The registration price is \$35.

Cyberbox II

If you like to challenge your logic skills more than your reflexes, then Cyberbox II is the game for you. There's not any fast action here, no laser beams or monsters to block your path. All you'll find in this game are some of the most intriguing and addictive puzzles you'll ever encounter.

Each level has several rooms and an exit door. You'll have to find all the gems on one level before you can exit to the next. Finding the gems is the easy part. Getting the gems and getting out is another story. You must slide different types of blocks in order to clear a path to the gem, without trapping yourself in the process. Level 1 has a lot of help to get you started, but by level 3, you'll need to save your game often. And if that's not enough, you can make your own levels with the included editor. To be a success at Cyberbox II, you'll need to plan ahead and get your brain in gear.

Cyberbox II requires an IBM PC or compatible with an EGA or VGA display. The registration price is \$7. □

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JAN 90: *Directory Master*, customize with this DOS shell; *Quick Type*, improve your typing skills; *Skullduggery*, tricky game of mystery; *MathMagic*, four educational games. (#CDSK0190)

MAY 90: *QHELP* and *QHCOMPIL*, create TSRs to give online help; *Levy Adventure Development System*, create your own adventure games; *GEEWHIZ*, TSR BASIC manual; *Sounds Good*, make sounds for programs. (#CDSK0590)

OCT 90: *Amado*, match scrambled blocks to the computer pattern; *Captain Comic*, great EGA graphic adventure game; *Funny Face*, Mr. Potato Head-type animation faces; *Fusion*, great game similar to *Tetris*; *Power Poker*, create poker hands in two dimensions. (#CDSK1090)

MAR 91: *Cash Control*, simplify financial recordkeeping; *Personal Inventory 2.11*, maintain a record of household items. (#CDSK0391)

APR 91: *Schedule*Master*, manage your daily schedule; *Meal-Master*, menu-driven database system for managing recipes; *The Monuments of Mars!*, great graphic arcade/adventure game. (#CDSK0491)

AUG 91: *TurboPaint 1.5*, full-featured paint program; *Math Voyager*, guide starship by answering math problems; *EARTH-WATCH*, graphically displays 24-hour day-and-night cycles. (#CDSK0891)

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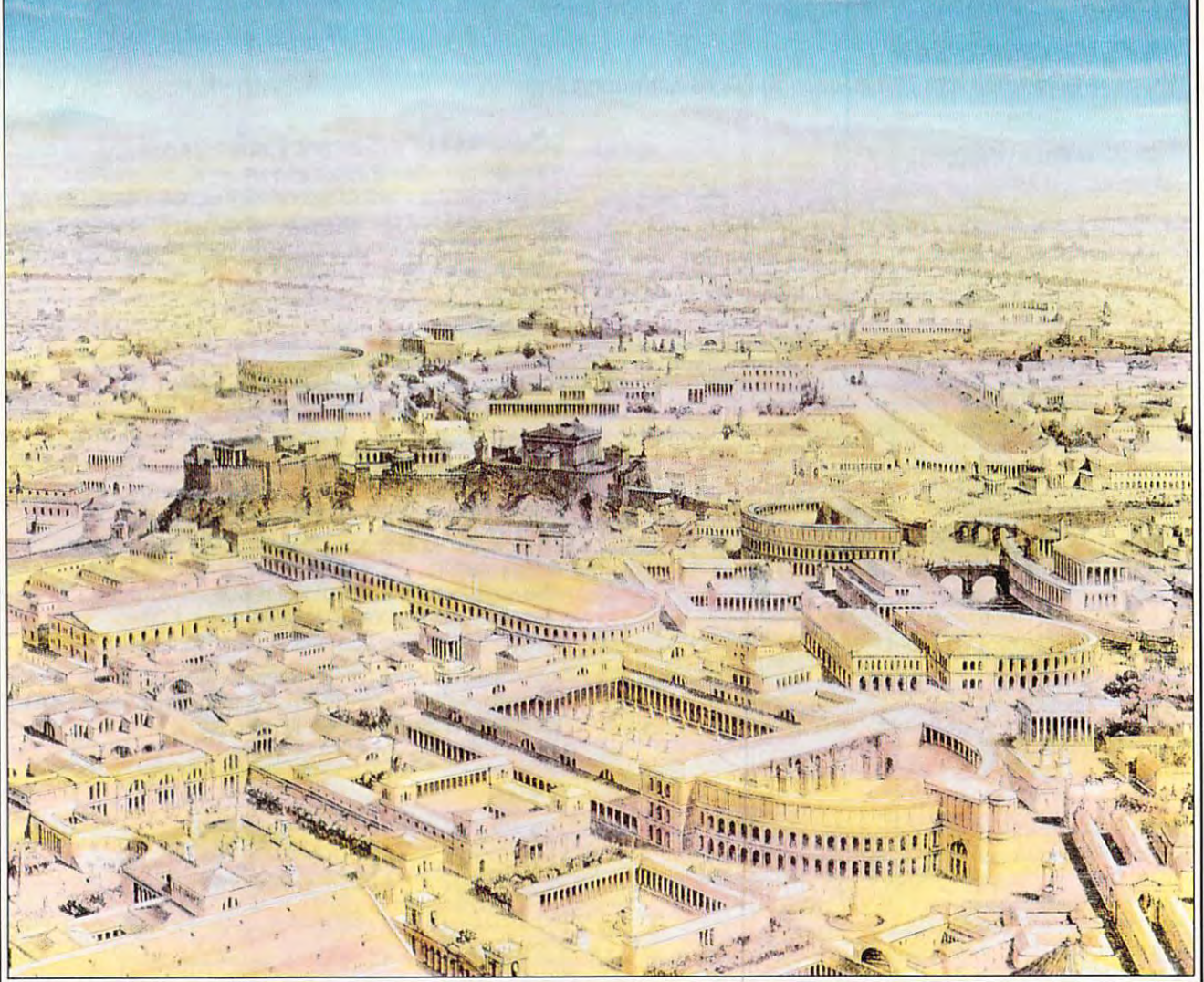
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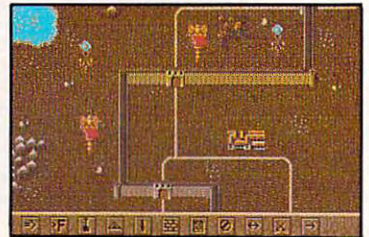
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The Best of The Year

THE COMPUTE CHOICE AWARDS

EDITED BY ROBERT BIXBY

Each year, COMPUTE writers and editors confer to select the best PC hardware and software. Selecting the winners for these awards is tough, and just being nominated is an achievement. It means that a computer professional, after using and seeing demonstrations of literally hundreds of products, sees one particular standout. In a sense, a nomination is an award in itself. To find out more about the products mentioned here, circle their numbers on the reader service card and mail it in.

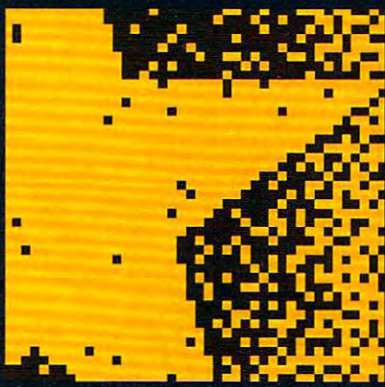
What will you find in this year's field? Languages and databases of extreme power, hardware with advanced design, word processors that could take over all of your desktop publishing tasks, games that put you into the cockpit of aircraft obsolete nearly half a century ago, whole libraries on a disk—in short, many of the dreams of science fiction through the ages.

Two technologies also receive special recognition—the local bus and the new PCMCIA standard, both of which are discussed in this month's feature "Emerging Technologies." Welcome to the future.

PRODUCTIVITY

Best Operating System/ Environment Microsoft Windows 3.1

Microsoft Windows 3.1 is clearly the operating system to use. If you're using 3.0, upgrad-



ing to 3.1 should be the easiest decision you've ever made. If you're not using Windows yet, 3.1 may be the advance that convinces you to come on board. Windows 3.1 is faster, crashes less often, has superb DOS support, boasts a first-rate File Manager, comes with its own font technology (TrueType), supports drag-and-drop editing,

makes compound documents possible with OLE, features a zippier and smarter SMARTDrive, and much more.

Speed. If we had to choose the most important feature of 3.1, speed would be it. There are several reasons for this dramatic speed increase. First, 3.1 sports new video drivers, including an SVGA driver that's faster than the third-party 16-color drivers we've seen. Next, hidden inside the system is Fast Disk, an improved 32-bit hard disk driver that boosts disks driven by Western Digital and compatible controllers.

Besides being faster, 3.1 is also more robust than 3.0. You can say goodbye to almost all the system crashes that plague 3.0.

Windows 3.1 wins the COMPUTE Choice Award for Best Operating System/ Environment because its power, features, versatility, innovation, quality, and DOS compatibility are unmatched achievements.

CLIFTON KARNES

Microsoft—\$149.95

Reader Service Number 340

Other nominees:
OS/2, IBM
Reader Service Number 341

Best Word Processor Microsoft Word for Windows 2.0

In Windows-land, Microsoft Word for Windows has always been the word processor to beat. With Ami Pro 3.0 and WordPerfect 5.1 for Windows, the competition's hot, but for our money, Word for Windows 2.0 is king of the hill.

Since the features accessed by WinWord's toolbar are at the heart of the program, let's take a quick toolbar tour. Going from left to right, you'll find buttons for opening and saving files; cutting, copying, and pasting; undoing; creating numbered and bulleted lists; building tables; creating frames; drawing (WinWord has an on-board drawing program); graphing; printing envelopes; checking your spelling; printing; and zooming between full-page and

the easiest-to-use packages we've ever seen.
CLIFTON KARNES

Microsoft—\$495
Reader Service Number 342

Other nominees:
Ami Pro 3.0, Lotus Development
Reader Service Number 343
WordPerfect 5.1 for Windows, WordPerfect
Reader Service Number 344
WordStar 7.0 for DOS, WordStar International
Reader Service Number 345

Best Spreadsheet Microsoft Excel 4.0

Last year, we gave Microsoft Excel 3.0 the COMPUTE Choice Award for Best Small Business Program. It seemed then to be an almost perfect program. This year, the COMPUTE Choice Award

a variety of what-if scenarios, a view manager that lets you look at a single worksheet in a variety of ways, a built-in spelling checker, complete compatibility with Lotus 1-2-3 macros, additional types of charts, and more.

With Borland and Lotus breathing down Microsoft's neck, this could become a very competitive category. But for the moment, Excel continues to live up to its name. It's still top dog.
DAVID ENGLISH

Microsoft—\$495
Reader Service Number 346

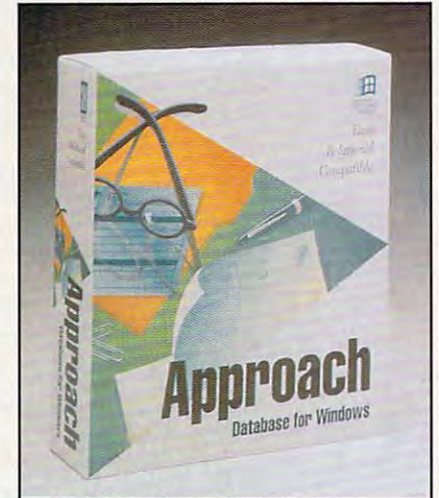
Other nominees:
Lotus 1-2-3, Lotus Development
Reader Service Number 347
Quattro Pro 4.0, Borland International
Reader Service Number 348
Quattro Pro for Windows, Borland International
Reader Service Number 349



Microsoft Word for Windows 2.0



Microsoft Excel 4.0



Approach for Windows

100-percent views.

Almost better than these new buttons is the fact that you can add your own. You can map to a button any native WinWord command or any macro you've created.

Looking beyond WinWord's new buttons, you'll find that the ribbon and ruler, familiar from WinWord 1.0, are present in 2.0 but they're combined. The ribbon sports drop-down list boxes for styles, fonts, and font sizes, plus buttons for styles (bold, italic, and underline), justification (left, center, right, and proportional), and tab settings (left, right, center, and decimal), as well as a button to turn paragraph marks on or off.

Word for Windows 2.0 wins the COMPUTE Choice Award for Best Word Processor because it combines an amazing list of features into one of

for Best Spreadsheet goes to Microsoft Excel 4.0. One of the best programs ever written has gotten even better.

How do you improve one of the best programs ever written? Version 4.0 adds a drag-and-drop feature that lets you quickly move a cell or group of cells from one location on the worksheet to another. In addition, a new autofill feature can intelligently complete a series of labels for you. Type *Jan*, highlight the eleven adjoining cells, and the remaining names of the months will fill in automatically. This is just one example. You can also autofill days of the week and any other natural series of cells commonly used in spreadsheets.

You also get a customizable toolbar that lets you create your own tools and group them the way you want them, a scenario manager that lets you create

Best Database Approach for Windows

Does a relational Windows database that fully supports dBASE, Paradox, and SQL files; lets you use all your Windows fonts; and is easy to use sound too good to be true? If it does, you haven't seen Approach. This modern database miracle takes the most popular database formats and allows you to create custom data entry forms and reports as well as search your data 20 different ways.

Using Approach is easy. The program has two modes: Design and Browse. In Browse mode, you enter or search data. In Design mode, you design either a form or a report. Forms are screen based, and the best example of one is the classic data entry form. Approach gives you an array of drawing tools to help you get your



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form just right. Also included are controls like list boxes and buttons, the latter of which can be mapped to macros. You move between Browse and Design modes by simply clicking on a button on the program's toolbar.

Reports are usually designed for the printer as an output device, and they are as easy to design as forms. You can incorporate text, date, memo, time, Boolean, number, calculated, and picture data types in both forms and reports.

Approach wins the COMPUTE Choice Award for Best Database because it's a masterful example of a powerful and feature-packed program that is simple to use. With Approach, you'll be productive within a few hours, not days or weeks.

CLIFTON KARNES

Approach Software—\$279

Reader Service Number 350

Other nominees:

dBASE IV 1.5, Borland International

Reader Service Number 351

FoxPro 2.0, Microsoft

Reader Service Number 352

Best Communications Program Procomm Plus for Windows

In 1985, Datastorm Technologies set the standard in PC communications software with the award-winning Procomm. Seven years later, the company does it again with Procomm Plus for Windows, a marvel of design.

Beyond its clean, user-defined graphical interface, the program offers a bevy of new and improved features: a 250-entry dialing directory, 34 video terminal emulations, a built-in Host mode bulletin board system, 11 transfer protocols, and the ability to view CompuServe GIF pictures as you download them. Also available are 40 programmable Meta keys, capable of sending text strings, running scripts, and launching Windows or DOS applications. The program takes full advantage of Microsoft's Dynamic Data Exchange (DDE), opening a new world of communications abilities to word processing, spreadsheets, and much more.

Datastorm's powerful ASPECT compiled programming language continues to evolve. More than 300 commands are available for writing scripts as simple as automated BBS log-in and file transfers or as complex as DDE-compatible user applications. Automated Record and Compile functions put even nonprogrammers at ease with executable scripts.

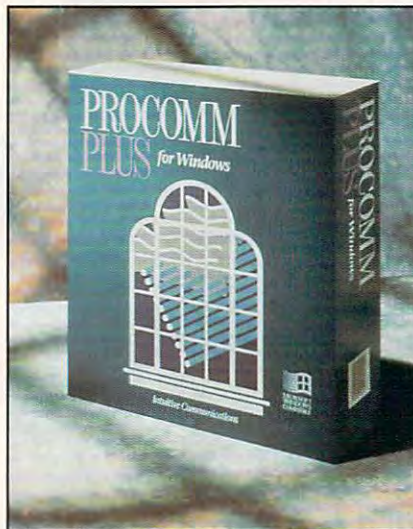
The crowning glory, for many users,

is the completely revamped documentation. Previously a nightmare of information disarray, the new manuals are now thoughtfully designed and generously illustrated.

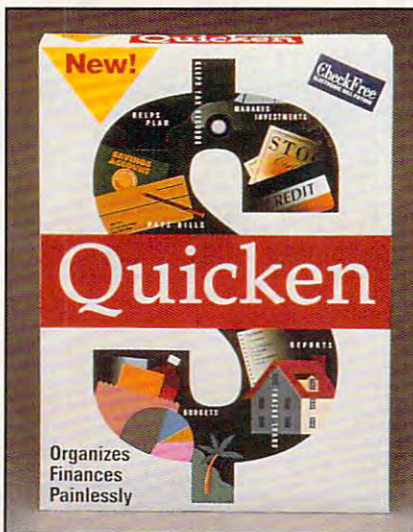
SCOTT A. MAY

Datastorm Technologies—\$149

Reader Service Number 353



Procomm Plus for Windows



Quicken for Windows

Other nominees:

Eclipse Fax, Eclipse Systems

Reader Service Number 354

The Sierra Network, Sierra On-Line

Reader Service Number 355

Best Money Management Program Quicken for Windows

If you thought Quicken for DOS was good, take a look at Quicken for Windows. This is not just a translation of this excellent program; it's a

redesign from the ground up that fits Windows like a glove.

Quicken is a personal financial manager that's most famous as an easy-to-use checkbook program that both manages your checkbook and prints checks. It certainly does these things, and does them well, but there's much more to Quicken. It can track your investments and manage credit card accounts and trusts (to name just a few accounts), and it can print reports that include net worth, budgets, income and expenses, and cash flow. It also keeps track of tax-deductible contributions, and it can fill in as a simple accounting package for most small businesses. If you have a small business, though, you ought to take a look at Quicken's companion program, Quick Books, which was designed to meet the specific needs of small businesses.

The fully MDI-compatible interface is easy to navigate and use. With the motto of Safety First, Quicken saves your data with each entry, and it encourages you to back up your files. Add to this the ability to remind you of payments due and the best data entry forms in the business, and you have a terrific program.

Quicken wins the COMPUTE Choice Award for Best Money Management Program because it's one of the best-executed, feature-rich, and downright useful programs of its kind that we've seen.

CLIFTON KARNES

Intuit—\$69.95

Reader Service Number 356

Other nominees:

DAC Easy Accounting, DAC Easy

Reader Service Number 357

Microsoft Money 2.0, Microsoft

Reader Service Number 358

QuickBooks, Intuit

Reader Service Number 359

TurboTax for Windows 9.0, ChipSoft

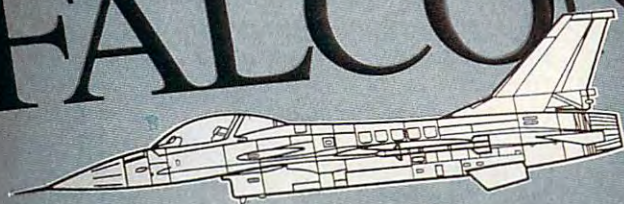
Reader Service Number 360

Best DOS Utility 4DOS 4.01

If you still find yourself doing much of your work from a DOS prompt rather than clicking your way through layer after layer of icons and windows, you'll love JP Software's 4DOS. This replacement command shell brings DOS into the 1990s, adding features found in advanced operating systems such as UNIX and AmigaDOS. On 286 and higher systems, 4DOS can be loaded high, using only 256 bytes of base memory—much less than command.com. And it's fully compatible

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3.0

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We could tell you about the superb graphics we put into Falcon 3.0™. And the incredibly real F-16 feel. And the sensational scope that delivers everything from Instant Action arcade excitement to plotting your own Red Flag training missions to engaging in a different campaign every time you play. But we couldn't say it half as well as the critics have said it. Look at the high marks they've given Falcon 3.0.

"The visuals during flight are awesome." JIM DOUGLAS, ACE

"If you aren't in the armed services—and maybe even if you are—this is as close as you can come to flying the Falcon." PETER OLAFSON, COMPUTE

"The graphics are stunning, the sound is incredible and the game play is a rush." DAVID ETHEL, VIDEO GAMES & COMPUTER ENTERTAINMENT

"It's not so much a game system as it is a way of life." EVAN BROOKS, COMPUTER GAMING WORLD

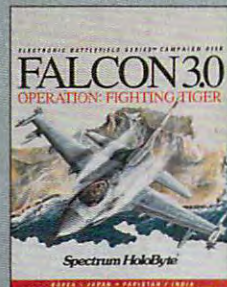
"Realistic, contoured terrain. Your view from the cockpit is the best in the flight simulator world. And Falcon's user interface is slick and easy to use." PC GAMES EDITORS

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"Be excited. Falcon 3.0 makes other efforts in this genre seem like test runs for the real thing."
 STRATEGY PLUS EDITORS

"The most complete and accurate jet fighter simulation to be found this side of a security clearance. Period."
 RICHARD SHEFFIELD, COMPUTE

"The most appealing aspect is the realism. This is as true to life as I've seen on a computer."
 COMPUTER GAME REVIEW EDITORS



Now Falcon 3.0 takes you places you've never flown before. Operation: Fighting Tiger™ takes you on action-packed missions in three new Asian campaigns. Fly your F-16 to Korea, to the Pakistan/India border, to Japan and the disputed Kurile Islands, where you can also fly the advanced FSX, Japan's newly modified F-16. Operation: Fighting Tiger requires Falcon 3.0

Spectrum HoloByte.

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Circle Reader Service Number 108

Available for IBM/compatibles

with Windows, DESQview, and task-switching software.

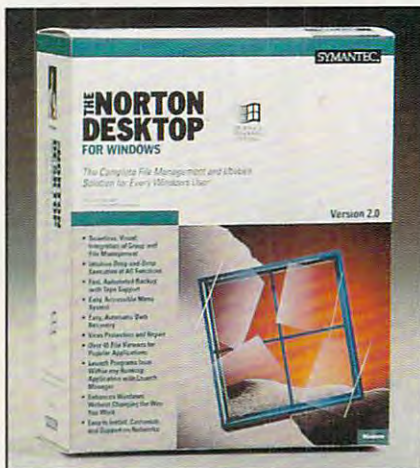
4DOS includes complete context-sensitive online help for all DOS and 4DOS commands. Over two dozen new batch file commands are included, and batch files in 4DOS's custom format execute five to ten times faster than standard batch files by loading the whole batch file into memory before execution. Even if you just use DOS and don't customize it, you'll benefit from 4DOS's enhanced command line history and recall, automatic filename expansion, command aliases, color-coded directories, and point-and-shoot file selection.

You can find a try-before-you-buy version of 4DOS on online networks or your local BBS. When you order the commercial package, you'll get a thorough 350-page manual that caters to novice and expert alike and a handy command reference booklet. A version for OS/2 called 4OS2 is available as well.

DENNY ATKIN

JP Software—\$69

Reader Service Number 361



Norton Desktop for Windows



Borland C++ 3.1

Other nominees:
Commuter 2.0, Central Point Software

Reader Service Number 362

File Runner, MBS Technologies

Reader Service Number 363

LapLink Pro 4, Traveling Software

Reader Service Number 364

Norton Desktop for DOS, Symantec

Reader Service Number 365

Best Windows Utility Norton Desktop for Windows

Tired of the shortcomings of the Windows Program Manager and File Manager? Looking for a slicker, quicker way to manage your hard disk from within Windows? Or perhaps you're looking for a suite of applications that perform such useful functions as examining your disk for viruses, letting you back up automatically, and helping you recover from disaster. If so, you're looking for Norton Desktop for Windows.

The file manager provides the garden-variety commands Copy, Move, and Delete that you can find in File Manager, but it also allows you to view files, providing filters for files created by all of the major applications, including graphics files.

Norton Desktop for Windows includes Norton Backup for Windows (which can back up while you do other work), Norton Disk Doctor for Windows (which can identify and fix problems before you're even aware of them), and SmartErase (which can virtually guarantee that files deleted can be recovered easily).

ROBERT BIXBY

Symantec—\$179

Reader Service Number 366

Other nominees:
Adobe Type Manager 2.02, Adobe Systems

Reader Service Number 367



Professional Draw 1.0

After Dark 2.0A, Berkeley Systems

Reader Service Number 368

The Amaze Daily Planner with Far Side Theme Pack 1.0, Amaze

Reader Service Number 369

hDC Power Launcher 2.0, hDC Computer

Reader Service Number 370

Metz Software Task Manager, Metz Software

Reader Service Number 371

NewWave, Hewlett-Packard

Reader Service Number 372

PackRat 4, Polaris Software

Reader Service Number 373

Skylight 2.0, RenaSonce Group

Reader Service Number 374

WinBatch, Wilson WindowWare

Reader Service Number 375

Best Programming Language Borland C++ 3.1

It's unusual for a company to do almost everything right, but Borland has done just that with Borland C++ 3.1. This package contains everything you need to create DOS or Windows applications, and the tools are almost without exception the best available anywhere. For Windows programming, Borland is the only optimizing Windows C compiler that boasts a Windows-hosted IDE. And this IDE is a programmer's dream, supporting ANSI C and the latest version of C++, multiple undo and redo, a choice of three interfaces, and a quick-access toolbar. The compiler is the fastest we've seen, and advanced features, like precompiled headers, are well integrated and easy to use.

Add to this Borland's Resource Workshop, the resource editor that lapped the competition a year ago, and a special version of Turbo Debugger that debugs Windows apps (but unfortunately doesn't run in a window), and you have a Windows development environment that can do anything.

For DOS fans, there's the best DOS-based IDE and compiler around, plus Turbo Debugger, Turbo Profiler, and Turbo Assembler.

For a little more money, you can get Borland C++ with Application Frameworks, which includes the company's C++ class libraries for DOS and Windows.

But the bottom line for any compiler is the quality of the code it produces, and here Borland outshines its competition in almost every category by producing the smallest and fastest exe files around.

Borland C++ wins the COMPUTE Choice Award for Best Programming Language because its power, ease of use, and superb set of integrated tools

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clearly set the standard for C/C++ development environments.
CLIFTON KARNES

Borland International—\$495
Reader Service Number 376

Other nominees:
Borland Turbo Pascal for Windows 1.5, Borland International

Reader Service Number 377
Microsoft C/C++ 7.0 with Windows SDK, Microsoft
Reader Service Number 378

Best Desktop Publishing/ Graphics Program Professional Draw 1.0

Professional Draw, one of the two winners in this category, comes to us from Gold Disk, long the creators of the most important productivity programs for the Amiga. As a pure illustration and drawing program, Professional Draw is without equal. Its COMPUTE's Choice Award crowns many months of cheering from the media for this standout performer. This product is aimed at serious desktop publishers, as is obvious from its ability to perform controlled overprinting and produce color separations and custom crop marks. It supports Corel, PostScript, and TrueType typefaces and provides hyphenation and a spelling checker for work in text. When working with graphics, you have access to style sheets for quickly applying attributes, as well as extrusion with shading and adjustable light source.

ROBERT BIXBY

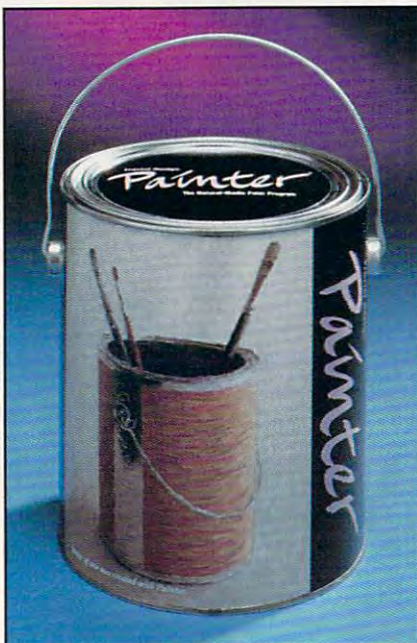
Gold Disk—\$495
Reader Service Number 379

Fractal Design Painter

Each year, we see two or three truly innovative programs for the PC. Fractal Design Painter, the other winner in the category of Best Desktop Publishing/Graphics Program, is certainly one of them. It's a full-featured paint program that skillfully simulates the tools and textures of natural paint media. With Painter, your brush can act and feel like the real thing: airbrush, pencil, felt pen, crayon, or piece of chalk or charcoal. Combine your brush with the variety of grains and textures of Painter's paper palette, and you can even



CorelDRAW! 3.0



Fractal Design Painter



Gateway 2000 486DX2/50

simulate the appearance of the raised areas that show in a real brush stroke or charcoal drawing.

If you have a pressure-sensitive graphics tablet, such as a Wacom tablet or a CalComp Drawing Board II, Painter can act and feel even more like the traditional painting tools it simulates. My wife, who has a background in art but rarely uses a computer, is fascinated by Painter and our Wacom tablet. I'm from the stick-figure school of art, and I'm equally drawn to Painter's simple elegance.

As you've probably guessed, this kind of graphics power comes at a price. You'll need at least 6MB of RAM, a Super VGA monitor (8-bit graphics required, 16- or 24-bit graphics recommended), and a fast 386 or 486. However, once you have had the opportunity to use Painter, you'll never want to go back to those ordinary one-size-fits-all paint programs.

DAVID ENGLISH

Fractal Design—\$399
Reader Service Number 380

Other nominees:
Arts & Letters Apprentice, Computer Support

Reader Service Number 381
CorelDRAW! 3.0, Corel
Reader Service Number 382
FrameMaker 3.0, Frame Technology

Reader Service Number 383
FreeHand 3.1, Aldus

Reader Service Number 384
Freelance for Windows, Lotus Development

Reader Service Number 385
Micrografx Windows Draw, Micrografx

Reader Service Number 386
QuarkXPress, Quark

Reader Service Number 387
Virtual Reality Studio, Accolade

Reader Service Number 388

Best Illustration/ Presentation Program CorelDRAW! 3.0

CorelDRAW! 3.0 has been improved so much that it's in a league by itself. It's still one of the best drawing programs available, with better text handling than before and a more standard drawing interface. Extrude has been much improved, with more shading and positioning options. CorelDRAW! now works with TrueType fonts, eliminating the need for a font conversion utility. But if you want, you can still use

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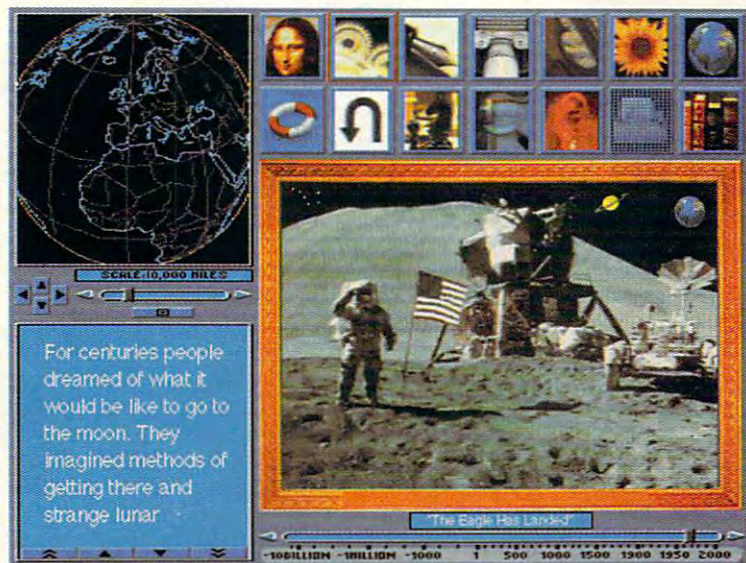
The New York Times

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ROBERT BIXBY

Corel—\$595

Reader Service Number 382

Other nominees:

FreeHand 3.1, Aldus

Reader Service Number 384

Freelance for Windows, Lotus Development

Reader Service Number 385

Harvard Graphics for Windows, Software Publishing

Reader Service Number 389

Intellidraw, Aldus

Reader Service Number 390

Micrografx Windows Draw, Micrografx

Reader Service Number 386

Microsoft PowerPoint, Microsoft

Reader Service Number 391

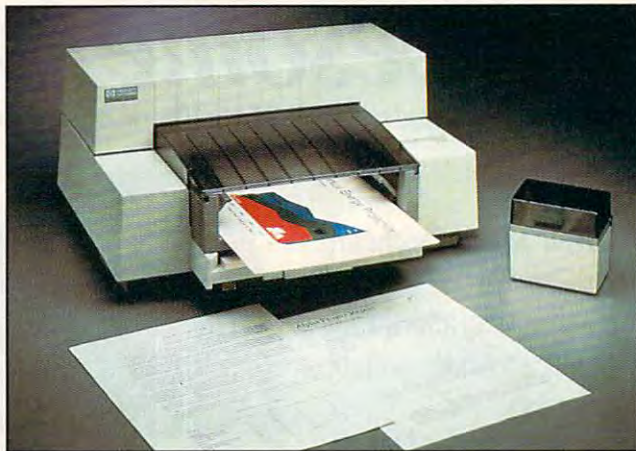
Professional Draw 1.0, Gold Disk

Reader Service Number 379

HARDWARE

Best Desktop Computer Gateway 2000 486DX2/50

The Gateway 2000 486DX2/50 is a sturdy desktop with a large footprint.



DeskJet 500C

The reviewed unit features 8MB of RAM (expandable to 64MB); a standard 200MB hard disk prepacked with Windows, DOS, and a choice of application software; an optional 14,400-/9600-bps fax/modem; and Super VGA (we recommend the 15-inch CrystalScan monitor as an option). This is a real plug-and-play computer. The excellent design, components, and craftsmanship of the 486DX2/50 earned it a COMPUTE Choice Award.

ROBERT BIXBY

Gateway 2000—\$2,595 (base unit)

Reader Service Number 392

Other nominees:

Cumulus GLC, Cumulus

Reader Service Number 393

Best Laptop/ Notebook Computer Zenith Z-Note 325L

Innovation and attractive features make the Z-Note a winner. The Intel 386SL microprocessor delivers all the power most people will need on the go while offering advanced power management features and a nickel-metal-hydride (NiMH) battery pack. In our November lineup of 11 notebooks, the Z-Note came out on top in a test of battery life, regularly delivering about 3 hours under continuous heavy-duty use and 4½–5 hours under average use with all of the power-saving features activated. Because of the modular design, you can upgrade the display to active matrix color, the hard drive to 120MB, the floppy drive to 2.88MB, and the memory to 12MB. If you need more processing power, just add an 80387SL math coprocessor. Need easier access to the company network? The Z-Note provides a connector for interfacing with a LAN adapter card, making networking with a portable easier than ever. And when

it's time to hit the road again, you can unplug Zenith's innovative port replicator instead of every peripheral plugged into it. This is such an attractive computer that Zenith has taken the precaution of providing a hardened steel loop, which you can use to protect this prized possession.

MIKE HUDNALL

Zenith Data Systems—\$2,949 with 85MB drive; \$3,249 with 120MB drive

Reader Service Number 394

Other nominees:

Nomad, Gateway 2000

Reader Service Number 395

HandBook, Gateway 2000

Reader Service Number 396

NCR 3170, NCR

Reader Service Number 397

Toshiba 4400SXC, Toshiba Computer Systems

Reader Service Number 398

ZEOS 386 Notebook Freestyle, ZEOS International

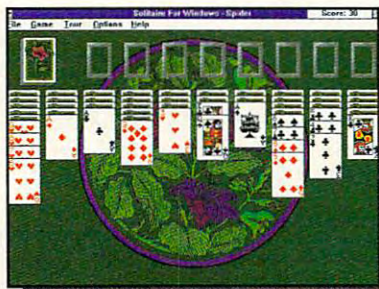
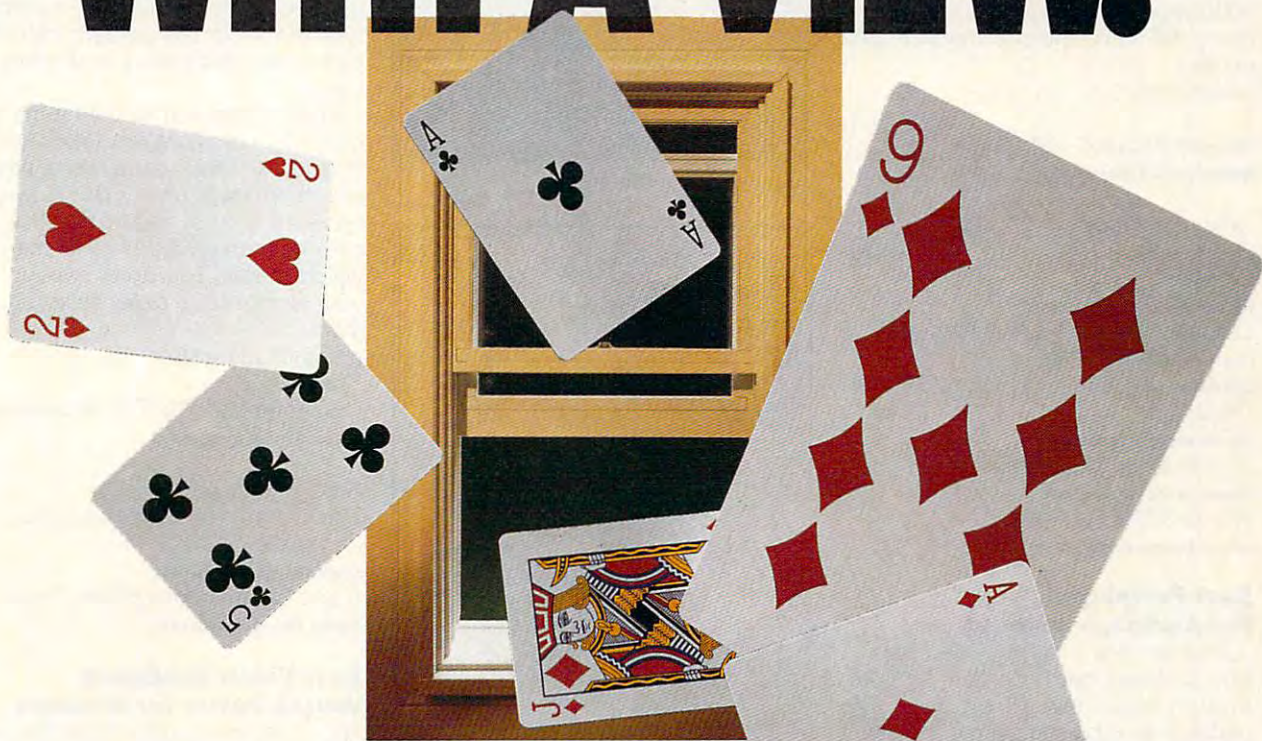
Reader Service Number 399

Best Printer DeskJet 500C

Imagine a printer that not only prints laser-quality text and graphics but does so in full 300-dpi color on plain paper. You'd probably expect to pay thousands of dollars, right? How does a street price of about \$700 sound?

Hewlett-Packard's DeskJet 500C offers black-and-white printing that's nearly indistinguishable from that of a LaserJet. But this new model adds a second cartridge that contains three colored inks, allowing you to print pictures and documents in full color. Although only three ink colors are provided, the sophisticated printer drivers included in Windows and AmigaDOS can mix and dither these to produce thousands of apparent colors. The resulting color output won't be quite

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Circle Reader Service Number 111

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as good as you'd get from a \$3,000 thermal transfer printer, but it's quite impressive for a printer in this price range. And because the DeskJet uses ink-jet technology rather than ribbons, you don't get the banding between passes found on inexpensive dot-matrix printers. When you're printing monochrome documents, you can pop in the less expensive standard black DeskJet ink cartridge.

You don't need to use special ink-jet paper with the DeskJet. Any good paper will work, although 25-percent cotton bond works best with text. HP fixed the only major complaint with the DeskJet technology—water-soluble ink—over a year ago. Color television finally knocked black-and-white off the market this year, and the technology and value embodied in the DeskJet 500C promise to go a long way toward doing the same thing to monochrome printers.

DENNY ATKIN

Hewlett-Packard—\$1,095

Reader Service Number 400

Other nominees:

Canon BJ20, Canon Computer Systems

Reader Service Number 401

LaserJet IIP Plus, Hewlett-Packard

Reader Service Number 402

Okidata OL830 LED Page Printer, Okidata

Reader Service Number 403

WinPrinter 800, LaserMaster

Reader Service Number 404

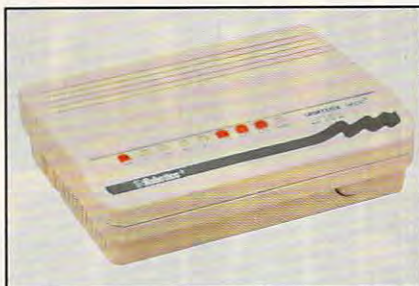
WinJet 800, LaserMaster

Reader Service Number 405

Best Peripheral Pro AudioSpectrum 16

Just when you thought it was safe to buy a sound card, companies start touting their new 16-bit sampling cards. If an 8-bit sampling card (like a Pro AudioSpectrum Plus or Sound Blaster Pro) sounds like an inexpensive FM radio, a 16-bit sampling card can sound as good as a CD player.

The Pro AudioSpectrum 16 is currently the best deal available in a 16-bit card. It offers full 16-bit audio sampling for CD-quality recording and playback (though you'll need a fast 386 or a 486 in order to record in stereo at the full 44-kHz rate). As a full-featured multimedia card, it has connectors for a SCSI CD-ROM drive, a joystick, and a MIDI synthesizer, as well as the standard set of audio-in and audio-out jacks. The card is compatible with programs that support the Windows 3.1, MPC, Sound Blaster, Ad Lib, and Pro Audio-



U.S. Robotics 9600 Fax/Modem-Sportster



Weitek Power for Windows



Pro AudioSpectrum 16

Spectrum sound standards.

We've been using this card for months now, and we're very pleased with its performance and the quality of its sound. If you're looking for a one-card multimedia solution, check out the Pro AudioSpectrum 16. It doesn't cost that much more than an 8-bit card, and you'll be ready for applications that support 16-bit sampling.

DAVID ENGLISH

Media Vision—\$299

Reader Service Number 406

Other nominees:

NEC CDR-74, NEC Technologies

Reader Service Number 407

Roland SCC-1, Roland

Reader Service Number 408

ScanMan Color for Windows, Logitech

Reader Service Number 409

Best Communications Hardware

U.S. Robotics 9600 Fax/Modem-Sportster

What's so special about this internal modem? It gives you 9600-bps, glitch-free communications. It's a well-engineered piece of hardware that will give you many years of fine-tuned service.

This U.S. Robotics modem (external version shown in photo) is a full-size card that's jam-packed with telecommunications goodies. It has great line-noise rejection, MNP error-control protocols, and MNP5 compression that help the modem communicate more accurately and more efficiently.

The modem comes set for the most common configuration found, COM1 and IRQ4. Most users won't have to touch the switches. But if you do have to make changes, the DIP switches are on the back of the card, which means you don't have to take your computer's case off to change them.

RICHARD C. LEINECKER

U.S. Robotics—\$409 (\$439 external)

Reader Service Number 410

Other nominees:

The Complete Communicator, The Complete PC

Reader Service Number 411

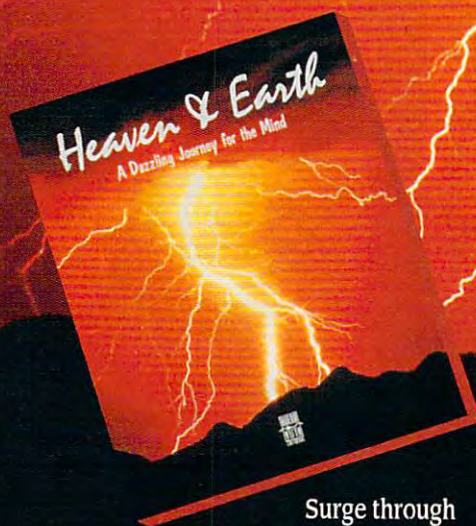
Supra Fax Modem V.32bis, Supra

Reader Service Number 412

Best Video Hardware Weitek Power for Windows

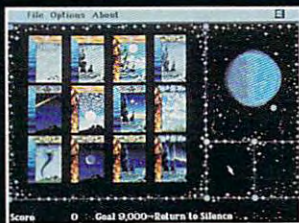
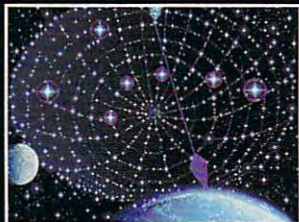
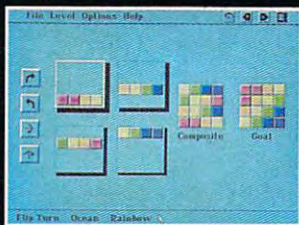
With a list price under \$300, this video accelerator card is a great value. But they don't call it Power for nothing: Equipped with 512K of video RAM, this half-slot card outperforms Super VGA cards with double the RAM, even when running DOS applications—thanks to its dedicated W5186 User Interface Controller chip. The W5186 off-loads the PC's CPU operations dealing with certain graphics operations. Under Windows, the card typically runs applications from two to four times faster. With Power for Windows, Weitek supplies drivers for Windows, ADI (Autodesk), and other popular applications such as WordPerfect 5.0 and 5.1, Microsoft Word 5.0 and 5.5, Lotus 1-2-3, and Ventura Publisher (GEM version). An excellent 58-page

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Actual VGA screen shots



Circle Reader Service Number 110

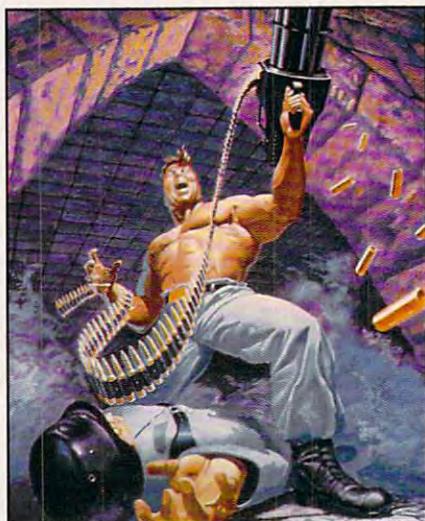
manual provides all of the information you'll need to get optimal performance for all Windows applications. The Weitek board is a joy to use, producing flicker-free displays in 640 x 480, 800 x 600, and 1024 x 768 video modes, with excellent color and image resolution even when used with a relatively inexpensive multifrequency analog monitor. The product lives up to Weitek's claims by producing a speed increase of more than 200 percent in applications used with it.

TOM BENFORD

Weitek will no longer be offering this technology for retail sale, but similar boards are available from the following companies.

Alpha Systems Labs—Price unavailable at press time

Reader Service Number 413



Wolfenstein 3-D

AvTech Development—Price unavailable at press time

Reader Service Number 414

Trigem—Price unavailable at press time

Reader Service Number 415

VidTech Microsystems—\$299

Reader Service Number 416

Vistro Computers—\$345

Reader Service Number 417

Other nominees:

Radius Multivision 24, Radius USA

Reader Service Number 418

ENTERTAINMENT

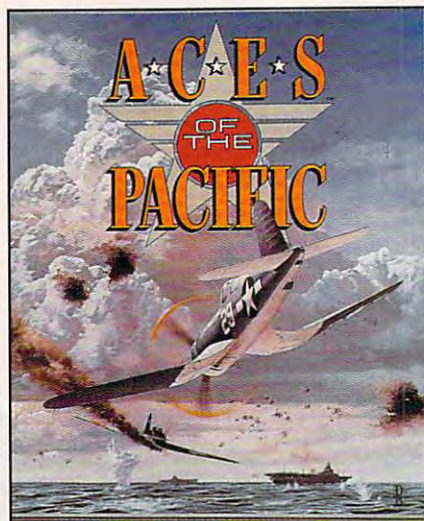
Best Arcade Game Wolfenstein 3-D

Outrageous, controversial, and impeccably programmed, Wolfenstein 3-D blows the cobwebs out of the PC gaming world. Designed by Id Software (Commander Keen), the game features

a killer combination of nonstop arcade action and cutting-edge technology. In what is surely the marketing coup of the year, Apogee Software released the first of the game's six episodes as shareware, triggering widespread commotion on local and national bulletin board systems.

Players assume the role of a Schwarzenegger-style WWII hero, blazing a bullet-riddled trail through six Nazi castles in the quest to put a stop to Hitler's bloodthirsty war machine. Each castle consists of nine levels of massive, serpentine mazes, liberally stocked with an assortment of guards, SS officers, killer dogs, mutants, and mad scientists.

Rendered in realistic first-person perspective, this ultraviolent shoot-'em-up appeals to the basic instincts



Aces of the Pacific

for survival. If you've ever played cops and robbers, capture the flag, or even hide-and-seek, you know the game's undeniable hook.

Earmarks of excellence include vibrant 256-color VGA graphics, smooth animation, and one of the fastest 3-D software engines in the industry. Perhaps more impressive than the graphics is the designer's use of sound. Players with computers equipped with Disney's Sound Source, Sound Blaster, or compatible cards will enjoy crisp digitized sound effects: footsteps, talking guards, barking dogs, slamming doors, and ear-shattering gunfire.

Although decidedly not for all tastes or age groups, Wolfenstein 3-D is a showcase of nearly flawless design and challenging gameplay.

SCOTT A. MAY

Apogee Software—\$50

Reader Service Number 419

Other nominees:

Gods, Konami

Reader Service Number 420

Out of This World, Interplay Productions

Reader Service Number 421

RoboSport, Maxis Software

Reader Service Number 422

Super Tetris, Spectrum HoloByte

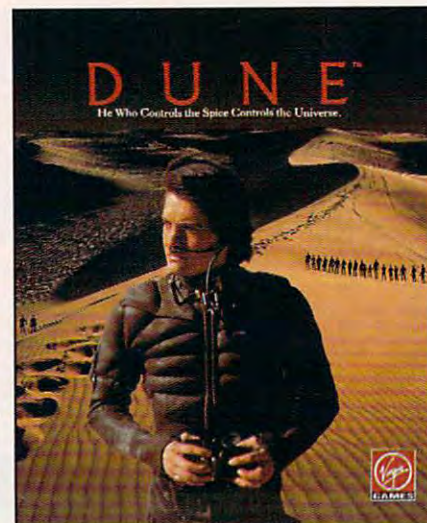
Reader Service Number 423

Tetris Classic, Spectrum HoloByte

Reader Service Number 424

Best Simulation Aces of the Pacific

For two hours on December 7, 1941, a date which will live in infamy, the skies rained terror upon Oahu. The Japanese Navy's surprise attack on Pearl Harbor left more than 2400 military and civilian casualties. Dive bombers and torpedo planes de-



Dune

stroyed or badly damaged more than 300 aircraft and 18 ships of the U.S. Pacific Fleet. A stunned nation officially entered World War II.

Aces of the Pacific is an incredible air-combat simulation; it may be too realistic for the faint of heart. The vintage bombers are meticulously rendered, complete with sometimes unpredictable power and inherent design flaws. Your opponents show real-life cunning. And the graphics and sound effects are incredibly realistic.

Aces salutes the historic events, budding technology, and heroism of this unique theater of conflict. Designed by Dynamix cofounder Damon Slye, Aces soars above and beyond his best-selling World War I combat simulation, Red Baron. Indeed, this tribute to the Pacific campaigns captures the passion and spirit of a generation better than any previous effort in the genre.

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Circle Reader Service Number 250

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The true stars of the show are the more than 30 types of vintage fighters and bombers, each with painstakingly reproduced flight characteristics. Some will amaze you with their innovative craftsmanship and intuitive control; others will ultimately scare the wits out of you with their untamed power.

Dynamix has awed us once again with a historically accurate flight simulator that combines the maximum in thrills, realism, and fun.

SCOTT A. MAY

Dynamix—\$69.95

Reader Service Number 425

Other nominees:

A-Train, Maxis Software

Reader Service Number 426

Falcon 3.0, Spectrum HoloByte

Reader Service Number 427

SimAnt, Maxis Software

Reader Service Number 428

Stunt Island, Walt Disney Computer Software

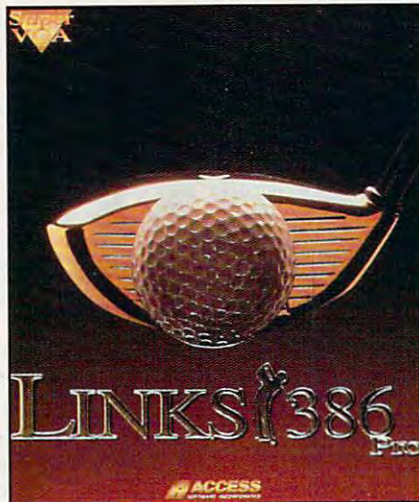
Reader Service Number 429

Best Fantasy Role-playing/ Adventure Game Dune

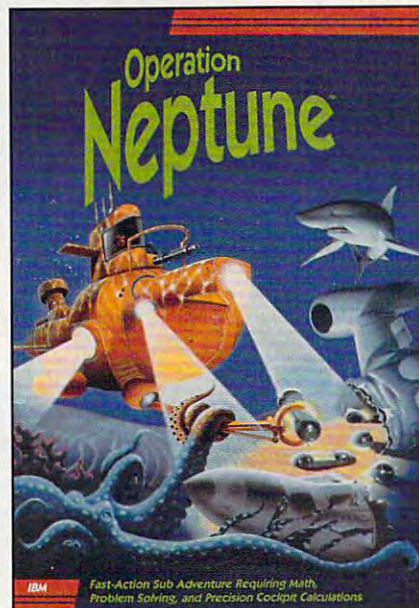
Prophets never lead easy lives, and Paul Atreides finds his duties as galactic revolutionary fearsome. Part messiah, part capitalist, and all determination, Paul intends to free the precious desert planet—the only source of the mind-expanding spice—from vicious Harkonnen rule, and green the desolate sands in the process. With the help of Duncan Idaho, Gurney Halleck, Thurfir Hawat, and Lady Jessica, Paul's jihad stands a fighting chance.

Anyone who saw the movie version of Dune will recognize the characters on sight—Kyle McLaughlin's face figures prominently here. Working for Virgin, design team Cryo managed to capture the expansiveness of the original Frank Herbert novel while adding the urgency of the movie. Through a series of rapid window selections, you can visit any part of Dune in an ornithopter, prowl the royal palace, or order Fremen troops to attack, mine spice, or garden.

Even with only a standard Ad Lib card, Dune's soundtrack is nothing short of amazing. Haunting and always appropriate, the music provides the perfect counterpoint to the gorgeous beige-scale graphics and constant military, social, and economic threats you face. But you are the prophet, the rider of giant sandworms, and this is your private sandbox. Free



Links 386 Pro



Operation Neptune

Dune—it's a challenge, but one no game player should miss.

DAVID SEARS

Virgin Games—\$59.99

Reader Service Number 430

Other nominees:

Crisis in the Kremlin, Spectrum HoloByte

Reader Service Number 431

Global Effect, Electronic Arts

Reader Service Number 432

Loom, LucasArts Games

Reader Service Number 433

Monkey Island 2, LucasArts Games

Reader Service Number 434

Planet's Edge, New World Computing

Reader Service Number 435

Robin Hood, Sierra On-Line

Reader Service Number 436

Star Trek: 25th Anniversary, Interplay Productions

Reader Service Number 437

Gateway, Accolade

Reader Service Number 438

Ultima Underworld, Electronic Arts

Reader Service Number 439

Best Sports Game Links 386 Pro

With 256-color Super VGA graphics and features galore, this new version of Links offers breathtaking realism and remarkable control. The courses are reproduced with so much detail that wherever your ball comes down, it behaves exactly as it would on the real course. If the ball lands on a downhill slope, it'll run farther down the hill. Hit a paved pathway, and you'll get a gigantic bounce. The swing mechanics result in just the right degree of difficulty to make the game as challenging as real golf. Clicking too early or too late gives you a hook or slice and decreases the power of the stroke. You select which views you want in each of the screen's panels. I like the main golfer's-eye view in the left half of the screen, with quarter screens showing the aerial view of the course and the view from the green. The ball's flight and position show simultaneously on all three views. You can record an entire 18-hole round and send that file to a friend, who can load it into his game and play alongside you, or you can take your recording to the tournaments on GEnie and CompuServe. This game is a golfer's nirvana.

RICHARD O. MANN

Access Software—\$69.95

Reader Service Number 440

Other nominees:

Earl Weaver Baseball II, Electronic Arts

Reader Service Number 441

Hardball III, Accolade

Reader Service Number 442

John Madden Football II, Electronic Arts

Reader Service Number 443

Mike Ditka Ultimate Football, Accolade

Reader Service Number 444

DISCOVERY

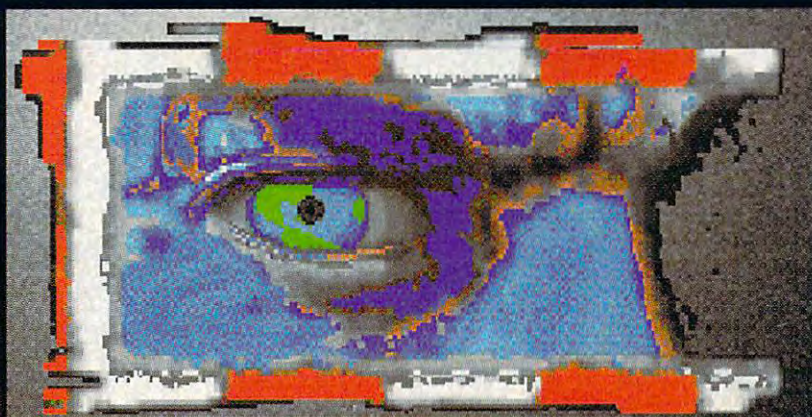
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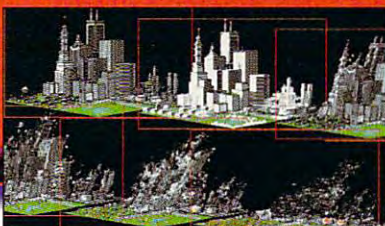
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sion were spread throughout inhospitable undersea terrain when they were jettisoned back to earth from beyond the solar system. Once you've collected the canisters and broken their security codes, you not only will reveal the discoveries made by the scientists and astronauts but may also learn whether the toxins found at the crash site are linked to the lost canisters.

This ecologically correct scenario forms the backdrop for the educationally sound Operation Neptune, one of the most ambitious programs to emerge from The Learning Company.

Designed for kids 10 and up, Operation Neptune combines fast-paced action and great graphics presentation with well-grounded mathematical principles. The underwater environment is rendered in brilliant pastels in a sea of blue hues, and the animation is smooth and fun to watch. The result is a game that's as addictive as any videogame you're likely to buy. Try to keep its educational benefits a secret. You and your children will have so much fun playing it that you might not realize you're getting a refresher course in math.

PETER SCISCO

The Learning Company—\$59.95

Reader Service Number 445

Other nominees:

Disney's Beauty and the Beast, Walt Disney Computer Software

Reader Service Number 446

Ferngully Computerized Coloring Book, Intracorp

Reader Service Number 447

Home Alone Computerized Coloring Book, Intracorp

Reader Service Number 448

Just Grandma and Me, Brøderbund Software

Reader Service Number 449

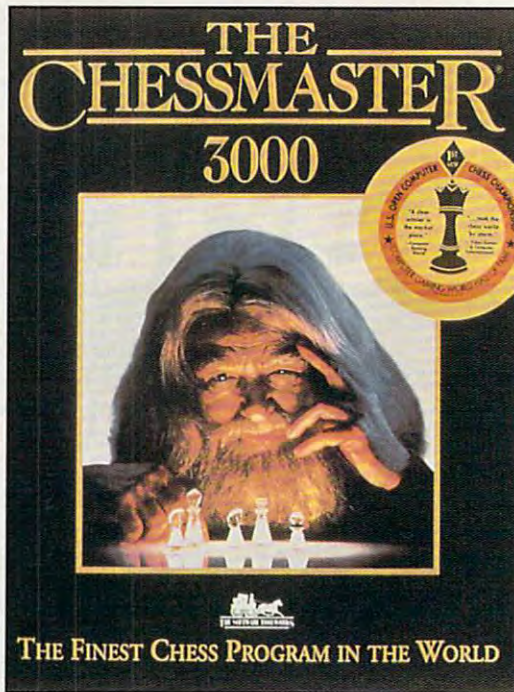
Kid Works, Davidson and Associates

Reader Service Number 450

Metrognomes Music, The Learning Company

Reader Service Number 451

ROCK A DOODLE Computerized



The Chessmaster 3000

Coloring Book, Intracorp

Reader Service Number 452

Time Riders in American History, The Learning Company

Reader Service Number 453

Best Young Adult Program The Chessmaster 3000

For a superb chess program, you can't go wrong with the CD-ROM version of The Chessmaster 3000. It's ideal for anyone, from a novice who knows nothing about the game to a U.S. Chess Federation master. For the novice or young adult struggling to learn the game, there's a set of lessons on the rules of chess. The computer reads them to you while illustrating its points onscreen. Another tutorial teaches the finer points to novices who already know the rules. To help beginners during the play, it can shadow all legal moves when you pick up a piece or shade all pieces in jeopardy.

For the serious student of the game, there are 150 classic games from history. You can choose from 16 opponents, all with varying styles and skill levels. Or you can create a new player by adjusting seven characteristics to design a unique opponent.

While playing, you can ask the Chessmaster for advice at any time. He tells you vocally to wait a minute while he studies the situation. He then delivers his spoken (and written) advice, projecting four to six moves ahead on what will happen, explaining in plain English why he thinks it's

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RICHARD O. MANN

The Software Toolworks—\$99.95

Reader Service Number 435

Other nominees:

EcoQuest, Sierra On-Line

Reader Service Number 454

Knowledge Adventure, Knowledge Adventure

Reader Service Number 455

The Miracle Piano Teaching System, The Software Toolworks

Reader Service Number 456

Orbits, Software Marketing

Reader Service Number 457

Science Adventure, Knowledge Adventure

Reader Service Number 458

The Secret Island of Dr. Quandary, MECC

Reader Service Number 459

Sports Adventure, Knowledge Adventure

Reader Service Number 460

Where in the World Is Carmen Sandiego? Deluxe CD-ROM, Brøderbund Software

Reader Service Number 461

Best Adult Program Mavis Beacon Teaches Typing! 2.0 Multimedia CD-ROM

Mavis Beacon has long been hailed as the best typing-teacher program. The Windows-based multimedia ver-

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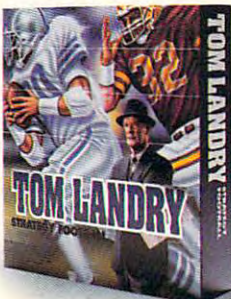


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Circle Reader Service Number 176

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sion on CD-ROM makes this winning program even better. It can be used to train you to type not only what you read but also what you hear. Software Toolworks has added digitized speech and digital audio music, recorded in stereo, with the quality and clarity of CD-ROM-based audio.

The CD-ROM version adds verbal dictation of ten prerecorded letters, with the ability to add your own dictation letters. You simply use a utility program, such as Windows' Sound Recorder, to create a WAVE format file to go with a matching text file of the same name. Stop, go, and rewind controls simulate a dictating machine or tape recorder. The help topic has 14 different voice-overs that let you read and listen to the help files. There's also a self-running spoken overview and demonstration of the program.

Multimedia Mavis adds Windows' task switching and built-in utilities, as well as the enhanced voice, sound, and music capacity of CD-ROM, to this critically acclaimed award-winning program. The latest incarnation of the best computer typing tutor is the best Mavis yet.

ALFRED C. GIOVETTI

The Software Toolworks—\$99.95

Reader Service Number 462

Other nominees:

Chemistry Works, Software Marketing

Reader Service Number 463

Doctor Schueler's Home Medical Advisor, Pixel Perfect

Reader Service Number 464

Insight, Three-Sixty

Reader Service Number 465

Mathematica 2.0 for Windows, Wolfram Research

Reader Service Number 466

Science Adventure, Knowledge Adventure

Reader Service Number 458

Time Treks, Earthquest

Reader Service Number 467

Best Reference Program Compton's MultiMedia Encyclopedia, Windows Edition

What has 9 million words in 32,000 articles; 15,000 images, maps, and graphs; 60 minutes of sound, music, and speech; 45 animation sequences; 5000 charts and diagrams; and the complete Webster's Intermediate Dictionary?

It's Compton's MultiMedia Encyclopedia on CD-ROM. The DOS CD-ROM version won a COMPUTE Choice



Compton's MultiMedia Encyclopedia

Award two years ago. But as good as the DOS version is, the Windows version is significantly better. While both offer a screen resolution of 640 x 480, the Windows version can have as many as 256 colors instead of just 16 (the DOS version has to switch to 320 x 200 in order to show its photos in 256 colors).

With the Windows version, you can have an article, a high-resolution picture, an animated sequence, and music—all going at the same time. The DOS version contains all of these elements, but it has to stop and switch from one to another.

Is a CD-ROM encyclopedia as good as a printed one? It certainly is a lot less expensive, especially when included in a CD-ROM drive bundle. And while you lose the higher-resolution pictures and immediacy of the printed page, you gain the ability to search on a grand scale—in addition to the music, speeches, sounds, and animation. It's not a bad trade-off—especially when you consider that this 26-volume encyclopedia is considerably smaller in physical size than a paperback novel.

DAVID ENGLISH

Compton's NewMedia—\$695 (\$595 for the DOS version)

Reader Service Number 468

Other nominees:

Cinematica, Microsoft

Reader Service Number 469

Library of the Future 4.0, World Library

Reader Service Number 330

Microsoft Bookshelf, Microsoft

Reader Service Number 331

Oxford English Dictionary, 2nd Edition, Oxford University Press

Reader Service Number 332

The Presidents: It All Started with George, National Geographic Society

Reader Service Number 333

The Software Toolworks World Atlas, The Software Toolworks

Reader Service Number 334

Special Technology Awards Local Bus PCMCIA Standard

Far from a year of stagnation, 1992 saw a number of new technologies appear and begin to be adopted. Two stand out, however, because they will quickly impact the portable and home computer user. Both are bus technologies, offering faster and more convenient access to peripherals by the system. Since the creation of the first personal computer, bus

architecture has been a subject of much controversy both among users and among manufacturers. Selection of a bus standard could determine whether the overall design succeeded in the marketplace.

The local bus is a technology that allows the CPU of a computer to interact with peripherals at its full clock speed rather than the relatively slow speed of the expansion bus. This technology brings new power and speed to video—at first. Any peripheral device could be placed on the local bus, but since video suffers most of all peripherals from the slow speed of the ISA expansion bus, it's the first application of the local bus. A standard has been set by VESA, and an additional local-bus standard may emerge from Intel by the time this sees print. Be cautious of hardware with nonstandard local-bus architecture, as it is more likely to be unsupported in the future.

PCMCIA is actually a bus standard established for tiny computers—laptops, hand-helds, and others—that bodes well for desktop computers. There is no reason you shouldn't have one or more PCMCIA slots in your next computer, regardless of its size. The first application of this standard will be memory enhancement, but soon after, it should find application in small peripherals (such as pocket modems, diagnostic tools, and mass storage) and software distribution.

To find out more about the local bus and PCMCIA, turn to this month's feature "Emerging Technologies."

ROBERT BIXBY

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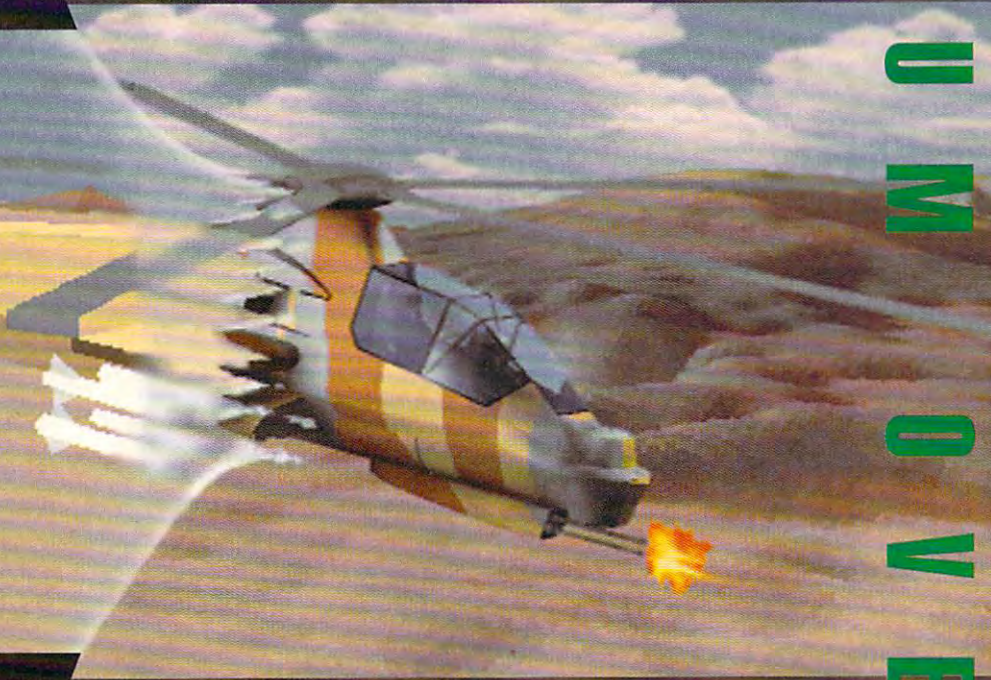
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Dave Moskowitz, Video Games and Computer Entertainment

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Arnie Katz, Electronic Games

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Compton's MultiMedia

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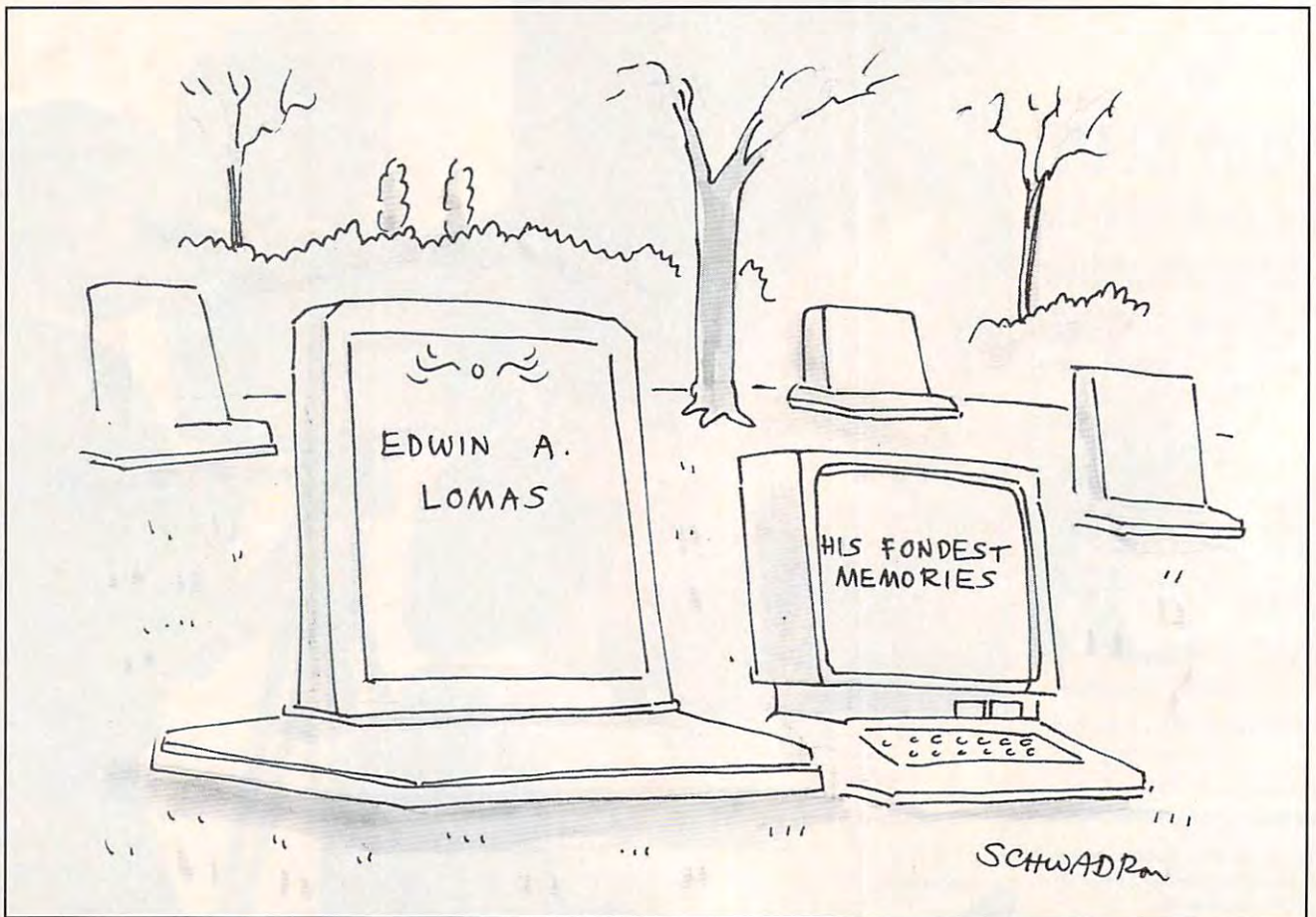
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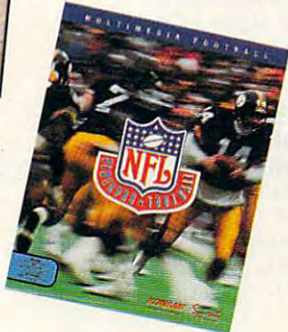




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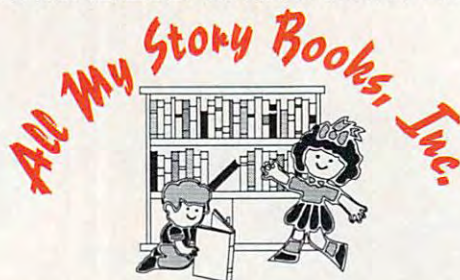
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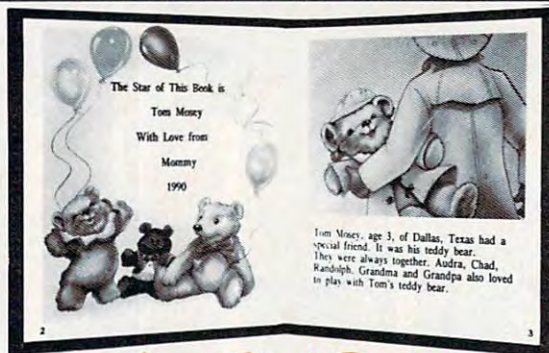
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AMI PRO 3.0

Last year, Lotus Development released version 2.0 of its excellent Windows-based word processor, Ami Pro. It was a major upgrade that included an abundance of new features. This year, Lotus does it again with Ami Pro 3.0. Some dull spots have been polished in this version, which is also feature rich and fairly fast—easily packed with enough stuff to warrant upgrading.

Want to move some text? Highlight it, and then click and hold the cursor anywhere in the highlighted area. The cursor becomes a pointer with a scissors. Now move the cursor anywhere, then release the button to move the text. This is without doubt my favorite 3.0 feature.

The SmartIcons just got smarter. In Ami Pro 2.0, you couldn't make your own icons, and modifying the SmartIcon bar was a pain. Version 3.0 has multiple SmartIcon bars, plus icons that are simple BMP-type bitmap files that you can alter or create with Paintbrush. You can also put "spacers" between groups of icons, allowing you to put the cut, copy, and paste group in a different area from the frame create and frame modify group.

Right mouse-button support: You've always wanted it; now, you've got it. If you're like me, you're constantly modifying a style or a frame. Under 2.0, that meant highlighting the item in question and then clicking on some menu item to change it. Now, you just click the right mouse button. It's an improvement, for

sure, but why don't vendors follow the lead of Micrografx, which lets you define the right mouse button to do *anything* in its Designer product?

Ami Pro 3.0 lets you see a document now before opening it; it lets you do the same thing with a style sheet. And that style sheet preview is useful, as serious Ami Pro users depend upon style sheets. Trust me: You're wasting your time massively if you're not using style sheets.

Envelope printing is no fun under any circumstances—on a humid day, not only will the laser printer address the envelope but it will also conveniently seal it. But the new envelope-printing function in Ami Pro 3.0 is easy to use. The program also has a new-and-improved mail merge for those of you creating junk mail with your PC.

Ami Pro has always had a spelling checker and a thesaurus. Now, the spelling checker is the unabridged Houghton-Mifflin dictionary. There's also one of those annoying grammar checkers, if you like that sort of thing. They're good for finding

some things that spelling checkers can't find, such as when you type *verses* when you meant *versus*.

Today, it seems as if everyone's tweaking programs to use OLE, which enables you to combine the best features of your favorite packages in a single document. Lotus has tried to implement OLE in Ami Pro 3.0, but sadly, it has fallen short of the mark. While Ami Pro is OLE-aware, it's not OLE-smart. For example, it can't start up an OLE server like Excel unless `excel.exe` is on your PC's path—a totally unacceptable bug shared by no other product that I know of in the industry.

But you will find more helpful help in 3.0. There's a tutorial that will get new users up and running quickly, as well as improved context-sensitive help. For WordPerfect users, there's a SwitchKit that makes Ami Pro respond to the WordPerfect keystrokes.

Of course, with every great new upgrade, there are some



problems. Since version 1.2, Ami Pro has allowed you to anchor frames to paragraphs, something that I do all the time. But now, the default is not to anchor a frame to a paragraph but rather to set it on a particular page and in a particular location. Despite the Set As Default button in its Modify Frame dialog box, Ami Pro 3.0 refuses to remember that I anchor frames to paragraphs. Hence, I've got to click on the Modify Frame and Anchor to Paragraph Above buttons every time I create a frame. Ditto for the graphics scaling of a frame.

And it's totally unacceptable that version 3.0 of a Windows 3.x product still has so many crashes. I've typed three-page memos on an 80486 with 16MB of RAM and 300MB of free hard disk space, only to have Ami Pro 3.0 crash—taking my data with it—when I saved the file. Other vendors are stamping out their UAEs; Lotus, you can, too.

Ami Pro 3.0 also has some bugs that it has suffered from since version 1.2, bugs which have been reported to Lotus but that still have not been fixed. For example, the search-and-replace function will sometimes destroy data in a document; the macro language is limited and buggy; and you can't search for and replace two consecutive carriage returns in a document.

In spite of these shortcomings, if you need a full-featured word processor, Ami Pro 3.0 is every bit as good as Word for Windows. WordPerfect for Windows is a real disappointment and little competition.

But what about the lower- and higher-end parts of the market? What about the per-

son who only needs to write the odd memo, letter, or 10-page report? And what about the person trying to lay out a 200-page book? Is Ami Pro 3.0 the right tool? Possibly. Ami Pro 3.0 comes with a pile of prebuilt style sheets that do much of the work of document preparation for you. There's even a booklet that profiles these style sheets, making it child's play to find the style sheet that's right for you. So I can recommend Ami Pro 3.0 to the busy executive without reservation.

As to Ami Pro's desktop publishing abilities, I can speak from experience, since I've written and laid out two 200+-page books with Ami Pro 2.0 and 3.0. It does 90 percent of what you'll need to get your document looking pretty. The nature of Ami Pro (oriented toward frames and style sheets) appeals strongly to me, as it seems logical and lets me leverage the design work of one document into my future documents.

However, Ami Pro lacks "floating" frames, frames that say, "Let's see—if I can fit right here on the page, then that's where I'll go. But if I can't, then I'll move to the next page and grab the text that originally appeared after me and use it to fill up the previous page." This type of experimentation helps prevent the ugly appearance of large white blocks at the end of a page. Unlike using PageMaker, if you want to change a font or font size throughout a style sheet, then you've got to change each style by hand (there is, however, a macro that will do most of this work for you). There's no way to place text indentations on the left for left-hand pag-

The graphic features the Lotus logo in the top left corner. In the top right, it says "Word Processor for Windows". The central image is a 3D-rendered scene with a large, stylized letter 'A' in the background. In the foreground, there is a desk with a computer mouse, a pen, and some papers. Below the image, the text "Ami Pro" is written in a large, serif font, with "WORD PROCESSOR" in a smaller, sans-serif font underneath.

es, but you can put those indents on the right for right-hand pages. Quibbles, yes, but FrameMaker can do those things; perhaps Ami Pro 3.1 will also be able to do them.

If you bought Ami Pro 2.0 after January 31, 1992, you can upgrade to 3.0 for \$49. It costs \$79 to upgrade if you purchased 2.0 before then. If you want to switch from one of the other word processors on the market to Ami Pro 3.0, you can do that for \$129. Buying Ami Pro 3.0 outright costs the usual \$495 that all word-processing packages seem to cost these days. No matter what the cost, it will be money well spent. Ami Pro 3.0 is without a doubt the best Windows word processor on the market. □

Circle Reader Service Number 271

IBM PC or compatible (80286 or higher), 2MB RAM, hard drive with 6MB free; supports mouse—\$495; upgrade from version 2.0 purchased after January 31, 1992—\$49; upgrade from version 2.0 purchased before February 1, 1992—\$79; competitor's upgrade—\$129

**LOTUS DEVELOPMENT
400 Riverpark Dr.
N. Reading, MA
01864
(800) 343-5414**

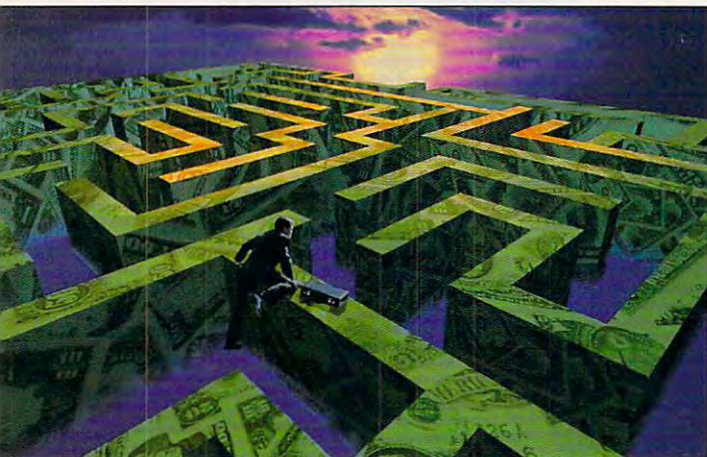
PERSONAL PRODUCTIVITY

Rosalind Resnick

EXPERIENCE AT WORK

Pick up just about any magazine these days, and you're sure to find a story about starting a home-based business. The range of possibilities is broad—word processing, mail order, even termite inspection, just to name a few.

But like most opportunities, launching a business typically requires a sizable investment of time, talent, and mon-



The money maze turns into a map when you view it from above. Freelance consulting has been the solution for many in recessionary times.

ey. Even so, if you know your way around a computer and already have a PC at home, there is one home business you can start with only a modicum of trouble, using the same skills you've honed at your office job: a computer consulting firm.

With a PC, a portable phone (so your clients can reach you whenever their systems crash), and your valuable expertise, you can quickly turn the same skills that have lined your employer's pockets to making money for you.

Consulting generally pays better than doing the same kind of work for a bank or business—once you get your customers lined up.

Many computer consultants spend years toiling away on

mainframes and minicomputers at Fortune 500 corporations before striking out on their own. Consulting wouldn't make much sense if you're still struggling to master DOS 5.0 or your first word processor. But if you have the skills, all that's left to do is to execute the business fundamentals: Zero in on your target market, and make your customers so happy that they'll keep coming back.

Easier said than done? Absolutely. What isn't? But veteran consultants say that with luck and patience, your fledgling home business will begin to soar.

Find your niche. Marketing yourself as a specialist can help you stand out from the crowd. Irvin Feldman, a consultant in Flushing, New York, turned his experience as an accountant and controller into a thriving business developing custom accounting systems. Paul Ferrara, owner of ColumbuSoft in Columbus, Ohio, used to work for a firm that provided management consulting for big companies. Ten years ago, Ferrara took his skills and went out on his own, as a database-language programming consultant writing custom software for corporate customers. "The majority of the successful consultants I've met over the years have been specialists," Ferrara says.

Market, market, market. Few computer consultants are household names, and advertising in journals or the Yellow Pages is often too expensive for budding entrepreneurs. That's why many consultants rely on person-to-person networking, either through industry contacts or logging on to online services and joining bulletin boards.

Ferrara, who says he's never advertised, met a partner in a Big Six accounting firm on CompuServe and soon

snared the contact as a client. Feldman, who is also active online, says he maintains a high profile in his community by speaking to civic groups and volunteering computer services at his synagogue.

Don't sell yourself short. Unlike some businesses, consultants can't afford to lowball their rates and make it up on volume. That's because they're selling their time, not some product that rolls off an assembly line. It's important—before you quit your job—to do some serious market research about your customers, competitors, and the average fees paid for the consulting services you'll offer.

But be flexible, especially when you're starting out. Ferrara says he hates to turn down a job for fear of losing out on a long-term customer. "I don't get hung up on a particular rate, what other people are charging," he says. "If somebody came in today and said, 'I can only afford to spend \$3,000,' and I thought the project was interesting and it looked like he was going to be a long-term client, I might eat some hours" and take the job.

Keep 'em coming back. The more repeat business you can get from your regular clients, the less time you need to spend hustling for new ones. Keep your promises and never nickel-and-dime a client, Ferrara advises.

Regular clients also help you get new clients. "The bigger your client base, the more repeat business and exposure you have, and that sells new projects," Ferrara says.

But by far the most important ingredient in the recipe for launching a successful computer consulting business (or any business, for that matter) is persistence. As Feldman asserts, "Not knowing when to quit certainly helps." □