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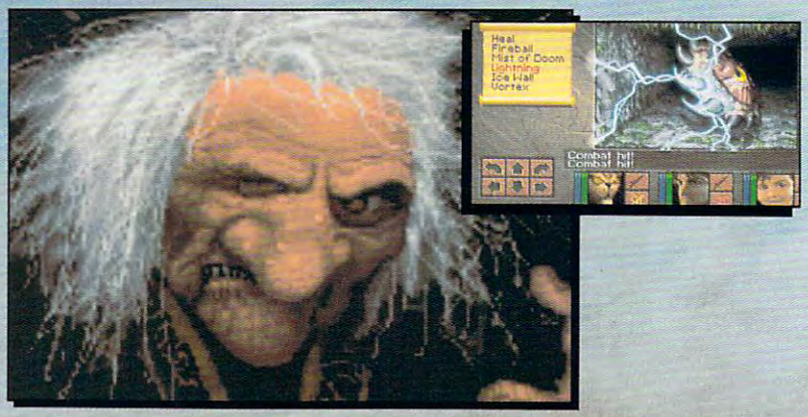

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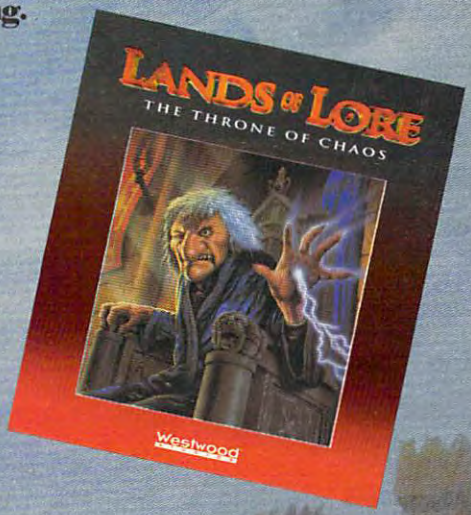

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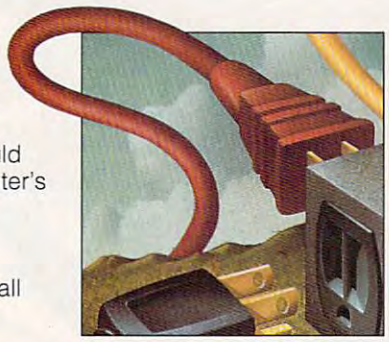

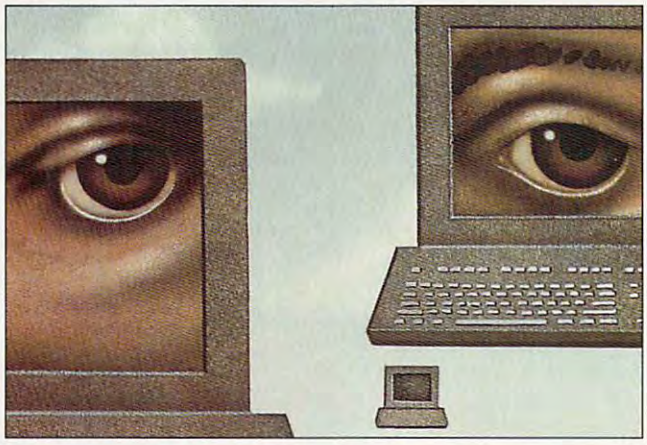

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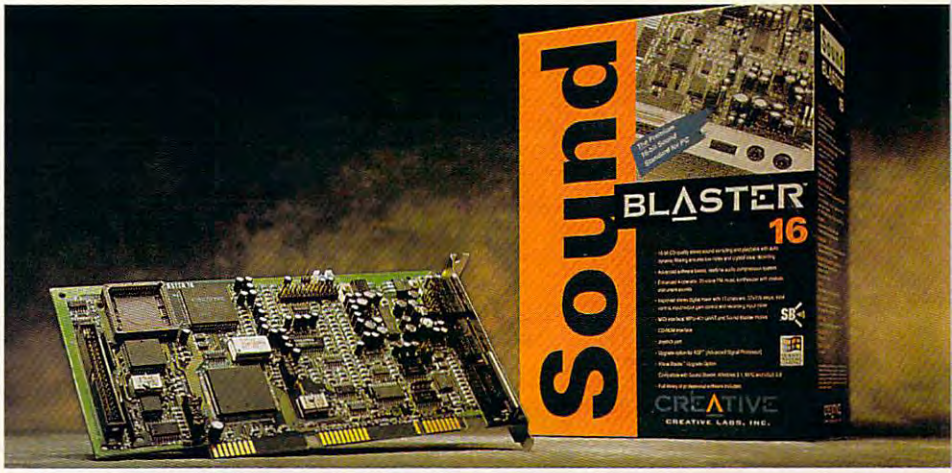

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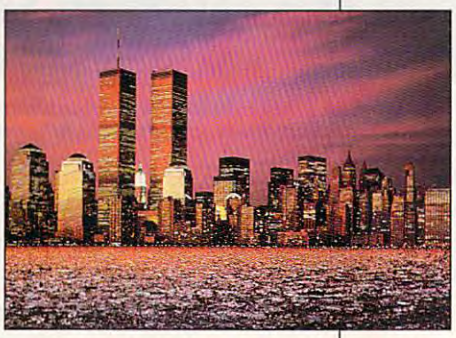
Clifton Karnes

This is really the season for computer shows. Last month it was COMDEX in Atlanta, and this month it's PC Expo in New York. I thought that PC Expo, coming so soon after COMDEX, would be just a repeat of that show, but it wasn't. Of course, there were a lot of products I'd already seen at COMDEX, but there were lots of new ones, and some of them were outstanding.

One of the neatest products I saw at PC Expo was Tapestry, from Pixar. This Windows app creates stunning visual effects with fonts. You can, for example, make a word look as if it's constructed from chrome, wood, or almost any other material. Pixar also produces photographic-quality textured backgrounds and special add-in font effects. This program is a deal at $199.



Each June, PC Expo transforms New York into a high-tech Mecca.

Teleconferencing is a topic that's been batted around for years, but only a few companies have done anything with it, usually using ultraexpensive dedicated hardware. Future Labs has a new twist on teleconferencing with TalkShow, a Windows program that lets any number of people, connected by modem or LAN, annotate a document in realtime so everyone sees everyone else's marks and comments. The ideal situation is for this visual conference to be accompanied by a telephone conference call. If this isn't possible, however, the program offers a floating talk box, so the people connected can type in a conversation. A two-player TalkShow pack is $395.

Microsoft has been busy lately, and the company showed a raft of new products at PC Expo. One of the most interesting was Microsoft at Work, which is a group of add-ins that make office equipment easier to use by improving its interface. The demonstration concentrated on the Microsoft at Work telephone interface, which transforms the phone into a really intelligent device. A small high-resolution screen is embedded in the phone, and it shows all kinds of information, like who's calling now and who called while you were out. It also provides an easy way to manage your phone messages. Microsoft at Work is a little hard to describe, but I was impressed.

On the main show floor, Stac Electronics was countering Microsoft's new DoubleSpace with the introduction of Stacker 3.1. This new version of Stacker has a score of neat features. The most useful of these integrates Stacker into the operating system—just like DOS 6's DoubleSpace—so there are no longer two sets of system files to deal with. It also has some very well thought-out safety features. For example, it automatically flushes the SMARTDrive cache when you close Windows and go to DOS. For a general overview of Stacker versus DoubleSpace, see my "Windows Workshop" column in this issue, which was written, by the way, before I saw Stacker 3.1. Stacker's upgrade price is $49.95.

Behind closed doors, Hewlett-Packard was showing Dashboard 2.0, its second-generation Windows shell. Dashboard 1.0 was pretty cool, and this new version adds many new features, including snap-off quick-launch toolboxes. The interface is also much more configurable. Dashboard has a suggested retail price of $99.

COMPUTE was impressed with Approach 1.0 when it was released in 1992. In fact, we gave the program a COMPUTE Choice Award as the best database product of the year. Approach 2.0, released late in 1992, was even better. This past June, Approach was acquired by Lotus, famous for 1-2-3, Ami Pro, and Freelance Graphics. Besides giving Approach the marketing muscle it needs, Lotus has introduced several small, but significant, changes to the product. The version being shown to the press at PC Expo has a more flexible interface (one that matches Lotus's other products) and was even easier to use than previous versions.

Do Visual Basic programmers have more fun? If they use Sheridan's VB Assist 3.0, they do. This Visual Basic add-in can double the productivity of almost any VB programmer. VB Assist adds two toolbars to the VB screen with features that make designing, coding, and managing projects amazingly easy. This superb tool improves on VB's already excellent interface; it's available for $179.

All in all, PC Expo was a good show. Although I didn't get to see each of the 800 exhibits, I do think I bumped into most of the 85,000 attendees. ❐

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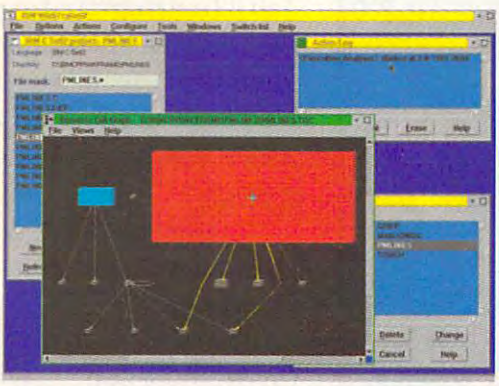

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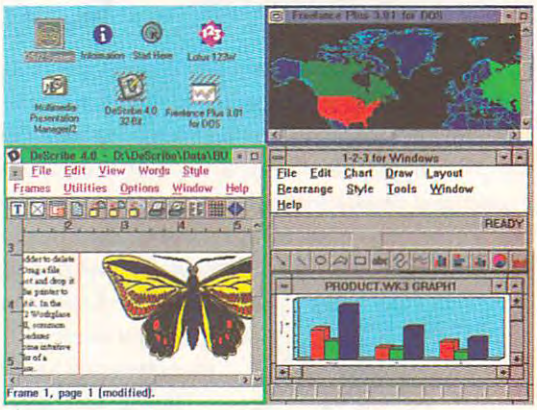

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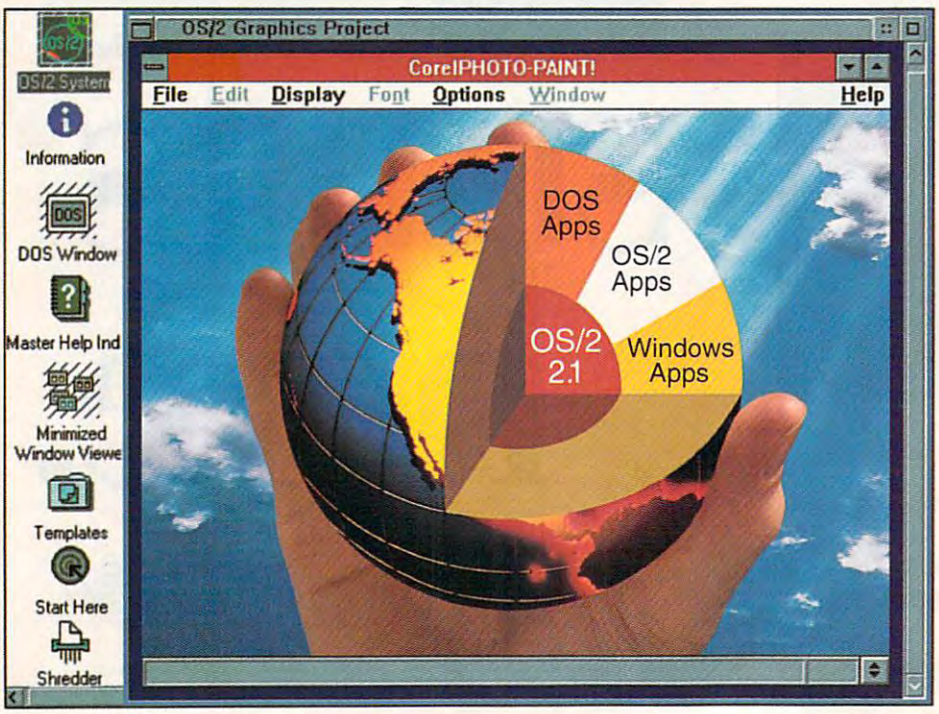

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What you should know about your computer's display system

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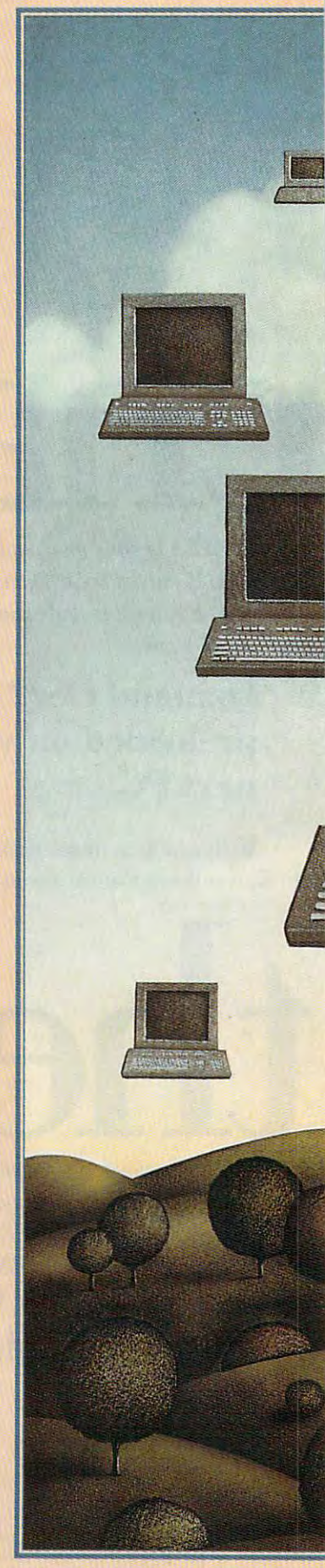

Have you ever wondered why Windows looks so different on your monitor from the way it looks on the monitor at the computer store? Or why your friend Joe's fonts appear so much crisper and clearer? Or how come his colors are so plentiful and pure and his graphics display is so much faster? The answer is simple. Like cars, washing machines, and lawn mowers, computer display systems come with a variety of options, and, of course, in a wide range of prices.

Since the introduction of Windows 3.0, with its support of high resolutions and 16.7 million colors, hardware vendors have been scrambling to find ways to make what shows up on your monitor faster and prettier. While the results are impressive—never before have type and graphics displayed so well on so many computer screens—the resulting plethora of display system types and sizes has become mind-boggling. You have 8-bit, 16-bit, and 24-bit color displaying at four or five different resolutions; graphics accelerators; local-bus adapters; analog and digital video; VGA and Super VGA—no wonder it's so confusing!

Let's see if we can't make it all make sense.

Your Display System

To display information, be it text or graphics, all computers require two components: a display adapter and a monitor. Display systems run in various modes providing different palettes and resolutions. Keep in mind during this discussion that for you to get the most from a display system, your display adapter and monitor must support the same modes. It does you little good, for example, to spend the extra money on a Super VGA display adapter if your monitor supports only VGA.

Pick a Card

Often called a graphics card, the display adapter is usually a separate card that slips into a bus slot on the motherboard (some computers have display adapters built onto the motherboard). The display adapter processes information from the computer and sends it to the monitor.

When looking for a graphics card, you should consider the resolution, number of colors (or bits per pixel), the screen refresh rate, and whether it supports interlaced or noninterlaced display. Also determine whether the card is accelerated. (Accelerated cards are discussed in the accompanying sidebar "Running Windows at the Speed of Light.")

By William Harrel

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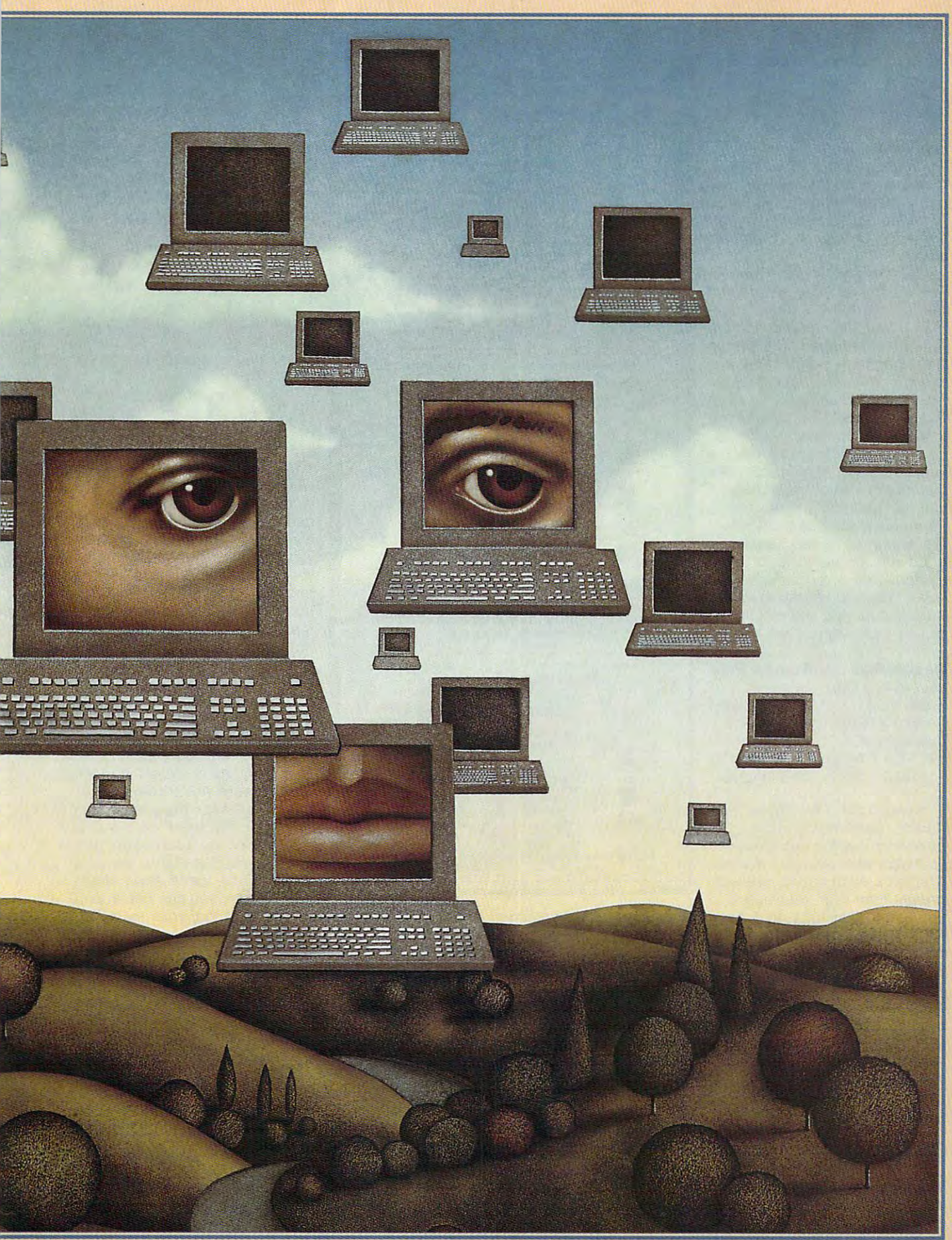

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Resolution

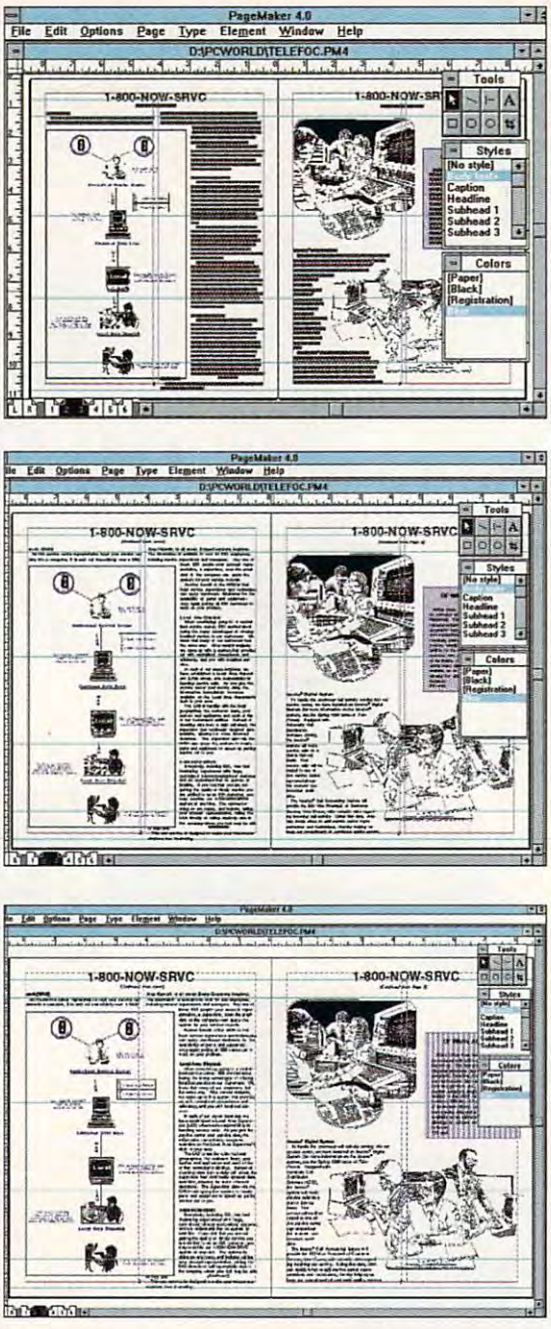
Resolution refers to the number of dots, or pixels, on the screen. The higher the resolution, the more information you can fit on the screen. In Windows that means that you can view more open windows at the same time, or, in a desktop publishing program, such as PageMaker, you get a better what-you-see-is-what-you-get (WYSIWYG) representation of how the page will print.

Standard VGA has a resolution of 640 pixels across and 480 pixels down (640 × 480). Super VGA mode is 800 × 600 or higher. VGA and Super VGA are the most common resolutions, but 1024 × 768 and even 1280 × 1024 (sometimes called Ultra or Extended VGA) are becoming increasingly popular.

When you choose a resolution, you'll also need to consider the screen size of the monitor. If you cram too many pixels onto a 14-inch monitor, text becomes too small to be read easily. A good rule of thumb is to use a system that approximates the size of the final printed text. This table should help you match resolution and monitor sizes.

Resolution	Screen Size
VGA (640 × 480)	14 inches
Super VGA (800 × 600)	15–16 inches
Extended VGA (1024 × 768)	17 inches or higher
(1280 × 1024)	19–21 inches

Keep in mind that these resolution recommendations are helpful for viewing text. However, no matter what size your monitor, graphics applications benefit greatly from high resolutions. If you edit graphics in CorelDRAW!, Micrografx Works, or some other application (and use a small monitor), you should choose a card that lets you switch resolutions, so you don't have to strain your eyes when editing text. Whether you use a 14- or a 21-inch monitor, editing graphics in 640 × 480 mode is hardly adequate. You'll get a much better WYSIWYG representation of what the final output will look like at 1024 × 768. Desktop publishers also benefit from the higher-resolution displays with large monitors. The idea is that the better your display, the easier it is to proof layouts onscreen, rather than by printing drafts. This saves both time and paper. Presentations and multimedia applications also benefit from high resolutions.



The higher the resolution of your display, the better the quality and the larger the editing area. From top to bottom, the resolutions of these screen captures are 640 × 480, 800 × 600, and 1024 × 768.

Millions of Colors

Perhaps even more confusing than resolution is color. Graphics cards are rated by the number of distinct colors they can display on a screen at one time. The range is from 16 colors to 16.7 million colors, with 256 being the most common number of colors. The number of colors a card is capable of producing depends on its bits-per-pixel rate. A rate of four bits per pixel, for example, provides 16 colors; a rate of 24 bits per pixel provides 16.7 million colors.

The 16-color model is the easiest one to use to demonstrate this concept. Since there are four bits per pixel, you have 4 × 4 (16) possible RGB combinations. As the number of bits per pixel increases, the possible combinations also increase substantially.

For most applications, 256 colors are fine. If you work with graphics, you should use high color. Most people, except for users of high-end photograph-editing software, such as PhotoShop or PhotoStyler, don't need 24-bit color.

(Note that just because a display is capable of only 16 or 256 colors, this doesn't mean that unsupported colors do not display. In Windows, for example, when an image calls for more colors than the graphics card is capable of, the additional colors are displayed through a process called dithering. Dithering mixes two or more solid colors to form another. If you have a low-resolution display that doesn't support many colors, you've probably noticed that some hues seem coarse. This is the result of dithering. In many applications, dithering is not a problem, but in graphics and photograph processing, where color purity is critical, it is not acceptable.)

Finally, as in everything else in life, there are trade-offs for these beautiful, high-resolution displays. The more colors and the higher the resolution, the more computing that is required of your CPU, which slows down your system. You can get around the demand that high resolution and numerous colors place on your computer by choosing an accelerated graphics card. Today's graphics cards come in four color standards, as depicted in the following table.

Bits/ Pixel	Mode Name	Colors
4	minimum color	16
8	pseudo color	256
16	high color	32,768
24	true color	16.7 million

Caution: Just because a display adapter claims 32,768 or 16.7 million colors doesn't mean it supports them at all resolutions. When you increase

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the number of colors, the display adapter needs more memory to store the additional information. When looking at a card's color (and resolution) specifications, make sure it's capable of the number of colors you need at the desired resolution. Sometimes you can add RAM to a graphics card to increase resolution and color capabilities. You should also be careful that the card is shipped with a Windows driver (software that lets Windows use the card) that supports the number of colors and resolutions you need. If you don't use Windows, make sure you have the needed drivers for the applications you do use.

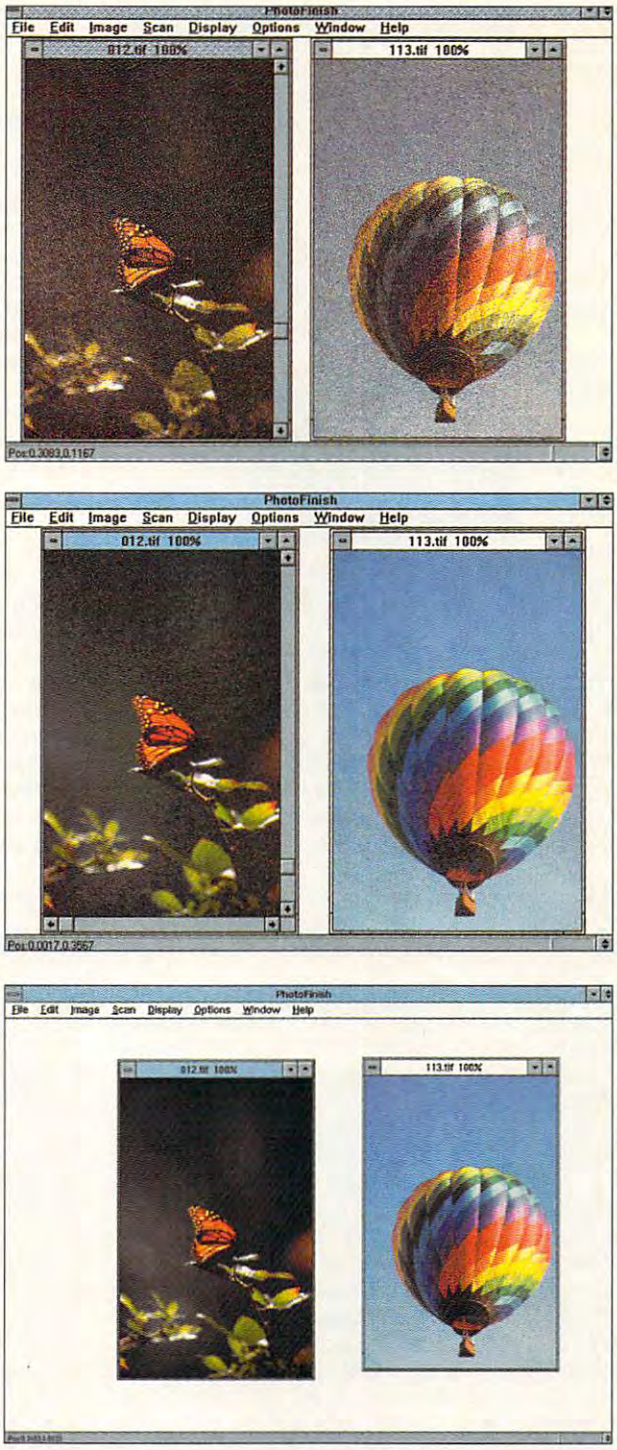
Refresh Rate

If you spend a lot of time at your computer, be on the lookout for a card with a high refresh rate. Your eyes will be forever grateful. The refresh rate is the speed at which the screen gets repainted. If the refresh rate is too low, your monitor flickers, which is annoying and hard on the eyes. It can cause headaches and lead to long-term vision problems.

Refresh rates are measured in hertz (Hz). A rate of 72 Hz means the screen is refreshed 72 times per second. Anything less than 72 Hz can cause noticeable flicker. Just because a card claims "up to 72 Hz" doesn't mean it supports that rate in all modes. Match the refresh rate to the number of colors and resolution at which you plan to use the card.

Interlaced Versus Noninterlaced

Also critical to how a display system treats your eyes is whether or not it's noninterlaced. In an interlaced display, the electron gun paints every other line on the monitor each time it is refreshed—first, even lines and then odd lines on the next trip down the screen—which causes flicker. Many graphics adapters claim to be noninterlaced, but if you look closely at the advertising material or documentation, you'll see that they are interlaced at higher resolutions. Remember that the monitor must also support noninterlacing in the modes you plan to run.



More colors, less dithering: With 16 colors (top) and 256 colors (middle), Windows dithers to compensate for the lack of pure colors. With 16.7 million colors (bottom), dithering is unnecessary.

Monitors

Once the display adapter collects a screenful of data from the CPU, the video signal moves on to the monitor. The monitor uses an electron gun to paint the picture. The electron gun, which scans back and forth very rapidly, causes phosphors on the inside of the screen to glow. On a color monitor, the phosphors are red, green, and blue (RGB). Depending on the color capabilities of the graphics card, RGB combinations are mixed to create other colors—up to 16.7 million, which, by the way, is far more than the human eye can discern at one time.

The phosphors glow for only a small fraction of a second, so the electron gun must repaint (refresh) them many times per second. The electron gun paints the screen one line at a time. When it finishes one line, it moves down to the next. When it reaches the bottom of the screen, it moves back to the top. The rate at which the electron gun repaints the lines is the refresh rate. The rate that the gun moves from the top to the bottom is the scan rate. As mentioned, the two primary considerations when buying a monitor are its size and whether it supports the resolution and refresh rate of the graphics card in your system. Some other things to consider when purchasing a monitor include multiscanning, dot pitch, and screen type.

Before looking at monitor-specific concerns, however, let's briefly review the issues that affect both monitors and graphics cards.

Resolution. Remember that the monitor must support the resolutions of the graphics card, including the highest one you plan to use. The good news is that you don't have to worry about buying a monitor that supports the number of colors you need. All color monitors support as many colors as your display adapter can generate.

Refresh rate. The monitor also must have the same refresh rate as your graphics card at the resolutions you plan to use. Again, make sure the desired resolutions and desired refresh rates match. Just because a monitor supports 72 Hz at 640 × 480 doesn't mean it will at 1024 × 768.

Screen size. Remember that it's important to match screen size to text size. However, where the size of your monitor really counts is in graphics and page layout applications. (Large monitors also help immensely when

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giving onscreen presentations to sizable audiences.) When laying out a double-sided, two-page document, for example, the extra screen real estate provided by a large monitor is very helpful. A 19- to 21-inch screen provides a much more accurate WYSIWYG view of the final document. This makes it easier to judge how well elements line up and to assess your overall layout, and it saves a lot of time by reducing the number of printed drafts needed.

Having reviewed the primary considerations, we can turn to monitor-specific concerns.

Multiscanning. *Multiscanning* refers to the monitor's ability to synchronize refresh rates automatically. Basically, this allows you to use different graphics cards with the same monitor. It also allows you to switch in and out of DOS applications from Windows without having to manually adjust the monitor.

Dot pitch. The size of a monitor's pixels is measured by dot pitch. The smaller the dot pitch, the crisper and cleaner the display. A good rule to follow is that 16-inch or smaller monitors should have a dot pitch of 0.28 mm or lower; 17-inch or larger monitors can get by with 0.31 mm or lower.

Microsoft's Video for Windows lets your computer run full-motion video.

Screen type. The screen type can also affect the quality of your display. All monitors should contain an antiglare mechanism, either a separate coating on the screen or a built-in filtering device. Some people prefer flat screens to the traditional convex (or spherical) designs. The theory is that the flat screens more closely represent a sheet of paper.

Before You Buy

There are, of course, some other things to think about when upgrading your display system. Chief among these other considerations is price. Monitors and graphics cards are designed for a variety of applications, ranging from simple word processing to very high-end graphic design. Naturally, the demands of digital photograph editing are much higher than, say, balancing your checkbook in Quicken.

Prices for graphics cards and monitors run from reasonable to absurd. You can pick up a good Super VGA graphics card for between $150 and $500. Or you can go to the extreme and choose a high-end graphics design station card for upwards of $3,000. When looking at the vast selection, it's difficult to tell why some cost so much more than others. The differences in quality and speed are often indiscernible. Monitor prices also fluctuate dramatically. However, since monitor prices generally vary directly with size, refresh rate, and resolution, and inversely with dot pitch, the pric-

Running Windows at the Speed of Light

A common complaint among users who switch from DOS character-based applications to Windows is that Windows' GUI (Graphical User Interface) slows down their computers. Depending on the machine in question, the performance hit can be substantial.

The reason for the sluggishness is that, unlike character-based applications, the Windows interface uses every pixel on your monitor to paint the screen. This requires hundreds of times more information flowing from the CPU to the screen than the average DOS application.

This rush of information causes an immense logjam at the bus port, where the display information is passed on to the graphics card. One way to relieve the bottleneck is with a graphics accelerator. These cards take the bulk of the display processing on themselves, which frees up the CPU to do more fundamental tasks, such as calculating your spreadsheet or sorting a mailing list.

A number of accelerator cards are available, ranging widely in price. The cost of the accelerator depends primarily on supported resolution, number of colors, and refresh rate. The cards also come in many configurations, with various coprocessor chips and RAM configurations.

While I am not usually reluctant to recommend one product over another, the field here is wide open. The important issue in this category is not what chips are on the board, but rather the board's performance. How fast does the card speed up screen redraw in Windows? Some claim up to 30-fold speed boosts, but double, triple, or quadruple the speed of your current display system is more likely, especially if you work with large graphics.

It takes a lot of horsepower to display thousands of colors at high resolution. Most Windows users should look into accelerated graphics cards. The immense increase in performance far outweighs the small increase in price. In some cases, you'll pay only $50 to $100 more for an accelerated version of a vendor's graphics card.

In other words, the only reason not to go for an accelerated card is if you believe you'll never need to display more than, say, 256 colors at 800 × 600 resolution.

Catching the Local Bus

Another way to speed up Windows is with a local-bus graphics card. However, the only way to get one is by buying a new computer—one equipped with a local-bus port on the motherboard.

Most computers interface with graphics cards at 8 or 16 bits. However, today's 386 and 486 machines process data at 32 bits. The result is a bottleneck between the computer and the display adapter. The local bus is a 32-bit bus port that holds a 32-bit adapter, which doubles the rate at which the computer can send data to the monitor.

If you're in the market for a new computer to run Windows, especially Windows graphics applications, such as CorelDRAW! or PhotoFinish, make sure your new machine is equipped with a local-bus display system.

Which is more important? An accelerated ISA-bus card will actually drive your display faster than an unaccelerated local-bus card.

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Movies on Your Monitor

The word *video* brings to mind renting *Terminator 2* at the video store or watching Madonna on MTV. Recent hardware and software technology has brought motion pictures, or video, to the computer screen. As with the desktop publishing craze of a few years ago, it won't be long before virtually anybody can create and edit videos on a computer.

Personal computers, both Macintoshes and PCs running Windows, process video with one of two standards: analog or digital video.

Analog Video

Analog video is the standard used by TVs, VCRs, laser disc players, and camcorders. Analog video is typically stored on videotape or videodisc.

To use analog video with your computer, you'll need a special display adapter known as a video-in-a-window card. You can then run video from any VCR, TV cable, or other analog device. One of the more popular video cards is Creative Labs' Video Blaster.

Digital Video

Digital video is a digital form of video that can be stored as a computer file. Two examples are Microsoft's Video for Windows and Apple's QuickTime. These full-motion video standards run with or without a video board; however, for the best performance, you need the additional hardware.

If you're looking for a quick, inexpensive, and easy way to put video in Windows, choose Video for Windows. It's easy to install and comes with several video strips to get you started.

ing seems to make a lot more sense than the pricing of graphics cards.

When you start doing your research, you'll find that there are hundreds of cards and monitors available. (That's the reason I didn't mention any by name in this article. There are so many good ones that I didn't want to penalize vendors by not mentioning them.) The best test for a graphics display is to see it in action. If you can, get a demonstration. Ask to see the applications you run displayed, and put them through their paces on a system with your prospective adapter and monitor installed. If you buy through mail order, make sure you get a money-back guarantee. ❑

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TECHNOLOGY UPDATE

How to get surround sound without buying the theater...

An amazing new surround sound decoder turns your existing stereo into a five channel home theater.

By Chuck Anton

As much as I love renting videos, it's just not the same as seeing a movie in a theater. I remember the first time I saw *Top Gun*. I nearly jumped out of my seat when the planes flew overhead. One of the reasons movies seem so real is because they use surround sound to make it seem like you're actually there. Now, an incredible new device lets you use your stereo receiver to get that same surround sound in your home.

It takes more than just four speakers to get surround sound. You need to have some way of separating the signals. The new QD-1 Series II decoder does just that, and in a revolutionary way that rivals the best Dolby Pro-Logic and THX Systems available.

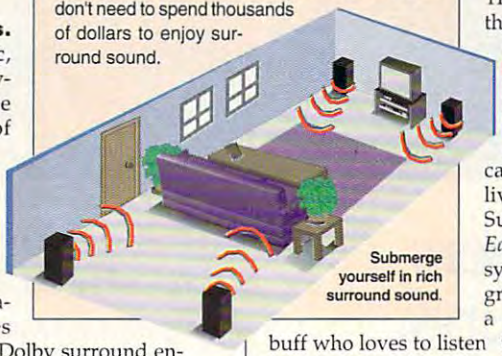
Wins over critics. Noted audio critic, Len Feldman, reviewed the QD-1 for the September issue of *Audio Magazine*. He concluded that "...the QD-1 produced a completely accurate and realistic surround sound experience from a variety of videotapes and laser discs with Dolby surround encoding... the QD-1 delivers home theater sound the way it was meant to be heard."

The Secret of Surround Sound

Surround sound has become the rage of the '90's because it adds "depth" to stereo sound, giving you the home theater experience. Simply stated, it makes you feel like you're actually at a concert or a movie theater.

To "fill a room" with sound you need more than the two channels. And that's the beauty of the Dynaco QD-1, it provides five channels from *any* two channel stereo or TV.

Dynaco offers rear channel speakers specifically designed to integrate with the QD-1 decoder. You may also need our center channel speaker, the A10-V, if your two front speakers are more than eight feet apart. Adding this fifth speaker, or center channel, helps keep dialogue and important localization cues centered. So you don't need to spend thousands of dollars to enjoy surround sound.



Submerge yourself in rich surround sound.

Breakthrough 'L minus R.' Back in the 1960's, Dynaco discovered that in addition to the right and left channels, a "difference" signal existed in a stereo recording, and aptly named it "L minus R." The QD-1 is able to decode Dolby Surround signals in a videotape or a laser disc because those spatial and depth cues have been matrixed into the "L minus R" portion of the stereo soundtrack. It does so passively, with no signal processing. What's more amazing, the QD-1 uses your main stereo amp to amplify the rear channels. You do not need any additional amplifiers!

Concert hall sound. The QD-1 also decodes the ambience found in all musical recordings. This sense of space, or concert hall acoustics is present in all CDs and cassettes, especially live recordings. John Sunier of *Audiophile Edition*, a nationally syndicated radio program, says "If you're a surround sound buff who loves to listen to music, you'll find this $79 passive black box superior to even the $3000 THX or Dolby Pro-Logic processor."

THE PASSIVE ADVANTAGE

Passive. The QD-1 is *passive*, meaning it requires no AC current. It actually sounds better than active decoders, producing more clarity, more detail, no noise, a greater sense of space, and zero distortion. This superior passive system is a breakthrough unique to Dynaco.

The QD-1 decoder *makes your movies come to life. Surround sound brings the theater experience home to you.*

Active. All Dolby Pro-Logic decoders (stand-alone or built-in units) are active. This means they decode and amplify the signal electronically. The active way induces noise and distortion, hindering the home theater experience. This is an example where "more is less." Spending thousands on an active system will not give you the performance of the QD-1.

Quick and easy installation. Hook up is easy. The QD-1 connects to the speaker outputs on your amp. The speaker leads then run to each of your four (or five) speakers. The rear channel speakers may be small; we recommend the AW-1s at $99 a pair. They come with mounting hardware, a keyhole slot for flush mounting, and have an attractive all-weather gun metal aluminum finish.

The AW-1 rear channel speakers *integrate perfectly with the QD-1.*

Factory direct offer. The QD-1 is so new you won't find it at your local department store. To introduce this product, we are offering it direct to you for a limited time special offer. By ordering now, you can save a substantial amount of money.

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QD-1 surround sound decoder.....**$79** $6 S&H

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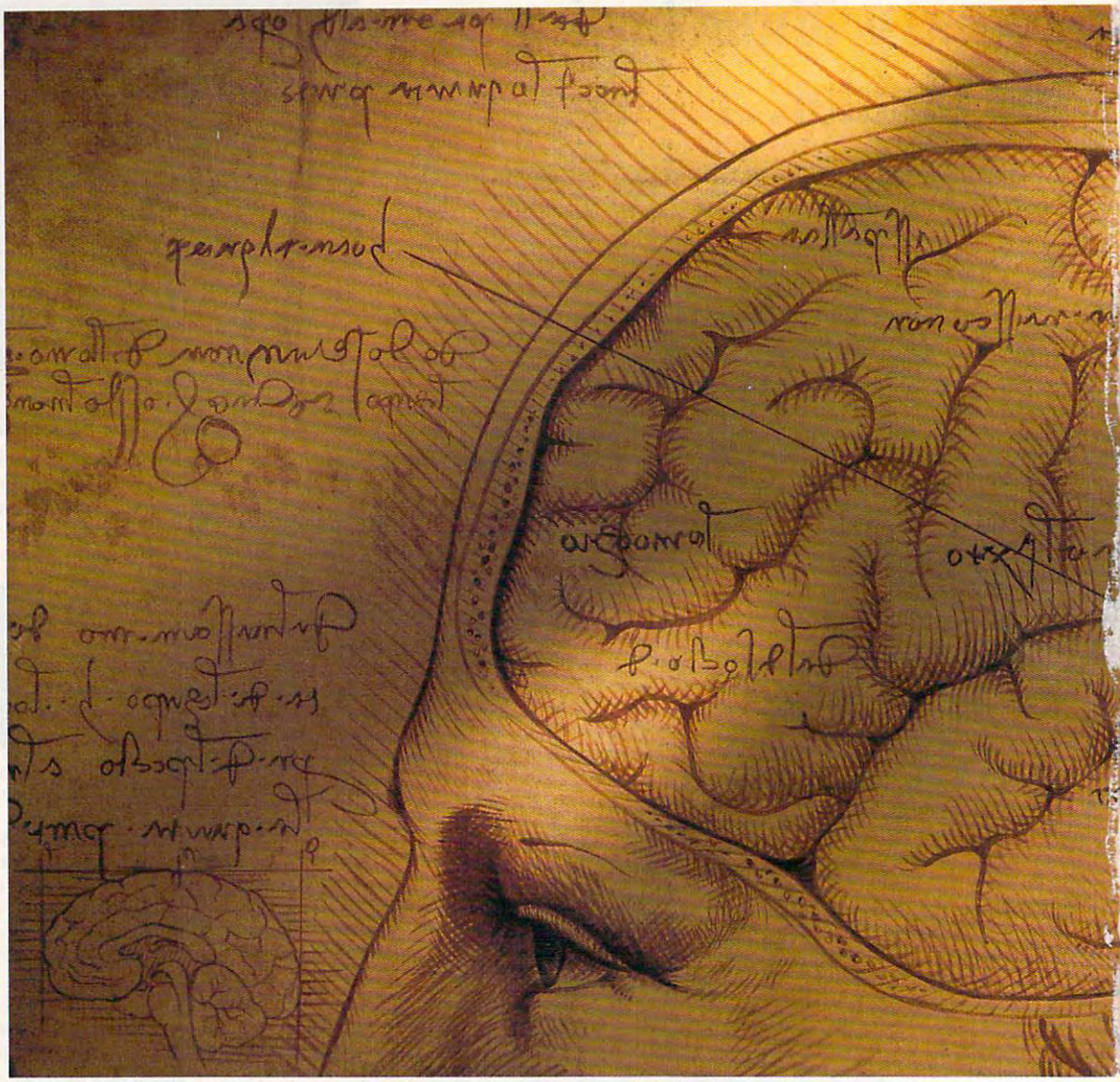

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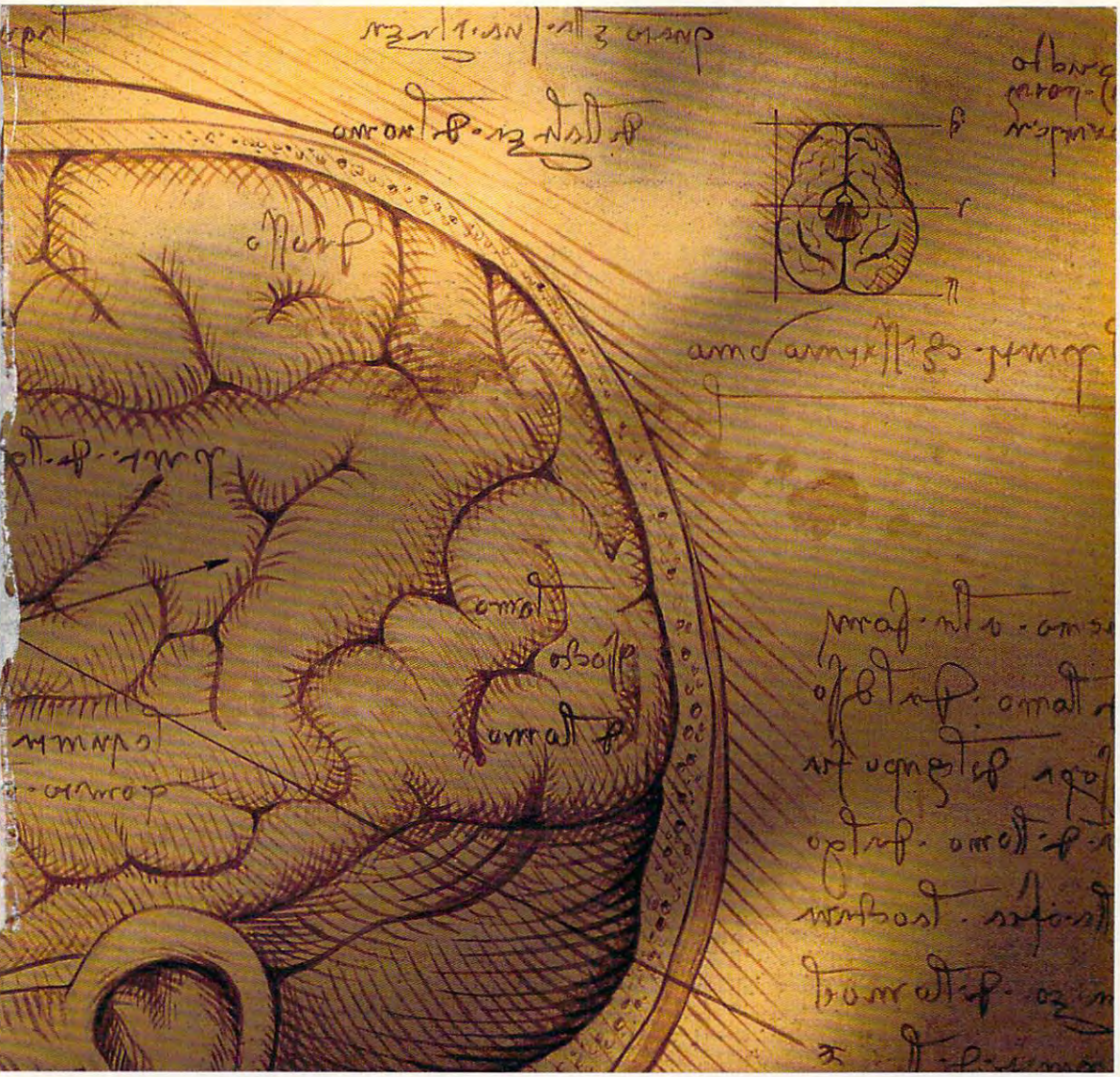

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TEST LAB

Edited by Mike Hudnall
Reviews by Tom Benford

As you make your way through the reviews of this month's notebook computers, paying attention to prices, performance, and important features, the professional in you will doubtless note with approval how well this technology could serve your purposes and make you more productive. Practical, sensible, and well designed, these notebooks could be great for you or your business and could possibly give you just the competitive advantage you've been looking for.

If you're like me, however, the kid in you will probably be wowed by the latest innovations in these notebooks, like the built-in bubble-jet printer in the Canon notebook or the ergonomically designed pointing devices and the PCMCIA slots on several of the units we evaluated. Then there are the features that, though not really new, continue to impress because manufacturers keep finding ways to make them better and less expensive—features like hard drives, color displays, and power management.

For this Test Lab, we asked for 486 notebooks with 4MB of RAM and hard drives of at least 80MB. As you'll see when you peruse our grid of features, these notebooks have 486 chips from four different manufacturers (Cyrix, IBM, Intel, and Texas Instruments), and their speeds range from 25 MHz all the way up to 50 MHz. We could have tested notebooks with 8MB of RAM, but since most come standard with 4MB, and since we felt most COMPUTE readers would go with 4MB, that was our choice. As for the hard drives, we had no trouble at all coming up with large ones. In fact, the smallest ones were 120MB, and a couple of notebooks sported 200MB drives, more than enough space to take care of business on the road.

It's a sign of Windows' acceptance, I think, that every notebook we tested came with Windows and a pointing device of some kind. Micro Electronics even calls its computer the WinBook. So if you want to do Windows on the road, these notebooks are ready.

It's also worth noting that the manufacturers of these notebooks have put a premium on expandability. Now upgrading memory, adding communications hardware, and hooking up to a network are easier than ever. Docking stations, expansion boxes, and port replicators have helped; I think that PCMCIA slots and cards will help even more while eliminating much of the bulk and complication of earlier solutions.

To see how these notebooks performed, look to the bar graphs with benchmark data. There you'll find not only performance ratings based upon the Norton Indexes but also real-world test data involving a word processor, a database, and more. We had planned a test involving Windows spreadsheet calculations; however, we had to scrap it, since all of these 486 notebooks were able to perform complex numerical spreadsheet calculations so quickly that performance differences were negligible. In addition to the application benchmark data, you'll find the results of our battery depletion test.

If you compute on the road and want information about the latest and greatest in notebook technology, read on. Test Lab has reviews, benchmark data, and feature information you can use.

MIKE HUDNALL

AST POWEREXEC 4/25SL COLORPLUS

Looking for a high-performance color notebook with a genuine 25-MHz Intel 486SL CPU? Then you'll want to learn more about AST's PowerExec 4/25SL ColorPlus notebook computer.

AST offers the PowerExec 4/25SL with three different displays. The 4/25SL Color version features a passive matrix color LCD screen, a 25-degree horizontal viewing angle, and a lower cost than the 4/25SL ColorPlus, which comes equipped with an active matrix color display that affords a 70-degree viewing angle and brighter, more vibrant colors. AST's monochrome version of this notebook, called simply the 4/25SL, can display 64 shades of gray with a 45-degree viewing angle. Both of the color models have 9.5-inch (diagonally measured) displays and can support 256 simultaneous colors at 640 × 480 resolution. Externally connected monitors can dis-

AST RESEARCH
16215 Alton Pkwy.
P.O. Box 19658
Irvine, CA 92713-9658
(800) 876-4AST
(714) 727-4141

Suggested retail price: $4,199 with 80MB drive; $4,499 with 200MB drive, Windows 3.1, and AST SmartPoint trackball
Warranty: one year, parts and labor, including 48-hour repair upon receipt at AST (AST pays freight each way)

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play 800 × 600 resolution with 256 colors, and you can use the external monitor simultaneously with the notebook's LCD.

AST provides plenty of power management support in the 4/25SL ColorPlus, and computing sessions well in excess of four hours were common during my review of the unit. With all of the power management options turned off, the nicad battery will still provide in excess of two hours of continuous use before you need to recharge it. This great charge life is attributable to AST's 3.3-volt low-power memory designed specifically for its notebooks (5 volts is the usual current drain in conventional designs).

A medium and charcoal gray color scheme gives the 4/25SL ColorPlus a smart, businesslike appearance. With this notebook, AST includes a nifty detachable miniature trackball, which snaps on the front of the machine just below the space bar. The manufacturer has positioned the two buttons on either side of the ball; I found this pointing device to be exceptionally well designed and easy to use. It gets its power from a dedicated port concealed behind a spring-loaded panel, and the connection is made automatically when you snap the trackball on the notebook.

The keyboard has all of the features serious users will favor: dimpled F and J keys, good key spacing, contoured key tops, a dedicated inverted-T cursor control pad, an embedded numeric keypad, and a light, crisp touch. AST provides a row of LEDs with icons under them to help you keep up with power, battery status, hard and floppy drive activity, and lock key status.

The 4/25SL ColorPlus provides two Type II PCMCIA expansion slots for adding options, and you can expand the standard memory configuration of 4MB up to 32MB, using the two user-accessible memory sockets. Since the i486SL CPU has an internal math coprocessor and 8K of internal cache memory, it's unlikely that you'll outgrow the power this notebook can provide, especially with additional RAM installed in it.

The PowerExec 4/25SL ColorPlus is bound to appeal to the discriminating user who wants a superior color notebook.

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Warranty: one year, parts and labor

CANON NOTEJET 486

Canon has taken portability a step further with its printer-equipped, 486-based NoteJet 486 Model 2.

The NoteJet has a Canon Bubble Jet printer integrated right into the case of the computer, making this truly a portable office that will fit easily into a briefcase. The printer is functionally identical to the Canon BJ-130e in that it uses a head configuration with 64 nozzles and provides a maximum print resolution of 360 × 360 dots per inch with a maximum print speed of 116 characters per second. Because it also emulates the IBM ProPrinter X24E and the Epson LQ-510, you have real printing versatility. An automatic sheet feeder capable of holding ten sheets at a time is also built into the printer portion of the NoteJet, and the Bubble Jet ink cartridge yields approximately 100,000 characters before it requires replacement.

The heart of the NoteJet, a Texas Instruments 486SLC CPU

running at 25 MHz, endows the machine with respectable performance while maintaining a miserly current draw from the machine's nicad battery.

A Cyrix CX83S87 25-MHz math coprocessor can be installed as an option should your work require enhanced math coprocessing, and you can expand the NoteJet's standard RAM configuration of 4MB to 6MB, 8MB, or 12MB with the optional SIMM board that mounts in a single available SIMM slot. You can easily install either of these upgrade options, since both the math coprocessor socket and the SIMM socket are accessible via a snap-off cover on the bottom of the machine. This is a nice touch Canon added here, since installing such upgrades on other notebook computers usually requires disassembly of the computer by a technician. For adding other options, you have two PCMCIA card slots behind another snap-off panel on the left side of the NoteJet.

A wand-style pointing device provided with the NoteJet plugs into the machine's mouse-or-keypad port. Although Canon calls it a trackball, that name doesn't conjure an accurate mental picture of what it really looks like. A palm-size unit, the device connects to the machine's port via a 24-inch cable. You use your thumb to control a marble-size ball while your index and ring fingers activate the dual buttons at the front of the unit, mounted one on top of the other. At first this configuration seems awkward, especially if

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you're accustomed to a desktop mouse or a large-ball device, but you get used to it after a short while. If there's one weak spot in an otherwise excellent machine, I think it's this pointing device. Of course, you can always substitute another pointing device more to your liking.

The LCD screen displays 16 levels of gray at 640 × 480 resolution, and you can plug an external SVGA monitor into the notebook via the 15-pin D connector located at the rear of the unit.

The Canon NoteJet 486 is a very good Windows-ready computer for people on the go who want to have a printer available whenever—and wherever—they compute.

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EPSON ACTIONNOTE 4SLC/25

EPSON AMERICA
20770 Madrona Ave.
Torrance, CA 90503
(800) 922-8911 (in USA)
(800) 463-7766 (in Canada)

Estimated street price: $1,429 with 80MB drive; $1,499 with 120MB drive; $1,699 with 120MB drive and fax/data modem
Warranty: one year, parts and labor; includes on-site service

A truly compact notebook PC that has a good assortment of standard features, Epson's ActionNote 4SLC/25 is convenient to tote, provides good performance, and is easy on the wallet.

With a textured, charcoal gray case, the stylish ActionNote is the thinnest notebook covered here, measuring just a tad over 1.5 inches thick with its lid closed. It has a footprint just slightly larger than a sheet of letter paper, measuring 8.7 × 11 inches; and with a weight of only 5.5 pounds with its rechargeable nicad battery installed, it's certainly no burden to take along with you.

A Logitech TrackMan trackball, included as standard equipment with the ActionNote, plugs into a mouse-or-keyboard port on the left side of the machine. You also get a good-quality compartmented carrying case as part of the standard package, along with a mouse-or-keyboard adapter for the machine's PS/2-style port.

The standard 4MB of RAM will meet the computing needs of many of COMPUTE's readers; if necessary, however, you can expand the memory to 8MB. The ActionNote includes 256K of video RAM and uses a paper-white, two-film CCFT (Cold Cathode Fluorescent Tube) backlit monochrome LCD which measures a generous ten inches diagonally. The LCD is capable of displaying 64 levels of gray at 320 × 200 resolution and 32 levels of gray at 640 × 480. Slider controls allow you to adjust the display's brightness and contrast, and a 15-pin D connector lets you attach an external monitor (simultaneous display of both the LCD and CRT is supported).

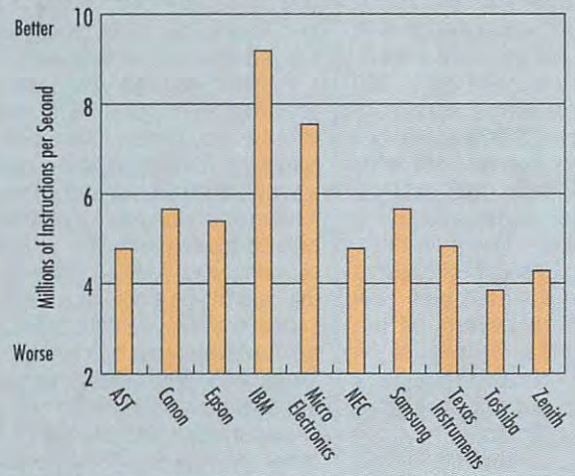
The Cyrix 486SLC CPU at the heart of the ActionNote runs at 25 MHz. To add number-crunching muscle for handling more demanding applications, you can add an optional Cyrix CX387SLC or Intel 387SX numeric coprocessor.

The keyboard features a moderately light touch and short key travel, along with a very nice feel. Bumps on the F and J keys confirm home row position, and an inverted-T cursor control pad makes moving around the screen easy. Epson also provides an embedded numeric keypad.

The review unit came equipped with a 120MB hard drive, although you can order the ActionNote with an 80MB drive. You can also install an optional internal 2400/9600 fax/modem

CPTS MIPS TEST AVERAGES

The CPTS MIPS Tests are a series of proprietary tests which measure the system's speed in MIPS (Millions of Instructions Per Second) to give a numerical profile of its performance. The tests time and count general instructions, integer instructions, memory-to-memory operations, memory-to-register operations, and register-to-register operations, and they automatically calculate MIPS task averages based on these discrete test results.



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ARTICLE I
PAYMENT OF DEBTS AND EXPENSES

I direct that my just debts, funeral expenses and expenses of last illness be first paid from my estate.

ARTICLE II
DISPOSITION OF PROPERTY

A. Residuary. I direct that my residuary estate be distributed to my spouse, Martha Parsons. If my spouse does not survive me, my residuary estate shall be distributed to my child(ren) in equal shares.

If a child of mine does not survive me, such deceased child's share shall be distributed in equal shares to the children of such deceased child who survive me, by right of representation. If a child of mine does not survive me and has no children who survive me, such deceased child's share shall be distributed in equal shares to the other child(ren), if any, or to their respective children by right of representation. If no child survives me, and if none of my deceased child(ren) are survived by child(ren), my estate shall be distributed to Martha Parsons, Hiawatha, Iowa 52233.

If such beneficiary does not survive me by 120 hours, he or she shall be deemed to have predeceased me for purposes of this Will. I have intentionally omitted to provide for my heirs at law or next of kin except as provided herein. If any beneficiary under this Will contests this Will or any of its provisions, any share or interest given to that beneficiary is revoked and shall be disposed of in the same manner provided herein as if that beneficiary had predeceased me without issue.

B. Specific Bequests. I direct that my personal effects and household furniture be distributed to my spouse, Martha Parsons, if she survives me. If she does not survive me, I direct that my personal effects and household furniture be distributed to my child(ren) in equal shares.

C. Trustee. I appoint my spouse, Martha Parsons, as Trustee of any trust created under this instrument. If she does not survive me, I appoint my child(ren) who survive me as Co-Trustees. If no child survives me, I appoint Iowa Trust Company as Trustee. Trustee shall have the power to collect, invest and re-invest property, collect income, profits, and principal of the trust estate, and pay taxes, expenses and compensation of the Trustee in accordance with the provisions of this instrument.

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Disk Density *(DOS only)*: ❑ High or ❑ Low *(choose one)*
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Circle Reader Service Number 164

(Epson installed one on the review machine). WinFax Lite and BitCom come preloaded on ActionNote configurations ordered with the modem installed.

A row of LEDs with illuminated icons below them lets you know the status of the power, the battery charge, AC power (whether it's being used), and floppy and hard drive activity, as well as whether the caps, scroll, or numeric locks are in effect.

With prices ranging from about $1,399 for the base model to $1,649 for the configuration as reviewed, the ActionNote provides a way to get 486 processing muscle without breaking the bank.

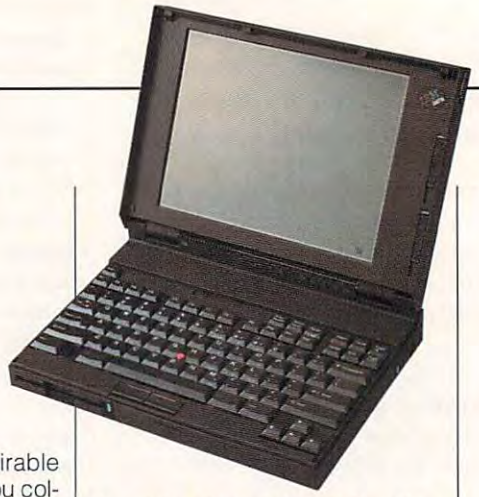
Circle Reader Service Number 373

IBM THINKPAD 720C

IBM packs a lot of computing punch into its ThinkPad 720C. For starters, it has the biggest, brightest color LCD I've seen on any notebook to date, and its IBM 486SLC2 CPU runs at a brisk 50 MHz. If I've piqued your interest already, read on. You'll find that there are lots of other desirable features in this take-it-with-you color notebook from Big Blue.

IBM PERSONAL COMPUTER
Box 100, Route 100
Somers, NY 10589
(800) 772-2227
(914) 766-1900

Direct price: $4,695
Warranty: three years



The ThinkPad's case features squared edges and sharp corners; no frills or nonfunctional embellishments are to be found. That isn't to say it's unattractive, however. Quite the opposite is true. The case is molded in a handsome matte black plastic, which resists fingerprints well (but tends to show dust and dirt). The overall appearance of the machine tells you it's a serious device that's ready to do business.

Lifting the ThinkPad's lid exposes the 10.5-inch TFT (Thin Film Transistor) 4096-color LCD, which is a joy to view. The LCD screen can display VGA at 640 × 480 resolution. Slider controls at the right side of the LCD adjust brightness and contrast, although I found the display to provide excellent viewing, even in bright light, without my having to change the settings.

Below the display a bank of LED indicators keeps tabs on the system's status. They show the status of the speaker, AC adapter, power, battery, hard disk, and floppy disk, as well as the caps, scroll, and numeric locks.

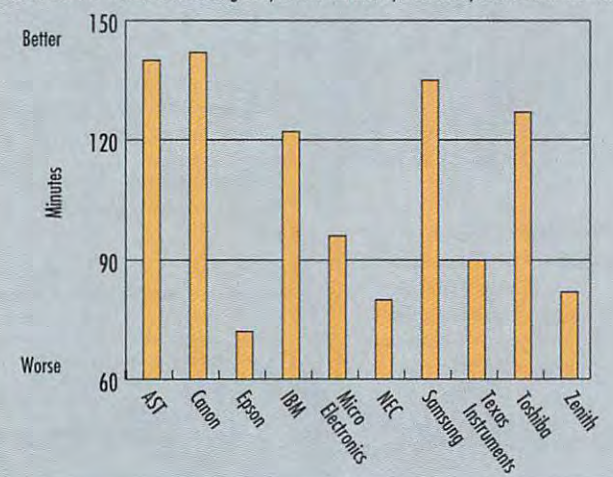
I found the ThinkPad's keyboard well laid out with regard to key spacing and key-top contour; raised dots on the F and J keys confirm home row position for touch-typists, and there's a separate inverted-T cursor control keypad, as well as an embedded numeric keypad.

Just above the B key, nestled between the bottoms of the G and H keys, is the ThinkPad's pointing device, an elevated red button that looks like a pencil eraser with a case of sunburn. Below the space bar, at the edge of the case, are two flat keys, each about one inch long; these correspond to the control buttons on a standard mouse.

While the idea of an integrated pointing device is good, I personally didn't care for the "eraserball" built into the keyboard. For my taste (and touch), it was too sensitive, and having the action buttons separate resulted in awkward operation. Suffice it to say that I found this setup anything but intuitive. I used the embedded pointing device throughout the review to give it a fair shake, but I must admit I was happy to

BATTERY DURATION TEST

The Battery Duration Test is performed with all power-saving functions deactivated to provide realtime charge-life expectancies for the notebooks' batteries. A proprietary program which creates, reads, writes, and erases files and writes a time-stamp log entry at the end of each cycle is used to keep the CPU, hard drive, and video display busy to simulate constant use during the test. The elapsed time between the start of the test and the last recorded log entry before the battery fails totally is calculated and recorded.



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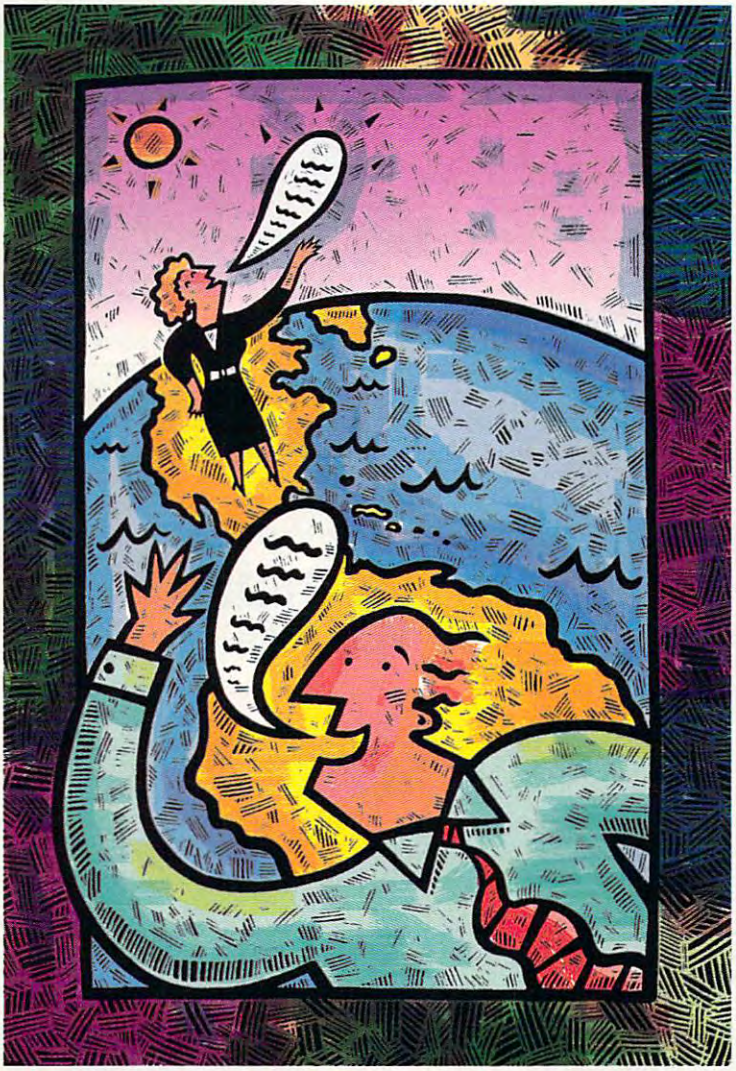

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get back to my desktop PC with a trusty old Microsoft mouse attached to it.

The ThinkPad 720C comes equipped with a 50-MHz IBM 486SLC2 CPU, a 180MB hard drive, and 4MB of RAM as its standard configuration. Two PCMCIA slots are also provided to accommodate any expansion options you may desire. For power users, this machine is a great choice.

Circle Reader Service Number 374

MICRO ELECTRONICS WINBOOK

Designed specifically with the Windows user in mind, the WinBook from Micro Electronics comes with plenty of desirable standard features that are frequently extra-cost options with other notebook computers.

Notebook describes the WinBook well, since it occupies about the same amount of space as an average three-ring binder and weighs in at a trim and easy-to-tote 5.4 pounds with its rechargeable nickel-metal-hydride (NiMH) battery installed.

The WinBook's standard configuration includes 4MB of RAM, a 120MB hard drive, a 2400-bps modem and 9600-bps send/4800-bps receive fax. For adding options, there's a Type II PCMCIA slot, an increasingly pervasive feature in this latest generation of notebooks.

For its CPU, our review WinBook uses a 33-MHz Cyrix CX486SLC rather than an Intel chip. Described in the WinBook's manual as an "enhanced version of the 80386 CPU," the Cyrix chip "includes a built-in 1Kbyte cache to increase the speed of data access."

The overall design of the machine is quite good, and it's evident that plenty of thought went into the placement of various system components. For example, a trackball is built into the WinBook; the manufacturer places this pointing device conveniently between the two wrist-support pads below the keyboard. About the size of a marble or gum ball, the trackball is flanked by its two buttons. While the trackball eliminates the need for an external mouse, you can still use one if you want.

MICRO ELECTRONICS
1160 Steelwood Rd.
Columbus, OH 43212
(800) 468-2162
(614) 481-7460

Suggested retail price: $1,799
Warranty: one year, parts and labor

Controls for adjusting the brightness and contrast of the LCD are also conveniently located—at the right side of the screen, along with LED indicators for power, floppy drive activity, hard disk activity, suspend mode, and the status of the Num Lock, Scroll Lock, and Caps Lock keys. The WinBook has an easy-to-look-at ten-inch display; the 512K of video memory allows 640 × 480 resolution for the internal screen and 1024 × 768 resolution for an external monitor.

Need expansion capabilities? You can upgrade from the WinBook's standard 120MB hard drive to a 250MB drive, add a math coprocessor, or buy a docking station for desktop use; a 160-pin connector on the WinBook accommodates the docking station.

The WinBook has a good assortment of power-saving features which, according to the manufacturer, will extend battery life to a maximum of four hours. I found the machine to be faster and more responsive with all of the power-saving functions deactivated (this brought battery life down to about 1½–2¼ hours between charges).

While the WinBook as reviewed is a good value at $1,699, if that's more than your wallet can handle, Micro Electronics is also offering a 25-MHz entry-level model of the WinBook, which has an

80MB hard drive and 2MB of RAM without the fax/modem for only $1,499. In either version, the WinBook is an attractive machine, especially if you want to take your Windows applications on the road.

Circle Reader Service Number 375

NEC ULTRALITE VERSA 25C

This color notebook offers good looks and sizzling performance.

NEC offers the UltraLite Versa series of notebooks in several models: 20-MHz models are available with either color or monochrome displays, while the 25-MHz models are available with both monochrome and color displays and with and without pen capabilities. The review unit is a 25-MHz model based on the Intel 80486SL CPU and equipped with an active matrix TFT color LCD screen measuring 9.45 inches diagonally. A real treat for the eyes, it can display 256 colors at 640 × 480 resolution (800 × 600 resolution with 256 colors and 1024 × 768 resolution with 16 colors are supported via externally connected monitors).

One of the truly outstanding features of the UltraLite Versa 25C—its local-bus video—accounts for its blistering performance with graphics-related applications such as CAD and Video for Windows. This machine is no slouch when it comes to nongraphical chores such as database and word-processing work, either.

Ergonomic design and aesthetic appeal are obvious concerns,

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NEC TECHNOLOGIES
1414 Massachusetts Ave.
Boxborough, MA 01719
(800) NEC-INFO (in USA)
(800) 343-4418 (in Canada)
(508)264-8000

Suggested retail price: $3,869 with 80MB drive; $4,269 with 120MB drive; $4,539 with 180MB drive; $2,659 with mono screen and 80MB drive
Warranty: three years, with free first-year upgrade to NEC Ultracare

and the UltraLite Versa 25C triumphs in both areas. NEC uses an attractive medium gray matte-finish plastic that hides fingerprints and resists scuffing well. A single slider control next to the screen adjusts the brightness of the color display. Rather than the usual array of LEDs commonly used for system status messaging, the UltraLite Versa 25C uses an LCD window which employs icons to convey system information. The usual items—including floppy and hard drive activity, power, power source, and battery condition—are all indicated, in addition to caps and numeric locks.

I liked the keyboard action and key placement, although I found the space bar to be considerably shorter than it is on other notebook keyboards, measuring 3.75 inches. While this wasn't a problem for me, some users with big hands or wide thumbs may not find it to their liking. However, other features, such as a dedicated cursor keypad, an embedded numeric keypad, and 12 function keys more than make up for the short space bar. Of course, you can always plug a full-size keyboard into the dedicated socket provided for it at the rear of the machine.

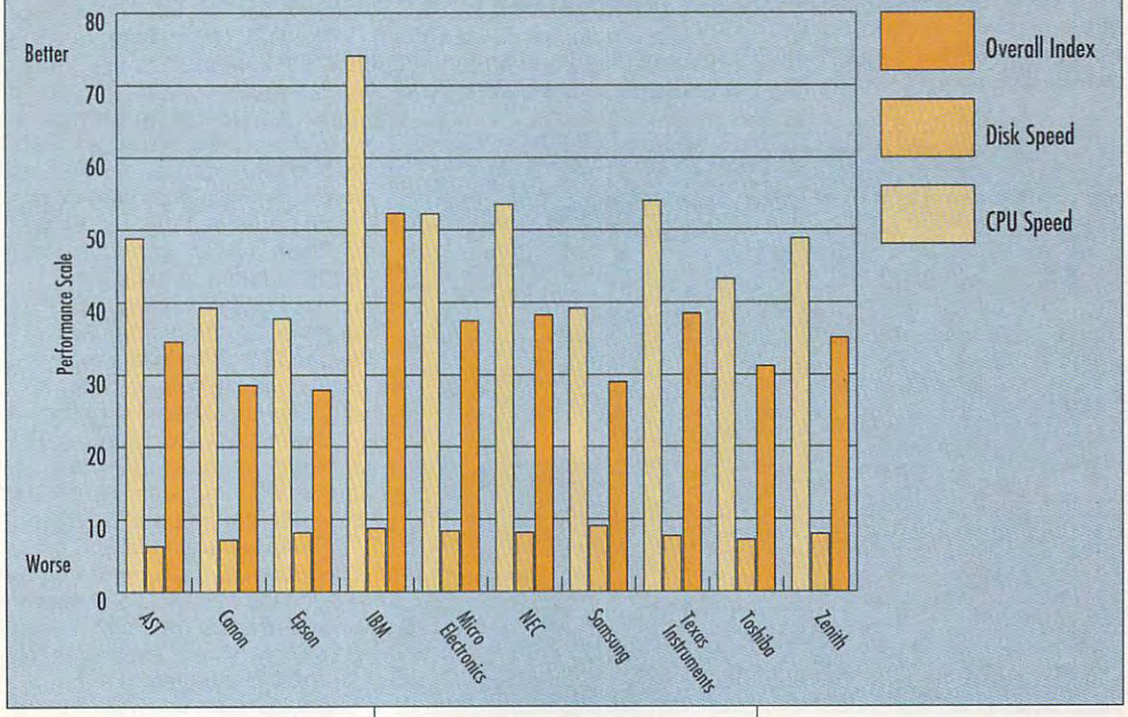
The package includes a Microsoft BallPoint mouse, which plugs directly into the dedicated mouse port (also at the rear). For adding options, the UltraLite Versa 25C also has one Type III PCMCIA slot, which can accommodate one Type III PCMCIA card or two Type II cards.

NEC has done a nice job of combining form and function in an attractive notebook with a superb color display.

Circle Reader Service Number 376

NORTON BENCHMARKS

The Norton Utilities 6.0 served as an overall "window" for viewing the systems' configurations, interrupts, and memory addresses. This group of utilities also provided a generic performance baseline, consisting of the CPU speed, the disk speed, and an overall index.



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SAMSUNG NOTEMASTER 486SLC

SAMSUNG ELECTRONICS AMERICA
Information Systems Division
105 Challenger Rd.
Ridgefield Park, NJ 07660-0510
(800) 446-0262

Suggested retail price: $1,999 with 2MB RAM and 80MB drive (standard configuration; $1,599 estimated street price); $2,298 with extra 2MB RAM (review configuration; $1,699 estimated street price)
Warranty: one year, parts and labor

Samsung shows lots of ingenuity and some novel design concepts in its NoteMaster 486SLC Model S3800 notebook.

This trim notebook has tasteful styling and a dark, charcoal gray, nonglossy finish which hides fingerprints and light scuffs well. Lifting the lid of the unit reveals a ten-inch monochrome LCD capable of producing 64 levels of gray to produce 640 × 480 VGA resolution.

The NoteMaster has 256K of video RAM and allows you to run its display and an external SVGA monitor simultaneously. While the display is certainly large enough, it isn't one of the best monochrome screens I've seen. With the brightness and contrast adjusted for comfortable viewing, I could see several of the LCD's "pathways" (intersecting lines in the display's background), and uneven image density across the screen was also noticeable. The shortcomings of this display aren't serious enough for it to be considered defective, but it did have a wearying effect on my eyes after only brief stints of looking at it.

The high-density floppy drive resides at the right side of the machine near the front, while the removable 2.5-inch hard drive resides just behind it, also on the right side. Yes, you read that correctly—the hard drive is removable on the NoteMaster, and that is its most unique feature. The advantages of a removable hard drive are many; for example, if you need additional storage, you can easily upgrade to a higher-capacity (120MB) drive.

Using Samsung's DriveMaster expansion kit, you can use the NoteMaster's hard drive on your desktop PC to make data transfer between systems easy; you can keep your data secure by taking the drive with you when you leave the office, or multiple users of the same NoteMaster can have their own individual hard disks. There are plenty of other instances as well in which the removable drive would be a highly desirable feature.

Samsung provides 2MB of RAM and an 80MB hard drive as standard equipment on the NoteMaster. The review unit came equipped with 4MB of RAM as requested, and it also sported the optional 120MB hard drive.

The CPU for the NoteMaster is the Cyrix 486SLC running at 25 MHz. You can add an optional Intel 80387SX coprocessor to give the machine enhanced math-calculating power; Samsung makes the installation easy by providing access to a socket beneath a snap-off plastic cover on the bottom of the case.

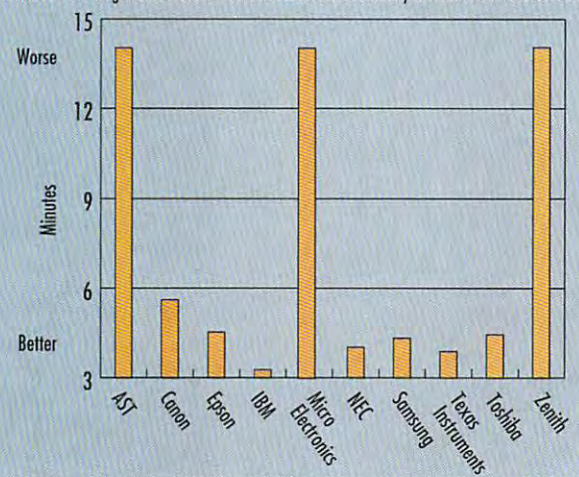
You can also easily install an optional fax/modem yourself. To expand the computer's memory, you'll use proprietary memory modules that simply snap into a compartment adjacent to the modem space. RAM can be expanded to a maximum of 8MB. No PCMCIA slots are provided.

The NoteMaster 486SLC Model S3800 is a good choice if you like the convenience of a removable hard drive, especially if you'll be using it with an external monitor most of the time.

Circle Reader Service Number 377

DBASE SORT TEST

Our database tests use a nonindexed 25,636-record database (each record contains 32 fields). The Sort Test times how long it takes to sort this database on a secondary field and create a sorted database.



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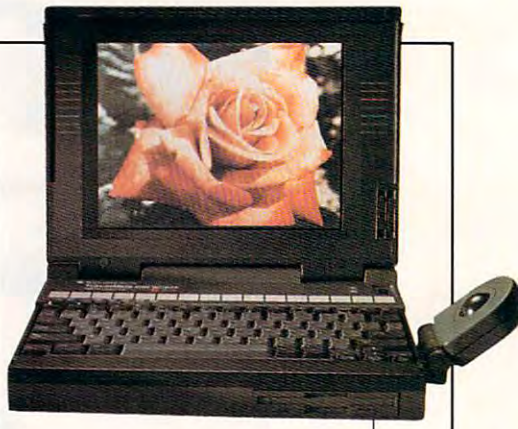
TI TRAVELMATE 4000 WINSX/25 COLOR



TEXAS INSTRUMENTS
P.O. Box 202230
Austin, TX 78720-2230
(800) 527-3500

Suggested retail price: $2,999
Warranty: one year, limited parts and labor

If you're interested in adding some color to your portable computing, backed by 486 processing power, then you may want to consider the TravelMate 4000 WinSX/25 Color notebook from Texas Instruments. This is the newest addition to TI's highly successful TravelMate 4000 series of 486 notebook computers.

The WinSX/25's 9.4-inch (diagonally measured) color LCD screen delivers 256 colors simultaneously at normal 640 × 480 VGA resolution and is supported with 512K of video RAM. You can plug in an external Super VGA monitor and find support for the following modes: 640 × 480 resolution with 256 colors, 800 × 600 with 256 colors, 1024 × 768 with 16 colors. Simultaneous display of both the LCD screen and a monitor is also possible.

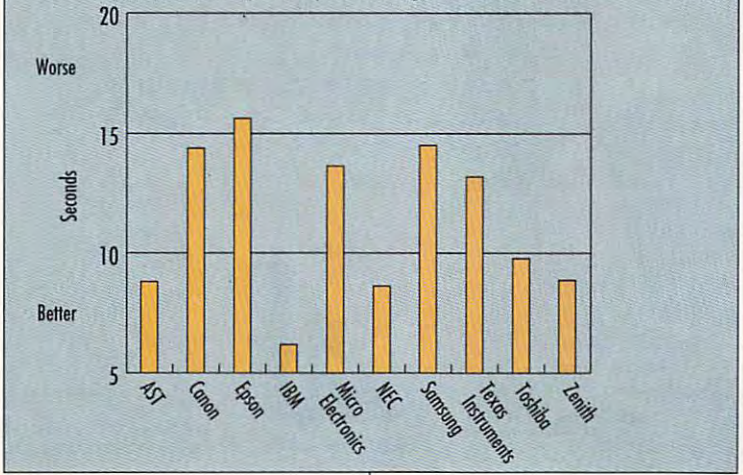
The WinSX/25's keyboard features a nice touch with moderately light action and nicely contoured key tops. Raised dots on the F and J keys help you find the home row, and there's an embedded numeric keypad and a separate inverted-T cursor control keypad. A color-coordinated Microsoft BallPoint mouse included with the WinSX/25 attaches to the QuickPort on the machine's right side.

Molded in two tones of gray, the WinSX/25 is a tastefully styled machine that does a good job of combining form and function. Dual slider controls for adjusting the color LCD's brightness and contrast come in handy, as some adjustment is frequently required when ambient light conditions change or when you switch from one application to another. I noticed some of the LCD's "pathways" visible in back of the video image when the brightness of the display was turned up all the way, and color saturation wasn't perfectly even across the full width of the screen (these are characteristics of passive matrix color displays).

The standard configuration includes 4MB of RAM, which you can increase to a maximum of 20MB. A 120MB hard drive and a front-mounted 1.44MB floppy drive also come standard. One of the upgrade options, a 14,400-bps V.32bis modem with 9600-

TEXT TEST

Using an 80-page Microsoft Word text document, the Text Test times how long it takes to search and replace a keyword occurring 1423 times in the document.



NOTEBOOK PC TRAVEL KIT

Want to get the most out of your laptop or notebook? Today's portable computers are great, but if you're like most people who compute on the go, you need accessories. Luckily, MicroComputer Accessories has assembled a compact kit of ten essentials for laptop and notebook users.

The kit has a suggested retail price of $29.95 and includes a flat-ribbon parallel cable for connecting your portable to a borrowed printer; a 12-foot telephone cord, a modular Y adapter, and a male-to-male connector for connecting your modem; a combination Phillips–flat blade screwdriver; an illuminated magnifying glass; reusable cable ties; two sizes of removable white labels; five strips of clear tape for affixing your business card to all your hardware; and a reference card with phone numbers for common E-mail and online services. All this fits neatly in a 7- × 8-inch nylon pouch (with room left over).

For more information, contact MicroComputer Accessories at 9920 La Cienega Boulevard, Inglewood, California 90308-7032, or call (800) 521-8270 or (310) 645-9400.

—PHILLIP MORGAN

Circle Reader Service Number 381

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bps send-and-receive fax capability, plugs into an internal slot provided on all of the TravelMate notebook models.

A proprietary expansion bus built into the rear of the machine lets you connect additional external peripherals; when not in use, this bus is concealed from view by a snap-off panel door. All of the I/O connectors (serial, parallel, mouse, and external video ports) reside on the left side of the notebook beneath a drop-down panel.

The WinSX/25's Drop N' Go software utility is particularly useful, permitting accelerated access to your applications and thus saving both time and battery life. With all of TI's power-saving features enabled, battery life can exceed four hours, depending on the type of computing you're doing. Even with all of the power management features turned off, the machine regularly delivered average work times of two hours or more during my review before I had to recharge.

The CPU is a 486SX running at 25 MHz. DOS 5 and Windows 3.1 come preloaded on the WinSX/25, so you're ready to start doing useful work as soon as you turn the power on. Check it out.

Circle Reader Service Number 378

TOSHIBA AMERICA INFORMATION SYSTEMS
Computer Systems Division
9740 Irvine Blvd.
Irvine, CA 92718
(800) 334-3445
(714) 583-3000

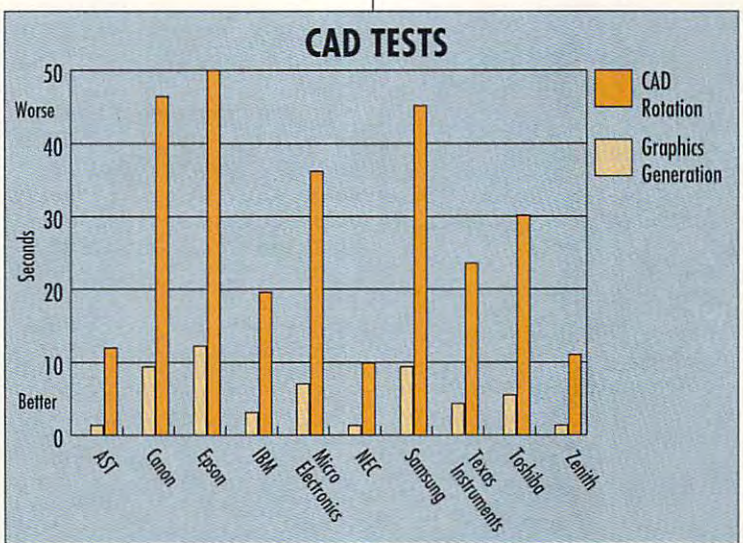
Suggested retail price: $3,799 with 120MB drive and color display

TOSHIBA T4500C

With its great assortment of desirable features, Toshiba's T4500C is another example of state-of-the-art technology in a 486-based color notebook computer.

The T4500C provides a bright and colorful 8.5-inch TFT active matrix color display for working with Windows or DOS applications. Surprisingly, Toshiba provides no discrete controls for adjusting the brightness or contrast of the display. This didn't prove to be troublesome, however, as the display was sharp and easily visible even in bright light, requiring only a slight movement of the lid backward or forward to change the viewing angle for optimum visibility. The built-in display can provide VGA 640 × 480 resolution with 256 colors, while connecting an external SVGA monitor enables the T4500C to produce 800 × 600 and 1024 × 768 resolutions.

Like manufacturers of some other top-of-the-line color notebooks covered here, Toshiba has forsaken the traditional LED status indicators in favor of an LCD window, which is separated into four "panes." In addition to providing information about hard and floppy disk activity, lock key status, and more, the window also provides a countdown clock, which gives you a realtime indication of how much operating time remains under current load conditions before the nickel-metal-hydride (NiMH) bat-



CAD TESTS

The Graphics Generation Test times the load of a complex color graphic file with thousands of unique elements, using AutoCAD's 3-D Concepts software. Since these elements must be calculated on the fly, this test is particularly indicative of the system's floating-point calculation capabilities and video speed.

The CAD Rotation Test times how long it takes to rotate and regenerate a CAD drawing with 57,657 elements in it. Since these operations are intensely numerical in nature, this test provides additional information about the system's ability to process floating-point calculations in realtime. This test was used in place of a spreadsheet calculation test, since all of these 486 notebooks were able to perform complex numerical spreadsheet calculations so quickly that performance differences were negligible.

—TOM BENFORD, PRESIDENT
COMPUTER PRODUCT TESTING SERVICES

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tery pack requires recharging.

The power-saving options are well thought-out and easily accessed via the machine's setup menus. As with other notebooks, the power-saving features cause some delays in the responsiveness of the T4500C, such as when the hard drive "goes to sleep" and takes a second or two to wake up again when file I/O operations are required.

A BallPoint mouse attaches via the machine's QuickPort. Although indeed a Microsoft BallPoint, it's molded in the same light, bone gray color as the T4500C and bears the Toshiba logo instead of the Microsoft name on its top (the underside identifies it as a Microsoft product, however).

Toshiba provides a single PCMCIA slot beneath a cover on the left side of the T4500C, and a similarly concealed cavity on the right side of the machine accepts a dedicated modem unit. The unit's 1.44MB floppy drive resides at the front of the machine toward the right side. All of the I/O ports (single serial, parallel, mouse, keyboard, and SVGA video) are hidden behind a drop-down door at the rear, and a proprietary connector for mating the T4500C with a desktop docking bay is concealed behind another panel next to the I/O bank.

The T4500C is a respectable performer with a terrific color display, a comfortable keyboard, great styling, and excellent expansion possibilities. It makes a great choice if you're looking for a color 486-based notebook.

Circle Reader Service Number 379

ZENITH DATA SYSTEMS
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Buffalo Grove, IL 60089
(800) 553-0331
(708) 808-5000

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ZENITH Z-NOTE 425LNC

Its bone white case and bold, vertical lines accented by embossed-square designs around the case perimeter make the Z-Note 425Lnc Model 200 a good-looker with lots of great features that become apparent when you open this notebook and turn it on.

Like other Z-Notes in the Zenith line, the 425Lnc has an LCD status panel which provides information about system status using icons rather than mere LEDs. The display takes the form of a four-pane LCD "window" in which graphical indicators signify the status of AC power operation, standby mode, battery power operation, hard drive activity, floppy drive activity, port replicator attachment, external CRT enablement, modem enablement, LAN controller enablement, and speaker enablement, as well as whether the Num Lock, Caps Lock, Pad Lock, and Scroll Lock keys are active. As you can see, this LCD window provides a wealth of information about which features are enabled or currently in use.

A single indicator, located in the center of the machine just below the display screen, shows power status with the lid closed; this LED changes color according to the current power/battery conditions.

The 425Lnc uses an Intel

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.

KEYPADS YOU CAN COUNT ON

For all their power and convenience, notebooks can leave you frustrated when it comes to entering numeric data quickly and accurately. One solution is to attach a portable numeric keypad, such as those offered by Genovation and CNF.

The 17-key Micropad from Genovation is modeled after the numeric pad of the familiar enhanced AT keyboard. It attaches to your computer via a pass-through parallel interface, and there are serial- and keyboard-port versions as well. A five-foot cable is available with Micropad, and additional options include a form-fitting polyskin cover and 17 key tops with clear, removable lenses. The Micropad sells for about $95.

The Numeric Keypads from CNF also feature 17 keys, and they have a rated reliability of at least 10 million keystrokes between failures. These units plug into your PS/2 (mini DIN) port and include a two-foot cable, allowing them to be positioned on either the left or right side of most notebooks. The Numeric Keypads range in price from $69 to $99.

To receive more information about the Micropad, contact Genovation by calling (800) 822-4333 or by writing to 17741 Mitchell North, Irvine, California 92714.

Circle Reader Service Number 382

To receive more information about Numeric Keypads, contact CNF at 17705 Hale Avenue I-1, Morgan Hill, California 95037. CNF's phone number is (408) 778-1160.

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—LISA YOUNG

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486 Notebook Features

	AST PowerExec 4/25SL ColorPlus	Canon NoteJet 486	Epson ActionNote 4SLC/25	IBM ThinkPad 720C	Micro Electronics Winbook
Physical Characteristics					
Dimensions	1.98" x 11.5" x 8.5"	2.2" x 12.2" x 10"	1.6" x 11" x 8.7"	2.2" x 11.7" x 8.3"	1.75" x 11" x 8.75"
Weight + transformer	7.8 lbs.	7.7 lbs.	6.9 lbs.	7.6 lbs.	6.4 lbs.
Weight of extra battery	1.5 lbs.	1.3 lbs.	0.75 lb.	1.5 lbs.	0.9 lb.
System Electronics					
CPU manufacturer	Intel	TI	Cyrix or TI	IBM	Cyrix
CPU	25-MHz 486SL	25-MHz 486SLC	25-MHz 486SLC	50-MHz 486SLC2	33-MHz 486SLC/E
BIOS	AST	Phoenix	Seiko Epson	IBM	AMI
Cache	8K	1K	1K	16K	1K
Proprietary slot for modem	no	no	yes	NA	yes
Number of PCMCIA slots	2	2	0	2	1
Standard RAM	4MB	4MB	4MB	4MB	4MB
Max RAM	32MB	12MB	8MB	16MB	8MB
Display					
Type	active matrix color	monochrome	monochrome	active matrix color	monochrome
Illumination	backlit	backlit	backlit	backlit	backlit
Max res	640 x 480	640 x 480	640 x 480	640 x 480	640 x 480
Max colors	256	NA	NA	256	NA
Shades of gray	NA	16	64 or 32	NA	64
Diagonal screen size	9.5"	9.5"	10"	10.5"	approx. 10"
External monitor support	yes	yes	yes	yes	yes
Simultaneous display + external	yes	no	yes	yes	yes
Modular display	no	no	no	no	no
Drives					
Size of hard drive	200MB	135MB	120MB	165MB	128MB
Floppy drive placement	right side	left side	right side	front left	left side
Input/Output					
Parallel ports	1	1	1	1	1
Serial ports	1	1	2	1	1
External keyboard port	mouse/keyboard	mouse/keyboard	mouse/keyboard	no	mouse/keyboard
Mouse port	mouse/keyboard	mouse/keyboard	mouse/keyboard	yes	mouse/keyboard
Pointing device	integrated keyboard trackball	mouse/trackball	Logitech TrackMan	TrackPoint II	integrated Alps trackball
Expansion unit port	yes	yes	no	yes	yes
External drive port	no	no	parallel port doubles as ext. drive port	NA	NA
Power					
Battery type	nicad	nicad	nicad	NiMH	NiMH
Hardware power management	yes	NA	yes	yes	yes
Software power management	yes	yes	yes	yes	yes
Software					
In addition to standard DOS and Windows	AST Online user manual	NoteJet software	WinFax Lite, BitCom	Prodigy kit	BitCom and BitFax

NA=not applicable or information on this feature not available at press time

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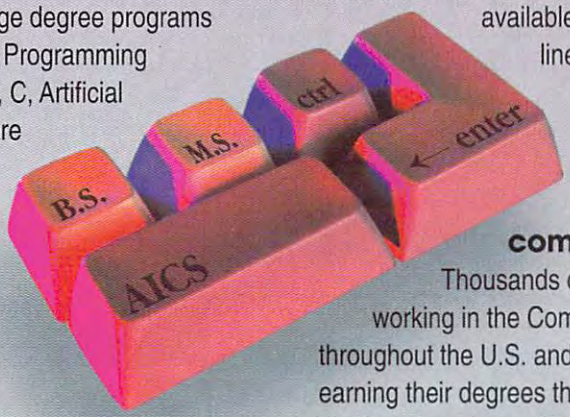

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486 Notebook Features

	NEC UltraLite Versa 25C	Samsung NoteMaster 486SLC	TI TravelMate 4000 WinSX/25 Color	Toshiba T4500C	Zenith Z-Note 425Lnc
Physical Characteristics					
Dimensions	2.09" x 11.69" x 9.33"	1.8" x 8.5" x 11"	2.1" x 11" x 8.5"	2" x 11.7" x 8.3"	2.1" x 11.9" x 8.5"
Weight + transformer	8.1 lbs.	5.9 lbs.	6.3 lbs.	6.9 lbs.	7.5 lbs.
Weight of extra battery	1 lb.	1.2 lbs.	1.35 lbs.	1.5 lbs.	1.18 lbs.
System Electronics					
CPU manufacturer	Intel	Cyrix	Intel	Intel	Intel
CPU	25-MHz 486SL	25-MHz 486SLC	25-MHz 486SX	25-MHz 486SX	25-MHz 486SL
BIOS	Phoenix	Phoenix	Phoenix	NA	ZDS
Cache	8K	1K	8K	8K	8K
Proprietary slot for modem	no	yes	no	no	yes
Number of PCMCIA slots	2 Type II or 1 Type III	0	0	1	0
Standard RAM	4MB	2MB	4MB	4MB	4MB
Max RAM	20MB	8MB	20MB	20MB	28MB
Display					
Type	active matrix color	monochrome	passive color STN	active matrix color	active matrix color
Illumination	sidelit	backlit	edgelit	NA	NA
Max res	640 x 480	640 x 480	640 x 480	640 x 480	640 x 480
Max colors	256	NA	256	256	256
Shades of gray	NA	64	NA	NA	NA
Diagonal screen size	9.5"	10"	9.4"	8.5"	8.4"
External monitor support	yes	yes	yes	yes	yes
Simultaneous display + external	yes	yes	yes	yes	yes
Modular display	yes	NA	no	no	yes
Drives					
Size of hard drive	179MB	120MB	120MB	120MB	200MB
Floppy drive placement	right side	right side	front right	front right	right side
Input/Output					
Parallel ports	1	1	1	1	1
Serial ports	1	1	1	1	1
External keyboard port	yes	mouse/keyboard	yes	yes	yes
Mouse port	yes	mouse/keyboard	yes	yes	yes
Pointing device	Microsoft BallPoint	internal mouse	Microsoft BallPoint	Microsoft BallPoint	Logitech TrackMan
Expansion unit port	yes (for docking station)	no	yes	yes	port replicator
External drive port	no	no	yes	yes	no
Power					
Battery type	NiMH	nicad	nicad	NiMH	NiMH
Hardware power management	yes	yes	yes	yes	yes
Software power management	yes	NA	yes	yes	yes
Software					
In addition to standard DOS and Windows	remote diagnostics	NA	TI utilities (Battery Pro, Large Cursor, Drop N' Go, power management)	Ultrafont, hypertext online documentation	Windows for Workgroups, Network Client Shells

NA=not applicable or information on this feature not available at press time

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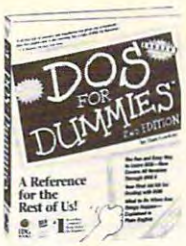

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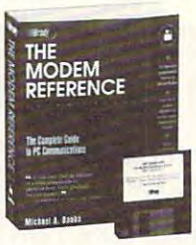

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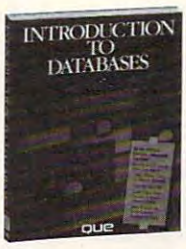

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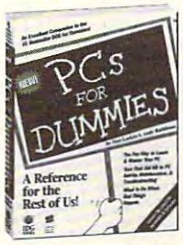
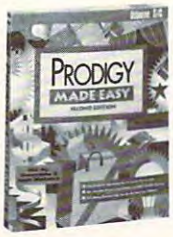


67517 $16.95



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73243-2 $29.95
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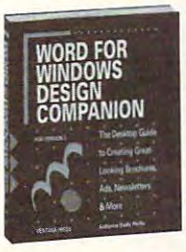

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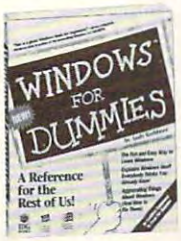

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80486SL CPU running at 25 MHz as the source of its computing power and comes with 4MB of RAM as the standard complement; for those who need more oomph, the RAM can be expanded up to 28MB. No PCMCIA slots are provided on the 425Lnc.

A few words about the 425Lnc's comfortable keyboard are in order here, since it is one of the best keyboards I've come across on a notebook or laptop PC. The key tops themselves are gently contoured with softly rounded edges that fit the fingertips well. The action is firm, not "mushy," and fast touch-typists will find it a joy to use. The embedded numeric keypad and dedicated cursor direction keys complement the alphanumeric keys, and the F and J keys have raised dots on them for confirming home row position.

Data input doesn't end with the keyboard, however, and Zenith covered that end well by providing a Logitech TrackMan pointing device, which conveniently clips onto either side of the 425Lnc. The notebook also comes equipped with a dedicated PS/2 mouse port, which accepts the plug from the TrackMan's cable to make using Windows and other GUI-based applications more efficient. The TrackMan's color perfectly matches that of the 425Lnc, and the turquoise-colored trackball "works" with the blue-green color of the Zenith logo on the notebook.

Color plays a big part in the 425Lnc, since it comes equipped with a TFT active matrix color display, which measures almost 8.5 inches diagonally. The display is clear and bright, providing 640 × 480 VGA resolution internally; if you plug an external SVGA monitor into the 425Lnc, you can use resolutions of 800 × 600 with 256 colors or 1024 × 768 with 16 colors. While not the largest color LCD I've seen, the 425Lnc's is certainly one of the best.

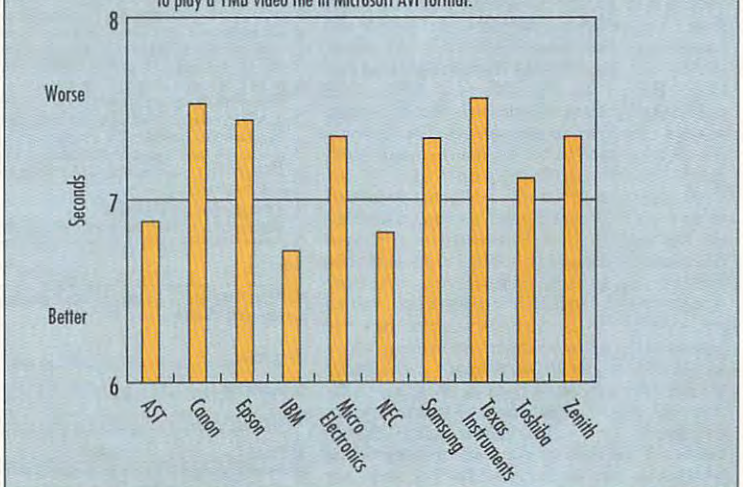
The Z-Note 425Lnc is a good choice for discriminating users who don't mind spending a bit more for a color notebook that performs well.

Circle Reader Service Number 380

For coverage of another 486 notebook, The Gateway 2000 Nomad 450DXL, see the review section.

VIDEO FOR WINDOWS

Our Video for Windows Test records the elapsed time required to play a 1MB video file in Microsoft AVI format.



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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, indeed.

It pays to keep the following points in mind:

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

Because computer technology evolves rapidly, a product may have changed by the time our review sees print. A manufacturer may decide to change the software or the hard drive, for example.

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. 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.

—MIKE HUDNALL

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NEWS & NOTES

Jill Champion

No More Blandscapes

No more staring at a *boring* monitor, now that Screenies have arrived. These illustrated frames for your screen, bursting with color, will rescue you from "the visual monotony" of your putty-colored monitor and "individualize your workspace at home and at the office," says Screenies inventor Rusty Schwartz, who also owns an art gallery in Sonoma, California.

Choosing from the 51 Screenies in the introductory First Edition Collection, for which many of America's top illustrators were commissioned, you can frame your monitor with a space station, inquisitive news media, mischievous kitties at the cat box, children at school, a rain forest, even Ren & Stimpy—and much more.

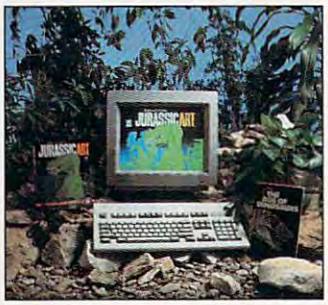
Leaping lizards make Arts & Letters Jurassic ART from Computer Support a sure bet.

Functional Screenies include a corkboard for posting notes, a dry-erase memo board, and a photo-frame collection. A line of holiday Screenies is currently in production. Each design is mounted on sturdy yet flexible art board, varnished for protection, and packaged in a resealable vinyl envelope. At $11.95 each, the Velcro-affixed frames are infinitely interchangeable.

Look for this new trend in "computerwear" at computer supply stores and gift and stationery shops across the U.S. For more information, contact Screenies, 18971 Sonoma Highway, Sonoma, California 95476; (707) 939-6060, (707) 939-6065 (fax).

Double Protection

Notebooks and laptops don't have to take a beating during travel. Colorado-based Doublecase manufactures a line of Eurodesigned attaché-style cases that offer extra protection for your delicate equipment. What's special about the Doublecase line is that each piece is engineered as a case within a case, with a double wall of tough, high-impact polyethylene that traps a cushion of air for extra protection from impact. The most versatile Doublecases are models NB-3600 and NB-4600, which allow you to easily customize your case interior by removing small cubes of foam. And these two are big enough to hold 17- × 11-inch notebook computers plus accessories. The NB-4600 does double duty as a briefcase, with extra compartments for



files, pens, and cards. Doublecase prices range from $60 to $200. For more information, contact Doublecase, 5350 North Academy Boulevard, Colorado Springs, Colorado 80918; (800) 475-0707, (719) 594-9331 (fax).

Now Hear This

Wouldn't it be nice to *tell* your computer what to do? Voice Blaster from COVOX lets you do just that by adding powerful voice recognition capabilities to popular sound cards and keystroke-intensive applications. This is an easy-to-use, entry-level product rather than an expensive, high-end technology that's difficult to learn and implement. It's designed to increase your personal productivity by adding a voice command interface that can be tied to keyboard and mouse macros.

Corporate PC users, hobbyists, PC game players, and program developers all can add voice commands to more than 1000 DOS and Windows business, educational, and entertainment software titles, including dBASE, FoxPro, Quattro Pro, Quicken, WordPerfect 5.1, and AutoCAD as well as games from Electronic Arts, GameTek, LucasArts Entertainment, MicroProse, Sir-Tech, and Villa Crespo. The system includes a high-fidelity headset (with a microphone and speaker) that connects to your computer via the parallel port. Voice Blaster also works with a variety of existing PC microphone systems and improves recording capabilities on most popular sound boards. It requires a Sound Blaster–compatible sound board. Suggested retail price is $119.95.

If you would like to know more, contact COVOX, 675 Conger Street, Eugene, Oregon 97402; (503) 342-1271, (503) 342-1283 (fax).

Hot Chip, Cool Solution

If your machine uses one of the new Intel Pentium chips, you could have a hot problem on your hands. The elevated temperature of an uncontrolled Pentium can cause system halts, UAEs in Windows, hard drive data corruption, and total loss of data.

PCubid's Pentium CPU Kooler, installed on the Pentium chip, provides an environment fully compliant with Intel's specifications for thermal control. Incorporating a custom-machined heat sink and a miniature fan, the CPU Kooler includes a temperature-probe port that allows you to add Radio Shack's Micronta digital thermometer as an optional accessory for measuring the heat sink temperature to ensure that the Pentium is being adequately cooled. With or without the tempera-

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To order or obtain more information about PORT·ABLE Sound Plus, write or call DSP Solutions, or, contact your local dealer.

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Balance the budget, capture your screens, and cool your Pentium.

ture probe, however, PCubid's Pentium CPU Kooler solves the temperature control problem for the Pentium chip—and at a very affordable price. Available direct from PCubid, the Pentium CPU Kooler is $39.95. Micronta Digital Thermometers can be purchased at Radio Shack stores for about $15.00. For more information, contact PCubid, 6705 Silverthorne Circle, Sacramento, California 95842; (916) 338-1338 (voice or fax).

Jurassic Art

Take a walk through *this* Jurassic park—er, art—and you'll see velociraptors dancing, not the vicious killers that run loose in Michael Crichton's bestseller. Arts & Letters Jurassic ART, a complete drawing program from Computer Support, incorporates the company's new Flex-Art technology, which allows you to actually customize its hundreds of colorful, detailed clip art images of dinosaurs. The program also includes an exceptionally well illustrated informational booklet, The Age of Dinosaurs, and an online database that provides instant access to dinosaur facts, charts, paleontological terms, and maps showing (by state) where dinosaur tracks, quarries, and exhibits can be found.

What's more, when you purchase Arts & Letters Jurassic ART, a portion of the sales will be contributed to "Quest for the African Dinosaur," sponsored by the Institute for the Study of Earth and Man (ISEM). ISEM is raising funds to bring the fossilized skeleton of a new type of dinosaur from Malawi, in Africa, to the United States, where it will be reassembled and a model of it made.

Once *Malawisaurus* comes to life in model form, the original skeleton will be returned to the citizens of Malawi and supervised by Malawian paleontologists trained under the ISEM program.

Arts & Letters Jurassic ART retails for $59.95. If you would like more information, contact Computer Support, 15926 Midway Road, Dallas, Texas 75244; (214) 661-8960, (214) 661-5429 (fax).

It Can Be Done

Can the federal budget be balanced? Congress says no, but consumers say yes. Banner Blue released its Uncle Sam's Budget Balancer software last fall, offering it free to all consumers as a public service to help increase American taxpayers' awareness of the budget crisis. Banner Blue says the response was outstanding. Results from the company's customer survey show that while many of those who used the program are pessimistic about the government's current solutions to the budget problem, 52 percent of those who tried the program have already balanced the budget themselves. For those who want to tackle fiscal year 1994, Banner Blue is offering an upgraded version of Budget Balancer for $19.99 plus $4.00 shipping (39500 Stevenson Place, Suite 204, Fremont, California 94539; 510-794-6850, 510-794-9152 [fax]).

One response from a Brooklyn Park, Minnesota, customer summed up the feeling for most users—and probably most frustrated American taxpayers: "The program allowed me to see that a workable solution to the budget problem *is* possible . . . so why can't the government come up with a solution?"

Capture It All

Screen shots don't have to be a hassle. Collage Complete, the easy new screen-capture program from Inner Media, is a complete image-handling system for both DOS and Windows that captures, converts, and catalogs images *fast.* Capture all or a cropped portion of a screen—with or without the cursor—in one of numerous formats supported, including PCX, TIF, GIF, Targa, BMP, and JPEG, in color, black-and-white, and dithered or true gray. The program's unique "countdown" timer allows you to make your picture just right, and with Preview mode, you're sure to save the right screen the first time around.

Use the image-cataloging system to group, save, and retrieve related images, and then view them as a collection of thumbnails for easy selection, conversion, or printing. Borders of any color can be added, as well as text, rectangles, and other objects. A powerful set of batch-style operations allows you to modify and/or print several images in one operation. Collage Complete fully supports Windows 3.1 Drag&Drop, Twain scanners, Kodak Photo CD-ROM images, and much more. Easy enough for anyone to use, Collage Complete retails for $199. Current owners of Collage Plus can upgrade directly through Inner Media for $59. For more information, contact Inner Media, 60 Plain Road, Hollis, New Hampshire 03049; (800) 962-2949, (603) 465-7195 (fax).

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

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FEEDBACK

Save That Screen

I want to save a screen created with a BASIC program in a format that I can do something with.

JIM BROWN
ATLANTA, GA

Here's a routine written in QBASIC that saves whatever's on the screen as a BMP file, the kind of file you could use as a Windows wallpaper file or load into Windows Paintbrush (or any program that can load a BMP file) to edit.

Screens you can use, sorts you can count on, ports you can find, mice you can program, and applications you can run once a day

```
SCREEN 12
DIM b(1345), a&(16)
FOR i = 0 TO 15
a&(i) = INT(RND * 64) + INT(RND
 * 64) * 256 + INT(RND * 64) *
 65536
NEXT
PALETTE USING a&(0)
cur=0
REM Place draw routine here.
REM The following lines are
REM a dummy drawing routine
REM just to put something on
REM the screen.
FOR i = 0 to 639
LINE (i, 0)-(i, 480), i AND 15
NEXT
GOSUB SAVESCREEN
END

SAVESCREEN:
GET (0, 0)-(200, 16), b
LINE (0, 0)-(200, 16), 0, BF
LOCATE 1, 1
c& = a&(cur + 15)
b& = a&(cur)
a&(cur) = 63 + 256 * 63 + 65536 *
 63
a&(cur + 15) = 63
PALETTE USING a&(cur)
INPUT "Filename: ", FILE$
a&(cur + 15) = c&
a&(cur) = 0
PALETTE USING a&(cur)
PUT (0, 0), b, PSET
IF file$="" THEN RETURN
OPEN FILE$ FOR OUTPUT AS #1
RESTORE bmpdata
FOR i = 0 TO 53
READ a: PRINT #1, CHR$(a);
NEXT
FOR i = 0 TO 15
PRINT #1, CHR$(((a&(cur + i) AND
 65536 * 63) / 65536) * 4);
PRINT #1, CHR$(((a&(cur + i) AND
 256 * 63) / 256) * 4);
PRINT #1, CHR$((a&(cur + i) AND
 63) * 4);
PRINT #1, CHR$(0);
NEXT
point$ = ""
GET (0, 0)-(10, 479), b
FOR i = 479 TO 0 STEP -1
c = (c + 1) AND 15
LINE (0, 481)-(9, i + 1), c, BF
FOR j = 0 TO 639 STEP 2
point$ = point$ + CHR$(POINT(j, i)
 * 16 + POINT(j + 1, i))
NEXT
PRINT #1, point$; : point$ = ""
NEXT
CLOSE
PUT (0, 0), b, PSET
a&(cur) = b&
RETURN

bmpdata:
DATA 66, 77, 118, 88, 2, 0, 0, 0
DATA 0, 0, 118, 0, 0, 0, 40, 0
DATA 0, 0, 128, 2, 0, 0, 224, 1, 0
DATA 0, 1, 0, 4, 0, 0, 0, 0, 0, 0
DATA 88, 2, 0, 132, 61, 0, 0, 132
DATA 61, 0, 0, 0, 0, 0, 0, 0, 0, 0
DATA 0, 0, 0, 0
```

Sort of a Problem

I want to sort a file, but not based on the first character in each line. Can you show me a BASIC program that will accomplish this?

CHAR THEUNE
GROSSE POINTE FARMS, MI

A BASIC program would be easy enough to write, but why not just use the MS-DOS command SORT? Usually, SORT is used to arrange files in alphanumeric order according to the first character in each line, but this command is far more flexible than that. To sort based on the second character in a line, use the command SORT /+2. To sort in reverse order, use SORT /R.

The newer versions of DOS have help built in. To see all the things that SORT can do, type sort /?.

BASIC Appreciation

I would like to express my thanks to your publication for including BASIC in its monthly coverage of the computer world.

I understand that some say that BASIC is a less-than-useful language, but, speaking as someone who uses it regularly and is constantly studying it, I am glad that not all feel this way.

I hope that you will continue to cover all of the computer world as well and completely as you have in the past. As a reader, I never stop learning from your publication.

DIRK R. LAUBER
DELTA, OH

Remouse

My language of choice is BASIC. I decided to make a menu program for running all my other programs. Everything works fine, but it's keyboard-driven, and I'd like to make use of the mouse in QBASIC. Is there any way to do this?

MARIUS ZYDYK
CALGARY, AB

Probably not in QBASIC, but a routine for accepting mouse input into QuickBASIC ran in "Tips & Tools" in April 1992. Here's a shorter program for getting mouse data. You have to run QuickBASIC with the library QB.QLB. To do this, start up QuickBASIC with the command QB /L QB.QLB.

```
REM Original program by
REM Mike Konesky of
REM Pittsburgh, Pennsylvania
' $INCLUDE: 'qb.bi'
DECLARE SUB hide ()
DECLARE SUB show ()
DECLARE SUB getm (k%, x%, y%)
DIM SHARED Inregs AS RegType,
 Outregs AS RegType
DO
getm k%, x%, y%
LOCATE 1, 1
```


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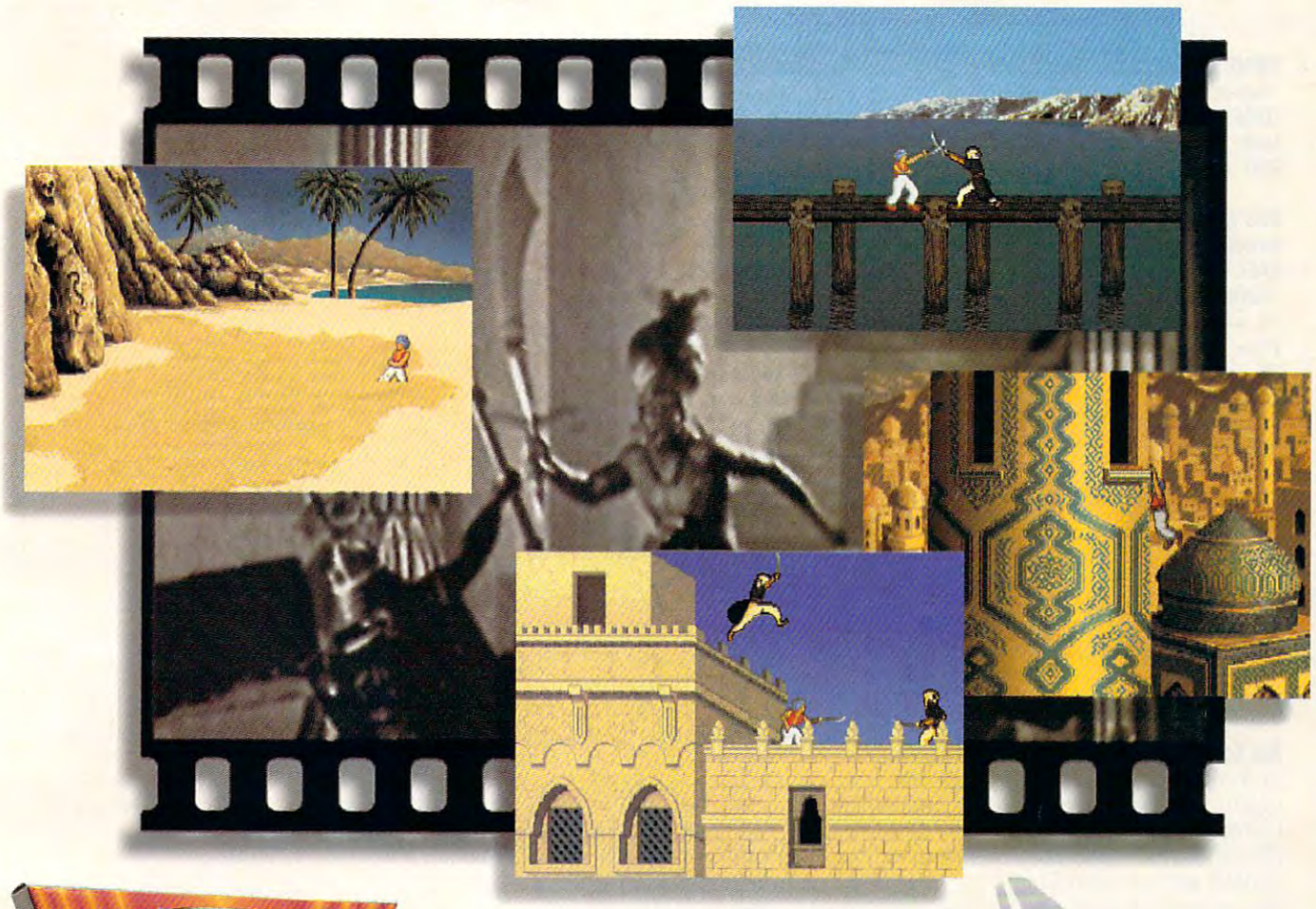
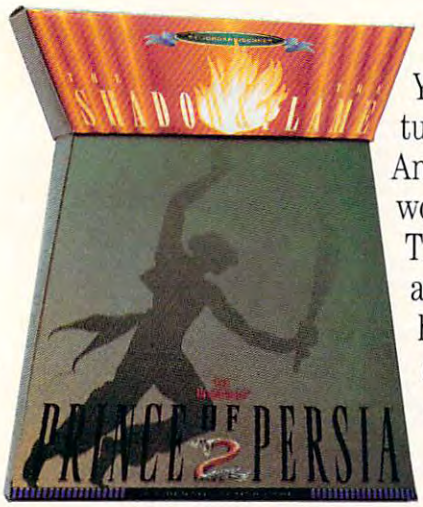
Bad Day in Bagdad!





You've been cast out of the palace as a beggar. The princess has turned against you. The palace guards want your head on a skewer. And you haven't even had breakfast yet. This is not good. It gets worse. One minute you're fleeing for your very life across roof tops. The next, you find yourself washed up on a desert island...or amidst ancient ruins, face to face with a disembodied head (and boy is it hungry!). This is *really* not good. You stumble upon quicksand, serpents, spikes, magic spells, a skeleton with a sick sense of humor, and then...well...things get just a mite tricky. Introducing *Prince of Persia 2®: The Shadow & the Flame.*™ Some call it a dozen Arabian Nights movies rolled into one. Actually, it's your worst Arabian nightmare. So get some sleep. Once this swashbuckler begins, you may never sleep again.

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```
PRINT x%, y%, k%, "Press both
  mouse buttons to end program."
LOOP WHILE k% <> 3
hide
END

SUB getm (k%, x%, y%)
Inregs.ax% = 3
CALL INTERRUPT(&H33, Inregs,
  Outregs)
x% = Outregs.cx% / 8 + 1
y% = Outregs.dx% / 8 + 1
k% = Outregs.bx%
END SUB

SUB hide
Inregs.ax% = 2
CALL INTERRUPT(&H33, Inregs,
  Outregs)
END SUB

SUB show
Inregs.ax% = 1
CALL INTERRUPT(&H33, Inregs,
  Outregs)
END SUB
```

An Ez in Every Port

In the May Test Lab on tape drives, product information for the Irwin EzPort was accidentally left out. The 250MB EzPort lists for $548, and a 120MB version is available for $448. For more information, contact Maynard Electronics, a division of Conner Peripherals, at (800) 222-5871. Maynard offers a one-year warranty on the EzPort.

In the July issue, the article on BIOSs is accompanied by the sidebar "Flash BIOS," which contains the statement that updating a flash BIOS can only be accomplished with specialized equipment. That is incorrect. A flash BIOS can be upgraded by the user, assisted by a utility that can be downloaded from the computer manufacturer's BBS.

THE EDITORS

Better 1DAY

Here's a better solution to the problem of running a program only once a day. It's better because it doesn't use BASIC, so it accomplishes in about 3000 bytes what your solution ("Feedback," April 1993) took 80K to do. There are three batch files. The first is called 1DAY.BAT.

```
@ECHO OFF
ECHO |MORE |DATE > !@#.BAT
CALL !@#
IF NOT EXIST !!#.BAT GOTO DOIT
CALL !!#
IF %LASTDATE%==%TODAY%
  GOTO END
:DOIT
ECHO !!! %TODAY% > !!#.BAT
REM This is where you should
REM put the commands to
REM run the programs you
REM only want to run once
REM a day.
ECHO.
:END
SET TODAY=
SET LASTDATE=
```

The second batch file is called CURRENT.BAT.

```
SET TODAY=%4
```

The third batch file is called !!!.BAT.

```
SET LASTDATE=%1
```

You have to have More and each of these batch files in your path for the program to work. Any programs you list where the REM statements appear in 1DAY.BAT will run only once a day.

R. C. MARCUS
ST. THOMAS, ON

Thank you for your elegant solution.

Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Call our special "Feedback" line: (900) 884-8681, extension 7010201 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Feedback" in care of this magazine. Readers whose letters or calls appear in "Feedback" will receive a free COMPUTE baseball cap while supplies last. We regret that we cannot provide personal replies to technical questions. ❐

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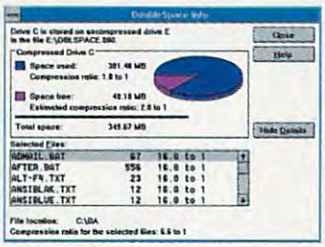
WINDOWS WORKSHOP

Clifton Karnes

Last month, I promised to talk about DOS 6's DoubleSpace, especially as it compares to Stac Electronics' Stacker. I've been using Stacker since version 1.0, and it's always performed flawlessly. I have to admit that I was a little queasy about trying a new compression product, but I wanted to test DoubleSpace and compare it with Stacker, so I decided to give it a try.

For Stacker users, Microsoft has a $10 product that will convert a Stacker-compressed volume to a DoubleSpace one (there's a coupon in your DOS manual). I had hoped to use that product to convert my Stacker drive to a DoubleSpace drive, but it didn't arrive in time, so I did the conversion the hard way.



With DoubleSpace, you can check on your free disk space and the compression ratio for any file or group of files from inside File Manager.

Here's the procedure I followed: I backed up my hard disk to tape, reformatted the disk, installed DoubleSpace, and restored the tape backup. It was not quite as simple as this sounds, but that's the gist of it. Since I wanted to run some benchmarks on my Stacker volume before I reformatted, I first optimized the Stacker drive and ran my database benchmarks and a suite of Windows programs. I ran each benchmark three times and averaged the scores.

Next, I backed up my hard disk. With Stacker, my hard drive is about 400MB, and the backup took about two hours. Then I created a DOS 6 bootable floppy and reformatted my hard disk with the /s option to make the disk bootable.

Before I could install DoubleSpace, I needed to restore all the files I use that create virtual drives, because these need to be active when DoubleSpace runs so it can intelligently choose a drive letter for itself. This meant that I had to reinstall my network files so the network drives would be available. I had to run Windows and build a permanent swap file, because after DoubleSpace was installed, this would not be possible. And I had to restore all my CD-ROM software so the CD-ROM drives could be installed.

After these files were restored, I booted up DOS (with its CD-ROM drives) and logged on to the network. Next, I ran DoubleSpace and followed the onscreen instructions to build a compressed volume. DoubleSpace works like Stacker in that it creates a compressed drive that in reality is a hidden system file on your physical drive. After the DoubleSpace (or Stacker) driver is installed, this file looks just like another drive to your computer. Traditionally, the real drive is called the physical drive, and the compressed drive is called the logical drive. This logical drive is, as mentioned above, really just a large file on your physical drive. After DoubleSpace installed itself, my drive C was a logical drive, and my physical drive became drive E.

Next, I restored the rest of my files (this took about four hours), and I was ready to go. I wanted to run my benchmarks using DoubleSpace, but just to be on the safe side, I optimized the DoubleSpace volume first and then ran the programs.

The results were about what I'd expected. DoubleSpace proved to be essentially as fast as Stacker (Stacker averaged 2 percent faster, which I consider insignificant), and it provided about the same compression ratio—1.8 to 1.

I have been running DoubleSpace for about two months, and it's performed without a hitch.

For Windows users, DoubleSpace does two things. First, it gives you more disk space for disk-hungry Windows applications. Second, it lets you check on your free disk space and the compression ratio for any file or group of files from inside File Manager. If you click on the DoubleSpace icon or select Tools, DoubleSpace Info, you'll see a 3-D pie chart of your hard disk indicating free space. Click on More, and you'll see the compression ratio of the selected file or files. Pretty cool.

DoubleSpace has one big advantage over Stacker that I haven't discussed so far, and that's that the driver is loaded before your system runs CONFIG.SYS. This means that with DoubleSpace there's no more problem synchronizing CONFIG.SYS and AUTOEXEC.BAT files on both your logical and physical volumes (usually drives C and D, respectively). The next version of Stacker should incorporate this enhancement, too.

So what do you do about DoubleSpace? If you're already using Stacker, there's little reason to switch, especially since it will cost you $10 if you use the conversion program. If you have DOS 6 and haven't installed a compression program yet, go ahead and install DoubleSpace, and reinstall a couple of those big applications you've had to knock off your hard disk in the last year. ❐

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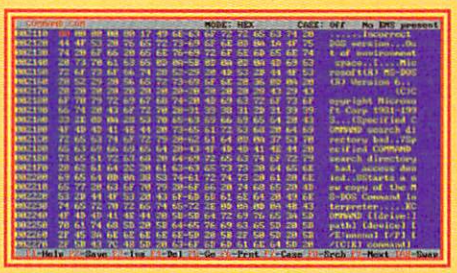

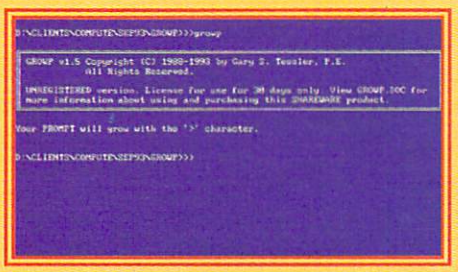

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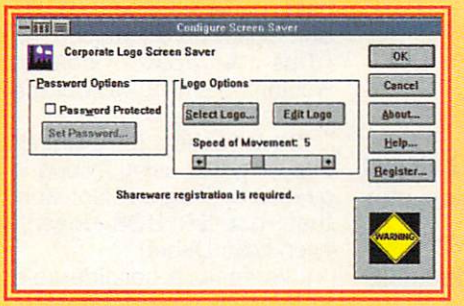

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TIPS & TOOLS

Edited by Richard C. Leinecker

Finding a Debug alternative and skipping the perforations

Easier Debug

I've had a number of requests for instructions on how to create those Debug scripts we publish. If you know a little assembly language, it's not too hard. Just write a small program that does something useful; then convert it to a text file that we can publish. Check out previous issues to see what the format looks like. Some of you have done just that, and we appreciate it very much. The "Tips & Tools" column wouldn't be much without the readers' input.

Other readers have written in saying that using Debug is awkward. I agree. Not only that, but DR DOS doesn't even have Debug.

I've spent a considerable amount of time addressing both of these issues. I wrote a program that does two things. It makes typing in those Debug scripts easier and even gives you an automatic checksum amount. It'll also give you the tools you need to create the scripts from your own programs. Besides that, I've collected a bunch of old programs for examples. The last thing I put together was a text file explaining the entire process.

The program, under the name TIP_TOOL.ZIP is available on GEnie, CompuServe, and America Online.

RICHARD C. LEINECKER
REIDSVILLE, NC

Skip the Perfs

The rather long BASIC program in answer to Abigail Furth's question published in "Feedback" in March 1993 seems to be overkill. All she wanted to know was how to skip the perforations while copying a file to PRN. A simple one-line program will do the trick.

Many 9-pin printers emulate the Epson FX line of printers. These printers all skip the perforations when sent the three-byte command sequence Esc-N-#. The # stands for the number of lines to skip over. I like 8, so the printer sequence I send is Esc-N-8. You can use the following BASIC program to do this.

```
LPRINT CHR$(27) + "N"
 + CHR$(8)
```

The program can be compiled and put somewhere in your path. If you don't have a compiler but QBASIC is in your path, save the program as SKIPPERF.BAS and run it with the line QBASIC /RUN SKIPPERF. You'll also need to add a line to the program containing the command SYSTEM, which returns you to the system. Here's the program if you plan to use this approach.

```
LPRINT CHR$(27) + "N"
 + CHR$(8)
SYSTEM
```

If you don't want to use BASIC, you can create a special file and send it to the printer. You'll have to use Debug to create a three-byte binary file. Type the following. In these examples, the italic text is what the computer prints; the roman text is what you should type.

```
debug skipperf.dat
File not found
-e 100 1B 4E 08
RCX
CX 0000
:3
-W
Writing 0003 bytes
-Q
```

To make your printer skip the perforations, type (or put in a batch file) *copy skipperf.dat prn.*

You can reset your printer to its default settings with the following BASIC program.

```
LPRINT CHR$(27) + "@"
```

Or you can use the file created with the following Debug script.

```
debug restprnt.dat
File not found
-e 100 1B 40
RCX
CX 0000
:2
-W
Writing 0002 bytes
-Q
```

E. STUART JOHNSON
ATHENS, AL

Batch Version of Deletex

The DELETEX.COM program which was printed in the January 1993 issue of COMPUTE inspired this batch file, ERASENOT.BAT. Much like Richard C. Leinecker's creation, this batch file erases everything in the current directory except the files you specify. The advantage over DELETEX.COM is that it's easier to type it in and make changes. The disadvantage is that it's kind of slow.

```
ECHO OFF
IF "%1" == "" GOTO USAGE

REM Here, we create a temporary
REM directory to hold all of
REM the files in this directory
REM that we don't want to delete.
REM If this directory name
REM conflicts with anything in
REM your system, use another
REM name that doesn't.
MD \TEMP
:DOCOPY
COPY %1 \TEMP

REM We do a shift so that up
REM to nine arguments can be
REM used.
SHIFT
IF "%1" == "" GOTO DONE
GOTO DOCOPY
```


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```
:DONE
REM First, we delete everything
REM in the current directory.
ECHO Y | DEL *.*

REM Then, we copy our temporary
REM files back here.
COPY \TEMP\*.*

REM Now, we delete the files in
REM the temporary directory.
ECHO Y | DEL \TEMP\*.*

REM And last, we remove the
REM temporary directory.
RD \TEMP
GOTO END

:USAGE
ECHO Usage: ERASENOT file-
 mask1 filemask2 . . . filemask9
ECHO This batch file erases all but
 the given file masks.

:END
```

ILYA TROYCHANSKY
BROOKLYN, NY

Files That Read Themselves

It never fails. I compress collections of files and send them to people, and they call back asking questions. To solve this problem, I include README files. Then they call and ask how to read the README files.

There are lots of other examples where groups of files need some explanation. You might be distributing disks to clients with records, programs, or batch files. Or you might upload files to an online service or BBS.

I have a solution that lets you create a program called MAKEREAD.COM. To use it, just create a file called README.TXT in the current directory and then run MAKEREAD.COM. It'll create a file called README.COM that displays a text file and allows users to cursor up and down through it. Press Esc to quit.

You can type Makeread in using the DOS Debug command (or with Com2hex, part of TIP_TOOL.ZIP, which is available for download on many online services). 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. Another way is to read the numbers into a tape recorder and then play them back as you enter the program code. This program will only work with color monitors.

```
debug makeread.com
File not found
-e 100 BA CE 01 B8 00 3D CD 21
-e 108 72 43 8B F8 BA C3 01 2B
-e 110 C9 B4 3C CD 21 72 36 8B
-e 118 D8 BA 51 01 B9 72 00 B4
-e 120 40 CD 21 B9 01 00 87 FB
-e 128 B4 3F CD 21 0B C0 74 08
-e 130 87 FB B4 40 CD 21 EB EE
-e 138 87 DF C6 06 51 01 1A B4
-e 140 40 CD 21 B4 3E CD 21 8B
-e 148 DF B4 3E CD 21 B4 4C CD
-e 150 21 B8 00 B8 8E C0 B4 01
-e 158 B9 09 69 CD 10 2B C9 2B
-e 160 FF B8 20 1F 51 B9 D0 07
-e 168 F3 AB 59 BE 72 01 2B DB
-e 170 2B ED 2B D2 8B FD AC 3C
-e 178 1A 74 1E 3C 0D 74 07 3B
-e 180 CB 7F F3 AB EB F0 3B CB
-e 188 7F 04 81 C5 A0 00 43 46
-e 190 8B D3 2B D1 80 FA 19 75
-e 198 DB 2A E4 CD 16 3C 1B 74
-e 1a0 19 80 FC 50 75 08 80 FA
-e 1a8 19 7C EE 41 EB B1 80 FC
-e 1b0 48 75 E6 0B C9 74 E2 49
-e 1b8 EB A5 B8 03 00 CD 10 B4
-e 1c0 4C CD 21 52 45 41 44 4D
-e 1c8 45 2E 43 4F 4D 00 52 45
-e 1d0 41 44 4D 45 2E 54 58 54
-e 1d8 00
-RCX
CX 0000
:00D9
-W
Writing 00D9 bytes
-Q
```

The checksum value (see the July 1993 "Tips & Tools" for the new Checksum program) is 25423.

RICHARD C. LEINECKER
REIDSVILLE, NC

Viewing ZIPs in Windows

I use archives to compress files to floppy disks. From DOS it's easy to see what's in the compressed file; you just type *pkzip -vn zipfile | more*. From Windows it's harder; normally, I shell to DOS because it's easier than using the File Manager to run the program.

I solved the problem by creating a batch file called ZIP.BAT.

```
PKUNZIP -VN %1 | MORE
PAUSE
```

While in the Windows File Manager, highlight a ZIP file. From the File menu select Associate. Then choose the Browse button to select ZIP.BAT from the directory where it exists. Now, to view ZIP files, just double-click on those files.

STEVEN R. PETERS
BETHLEHEM, PA

Creating self-typing README files and peeking through Windows to see what's inside ZIP files

Correction

In the October 1992 "Tips & Tools," a tip was published with the name *Andeep Tamhankar.* The name that appeared should have been *Sandeep Tamhankar.* Our apologies for the mistake.

RICHARD C. LEINECKER
REIDSVILLE, NC

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INTRODOS

Tony Roberts

MOVE AND DELTREE

These two new disk-management commands make it easier to work in DOS 6.

They've been a long time coming, but Microsoft's new DOS has a couple of important disk-management tools—Move and Deltree—that shouldn't be overlooked.

Unless you already have some kind of a file mover on your system, getting a file from one place to another is a three-step process: First, you copy the file to its new location; second, you check to see that the copy was successful; and third, you delete the file from its original location.

With DOS 6, you can accomplish the move in a single command. The syntax is Move filename destination.

To move more than one file, you can use wildcards, as in Move *.TXT C:\TXTFILES. If wildcards won't work, explicitly name all the files you want to move, separating the source filenames with commas: Move AUTOEXEC.BAK,CONFIG.BAK C:\BACKUPS.

DOS informs you if the destination subdirectory doesn't exist and asks if you want to create it. This feature saves time, but it comes back to haunt you if you attempt to move files to the root directory. For some reason, DOS doesn't know that the root directory exists and asks, *Make directory c:\? [yn]*. Although you know the root directory exists, press Y and the files will be moved.

Move, like its older cousin Copy, doesn't warn you if the files you're moving will overwrite files of the same name. This requires that you know what files exist on the destination end of your move.

With Move, it's also possible to rename a file as it's being moved, but only if you're moving a single file. The syntax that accomplishes this is Move OLDNAME.EXT C:\DEST-\NEWNAME.EXT.

Use this trick to rename a subdirectory, too. For example, use Move C:\SEP93 C:\OCT93 to rename your monthly project subdirectory.

Note that Move isn't as complex as the "prune and graft" commands found in some file managers. All Move can do is change the name of the subdirectory; it can't change its position on the directory tree. To relocate a directory full of files on the directory tree, create the new subdirectory, use Move to put the files in the new location, and then remove the old subdirectory.

Since the old subdirectory is now empty, it will be easy to remove it the traditional way—with RD. However, when circumstances call for you to delete subdirectories full of files, you'll want to use DOS 6's Deltree command.

Prior to DOS 6, removing a subdirectory could be a chore. DOS wouldn't remove a subdirectory containing files, so you had to erase the files before using RD. If the subdirectory contained hidden files, the DOS Erase command missed them, but RD knew they were there and refused to delete the directory. So, you had to use the Attrib command to make the hidden files visible and then erase them before you could remove the subdirectory. If you had subdirectories nested within subdirectories, you had to start at the lowest level and repeat this process as you worked your way up.

Deltree untangles this sticky web. Typing *deltree path* wipes out the subdirectory, all of its files—including system, hidden, and read only—and the subdirectories nested within it.

It's powerful, but dangerous, so make certain you know what you're doing. Even Undelete running in Delete Sentry mode can't bring back files that were stored in deleted subdirectories.

Normally, unless you use the /y switch, Deltree will ask for a confirmation before it takes any action. Sometimes, though, it returns to the DOS prompt without saying anything. This simply means that Deltree didn't find the subdirectory you specified. You may have made a typo as you entered its name or failed to identify the entire pathname. Try again. If you're successful, you'll receive a confirmation request followed by the message *Deleting pathname. . . .*

Deltree suffers from some other anomalies. First, if you try to delete the current subdirectory, Deltree's messages will indicate that it's being done, but the operation won't be complete. The files and any subdirectories will be removed, but the active subdirectory won't be deleted. Second, if the subdirectory you're removing has any of its attributes set, Deltree thinks the subdirectory is a file and prompts you with *Delete file "filename"? [yn]*. Although the prompt is erroneous, Deltree takes the expected action and deletes the specified subdirectory.

Finally, either one of these commands can help you correct an illegal-directory-name problem. For example, although spaces aren't allowed in directory names, some applications or installation programs manage to create directory names with spaces in them.

To delete such a directory with Deltree, place quotation marks around the directory name when typing the Deltree command: *deltree "93 data"*.

If you just want to change the directory name so it's legal, use Move, again surrounding the illegal name with quotation marks when you enter it: *move "93 data" data.* ❐

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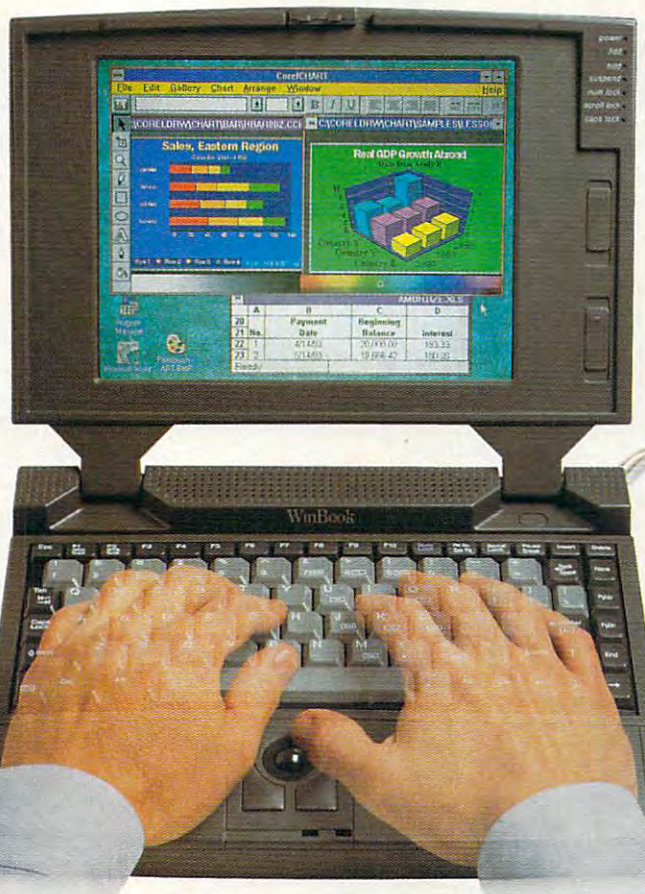
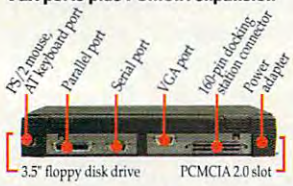


Docking station gives you desktop power

With the available docking station, your WinBook instantly becomes a full-function desktop computer. The two expansion slots and drive bays allow you to add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard and includes parallel, serial, PS/2 mouse, external keyboard and VGA ports.

And it's just $399!

Mouse/keyboard, parallel, serial and VGA ports plus PCMCIA expansion



Clean, sharp color display

The superior quality of the WinBook's new dual-scan STN color display gives you near active matrix quality at a passive matrix price.

Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries—and there's no memory effect.

Service, warranty and support

- 72-hour service turnaround guarantee.
- 45-day unconditional money-back warranty.
- 24-hour burn-in protection.
- One-year limited warranty on parts and labor.
- Toll-free technical support for the life of the computer.

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No-risk, 45-day unconditional money-back guarantee

Specifications

Size/Weight
- 11" X 8 3/4" X 1 3/4"
- 5.4 lbs. with battery (monochrome)
- 5.9 lbs. with battery (dual-scan color)

Pointing Device
- 16mm Alps dual-action, Microsoft compatible trackball

Battery
- Up to 3 hours with power management (less 30 minutes for color)
- NiMH (no memory effect)
- 2200 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 2-hour recharge

Power Management
- Eight power-saving features

Processor and Memory
- 486 SLC/E-25MHz CPU
- 4MB RAM
- 1MB ROM for AMI BIOS
- Motorola chipset
- 1k internal cache

Drives
- One built-in 1.44MB 3.5" floppy drive
- Internal 120MB (15ms) hard drive
- 250MB (12ms) hard drive optional

Software
- Comes loaded with MS-DOS 6.0 and Microsoft Windows 3.1

Display
- Super-twisted 64 grayscale, 10" LCD and 1024 x 768 for external monitor with 512k
- Optional dual-scan STN color display
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
- PS/2 mouse interface/AT keyboard interface
- PCMCIA 2.0 slot
- Serial: 9-pin connector
- Parallel port
- Video: 15-pin connector for CRT
- 160-pin docking station

Options
- 250MB (12ms) hard drive
- 8MB RAM
- Coprocessor
- Docking station

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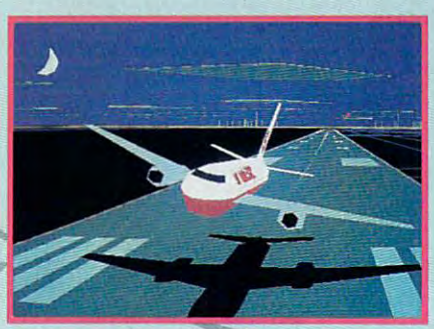

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HARDWARE CLINIC

Mark Minasi

DOS 6's MULTICONFIG, PART 3

Use DOS 6's MultiConfig and batch files to supercharge your AUTOEXEC.BAT and CONFIG.SYS files.

In the August column, I suggested one way to easily combine a number of AUTOEXEC.BATs into a single MultiConfig-ready file. If you tried experimenting with your system, perhaps you learned that the configuration names get passed to AUTOEXEC.BAT in the same case that you wrote them in CONFIG.SYS. If the configuration name is *interlnk*, don't write the IF statement as IF %config%==INTERLNK GOTO . . . , for that'll never match. The case must match; the statement would have to be IF %config%==interlnk GOTO . . . .

If you're batch-savvy, you may know about the CALL statement. The CALL statement makes it possible for one batch job to activate another batch job without DOS's forgetting about the original batch job. For you nonbatchers, activating one batch program from inside another doesn't ordinarily cause DOS to finish the first batch job once the second has been run. For example, assume that you have a batch job called X.BAT that looks like this.

```
@echo off
echo Message from X
Y
echo Last message from X
```

Also, assume that you have a batch program called Y.BAT that looks like this.

```
@echo off
echo Message from Y
```

Running X will result in the screen's showing this.

```
Message from X
Message from Y
```

There will be no Last message from X.

That's because starting one batch program from inside another batch program causes COMMAND.COM—the program that executes batch programs—to load Y.BAT in anticipation of executing it and to accidentally overwrite X.BAT in COMMAND.COM's memory. As a result, when Y ends, COMMAND.COM returns to the command prompt, not to the finishing lines of X.BAT. If, on the other hand, the line Y that stands by itself in X.BAT is replaced by CALL Y, COMMAND.COM will remember X.BAT, and the output will be as follows.

```
Message from X
Message from Y
Last message from X
```

The CALL command will, then, provide an alternative to inserting the various AUTOEXEC.BATs physically into the master AUTOEXEC.BAT. To apply this, recall the AUTOEXEC.BAT that we ended up with in August looks like this, with three sections.

```
@ECHO OFF
IF %config%==standard GOTO
 STANDARD
IF %config%==maxmemory GOTO
 MAXMEMORY
IF %config%==wingcomm GOTO
 WINGCOMM
:STANDARD
PROMPT $P$G
PATH C:\DOS
DOSKEY
PRINT /Q
SMARTDRV
GOTO END
:MAXMEMORY
PROMPT $P$G
PATH C:\DOS
LH DOSKEY
GOTO END
:WINGCOMM
CD\GAMES\WC2 WC2
GOTO END
```

The standard section is the stuff that you usually use, the interlnk section sets up an Interlnk server, and the wingcomm section sets up a configuration that allows Wing Commander II—a very memory-intensive game—to run. But instead of merging these files, imagine that you have batch files called STANDARD.BAT, MAXMEM.BAT, and WINGCOMM.BAT. Inside the sections you could simply insert CALL STANDARD, CALL MAXMEM, or CALL WINGCOMM. The final AUTOEXEC.BAT look like this.

```
@ECHO OFF
IF %config%==standard GOTO
 STANDARD
IF %config%==maxmemory GOTO
 MAXMEMORY
IF %config%==wingcomm GOTO
 WINGCOMM
:STANDARD
CALL STANDARD
GOTO END
:MAXMEMORY
CALL MAXMEM
GOTO END
:WINGCOMM
CALL WINGCOMM
GOTO END
:END
```

Now, there's an even more compact way of doing this that involves just doing the CALL statements from inside the IFs; the AUTOEXEC.BAT would look like this.

```
@ECHO OFF
IF %config%==standard CALL
 STANDARD
IF %config%==maxmemory CALL
 MAXMEM
IF %config%==wingcomm CALL
 WINGCOMM
```

That's probably an acceptable alternative, and it certainly makes converting a bunch of configurations to a single AUTOEXEC.BAT easier, but it won't work if the %config% variable gets altered by one

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of the batch files. The chances of that happening are small, so this may be the simplest method of unifying AUTOEXEC.BATs for most people.

If you're a batch expert, a look at the amalgamated batch file above will probably lead you to notice that I could've reorganized some of the statements to make the AUTOEXEC.BAT smaller. That's certainly true, and if you want to do that for your AUTOEXEC.BAT, go ahead. I didn't because I like the clearly defined separate areas for the different configurations.

Making It Simple

Let's get back to the CONFIG.SYS part of MultiConfig. In my example, I end up with a CONFIG.SYS that looks like this.

```
[menu]
menuitem normal,Standard setup
menuitem interlnk,Setup with
  Interlnk driver
menudefault normal,2

[normal]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH

[interlnk]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\INTERLNK.EXE
```

You'll notice that a group of statements is common to both configurations. There are just a few statements that you can expect all configurations to have—perhaps an essential device driver, FILES/BUFFERS/LASTDRIVE/STACKS statements, and the like. In the case of my example configuration, the commands that are common to the two configurations are as follows.

```
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
```

You can save yourself some typing by extracting a common group of statements and making it a block by giving it a block name and using the MultiConfig command INCLUDE. Just remove the group of statements from all configurations that use it, and precede it with a name in brackets, just like the configurations that you've been building so far.

Where the group of statements used to be in each configuration, insert the phrase INCLUDE [blockname], where blockname is whatever you've called the block of statements common to the configurations. For example, if I create a block called [shared] that contains the statements that are shared between the configurations, the CONFIG.SYS looks like this.

```
[menu]
menuitem normal,Standard setup
menuitem interlnk,Setup with
  Interlnk driver
menudefault normal,2

[shared]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH

[normal]
INCLUDE shared

[interlnk]
INCLUDE shared
DEVICE=C:\DOS\INTERLNK.EXE
```

You can have as many INCLUDE blocks as you like. For example, you might have an INCLUDE block with your memory management commands (EMM386/HIMEM/DOS=HIGH,UMB), another with your LAN drivers, another with Interlnk commands, and so on.

If you have a bunch of statements that are common to all configurations, you can create a block containing those statements, and then include them in each block. But there's an easier way: using the [common] block.

There's a predefined block called [common], which, if included in your CONFIG.SYS, will automatically be executed at the end of every configuration. Just include [common] on a line and follow it with whatever statements you want to see executed, no matter which configuration gets selected.

I strongly recommend that you have a [common] block and that you put it at the end of your CONFIG.SYS. That way, when you install a program that inserts commands into your CONFIG.SYS statement, the new statements will usually be placed at the end.

If the last block is the [common] block, you know that the statements will be executed; if the last block isn't the [common] block, the newly inserted statements won't be executed unless the last block happens to get executed, which would probably cause the newly installed program to fail.

Speak Up!

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PROGRAMMING POWER

Tom Campbell

PARADOX AS A WINDOWS DATABASE MANAGER

This month, I find myself in a strange position. I'm going to tell you why I think Paradox is a great Windows database manager to use for serious applications development. Then I'm going to tell you to break all the rules. Borland has some of the best manuals I've ever seen for a language product, but it tells you to use them the wrong way. Below, you'll find my new rules, which will tell you how to use them the right way.

Read the tutorial first if you don't think you need it; read The ObjectPAL Developer's Guide first if you think you need the tutorial.

Remember that I'm looking at this from a programmer's standpoint, but you don't need experience in any other computer languages to learn how to program Paradox. It will take a while, probably at least three months, to get the hang of it if you've never programmed before. This is true for any programming language. Learning ObjectPAL (*PAL* stands for *Paradox Application Language*) is very easy in some respects but daunting in others. It is well worth the time you put into it.

1. **Read the tutorial first if you don't think you need it; read The ObjectPAL Developer's Guide first if you think you need the tutorial.** The Borland documentation says you should read the Learning ObjectPAL tutorial if you don't have any programming experience. The problem is that it jumps right into hard-core concepts like objects and methods while neglecting to explain more basic things like constants and variables. All are important, but the basics are called that for a reason. They should always come first. If you understand none of these things, worry not. The Borland manuals offer hope if you break the rules. The ObjectPAL Developer's Guide, ostensibly for programmers who have read Learning ObjectPAL and are now ready to start developing full-fledged applications, has four introductory chapters that really belong in the tutorial. They are very well written, just misplaced. The first rule, then, is to read chapters 1–4 of The ObjectPAL Developer's Guide if the Learning ObjectPAL book leaves you a bit unfulfilled. None of this is to say that the guide falls short. It's a milestone in Borland documentation and should be a model for all language products. Usually, languages give you a reference and, if you're lucky, a tutorial. The problem is what happens in between. They never seem to have a book that addresses the needs of the person who has mastered the rudiments but doesn't know where to go next. It's the basis of a multimillion-dollar book industry. I'm delighted to see Borland tackling this very difficult subject. I'd like to see Borland do the same thing with its Pascal and C products, and Microsoft should do the same with its languages.

2. **Use the reference as a tutorial no matter what.** As good as The ObjectPAL Developer's Guide is (and that's very good), you can learn even more by thumbing through The ObjectPAL Reference. Reference books aren't designed to be used as tutorials or even to be browsed. You're expected to have an idea of what you're looking for before you crack the book. ObjectPAL is such a big language that no tutorial could cover all its facets. Spend an occasional lunch hour or bus ride just thumbing through The ObjectPAL Reference, and you will assuredly discover useful, timesaving features that you might never learn about otherwise. Do this once while you're learning ObjectPAL, expecting to learn very little, and then several times after you've learned it. It's a synergistic process. The more you learn about ObjectPAL, the more useful these free-form sessions will become and the more they'll help you learn the language. A side note: If you're trying to learn how to program Windows in C, this technique might be the glue you need to hold together the concepts you've been learning.

3. **Quit planning.** The ObjectPAL Developer's Guide quotes the party line of database programming, which is that you should plan an application extensively before starting it. This may make sense in large corporations, although there is ample evidence suggesting this isn't automatically true. It's also the first rule of every database textbook written since the Jurassic Period. Throw that rule out the window if you use Paradox. Object-oriented programming tends to seal off the parts of large programs in such a way that shuffling them around and trying out new ideas is easier than it ever was before with traditional programming techniques. Paradox enforces many good object-oriented techniques, and because of this, I've had a lot more, well, fun letting applications evolve naturally.

The Paradox programming environment is responsive, efficient, flawlessly designed, and a joy to use. Borland's language manuals used to be full of corny jokes and asides about just how fun the products were to use. And they were right! Paradox 1.0 is as cool as Turbo Pascal 1.0 was, but the manuals forget to mention it. Quit planning. Learn the language, but play as you go. The rest will take care of itself. ❐

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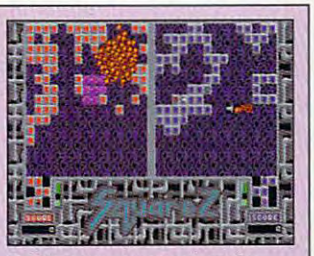

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The programs typically contain messages asking you to send money if you like and use them. If enough users like a particular program enough to send in the recommended payment, the author will recoup his or her investment of time and effort.

Contrary to what some ads imply, the actual value of a shareware product can range from nothing to several thousand dollars. While the price you pay for a disk may be just a couple of dollars, the actual program can be worth much more.

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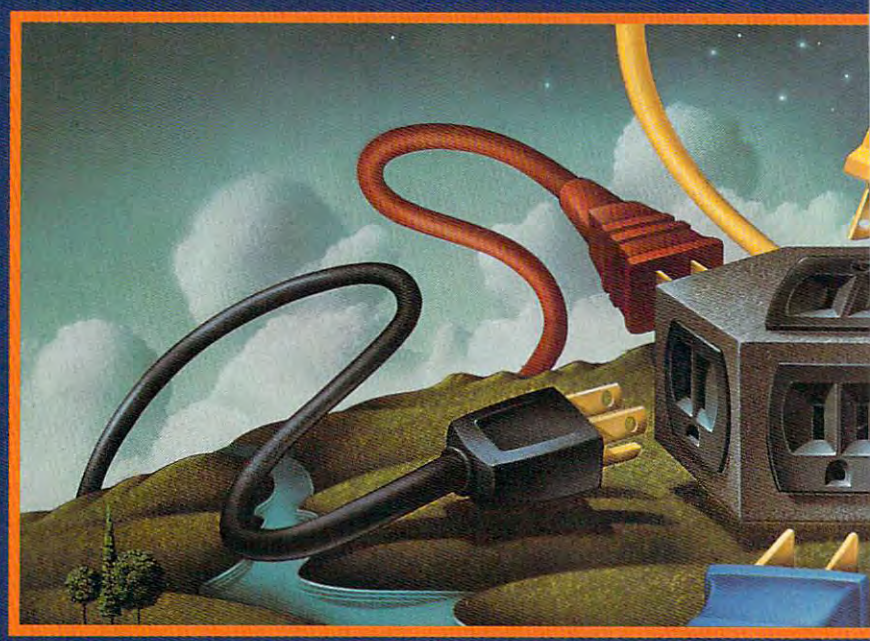
Shareware offers an author an excellent opportunity to be in complete control of the product. The alternative is to sell or license it to a publisher, who may change it or decide it isn't worth the effort to promote it. A shareware author gets all of the profits from his or her program—not a small royalty fee for each copy sold.

Shareware offers the user one of the best ways to determine whether the software has the needed features and power.

Contract

There are many variations on the shareware contract. Some programmers encourage you to try the program for a period of time, after which you're expected to send in a specified amount of money. As with commercial products, there are both reasonably priced and overpriced shareware products. Other programmers ask you to send in whatever amount you feel is reasonable. Still others offer a demonstration version of a program and encourage you to register by sending a more fully featured program when the registration fee is received.



Most shareware is copyrighted, and using the shareware without registering it according to the terms in the contract is technically a violation of copyright laws, although neither the Association of Shareware Professionals nor the Software Publishers Association has prosecuted such a copyright violation, according to Jan Abbott, executive director of the Association of Shareware Professionals, and Ken Wasch, executive director of the Software Publishers Association.

Many users choose to send in shareware payments for programs that they actually use. It's an excellent way to tell the author that you care about the effort that went into writing the program and to encourage future versions. In

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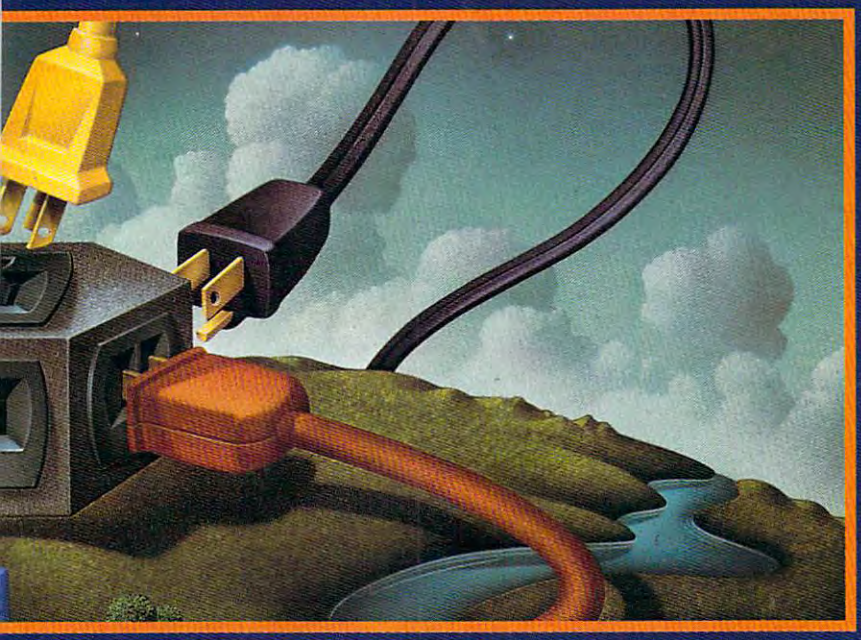
AREWARE

U CAN DO IT WITH SHAREWARE.

addition, most authors will give technical support (if any is available) only to registered users and will notify them about new versions and upgrades when they become available.

A variation on shareware is blackmailware. These programs look like shareware products, but they won't give you full access until you send in the required payment. Obviously, a program that doesn't permit complete access forces you to buy the unlocked copy if you wish to use it. While there are several blackmailware programs, they aren't widely distributed simply because they are so annoying to users. It's almost always easier just to search for another shareware product that doesn't restrict you.

Some restrictive shareware programs purposely destroy themselves after a given period of time unless they've been registered. After you pay the registration fee, you're given either a new version or a password that disables the erase function in your copy.



A variation on the password theme is a program that constantly prompts you to send in your registration payment. When your payment is received, you're given a password that disables the prompt.

Even major software companies get into the shareware act. Many distribute commercial demo programs. A demo program is generally a limited version of the real program—enough for you to see how the program works but not enough for you to use it for any practical application. For example, the program may lock out the capability to save files or print them. Rather than prompting you to send in a registration fee, these programs are intended to whet your appetite for the features and power you glimpse so that you will buy the fully operational commercial version. Technically, these programs are just fancy advertisements, but shareware collections often include them.

Most shareware products are fully operational programs or utilities, and for the most part, they have reasonable registration fees. Some of the best shareware programs have innovative payment methods. For example, some authors ask you to donate money to their favorite charities as a registration fee. Beerware authors request that you make a toast in honor of the programmer if you like the product.

Many shareware contracts include limitations on how the shareware can be used. A program may be limited to noncommercial uses, or there may be limitations on how its data can be distributed. Typically, there is a pricing tier where noncommercial users are asked to send in smaller payments than commercial users. Site licenses are often available as options.

Many businesses require some kind of invoice before they can pay for anything, and most shareware

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programs include invoice-printing functions for businesses' convenience.

Avoiding the Plague

One of the biggest concerns with shareware is how it enters the distribution channel. With a commercial program, you know that all of the disks were written by the manufacturer, probably with the same disk duplication equipment and hopefully with strict quality control. It's unlikely, although not impossible, for a virus to be accidentally distributed with a commercial product.

On the other hand, shareware products often go through many intermediate duplications before they reach the consumer, with no guarantee of antivirus precautions. In addition, most shareware products are distributed as plain, unsealed disks. How can you protect yourself from viruses when you're using software that's passed through so many hands?

Many shareware distributors advertise their products as virus-free, accepting responsibility for the integrity of the media they distribute. Some shareware designed for the retail market comes in fancy packaging (fancy for shareware) with a seal labeled virusproof. Whether or not that seal can prevent a virus from getting into the duplication process is debatable. In any case, you should treat any floppy disk you receive, whether it's shareware, commercial software, or a data disk, as potentially infected. Make it a practice to scan disks with a virus checker.

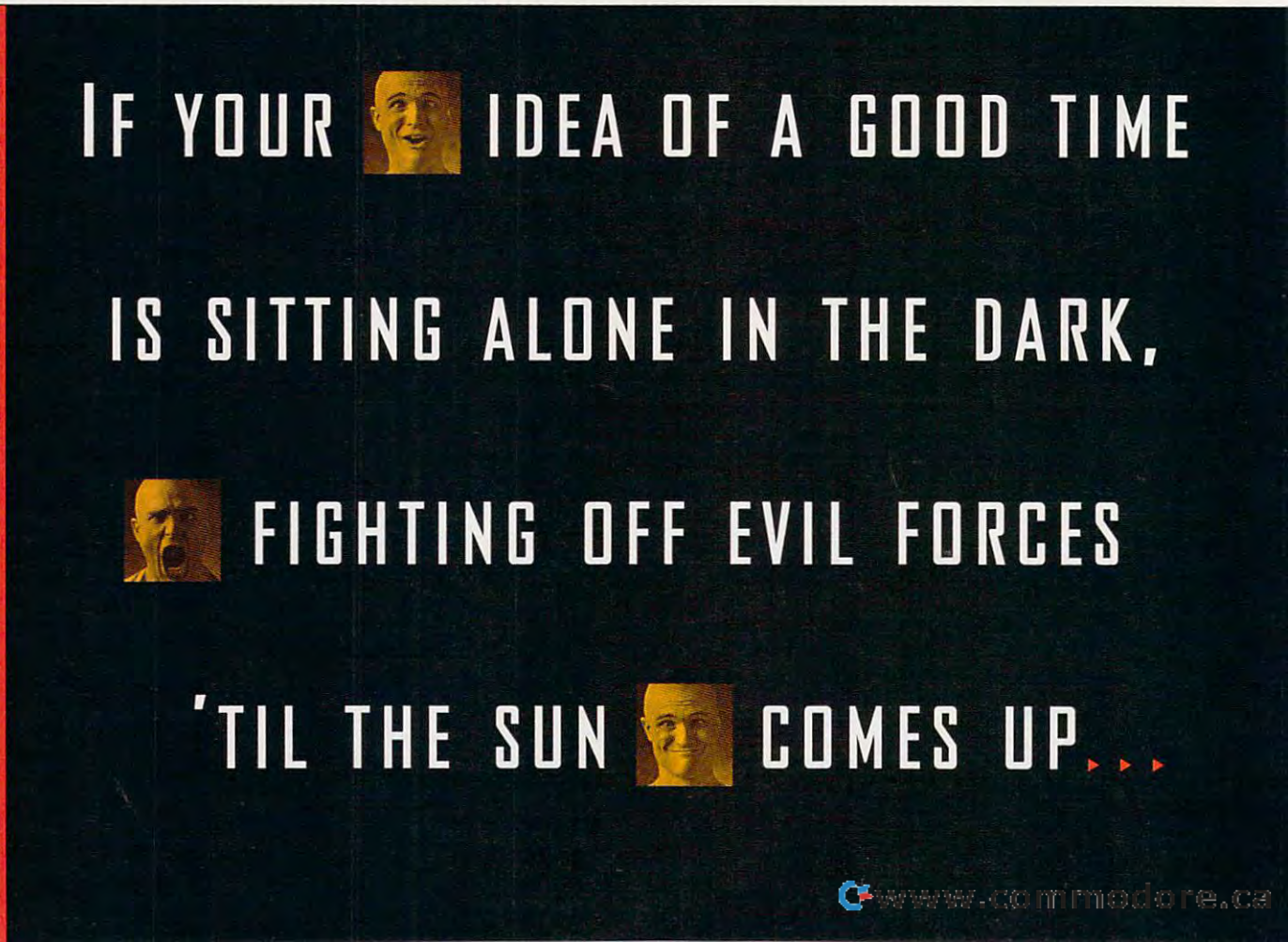
Swimming the Channel

Some companies will charge as much as $5 or $10 per shareware disk; others will charge as little as $1 for the same product. What's the difference? Shareware sold from a retail store oriented toward fancy packaging (for example, most shopping mall software stores) will probably come in a fancy package with a display card. That packaging translates into increased costs passed on to the user. On the opposite end of the price spectrum, the least expensive shareware often comes without guarantees or exchange privileges—even for damaged disks. In any case, there's no credible reason for paying more than $2–$5 per disk for shareware products.

With the proliferation of CD-ROM drives and reduced prices for both drives and media, shareware CD-ROM collections have become popular. A huge collection of shareware programs can be put onto a single CD-ROM and distributed much less expensively than the equivalent stack of floppy disks. It's a good bet that files on a CD-ROM do not have any viruses, but this is not an absolute guarantee. Conceivably, the files on a CD-ROM could have embedded viruses, if the person who assembled the programs wasn't careful. It's also possible that the utilities you use to transfer files from the CD-ROM to your computer—or even your computer's operating system—could have a virus that could affect the programs as you use them.

It's important to note that while you pay for a shareware CD-ROM, you pay for the physical medium, not the programs on it. You are still expected to send in your shareware registration fees. The primary disadvantage of shareware CD-ROMs is that the discs may have dated shareware. Publishers pay a high one-time cost each time a new CD-ROM is mastered, and many companies are reluctant to remaster their collections until they start to lose sales.

Being a read-only medium, CD-ROMs are limited in their usefulness for many applications. Data files (graphic libraries are a good example) can remain on the CD-ROM for loading into memory as required. But many programs must first be transferred from the CD-ROM to your hard



drive before they can be used. Despite the huge capacity of a CD-ROM, many publishers also compress the files on the disc, which means that a decompression utility transfers the files to your hard drive.

Happy Hunting

So what is available in shareware? Everything from truly free programs without any financial obligations up through multithousand-dollar vertical-market products. You can obtain clip art, databases of information, or useful productivity programs.

The primary advantage of shareware is the concept of checking something out before you make your full payment. For the most part, commercial software is sold on the you-break-it-you-bought-it principle—*it* in this case referring to the product's shrink-wrap. As a rule, the only guarantee you have of the product's performance is its advertisements, the company's reputation, and the opinions of friends and reviewers. With shareware you're actually encouraged to test before you invest.

There are many good shareware productivity products. Which product is better is often a matter of personal preference, but there are many programs that are generally considered excellent. Here are some of my favorites. It would be possible to run a business office using only programs from this short list.

Word processing. So far, a shareware product on the level of Microsoft Word or WordPerfect has not appeared, but if you need a functional, friendly DOS word processor for writing letters, short documents, and notes, PC-Write is an excellent, inexpensive shareware choice.

Spreadsheet. The capabilities of shareware spreadsheet programs like PC-Calc, Express-Calc, and Free Calc compare favorably with those of professional programs like VisiCalc and Lotus 1-2-3. The documentation for these shareware products is not on a par with the documentation shipped with the professional products, but if you already know how to use a spreadsheet program, you'll probably be satisfied with their performance.

Database. As a file-card–style database program, PC-File or File-Express performs adequately. If you need a more relational database utility, try 1 on 1 = 3, a workalike clone of dBASE III. Also, keep an eye out for WAMPUM.

Communications. Telecommunications programs are one area where shareware really excels. Procomm is one of the most popular communications programs, even when considering professional products. It's gone professional (Procomm Plus for Windows was a COMPUTE Choice award winner), but version 2.43 is still available in shareware collections.

Other categories where there are excellent shareware productivity programs include graphics, desktop publishing, and utilities.

Until recently, there wasn't much Windows shareware available. Several shareware programming utilities for Windows programmers have made it easier to develop Windows-based applications, and there are now collections of shareware Windows programs.

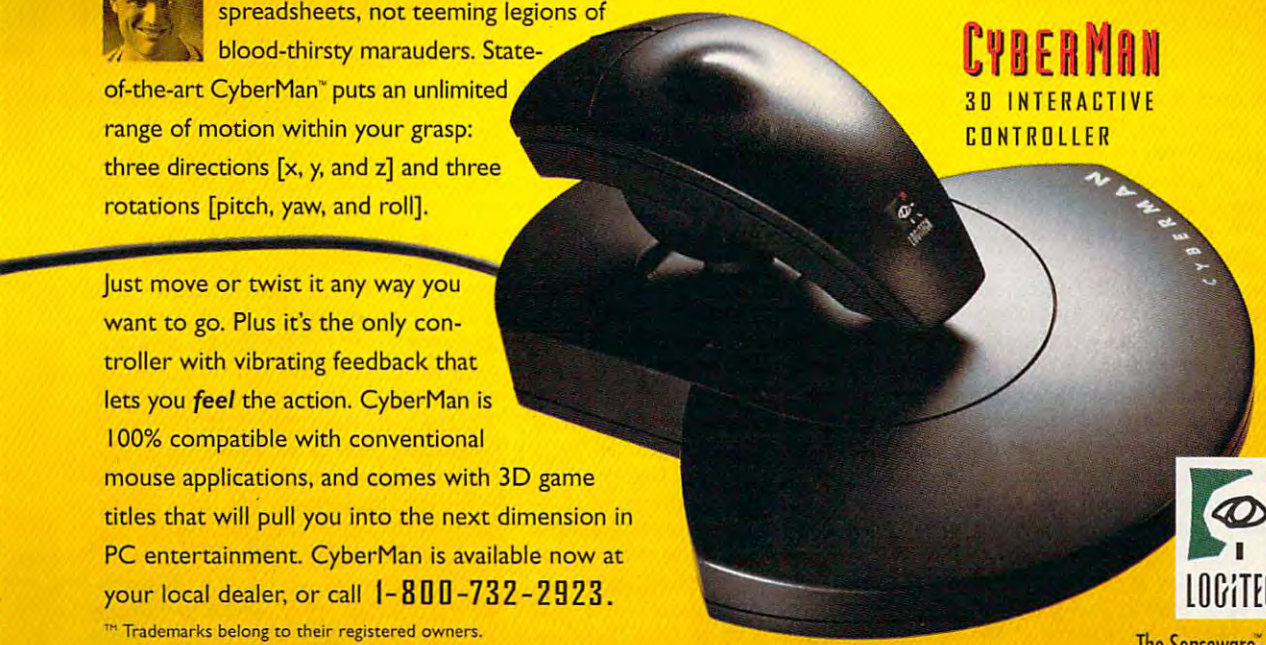
Sharing Is Caring

The biggest shareware question is, If shareware is better than commercialware, why would anybody buy commercial software?

The primary disadvantage of shareware is explained by Sturgeon's Law. Science-fiction author Ted Sturgeon once shocked his colleagues by stating, "Ninety percent of science fiction is crap." He continued, "But so is 90 percent of everything else." Well, shareware probably approaches the 99th percentile. With commercial programs, especially those from a reputable company, you

...YOU NEED PROFESSIONAL HELP.

A mouse and keyboard are fine for tackling spreadsheets, not teeming legions of blood-thirsty marauders. State-of-the-art CyberMan™ puts an unlimited range of motion within your grasp: three directions [x, y, and z] and three rotations [pitch, yaw, and roll].



CYBERMAN
3D INTERACTIVE CONTROLLER

Just move or twist it any way you want to go. Plus it's the only controller with vibrating feedback that lets you ***feel*** the action. CyberMan is 100% compatible with conventional mouse applications, and comes with 3D game titles that will pull you into the next dimension in PC entertainment. CyberMan is available now at your local dealer, or call **1-800-732-2923.**

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Hotware

What's hot in shareware? We called CompuServe to get the titles of the hottest shareware and freeware. Here's the list.

Windows

Here are some of the most popular Windows shareware and freeware packages on CompuServe.

1. Switcher (filename SWITCH.ZIP); 15,943 bytes. This utility lets you quickly switch video modes.

2. Monitor Saver (filename MS20B-.ZIP); 16,700 bytes. This screen saver includes five blanking options.

3. Flipper (filename FLIPPE.ZIP), 6530 bytes. Flipper is a utility that flips the printer orientation from portrait to landscape when you double-click on its icon.

4. Makefont (filename MAKEFO.ZIP); 11,389 bytes. Makefont converts the fonts found in your system ROM into Windows FNT files.

5. Gtoys (filename GTOYS.ZIP); 40,128 bytes. This fractal generator draws Mandelbrot, Julia, and fractal dragon sets.

6. WinTak (filename WINTAK.ZIP); 101,376 bytes. WinTak is a Windows video benchmark that analyzes the performance of your video card. Created by Texas Instruments, it uses the TI 34010 or TI 34020 graphics accelerator as the standard against which your video card is measured. It requires Windows 3.1.

7. POSTNET Bar Code Font (filename POSTAL.ZIP), 7347 bytes. This file is actually a font file that contains TrueType and ATM versions of the bar code used by the U.S. Postal Service. It will print the nine-digit ZIP code or the POSTNET bar code on envelopes.

8. DisplayText (filename DRVTST-.ZIP); 93,249 bytes. This utility tells the user about the display technology in use by Windows. It also can list all of the modules loaded, giving expanded file data about them.

9. DISK SPOOL (filename DS.EXE); 118,151 bytes. This is a print spooler for Windows.

10. WinZip (filename WINZIP.ZIP); 153,964 bytes. This is a shell for all of the most popular archiving products, such as PKZip and LHARC. This does not actually include the archiving products, which must be downloaded or purchased separately.

DOS

Here are some of the most popular DOS shareware and freeware packages on CompuServe.

1. UMBDVR.EXE; 40,389 bytes. This utility uses shadow RAM to provide upper memory and XMS to provide EMS for DOS 5. It loads high.

2. LXEX91.ZIP; 43,975 bytes. It compresses EXE files (typically 30–40 percent) while leaving the files executable. Warning: Screen messages are in French.

3. TSR.COM; 75,277 bytes. This is a library of TSR management utilities including the well-known utilities Mark and Release.

4. FDATE.ZIP; 60,477 bytes. This utility allows you to use date manipulation in batch files. Use it to put the date of your choice into an environment variable.

5. JCScroll (filename JCSCRO.ZIP), 8202 bytes. This TSR screen-scrolling utility lets you scroll the screen backward to see information that has scrolled upward off the screen.

6. VIRX.ZIP; 107,708 bytes. This virus scanner has 1300 virus strings and will identify over 1400 viruses.

7. DIET (filename DIET14.ZIP); 40,925 bytes. This utility compresses executable files and data files. It decompresses and compresses on the fly as a TSR, thus saving disk space.

8. PRINDIR (filename PRINDI.ZIP); 28,328 bytes. This TSR allows redirection of printer output from one LPT or COM port to another port, to a disk file, or to the screen.

9. MEMKIT.ZIP; 140,547 bytes. This creates upper memory from shadow RAM and loads TSRs and device drivers into high memory on 8088s and 80286s.

10. LIST Plus (filename LIST77.EXE); 108,729 bytes. This file browser and viewer includes menuing, selective printing, and a telephone dialer.

can be fairly sure that the product is useful. On the other hand, many shareware collections proudly claim to include every shareware program the distributors could find, actually taking pride in being indiscriminate about what they include.

Generally, you get better support for commercial programs, including better help screens, better manuals, and better telephone support. As a rule, a programmer who can write an excellent program probably can't write a good instruction manual. With a commercial program, the manual, packaging, and other components were probably created by different specialists. The program itself was probably written by a team—each programmer specializing in a particular module. Most shareware programs are individual efforts; the programmer is the manual writer, the tutorial writer, and the technical support department.

Another disadvantage of a single-author effort is bad programming habits. All programmers have them, and they range from simple typos and crude menus to calculation mistakes. With multiple programmers it's less likely that mistakes will get by.

The best shareware eventually becomes commercialware. The author may suddenly realize that a product is popular enough to start a one-product business. A program may be purposely first introduced as shareware to evaluate users' responses: what features they want, which features are confusing, which features cause the program to freeze solid. Or a software publisher may offer to purchase a product. When this happens, the last shareware version often remains on bulletin boards as an advertisement for the commercial product.

Even with the limitations, there are many good shareware products that are certainly worth searching for. But is it worth paying $1 to $5 per disk and sifting through hundreds of shareware programs until you find one you want? Again, Sturgeon's Law applies. It's best to assume that the good products you find will make up for the effort of winnowing the rest. Under the worst circumstances, you can always reformat the disk and partially recoup your loss with a blank disk.

Occasionally, you will find shareware specials. In an effort to reduce stock or use it as a loss leader to get

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TECHNOLOGY UPDATE

900 MHz breakthrough!

New technology launches wireless speaker revolution...

Recoton develops breakthrough technology which transmits stereo sound through walls, ceilings and floors up to 150 feet.

Breakthrough wireless speaker design blankets your home with music.

By Charles Anton

If you had to name just one new product "the most innovative of the year," what would you choose? Well, at the recent *International Consumer Electronics Show*, critics gave Recoton's new wireless stereo speaker system the *Design and Engineering Award* for being the "most innovative and outstanding new product."

Recoton was able to introduce this whole new generation of powerful wireless speakers due to the advent of 900 MHz technology. This newly approved breakthrough enables Recoton's wireless speakers to rival the sound of expensive wired speakers.

Recently approved technology. In June of 1989, the *Federal Communications Commission* allocated a band of radio frequencies stretching from 902 to 928 MHz for wireless, in-home product applications. Recoton, one of the world's leading wireless speaker manufacturers, took advantage of the FCC ruling by creating and introducing a new speaker system that utilizes the recently approved frequency band to transmit clearer, stronger stereo signals throughout your home.

Crisp sound throughout your home. Just imagine being able to listen to your stereo, TV, VCR or CD player in any room of your home without having to run miles of speaker wire. Plus, you'll never have to worry about range because the new 900 MHz technology allows stereo signals to travel over distances of 150 feet or more through walls, ceilings and floors without losing sound quality.

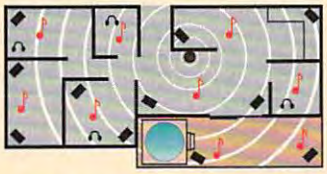
One transmitter, unlimited receivers. The powerful transmitter plugs into a headphone, audio-out or tape-out jack on your stereo or TV component, transmitting music wirelessly to your speakers or headphones. The speakers plug into an outlet. The one transmitter can broadcast to an unlimited number of stereo speakers and headphones. And since each speaker contains its own built in receiver/amplifier, there are no wires running from the stereo to the speakers.

Full dynamic range. The speaker, mounted in a bookshelf-sized acoustically constructed cabinet, provides a two-way bass reflex design for individual bass boost control. Full dynamic range is achieved by the use of a 2" tweeter and 4" woofer. Plus, automatic digital lock-in tuning guarantees optimum reception and eliminates drift. The new technology provides static-free, interference-free sound in virtually any environment. These speakers are also self-amplified; they can't be blown out no matter what your stereo's wattage.

150 foot range through walls!

Recoton gives you the freedom to listen to music wherever you want. Your music is no longer limited to the room your stereo is in. With the wireless headphones you can listen to your TV, stereo or CD player while you move freely between rooms, exercise or do other activities. And unlike infrared headphones, you don't have to be in a line-of-sight with the transmitter, giving you a full 150 foot range.

The headphones and speakers have their own built-in receiver, so no wires are needed between you and your stereo. One transmitter operates an unlimited number of speakers and headphones.



Recoton's transmitter sends music through walls to wireless speakers over a 75,000 square foot area.

Stereo or hi-fi, you decide. These speakers have the option of either stereo or hi-fi sound. You can use two speakers, one set on right channel and the other on left, for full stereo separation. Or, if you just want an extra speaker in another room, set it on mono and listen to both channels on one speaker. Mono combines both left and right channels for hi-fi sound. This option lets you put a pair of speakers in the den and get full stereo separation or put one speaker in the kitchen and get complete hi-fi sound.

These wireless stereo headphones have a built-in receiver.

Factory direct savings. Because of our commitment to quality and our factory direct pricing, we sell more wireless speakers than anyone! For this reason, you can get these speakers far below retail with our 90 day *"Dare to Compare"* money-back guarantee and full manufacturer's warranty. Through this limited time offer, the Recoton transmitter is only $69. It will operate an unlimited number of wireless speakers priced at only $89 and wireless headphones at $59 each. So take advantage of this special offer to fill your home with music. Your order will be processed in 72 hours.

Recoton Transmitter.....**$69** $4 S&H

Wireless products compatible with the Recoton transmitter:

Recoton Wireless Speaker.....**$89** $6 S&H

Recoton Wireless Headphones.....**$59** $4 S&H

Please mention promotional code **161-CU1103.**

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Midlothian, Virginia 23113

AWARD WINNING WIRELESS SPEAKER

Built-in receiver and amplifier:

The wireless speaker and headphones both contain a built-in receiver and amplifier. Signals are picked up and transmitted as far as 150 feet away through walls without the use of wires.

Size: 9"H x 6"W x 5.5"L
Signal-to-noise ratio: 60 dB
Channel Separation: 30 dB
Two-way bass reflex design
10 watts/channel RMS amps
Frequency Response: 50 Hz-15 KHz

Don't take our word for it. Try it yourself. We're so sure you'll love the new award-winning Recoton wireless speaker system that we offer you the **Dare to Compare Speaker Challenge.** Compare Recoton's rich sound quality to that of any $200 wired speaker. If you're not completely convinced that these wireless speakers offer the same outstanding sound quality as wired speakers, simply return them within 90 days for a full "No Questions Asked" refund.

Recoton's Design and Engineering Award

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Shareware Sources

Here is a list of some sources for shareware. Remember that shareware is also available for downloading from online services and bulletin board services.

American Software
P.O. Box 509, Ste. M22
Roseville, MI 48066

The Amish Outlaw
3705 Richmond Ave.
Staten Island, NY 10312
(800) 947-4346

Bright Futures
P.O. Box 1030
E. Windsor, CT 06088
(800) 235-3475

Caloke Industries
P.O. Box 18477
Raytown, MO 64133
(816) 478-6185

Chestnut CD-ROM
222 Third St., Ste. 3212
Cambridge, MA 02142
(617) 864-8326

Christella Enterprise
P.O. Box 82205
Rochester, MI 48307

Compro Software
P.O. Box 4426
Star City, WV 26504
(304) 599-7183

Crosley Software
Box 276
Alburg, VT 05440
(514) 739-9328

Disks O'Plenty
8362 Pines Blvd., Ste. 270
Pembroke Pines, FL 33024
(305) 963-7750

Finto Software
Rte. 2, Box 44
Rosebud, TX 76570
(817) 583-2151

Free Spirit Software
720 Sycamore St.
Columbus, IN 47201
(800) 638-5757
(812) 376-9964

IkeaMo Enterprises
255 W. 300N
Howe, IN 46746
(219) 463-5246

M & M Computing
43 Maple St.
Newburgh, NY 12550
(914) 569-0510

PC Shareware
1763 Garnet Ave.
San Diego, CA 92109
(800) 447-2181
(619) 272-6673

PC SIG
1030 E. Duane Ave., Ste. D
Sunnyvale, CA 94086
(800) 245-6717
(408) 730-9291

Pendragon Software Library
P.O. Box 56
E. Greenwich, RI 02818
(800) 828-3475
(401) 884-6825

The Profit Group
2956 N. Campbell Ave.
Tucson, AZ 85719
(800) 843-7990
(602) 577-9696

Save-On Software
P.O. Box 1312
Wilkes-Barre, PA 18703
(800) 962-6107
(717) 822-9531

Shareware Central
P.O. Box 897
29 Erie St. N
Wheatley, ON
Canada N0P 2P0
(519) 825-7480

SoftShoppe
P.O. Box 247
Artesia, CA 90701
(800) 829-2378
(310) 802-1333

Software Labs
100 Corporate Pointe, Ste. 195
Culver City, CA 90231
(800) 569-7900
(310) 410-3040

Software of the Month Club
5816 Dryden Pl.
Carlsbad, CA 92008
(619) 931-8111

Software Twenty Twenty
P.O. Box 1078
Lorton, VA 22079
(800) 800-3122
(703) 339-0961

Value Software
P.O. Box 4638
Medford, OR 97501

Walnut Creek CD-ROM
1547 Palos Verdes, Ste. 260
Walnut Creek, CA 94596
(800) 786-9907
(510) 674-0783

Windows 900
P.O. Box 85178
Las Vegas, NV 89185
(702) 386-8048

more sales elsewhere, a distributor might charge a dollar or less for each shareware disk, or $20–$30 for a CD-ROM with 500MB of shareware. If you can find shareware at those prices, it's difficult to go wrong.

Strictly Business

In addition to programs, you can find excellent shareware data files. For example, you can get an entire library of prewritten generic business correspondence as text files that you can load into your word processor and edit to suit your needs. You'll find premade spreadsheet and desktop publishing templates, and a museum's worth of clip art.

It's not unlikely that you could start and run a business office using shareware exclusively. At some point you might want to move to commercial software, but there's no less expensive or less risky way to get started.

The high popularity of shareware has forced the software industry to become more competitive. Originally, commercial software publishers looked down on shareware products as amateurish and unsophisticated. But as shareware has proliferated, it has influenced the commercial software industry. Many commercial products have reduced their prices to become more competitive with shareware products, and new releases often include features first introduced in shareware products.

The personal computer industry has its roots in the garage operations of people like Steve Jobs, Steve Wozniak, Paul Allen, and Bill Gates. What are the struggling little garage-style operations of today up to? By the hundreds, they're writing, debugging, and distributing shareware of every description. ❑

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Edward Grabowski's

THE BLUE & THE GRAY™

Authentic historic interludes faithfully recreate the atmosphere of the period!

Watch your armies battle in fast, high-resolution animation

Where will *you* fire the first shot?

Recreate the power and excitement of the Civil War! As the leader of either side in this challenging simulation, you recruit, train and direct your armies around the American countryside. When two armies clash, fight out a Micro Miniatures battle in fast, high-resolution animation! Historically authentic, *The Blue and the Gray* features up to 200 animated figures per battle, naval units and blockades, river and rail transport, breathtaking graphics atmospheric sound and music.

Includes a FREE copy of a specially commissioned book on the Civil War!

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IBM PC VGA Screenshots

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PRODUCTIVITY CHOICE

It's the less publicized features of this upgrade that make it so attractive.

Mark Minasi

MS-DOS 6

MS-DOS 6 is the latest version of Microsoft's best-selling operating system. The DOS 6 features that you probably haven't heard much about are, strangely, the ones that make the upgrade worthwhile. There's a lot to like in DOS 6.

Probably the most useful new feature is MultiConfig. If you have one CONFIG.SYS (and AUTOEXEC.BAT) for your normal work, another one that you use sometimes when you need the most free memory, another that's completely vanilla, and perhaps one other to play Wing Commander II, then you have to have MultiConfig. There are boot manager programs, but they always seemed to give me heartburn when I used them with OS/2 or NT.

In contrast, MultiConfig is a fairly simple program that's built into the operating system. It lets you put a pile of configurations into a single AUTOEXEC.BAT/CONFIG.SYS, and two keystrokes let you choose a specific setup that's right for today. Best of all, it coexists with other operating systems with no muss, fuss, or greasy aftertaste. So I call MultiConfig the best single reason to buy DOS 6.

But that's not all there is to this upgrade. The memory manager is better, although it isn't perfect (yet). The EMM386.EXE/HIMEM.SYS two-part memory manager shipped with DOS 5 is a good basic memory manager. It's particularly well adapted to working with Windows, and it can accomplish about 90 percent of what a full-blown memory manager like QEMM-386 or 386Max can do. DOS 5's memory manager really lacks only two important tools: program placement and program squeezing. On that front, when we look at DOS 6, there's some good news, and there's some bad news.

Program placement makes it possible to say to the memory manager, "Not only do I want to load this program high—into an upper memory block—but I also want to load it to this particular location." DOS 5 can't do this, but DOS 6 can. That's the good news.

But what about program squeezing? Program squeezing is necessary when you're trying to load a program that seems very large when it begins loading but then settles down to a small memory footprint. Such a yo-yo program can cause a memory manager to erroneously refuse to load the program high. What happens is that the memory manager sees the program in its initial huge configuration and reckons that a program that large will be unable to fit into the upper memory area. As a consequence, the memory manager loads the program into low memory.

A squeeze feature allows you to inform your memory manager that a program is a yo-yo. Duly informed, the memory manager will exercise a little patience and load the program high on the basis of its final load size, not on its overstated initial load size. Other memory managers have this capability, but—here's the bad news—DOS 6 doesn't. Maybe next time?

Next on the list of new features is Interlnk. If you travel, you'll appreciate Interlnk. I travel all the time, so there are few weekdays that I'm writing with my desktop machines. Sunday through Thursday nights, I bang out PC prose on my notebook. And when I return home, I want to easily move the fruits of my labors to one of my desktop machines. But shuffling floppies around is a pain. I've tried LapLink—all the pundits say that it's the best—but I find its menus confusing. DOS 6's serial/parallel file transfer program, Interlnk, is exactly what I've been looking for.

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InterInk lets me connect two machines parallel port to parallel port and load a device driver. Then one of the machines acts like a LAN server. I had an extra parallel port, so I installed it in my desktop machine as LPT2 and put a parallel transfer cable on it. Now, when I come home, I just plug the other end of the cable into the parallel port on my notebook computer, run InterInk (I don't even have to mess with CONFIG.SYS—I have MultiConfig set to offer an InterInk optional setup), and voilà! My notebook computer now has a new drive, E. Drive E is, of course, really drive C on my desktop machine. An Xcopy command or two, and my data's transferred.

I find the new DOS online help to be of great value when I'm editing a CONFIG.SYS file. (What were those InterInk parameters, anyway?) And while I've always had virus scanner programs around, DOS's built-in virus scanner is OK. That means that carrying DOS disks around with me will serve the virus-scanning function, allowing me to carry fewer disks.

Up through DOS 5, batch files could talk, but they couldn't listen. However, that's no longer true. There's a new batch command called CHOICE, which allows your batch files to prompt for single-character answers. Furthermore, the CHOICE command can be used in a timer role. You can use CHOICE as a kind of poor man's time activator.

Undeletion capabilities appeared in DOS 5, but DOS 6 takes undeletion a step further in reliability with a feature called Delete Sentry. Once activated, Delete Sentry prevents DOS from actually erasing files when you issue a Del or Erase command. Instead, DOS moves the files to a hidden directory. It holds them there for a while (you can define *a while* however you like), which gives you a chance to change your mind and restore the files later.

DOS 6's new features bring with them some opportunities for trouble, as is the case with all new pieces of software. In particular, you may want to be careful about installing DoubleSpace, the new disk compression routine. If you do plan to use DoubleSpace, try doing a few things to minimize the chance that you'll stumble on the path to more disk space. First, prepare your disk before installing DoubleSpace (it isn't installed automatically; you install DOS 6 and type *dblspace* when you're ready to start using this feature).

DoubleSpace has a hard job, so it's a good idea to make the job as easy as possible for it. Clean your disk by getting rid of any extra disk files; get rid of anything that you haven't used in a while. Then defragment your disk with the new Defrag command. Finally, do not compress the entirety of your C drive; instead, let DoubleSpace create a new drive out of the empty space on your C drive. If you find it necessary, remove some things from C, create a new drive from the empty space, and then restore the files to the new drive. Be aware that the new SMARTDrive requires that you reboot your system by executing a Ctrl-Alt-Delete keystroke combination—don't use your reset switch! Keep that in mind, and you'll be able to get up and running with more disk space in short order.

DOS 6's MemMaker will organize your memory manager to give you more memory, and you will probably want to run it soon after installing DOS 6. But heed one word of advice: Don't run Express Set-up. Run Custom Setup instead; you'll eventually see the question *Search upper memory aggressively?* Respond by answering no; then let 'er rip! You may find yourself with more RAM than ever before. (All of a sudden, running Wing Commander with the sound effects becomes possible.)

DOS 6 is a good buy; it's an even better buy if you take a close look at some of its less publicized features. If you didn't go for this upgrade when it was offered at a special introductory price, don't feel too bad. At least you can still get it—and the new utilities bundled with it definitely justify the cost. ❐

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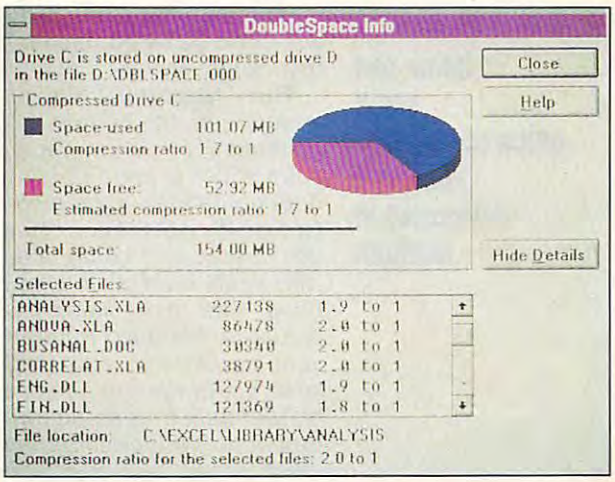

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PERSONAL PRODUCTIVITY

Rosalind B. Resnick

COMDEX HIGHLIGHTS

Home and small office productivity boosters showcased at COMDEX

For computer professionals worldwide, COMDEX offers a dazzling array of high-tech gadgetry. But COMDEX also features plenty for the home office user, and this spring's show in Atlanta was no exception. Stashed among the splashy displays of high-end products were lots of offerings capable of boosting productivity without busting your bank account.

Here are several new hardware and software releases that caught my eye:

The Microsoft Mouse. Reengineered to be more ergonomically correct, Microsoft's mitten-shaped pointing device won't make you reach for the Motrin at the end of the day. Capable of being used with equal comfort in either hand, the new, improved mouse is designed to boost your speed and efficiency when you're working with one of Microsoft's better-known products, Windows. Mouse mashers will also enjoy the snazzy, new software driver that minimizes mouse movement on the screen with features like Snap To, which automatically snaps the cursor to the default button in Windows' dialog boxes, and Locate, which returns the cursor to the center of the screen if you momentarily lose it. The serial and mouse port versions cost $109.00 each; the driver alone sells for $19.95.

PackRat 5.0. Polaris Software's award-winning personal information manager for Windows has been totally revamped, so you can spend less time figuring out how to use it and more time putting it to work. New features include customizable folders, forms, and lists; electronic mail capability; full integration with other Windows applications; macro scripts and a programming language; and SmartStart customized workspaces for lawyers, managers, and other professionals. The upgrade costs $99; the stand-alone version had not been released in stores at press time.

HP 100LX. The latest version of Hewlett-Packard's popular palmtop PC is a savvier road warrior than the original (the HP 95LX). The HP 100LX features built-in Lotus cc:Mail Remote, data communications, and PC-software compatibility for number-crunchers on the go. It still comes in a trim black case and weighs in at 11 ounces, but the guts of the machine have been totally redesigned. It has everything from the faster CPU to the higher-resolution screen to the interactive serial port. All this for only $749 (list price).

PagePlus 2.0 for Windows. This full-featured page layout program by Serif provides a low-cost alternative to such desktop publishing heavyweights as QuarkXPress and Aldus PageMaker. PagePlus, which retails for $59.95, offers style sheets, floating palettes, rotation of text and objects, kerning, tracking, text filters for a variety of Windows word processors, PANTONE color selection, spot and process color separations, and support for Object Linking and Embedding (OLE). Serif also offers low-cost add-on packages such as TypePlus ($19.95), which lets you manipulate text, and FontPack One ($19.95), which offers 100 TrueType fonts.

TravelMate 4000E WinDX2/50. If you have some extra money burning a hole in your pocket, consider Texas Instruments' hot new 486 color notebook ($4,999), which gives you all the power of a desktop PC in a slim 6.2-pound case. The newest TravelMate features a brilliant 640 × 480 VGA display, a high-speed video system for lightning-fast graphics, advanced BatteryPro power management for longer battery life, and a full-travel keyboard with 12 separate function keys plus dedicated Page Up, Page Down, Home, and End keys.

Stacker Special Edition. Unwilling to let DOS 6's new DoubleSpace data compression utility go unchallenged, Stac Electronics rolled out Stacker Special Edition ($49.95) at the show, trumpeting it as a low-cost solution for computer users leery of trusting their valuable data to a first-generation product. The new Stacker, designed only for PCs with DOS 6 already installed, replaces DoubleSpace with Stacker files and adds such features as Stackometer, which lets you monitor your hard drive's data compression ratio, and Stacker Tuner, which lets you balance speed and space. Stacker Special Edition also lets you use powerful DOS commands like Dir, Chkdsk, and Defrag on your Stacker drives.

QmodemPro 1.5 and Qmodem for Windows. Mustang Software's latest releases let you send and receive electronic mail using one integrated program regardless of the originating E-mail source. Version 1.5's new Remote Imaging Protocol (RIP) emulation allows callers to view full-screen graphics and use a mouse when connected to an online bulletin board system with RIP support. The Windows version lets you view GIF images during transfer (with magnify mode for closeups); it also supports DDE and drag-and-drop capabilities for file selection and message text.

With productivity boosters like these, you won't need to spend like a power user to get your office up to speed. ❐

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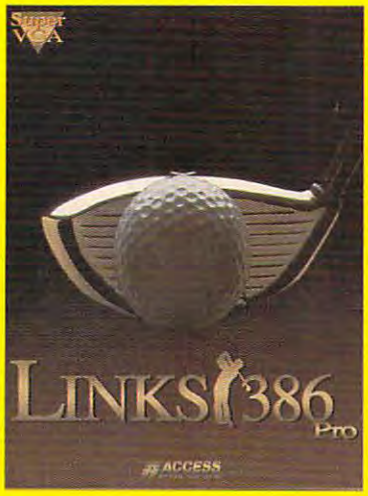

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MULTIMEDIA PC

David English

COMPUTER, STATUS REPORT

Many of us talk to our computers. Now our computers are learning to listen.

When you hear Captain Picard casually call up the ship's computer on "Star Trek: The Next Generation," do you ever wonder when you'll be able to control your own computer by voice? We're a long way from having intelligent computers, but simple voice recognition software (also called speech recognition software) has finally arrived. By the time you read this, many of the popular sound cards will be shipping with some form of voice control software. In this column, I'll discuss how well this software works, what's available, and who might want to use this futuristic technology.

A number of factors determine how accurate a voice recognition program will be. These include how well the software is designed, your consistency in pronouncing the words, the number of commands that are active (especially similar-sounding words), the quality of your microphone and sound card, and the level of background noise.

Most voice programs are speaker-dependent, which means they work best when you train them to your own voice, repeating each command three or four times during an initial training session. Most programs let you save multiple command sets so that more than one person can use the program.

With a good 8- or 16-bit sound card, decent microphone, relatively quiet environment, and careful training, most of these programs are between 80 and 95 percent accurate. That means they'll only occasionally confuse one command with another or require you to repeat a command a second or third time.

How does a voice program work? Most programs record your voice command and compare it to a database of trained commands using a pattern-matching algorithm. The program calculates a score that represents how close your voice command is to each trained command and chooses the trained command with the closest score. If the score is within the acceptable limits, the program initiates the macro that's associated with the trained command. If the score is outside the acceptable limits, the program alerts the user that it didn't understand the command. The entire process takes place almost instantly.

The first major sound card to ship with voice software was Microsoft's Windows Sound System. Its software, called Voice Pilot, includes command templates for many Windows applications. It also lets you add your own commands. Media Vision's software, called ExecuVoice, is nearly identical to Microsoft's Voice Pilot because Dragon Systems wrote both programs. Media Vision uses a newer version of the Dragon engine, but it doesn't include the ability to add additional commands (though you can launch any new application). Both ExecuVoice and a button-style microphone are included with the new Pro Audio Studio 16 sound card and in an upgrade kit for the Pro AudioSpectrum 16. Dragon also offers two voice programs through IBM. They're called IBM VoiceType Control for Windows ($129, with microphone) and IBM VoiceType 2 ($2,195, with a vocabulary base of 7000 words).

The voice software that Creative Labs is bundling with its sound cards was developed by Voice Processing of Cambridge, Massachusetts. It's called VoiceAssist, it supports as many as 1024 commands per application (256 active at a time), and it adds a built-in macro program. VoiceAssist is shipping with all Sound Blaster 16 sound cards. Creative Labs offers an upgrade path for current Sound Blaster 16 owners.

Covox has been making voice recognition products for many years. In addition to its own sound boards with voice support, Covox offers a program, called Voice Blaster ($119.95), for Sound Blaster–compatible sound cards. It includes both DOS and Windows interfaces, support for Windows OLE, and a headset with a microphone and earphone. Digital Soup plans to release a basic voice program called Rover ($129, with an introductory price of $49) that translates voice commands into keyboard commands. And Sierra Semiconductor is providing a number of sound card manufacturers with its new hardware-based Aria Listener technology. Some of these boards are shipping with a Star Trek game from Interplay that can be voice controlled.

Who would want to use voice recognition technology? It's most appropriate for handicapped individuals, though a less-than-perfect recognition rate could cause the computer to hang occasionally. It's also appropriate for special work situations, where an employee must use his or her hands doing something else, as on a factory assembly line. For the rest of us, voice programs provide a great way to impress our friends and relatives, though I suspect few of us will use voice control every day.

Perhaps in five years or so, when the technology is perfected, you'll be able to walk down an office hall and hear people say, "Print page three" or "Send memo to George Smith." We may also have to contend with the disgruntled employee who yells, "Reformat hard drive!" as he's escorted out the front door. ❐

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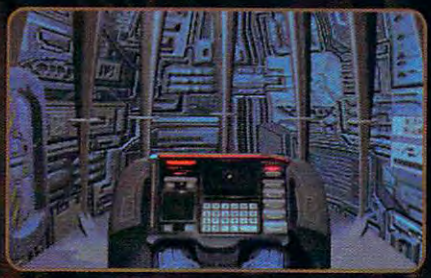

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ART WORKS

Robert Bixby

FORCE MAJEURE

First, it was DOS 6; then, Windows NT. Rarely have so many exciting major programs been released in new versions at once. Summer seems to be the season for productivity software, probably because long magazine lead times make it important that editors become familiar with the programs in time for the end-of-year awards issues. But perhaps I'm just being cynical. Maybe it's just a coincidence that spring, traditionally the mating season, has become the beta season and that everyone seems to be pushing software out the door by the end of June.

WordPerfect 6.0 for DOS is the first WordPerfect that's as friendly to first-time users as it is to power users.

In this spirit, WordPerfect has brought out the first WordPerfect word processor I can unhesitatingly recommend to a beginner.

WordPerfect 6.0 for DOS is a work of art. It has all the power of earlier versions and a friendly almost-standard interface that is not a nightmare to learn. Throw away your cheat sheets and function key stencils. All you need to operate WordPerfect 6.0 is a mouse and a passing understanding of the functioning of a word processor.

Want to send a WordPerfect document as a fax? No problem. WordPerfect has bundled a fax module to make that simple. Want to spell-check, style-check, or look something up in the thesaurus? You're two mouse clicks away from any tool. And the macro language (finally) is simplicity itself. Forget all those tildes (no one could ever figure out how many to use or where they should go). WordPerfect 6.0 has a macro language very similar to that of WordPerfect 5.1 for Windows—a macro language that looks like a language rather than a keypress script.

Is there room in the market for an innovative, easy-to-use DOS word processor? Don't ask Borland. Don't ask WordStar International. But neither of these companies is WordPerfect, which seems to have a lock on DOS word processing. If anyone can pull it off, WordPerfect can. It has the clout, and now it has a product that will appeal to the whole DOS market (and with its new, optional graphical interface, some of the Windows market as well).

Speaking of new releases, WordPerfect's release was accompanied by Microsoft's release of Word 6.0 for DOS. Unfortunately, I haven't had the opportunity to see this product yet. I hope to obtain a review copy soon.

Obviously, Corel is intent on pulling light years ahead of its competition. It couldn't resist the temptation to amaze us again with a new CorelDRAW!.

CorelDRAW! 4.0 doesn't represent a massive overhaul of last year's 3.0 version, but throughout the program you can find important improvements over last year's COMPUTE Choice award winner.

A more intuitive organization of commands, multiple pages, and a new fill feature are among the most exciting parts of CorelDRAW! itself. Each of its companion programs has also gone through an evolutionary change—adding and reorganizing in a general housekeeping effort.

One completely new feature in the package is CorelMOVE!, an AddImpact-like animation product that makes creating animated panels for your CorelSHOW! presentations much simpler.

CorelDRAW! added layers to its 3.0 release. For the 4.0 release it also added pages, which allow you to create a publication up to 999 pages long. This makes CorelDRAW! the most graphically intensive desktop publishing package ever. And it's clear from the way Corel implemented pages that this was its intention. The Page Setup dialog box allows you to select from several common desktop publishing options, including a saddle-stitched or bound book. Since CorelDRAW! already boasted a spelling checker and thesaurus, it might be all the word processor many people need. (Thank you, Corel, for quoting me in your annual report. The name is *Robert,* not *Bill,* but I'll answer to either.)

Now that the last rose has faded and we've sweltered our way through August, I'm left with one nagging question: Where was Ami Pro? It hardly seemed like summer without a new word processor from Lotus.

Have a DTP tip you'd like to share? Let me know about it by calling (900) 884-8681, extension 7010203 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Art Works" in care of this magazine. And if you don't have a tip, please let me know what you're publishing, what software you're using, and how "Art Works" can help. ❐

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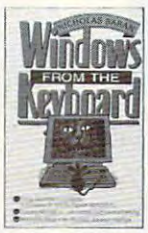

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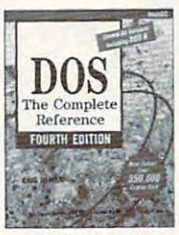

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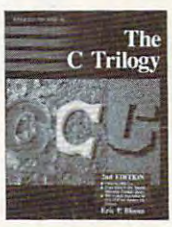

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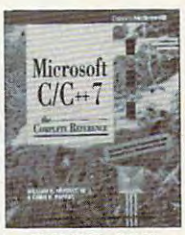

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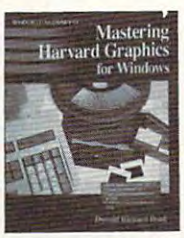

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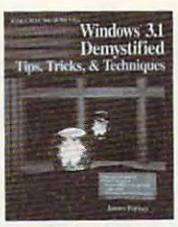

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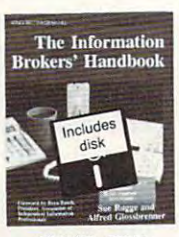

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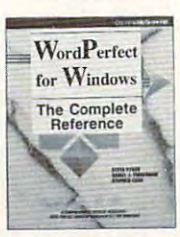

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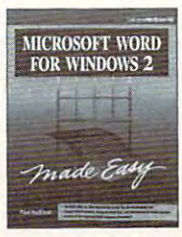

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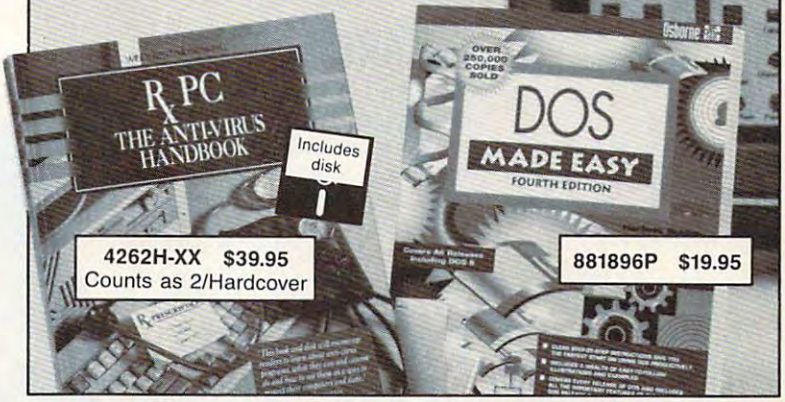

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DISCOVERY CHOICE

Research has never been as easy or entertaining as it is with this comprehensive multimedia encyclopedia, complete with animation and sound.

Stephen Levy

ENCARTA

It's Sunday evening, about 9:00, and your 12-year-old daughter is reading quietly in the family room. Suddenly, a horrified look overtakes her face. "The report!" she cries out. "It's due tomorrow!"

If you have a good reference library in your home, then you have no problem. Most of us, though, don't have the space for a comprehensive library. But we do have room for Encarta, the much-anticipated multimedia encyclopedia from Microsoft. And with access to its more than 25,000 articles, 7000 photographs, seven hours of sound, 800 maps, and nearly 100 animated sequences, your daughter just might get that report written.

Developed from the ground up as a multimedia computer encyclopedia, Encarta is much more than *Funk and Wagnalls New Encyclopedia,* on which it is based. Indeed, Microsoft has incorporated an abundance of copyrighted material that it licensed from numerous sources to create both an excellent research tool and entertaining software.

Encarta has three main parts: an encyclopedia, an atlas, and a time line. The latter two draw on the information in the encyclopedia. Microsoft has also included the game MindMaze.

And it's an intuitive, easy-to-use Windows application to boot. Want to learn about Abraham Lincoln's ability as a military leader? Easy. Simply click on the Contents button and type *lincoln;* then click on Lincoln, Abraham. In a few seconds the appropriate article appears onscreen. This task is analogous to looking up an article in a standard encyclopedia, complete with pictures and headlines that help you find the exact information you want. This similarity ensures that most users will have little trouble learning to use Encarta.

Encarta's basic textual information is just what you would expect from a standard desktop encyclopedia: a survey of thousands of topics with varying levels of detail. It's a great place to quickly learn about a topic or to begin a research paper.

In addition to its simple Contents-button method of locating information, Encarta has a fast and efficient Find command. You simply type in the topic, concept, or words you want to explore, and Encarta gives you a list of articles that include the words you've typed. The program also allows more precise search requests: birds *and* food, birds *or* food, and similar options.

Even as a standard encyclopedia, Encarta offers more than its printed bound cousins. And it's much more than a standard encyclopedia with great search capabilities; it's a multimedia reference guide with animation, pictures, sound, and more.

The program's information database is organized conceptually. All information falls into nine general categories, from Physical Science and Technology to Sports, Games, Hobbies, and Pets. Each of these broad conceptual groups is divided into as many as 15 specific areas, which again are broken down into scores of topics.

Once you've found a topic that interests you, Encarta takes you to the appropriate article. When reviewing the article, you'll immediately notice the small icons that appear within it. These icons indicate a related picture (which shows on the screen automatically as you scroll through the article), sound, animation, map, chart, or table. Each of these is well done, but the

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ones I find most impressive are the animation and sound. This is where it is obvious that Encarta was designed for the situation instead of being simply an electronic version of the printed page.

Animation is used as a tool to help comprehension; it takes the printed word one step further to aid in understanding. With nearly 100 animated sequences in the program, it was impossible for me to watch each one. By way of illustration, I'll describe just one sequence. It shows, through animated pictures, diagrams, and audio, exactly how a television camera converts an image from the real-life object into the image you see broadcast on your screen. This is something that could not possibly be accomplished as clearly and efficiently with printed words and stagnant pictures.

Sound, including music, is also important to the Encarta experience. For instance, selecting Language Sample under the Gallery Special List group lets you hear a variety of expressions and words in dozens of different languages. Or you can hear an assortment of folk music from around the world. These are just two of many examples of how Encarta can entertain and provide a true multimedia experience without losing sight of its goal as a vast storehouse of information.

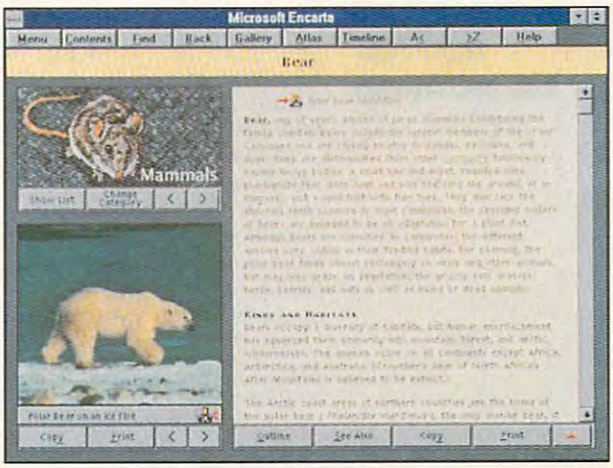
The "hot links" feature is another that shows Encarta's strengths. As you read an article, you'll notice immediately that some words are printed in another color and are underlined. These words are hot links to other articles. Click on one, and in a few seconds you'll be transferred to the related article. You can continue to do this and explore articles in any direction and depth you want. And when you want to go back to where you've been, simply select Topic Tracker from the menu; you'll see a list of the topics for your entire session. In this list, you just click on the topic you want to return to, and there you'll be.

To assist the student who is using Encarta as a research tool, Microsoft has included several conveniences such as a dictionary and thesaurus, as well as access to Write (Windows' word processor). In addition, it's easy to print pictures, entire articles, or portions of articles. Pasting text and pictures into Write is accomplished in the same way as in any other Windows application.

Although the encyclopedia is the heart of Encarta, the program does include two other important parts, an atlas and a time line. Selecting Timeline from the main window converts the computer monitor into a 20-foot scrolling historical time line from 15 million B.C. to the present. Using the arrows, you can scroll through time as pictures and a list of historical events move by. Click on any picture or event, and a short text box appears, giving more detail. To Microsoft's credit, this time line is a true world historical time line; it doesn't concentrate on just Western events. Although well done and interesting to explore, it, like any other time line, is limited in its value.

The third part of Encarta is the atlas. Use the pointer to move the globe to the desired world location, or click on Place Finder to locate any area of the world. The map is filled with hot spots where the arrow pointer turns into a pointing finger. Click on any hot-spot country, sea, or continent, and the atlas zooms in to give you a closer look. Click on the name of a city or on the currently highlighted country, and you can learn more about that place.

Although Encarta is an excellent implementation of multimedia and a useful educational tool, some will say that the articles lack the depth and content of other encyclopedias. A more objective concern is one that's common to most CD-ROM software: speed. You'll have to wait several seconds before Encarta retrieves information from the CD-ROM. The speed, of course, depends a lot on the access time of your CD-ROM drive and microprocessor. But on balance, Microsoft's implementation of this multimedia encyclopedia is well done with lots added to the original base encyclopedia. Encarta is well worth its price, and who knows? It might come in handy late one Sunday evening. ❐



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GAME INSIDER

Shay Addams

POWER SIMULATIONS

The reunion of the Zork team, more adventures and sims, Peter Pan, and Vietnam

Basketball fans—who have probably been playing a lot of Electronic Arts' Michael Jordan in Flight lately—may want to pick up the latest sports sim, David Robinson: NBA Action. A center for the San Antonio Spurs, Robinson worked with Park Place Productions (which did a similar Sega game) to create what is apparently the only basketball simulation with all 27 NBA teams.

The designers digitized videotapes of Robinson in action on the court, enhancing the game with a full complement of the moves that made him famous. Other features of the game, being marketed by Spectrum HoloByte, include league and season options and instant replay.

Mystery fans will prefer the latest Sierra adventure, which stars an all-new character—Gabriel Knight. Instead of using a traditional horror theme, Sierra aimed at creating suspense in the style of Hitchcock in this animated adventure. Knight is from a family of shadow hunters whose destiny is to fight the forces of evil—and what better place for hunting shadows than the French Quarter in contemporary New Orleans? The game was designed by Jane Jensen, who worked with Roberta Williams on King's Quest VI.

Electronic Arts has some incongruous titles due by September: Seal Team and Peter Pan. The former is a Vietnam-era war game that, in addition to the conventional aerial-view maps of the battle area and units, incorporates the kind of 3-D graphics usually seen in flight simulators. So, you'll encounter enemy soldiers face to face in a rice paddy, rather than just view them as icons on a map—a fresh perspective on war gaming that should make Seal Team attractive to a wider audience than just hard-core strategy gamers.

Peter Pan is the latest in the EA Kids line of children's games. You can alter the story by using tools, such as a paintbrush or spray can, to save Peter from a bear by turning it into a bunny.

Running a bit behind schedule, Maxis says its SimFarm, originally set for midsummer, should be on the shelves by the time you read this. Sam & Max Hit the Road is on the way from LucasArts. Even though it is based on a comic book about a team of freelance police detectives who happen to be a dog and a bunny, this graphic adventure will appeal more to adults than kids.

Ecological overtones surface in Sir-Tech's upcoming Jagged Alliance. Your goal in this strategic role-management game is to protect a species of tree from destruction by the villains. You direct up to eight characters on a remote island in the south Atlantic. Activities range from managing the harvest of the trees' valuable serum (used to fight a children's disease) to hiring mercenaries whom you control in combat. Look for it by October.

A couple of side trips this month led me to the Computer Game Developers Conference (CGDC) in Silicon Valley and to Westwood Studios in Las Vegas. The hottest round table at CGDC was the one on vehicle simulations. Novalogic's dramatic ride to the top with Comanche: Maximum Overkill has convinced many fledgling designers that simulations are the fast track to overnight success.

One hot topic at the show was the recent acquisition of ICOM Simulations (which did Deja Vu and Uninvited) by Viacom International. A few days after the show, another major deal emerged when Sierra announced that its TSN gaming network and communications giant AT&T would work together in TSN-related projects. AT&T would pick up some of TSN's stock, while providing capital as well as other resources.

The most interesting thing about the show, however, was a spontaneous reunion of the original Infocom staff, including ZorkMaster Marc Blank, who vanished from the adventure game scene after Activision bought Infocom several years ago. Brian Moriarty, who was also with Infocom in the golden age of adventure games, revealed that he's doing his first adventure since his highly acclaimed Loom appeared three years ago. The Dig, set for this fall, involves a space shuttle crew swept away to a distant world. (LucasArts says a "very famous film director/producer" is collaborating with Moriarty on The Dig.)

In Vegas, Westwood Studios was showing Lands of Lore and Legend of Kyrandia II, both set for the Christmas season. Lands of Lore is the first role-playing game Westwood has done under its own label (Westwood also designed major hits such as SSI's Eye of the Beholder). The game uses inventive storytelling sequences to round out the panoply of role-playing activities. Kyrandia II is a dazzling sequel starring Zanthia, a female character who played a role in the first game. It should be out by November.

Despite previous announcements of mission disks and sequels, Westwood has elected not to do either for Dune 2. Instead, it is developing an all-new tactical game called Command and Conquer that will be out early next year. ❐

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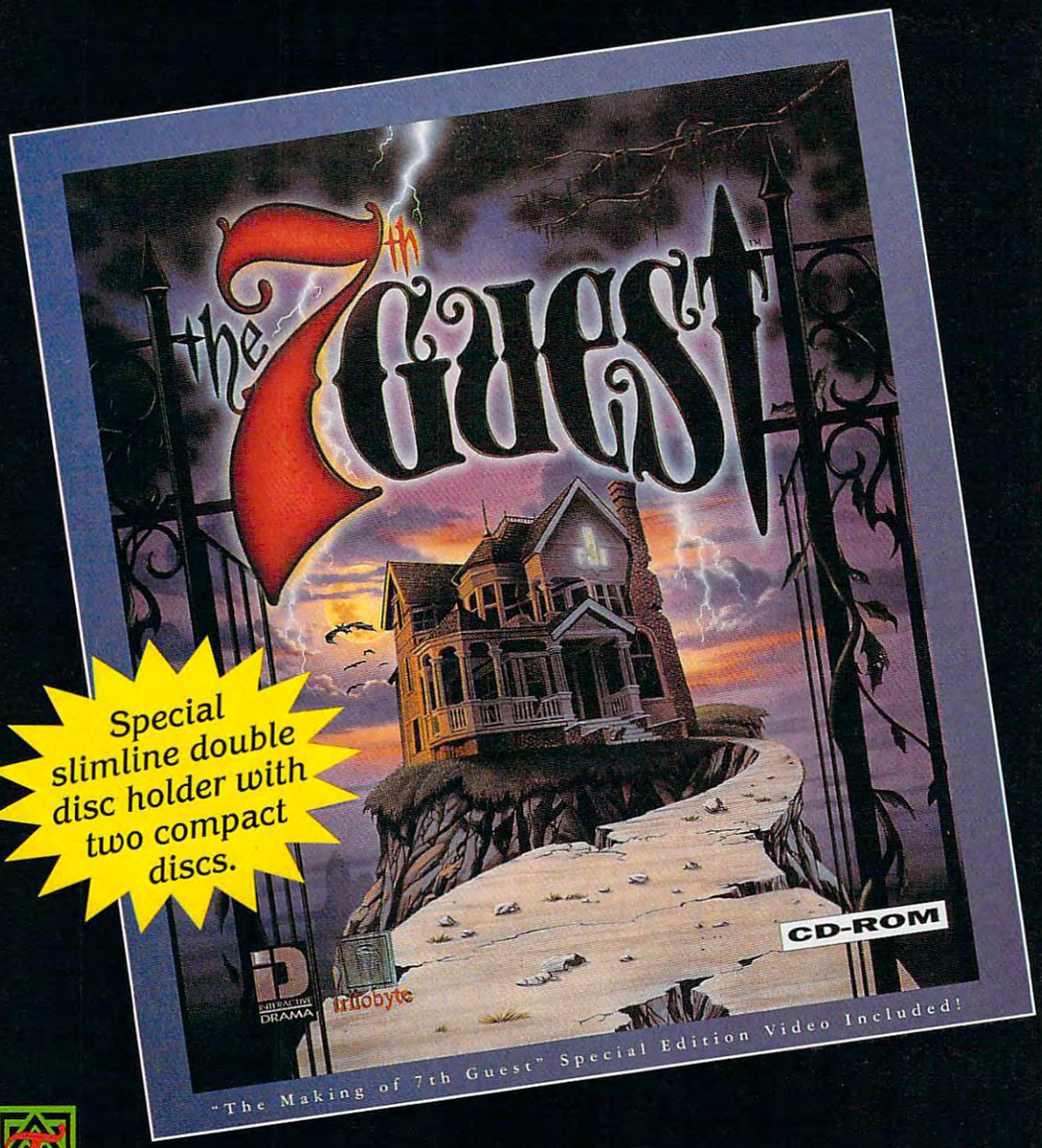

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ENTERTAINMENT CHOICE

The only thing better than playing this incredibly realistic football simulation is putting on a uniform and playing the real thing.

Scott A. May

FRONT PAGE SPORTS: FOOTBALL

In a blitz of cutting-edge technology, Dynamix's Front Page Sports: Football blindsides the competition and knocks them out cold. We're not talking about a playful beating here, but a crushing blow—one so powerful that it renders almost every gridiron game before it instantly obsolete. Sporting a game plan that bursts with realistic action, in-depth strategy, and statistical detail, this is a pigskin lover's dream come true.

It's hard to believe that something this good represents Dynamix's first foray into sports simulation. After only a cursory tour of the game, you'll notice the same commitment to excellence that's marked such previous bestsellers as Red Baron and Aces of the Pacific. The design turned out so well that Dynamix has slated an entire series of Front Page Sports titles.

The game divides itself into three separate, but directly connected, sections: on-field action, coaching playbook, and team management. You can compete against the computer or head to head against another player. You can choose exhibition, single season, or career league play. The game boasts full 47-man teams, complete with injured reserve, free agent pools, drafting, training camp, and trading. Seasons can be designed in one of five league sizes divided into one or two conferences with up to three divisions each. Seasons culminate with divisional championships, postseason playoffs, and a final Super Bowl–style showdown.

Almost every detail of a team's franchise can be customized by the owner: team name, nickname, head coach, jersey colors, stadium type (domed or outdoor), and nearest city. The last two options also have a direct influence on weather conditions, temperature, humidity, and precipitation, which in turn affect field conditions and player performance.

Statistical jocks will love the game's exhaustive number crunching. More than 300 stat categories are automatically compiled, updated, and displayed onscreen or printed. Detailed box scores are available during and after games, as well as match-ups from the previous week. League leader stats compare all teams and players in the league in a wide range of categories.

Players are rated from 0 to 99 in eight performance classifications. Team and player editors are available as shareware on many electronic information services, and you can find unofficial, user-created files for the 1992 NFL season.

In career leagues, the program maintains a sharp distinction between potential and actual ratings, affected by such factors as training, injuries, and aging. This attention to subtle cause and effect not only increases the realism but also deepens the game's considerable role-playing aspects. As general manager, you attempt to handpick the best players. As coach, you're responsible for working with each player to bring out everyone's best abilities. On the field, your players are compelled to excel both individually and as a team. No other computer football simulation offers such well-rounded, personal involvement with every phase of the game.

Strategic-minded players will revel in the game's extraordinary playbook editor—which is without doubt the most comprehensive and intuitive yet seen. More than 200 stock plays are included, divided among standard offensive and defensive formations. Utilizing a CAD-style point-and-click drawing interface, you

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can easily alter any of these predesigned plays or create your own. Movement paths are represented by lines, ending with or segmented by logic boxes. Assembled with simple menu-driven text commands, logic boxes are instructional scripts that tell each player how to react as a play unfolds. Instructions may be absolute, causing an action to be performed regardless of circumstances, or conditional, allowing players to react logically to each unique situation.

Logic boxes offer incredible control over every nuance of play. Defensive players can be "taught" to adopt an aggressive, conservative, or balanced stance. Offensive and defensive plays can be practiced with or without opposition. Try experimental pass routes against different formations, or select a killer offensive attack and mold a defense to stop it. Much of the game's appeal comes from testing, dissecting, and fine-tuning your plays into gridiron ballets of power and beauty.

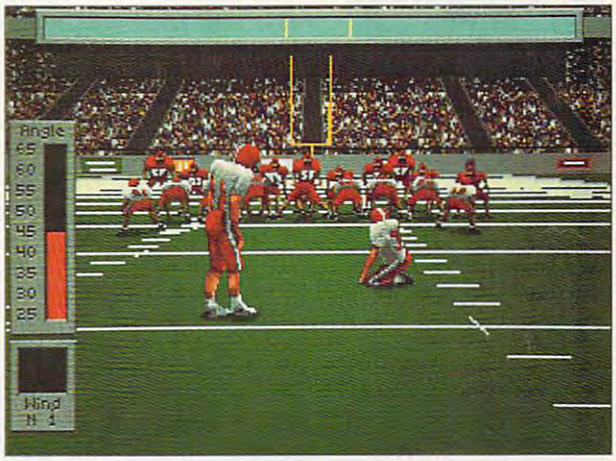
More than 8000 frames of animation were used to create the astonishingly lifelike player movement, digitized from human models with a technique called rotoscoping. Rendered from a 256-color VGA palette, the graphics are bright and expressive, augmented with bone-crushing sound effects and crisp digitized speech.

Although Dynamix recommends an 80386SX as its minimum system requirement, the game performs better on a 33-MHz 80386, and it positively smokes on an 80486. On slower machines, the players move as if they're running underwater. Luckily, most sound and graphic effects can be selectively turned off, speeding up the action considerably. The game also makes excellent use of expanded memory for reduced disk access.

The on-field action is fantastic. Three skill levels offer you full or partial control of the action and coaching duties. The game supports keyboard, mouse, and dual joysticks. The joysticks option is definitely preferred. Arcade controls are fast and reliable. Your view of the action can be changed either before or during play to one of nine fixed camera positions. These views, as well as a free-floating camera, also contribute to the game's extraordinary instant-replay system. Using standard VCR-style controls, you can easily view, edit, and save pivotal plays as a highlight film.

Like all other great works, this game has its share of problems and shortcomings. Entire playbooks must be memorized by their often cryptic eight-character abbreviations. Unfortunately, there's no provision for printing actual play diagrams to create a real coach's playbook. Missing play options include improvised hand-offs, laterals, and shovel passes, but these require realtime action that would admittedly be difficult to program. An option for shorter quarter lengths (five or ten minutes) would also add zest to pure arcade contests.

Another major inconvenience occurs when you simulate a series of weekly league games. For realism's sake, the program simulates every game—sans graphics—instead of quickly generating results. This means agonizingly long periods of computer inactivity. On a 25-MHz 80386, for example, the average computer-simulated game takes 11 minutes. Multiply this by the full 28-team weekly schedule, and you're looking at 2–3 hours of nonstop number crunching and hard drive activity. On a 66-MHz 80486, this figure drops to about 30 minutes. Regardless, players should be given the option for a quick resolve. Adding insult to injury, the only way to stop the computer simulation is to exit to DOS or reboot.



Despite these problems, a big stadium wave is in order for Dynamix's support team, especially those folks involved with the game's outstanding documentation. The indexed manual brims with illustrated examples, playbook tutorials, and suggested reading. The folks at Dynamix also earn high marks for their quick response to customer-reported bugs and suggested improvements.

Front Page Sports: Football kicks our perception of computer sports simulations into another dimension. The only thing that gets better than this requires a uniform. ❐

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GAMEPLAY

Paul C. Schuytema

WHAT COST FREEDOM?

Can teaching children about the gross reality of slavery inspire them to work together to create harmonious race relations?

MECC has been at the forefront of educational software development for years, paying special attention to classroom-based games. Its Oregon Trail is a classic—and is still a vibrant educational tool after more than a dozen years.

Last fall MECC released Freedom!, another historical simulation. In it, children in grades 5–8 assume the role of a slave attempting to escape to freedom through the Underground Railroad.

The game's historical detail was provided by African-American scholar Kamau Sebabu Kambui. Freedom! attempts to recreate the experience of the antebellum period in the eastern U.S.

Players choose a character who has certain skills, such as literacy (though usually the character is illiterate). Children, as slaves, have the option to speak with elders on the plantation to glean necessary advice such as "Moss grows on the north side of trees."

Play proceeds as children attempt to travel from safe house to safe house, learning survival and communication skills plus resource management. One of the game's most exciting aspects is the way it handles illiteracy: If a slave can't read, then any notes or signs encountered appear on-screen as indecipherable symbols. Children can learn to match symbols to see if they're on the right track.

Freedom! hit classrooms last fall. By the beginning of 1993, it had been pulled from the market and all its field licenses had been revoked. Why? Freedom!, as a simulation, opens an interesting Pandora's box of questions.

A parents' group in Merrillville, Indiana, objected to several prominent features of the game. After meeting with the group, Kambui, and an NAACP representative, MECC decided that the parents' objections were of sufficient magnitude to justify pulling it from the market.

Paulette Davis, spokesperson for the parents' group, told me that Freedom!, introduced into the school's open computer lab, was offered as something students could explore with their free time. No curriculum was attached.

Freedom! attempts to recreate the attitudes, prejudices, and speaking patterns of the times. Davis felt that the slaves' uneducated, dialect-heavy speaking manner presented the wrong impression of African-Americans to a predominately white student body. She felt that the school's few African-American students were being alienated and misrepresented.

Davis also felt that since the game's outcome is either winning freedom or losing by being killed or recaptured, and since it's a very challenging simulation, children with strong computer skills had a serious advantage. Consequently, other students were not receiving healthy feedback or positive reinforcement.

Perhaps her strongest objection—that African-American history doesn't begin with slavery, but in the kingdoms of Africa—is not so much a fault of the game as it is a fault of historical curricula in general. For Davis's group, Freedom! trivialized and "Nintendoized" a traumatic and difficult period. Thus, it sent the wrong messages to students.

On the other side of the argument, Helen Cartier, librarian and computer educator at the Hoover Elementary School in Wisconsin, was shocked when MECC pulled her school's licenses for Freedom!. She had it installed on over 30 computers in fifth- and sixth-grade classrooms.

In her experience, Freedom! provided an exciting vehicle that enabled students to understand some of the challenges that African-Americans faced when fleeing captivity. Her students reacted better than she had hoped to the game's handling of illiteracy. She found them challenged to learn new problem-solving skills and excited enough to seek more information.

For Cartier and other teachers across the country, Freedom! was an exciting addition to their curriculum, presenting the time's struggles, prejudices, dialect, and history in an interactive manner that challenged students to think and learn, not just to memorize.

Cartier feels that the parents in Merrillville had the right motivation: to enhance awareness of and education about the African-American experience. But by initiating the action that pulled the game, they actually hurt their larger cause by depriving students of a valuable educational tool.

The question is, While prejudice, ignorance, and cultural ethnocentrism remain with us, how should we approach games and simulations such as Freedom!, which portray a time when the attitudes we're trying to eradicate were the norm? Do they trivialize the struggle and further ingrain the long-standing attitudes, or do they provide an exciting, kid-friendly vehicle with which to educate and inform?

If there's one thing that both sides adamantly agree upon, it's that a game such as Freedom! should not exist in a vacuum. It's up to parents, teachers, and school systems to ensure that a solid curriculum supports such a product. Only then will its educational merit truly come through. ❐

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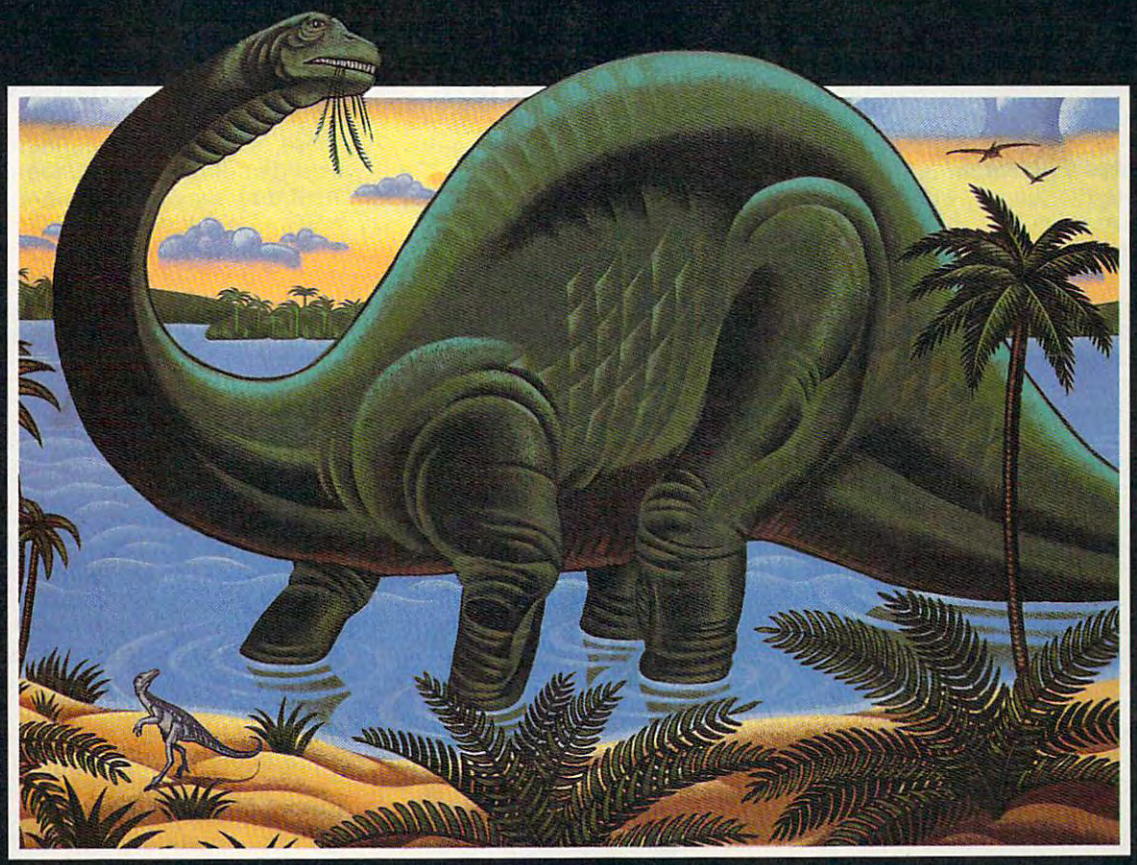

These days, programs have to provide depth, power, and value—going far beyond great entertainment—to keep children interested.

By Carol Ellison

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Have you heard the news about kids' games? They're not just for kids anymore. They're bigger, better, and more challenging than ever. And they're pushing the high end of computing technology. If you want to give your children the best software that the market has to offer—the programs with fast-paced action, hi-res animation, and concert-quality sound—you're looking at an upgrade akin to what it takes to run Windows apps.

Gone are the days of trickle-down economics in home computer budgets. No longer can you simply move your PC into the playroom when you trade up to a heftier model for yourself. If you still think the kids will be satisfied with any system you pass along, think again.

The Games Platform

"I finally had to turn my 386 with the 300MB hard drive over to my kids," a programmer in California confided. "I got tired of them pirating my VGA monitor and hounding me to uninstall software so they could install new programs; 120MB wasn't enough. Now, the kids have a better system than I do. Life's just easier that way."

It's also more fun. And unless you're a programmer, it's unlikely that your children's software will require that much disk space. Still, plan on allowing 6MB–8MB per game if you want to install programs packed with sound and animation.

The newest and niftiest programs on the market make use of multimedia effects that raise the bar on hardware requirements. And we're not simply talking about the programs on CD-ROM. True, Sierra On-Line and Brøderbund, two leaders in children's software, have pioneered CD-ROM–based games: Sierra by taking its classic Mixed-Up Mother Goose to disk three years ago and Brøderbund with its more recent series of interactive Living Books. But these companies and others now are delivering high-quality multimedia programs that you can run directly from your hard disk. If, that is, you have the PC power for it.

Arnold Waldstein, director of marketing for Creative Labs, which makes the popular and widely supported Sound Blaster cards, recommends a PC with an 80386 or higher processor, at least 2MB of memory, Windows 3.1, and no less than a 30MB hard drive as an entry point to the world of children's entertainment software.

VGA has become the video standard for the latest children's games. And virtually all new games—certainly the best ones—require a sound card for full enjoyment. Plus, many children's programs consume hard disk space soaring into the megabytes.

Binary Zoo's animated romp though the Smithsonian Institution, Smithsonian Mystery at the Museums, requires 5MB of disk space to accommodate the games and scanned art images from the real museum. And its Wild Science Arcade (which presents kids with wacky exercises to illustrate concepts like the force of gravity) even requires expanded memory.

Squeeze Out Power

Superior compression techniques allow developers like Knowledge Adventure's Bill Gross to imbue that company's latest release, The Tale of Peter Rabbit Talking Storybook, with sound, action, and interactive hypertextlike capabilities. The software reads the complete text of the storybook aloud to an original musical score, and children can explore illustrative elements in the story. Best of all, it runs from your hard disk and uses only 3MB of space. These new compression techniques are marvels, but don't expect them to shrink the size of software. Developers are using these newfound schemes to pack more sound and graphics into their already sizable programs.

Superior compression schemes are what make The Sierra Network's online gaming service possible. The Sierra Network lets you and your children pit your skills at everything from poker to Boogers (a children's game, as you can tell from its name) against those of gamers across the country. The games actually reside on your hard disk; they consume a whopping 8MB. But because the games run locally on your system as part of the front-end software that accesses the network, the graphics achieve near-VGA quality, and animation runs at a reasonable speed.

Voice! Orchestra!

Strides in audio technology are producing far more realistic sounds. New, quicker 16-bit sound cards, such as Creative Labs' $99 Sound Blaster Pro Deluxe, are downward compatible with software written for the old 8-bit cards and are able to take advantage of new technologies that produce more natural sounds. The company's new Sound Blaster 16, scheduled to list for $279 and ship by the time you read this, will combine 16-bit sound quality, downward compatibility, and upward expandability in a bundle that includes a variety of games, applications, and voice recognition software.

The new 16-bit Sound Blaster supports both FM (synthesized) sound and sampled sound, which is recorded and digitized. A new technology called wavetable synthesis merges the two to produce a wider, more even range of tones. This makes your PC's sound capabilities leap to a new range of fidelity that can produce everything from the high notes of a soprano's aria to the chirp of crickets on a hot summer's night, a Mozart concerto, or a stentorian monologue.

Voice recognition is the newest multimedia frontier. Voice recognition will probably first make a significant appearance in children's software in the form of verbally entering players' names so that the games programs can speak them back at appropriate moments. Creative Labs' bundled

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Pick a color, any color. Then, pick a background, one that explodes with starbursts. Mix it with thundering applause and a beat to rock a coliseum. Add some reverb, and loop the routine so the end links to the beginning and it plays and plays and plays and . . .

This little scenario is what plays out in Rock and Bach Studio. The software not only turns kids into budding MTV producers but also gives them something new to work with every time they sit down at the PC.

Programs like Rock and Bach, Davidson's Kid Works 2, Brøderbund's Kid Pix and Print Shop Deluxe, MECC's Storybook Weaver, and the Disney print kits aren't just games. They're tools—programs that a kid can come back to when there's a project to complete. They're as versatile as adult desktop publishing programs, word processors, or draw and paint software. In fact, Kid Pix and Kid Works 2 put in a little of each of these applications and throw in animation and sound effects to boot.

These programs are the electronic equivalent of finger paints, crayons, and chemistry sets. They're limited only by the imagination. And two minds often being better than one, these games are also better suited to group play than ones that challenge kids individually to attain a higher score.

The beauty of these programs is that they grow with the children. Adults who want to include a family newsletter in a greeting card or produce their own announcements will even enjoy using them.

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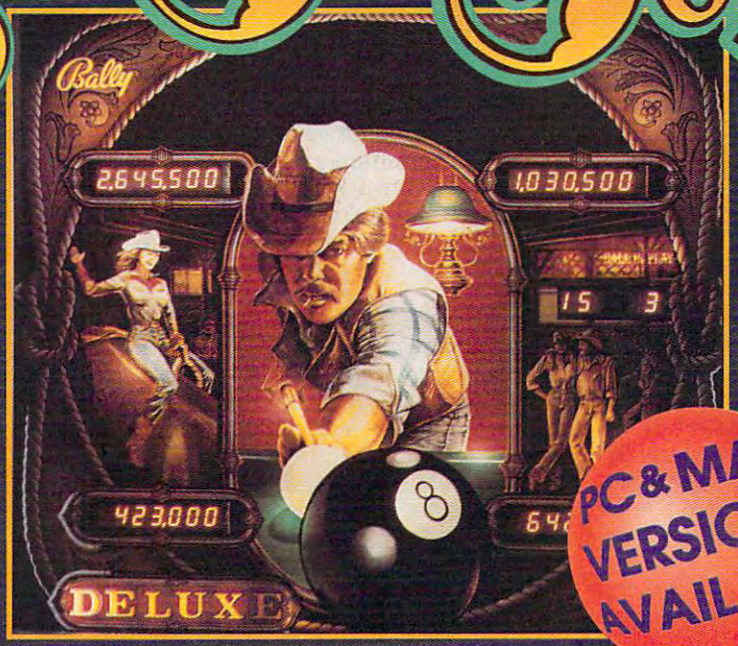

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Circle Reader Service Number 157

voice recognition software is called Voice Assist, from Voice Processing Corporation (VPC). Voice Assist comes trained to recognize 256 words, including those on familiar Windows menus. Understandably, it initially will be most useful for Windows-based software.

At this writing, voice recognition has not made an appearance in children's games. However, at the Computer Game Developers Conference last spring, attention focused on its potential. With voice recognition and a bit of artificial intelligence (AI) built into the software, and with a sound card, speakers, and a microphone installed, a computer will be able to interact with a child in more natural ways. The child will be able to speak commands instead of entering them from the keyboard.

Creative Labs, in testing Voice Assist, actually wrote an AI program that took orders for pizza and assembled the pizza, with the user's choice of pepperoni, extra cheese, onions, or anchovies, onscreen as an order was entered verbally.

Sound is important in entertaining educational games. Unless you have a sound card, you simply can't hear ground control monitoring Carmen Sandiego's moves through the solar system in Where in Space Is Carmen Sandiego?, Brøderbund's latest entry in its runaway hit mystery series. And unless your hard disk can accommodate the 8MB the program consumes, you won't even be able to install it.

And what's a music video without sound and animated effects? Binary Zoo's Rock and Bach Studio lets kids stage music and light shows, à la animated music videos, right there on the monitor. It, too, requires a sound card—not to mention a large amount of disk space to hold the sound and animation files that make video creation possible. If you let your children save their videos, your disk needs start rising incrementally.

The Man Becomes the Child

The latest games software from companies like Brøderbund, Sierra (and The Sierra Network), Davidson & Associates, and Binary Zoo combine fun and challenges with state-of-the-art technology that the whole family will enjoy.

What's more, these new technologies are remarkably interactive, allowing children young and old to interact with the computer, with one another in multiplayer games, and even with the masses in online interactive game arenas like The Sierra Network and America Online's Neverwinter Nights adventure game.

You'll still find software with age ratings on the box, but a number of companies are following the lead of Davidson. Last fall that company erased the age rating on its Davidson's Kid Works 2, a paint and publishing program packed with animation and sound effects, and began advertising the package "for kids of all ages."

Davidson's Kid Works 2 is just one of the multimedia products that populate the top of the children's software charts. It's a creativity kit that's sold with a companion clip art library, called Kid Pictures. Kid Pictures can also be used with the competition, Brøderbund's runaway paint hit, Kid Pix. These creative kits make wackiness the norm. The sight gags and sound bloopers you can build into pictures and stories are limited only by your imagination—oops! We meant to say *your kids'* imaginations, of course!

If you haven't perused the software store shelves lately, take time to do so. You'll find that these incredible children's packages are affordable. But be forewarned: Once you take these programs home, you'll probably have to relinquish your computer to your kids. That is, until you try out some of the programs yourself. Indeed, they aren't just for kids anymore.

Carol Ellison is coauthor of the book Parents, Kids, & Computers *(Random House). Her column "Of Mice & Kids" appears in the Education Review of the* Washington Post. ❑

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64/128 VIEW

COMPUTE says goodbye to Amiga Resource, but Gazette will continue—with your help!

Tom Netsel

There's good news and bad news this month. Let's get the depressing item out of the way and then finish on a couple of upbeat notes.

The bad news is that this issue marks the final edition of Amiga Resource. As Gazette is available for 64 and 128 users, Amiga Resource was available to Amiga subscribers as a special section in COMPUTE. Subscribers to COMPUTE's multiedition received both the Amiga and Gazette sections.

What began in 1988 as a sporadic buyer's guide for Amiga products evolved into a quarterly publication in the spring of 1989. Reader response was enthusiastic, and Amiga Resource became a bimonthly publication less than a year later. In the summer of 1990, General Media bought COMPUTE Publications and relaunched the magazines in their present format. Amiga Resource went monthly with Denny Atkin as editor.

In a computer market dominated by IBM and clones, Amiga Resource and Gazette provided coverage for a dedicated core of Commodore users. As long as each section had a sufficient subscribers, publication could continue. Those numbers are no longer there for Amiga Resource.

That's the bad news. The good news is that Gazette continues. Thanks to your support, we still have enough subscribers to warrant the time, effort, and expense of turning out a 40-page section devoted to an 11-year-old computer. How long Gazette continues is up to you readers. If you renew your subscription and encourage fellow Commodore owners to subscribe, then we'll continue. If you feel it's time for Gazette to call it quits, let your subscription lapse.

Naturally, I hope you'll continue supporting Gazette as you've done for the past ten years. Commodore users from around the world continue to produce amazing programs for the magazine and its companion disk. And after more than a decade of publishing, our columnists and writers still haven't exhausted their editorial possibilities. I've got some great programs and articles that I want to share with you, and it'd be a shame to waste all this valuable information. I hope I can count on your continuing support.

Here's some more good news. Creative Micro Designs (CMD) is now handling a lot more Commodore software and hardware. It recently purchased all of the products that *RUN* magazine once offered through TechMedia.

CMD has confirmed that it is taking orders, and a new catalog of products that include the GEOS Companion disks, Productivity Pak, modems, and heavy-duty power supplies should be available by the time you read this.

CMD is searching for more Commodore products from other firms as well. The Massachusetts-based company wants to become an even greater resource for Commodore owners by offering a wider range of software and hard-to-find products. Keep up the good work, CMD! ❐

GAZETTE

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Printers are practically a requirement for any well-equipped computer system. Through the use of an interface, a 64 or 128 can connect to almost any printer, but the dot-matrix is still the choice of most Commodore users.

PRINTER POTPOURRI

BY RANJAN BOSE

When the 64 was introduced 11 years ago, its users were severely restricted in their selection of printers. One of the reasons for this was because their computer didn't come with an industry standard Centronics parallel or RS-232 serial port.

Printers from Commodore were the only game in town for some years, and they were generally high-priced and of poor quality. Most third-party printers came equipped with Centronics parallel ports (RS-232 ports were available as an option), but they were incompatible with Commodore hardware. Luckily for us users, a number of companies produced printer interfaces that enabled us to use these third-party printers with our Commodores.

These days, most any printer, be it dot-matrix, ink jet, or laser, can be connected to a Commodore through one of these printer interfaces. Although laser printers have experienced dramatic price reductions, most Commodore users still opt for dot-matrix printers, which offer excellent quality at affordable prices.

In the Mode

Getting back to the interface, these devices take the nonstandard Commodore serial port signal and make it look like a Centronics-compatible signal, which most third-party printers can recognize. Interfaces typically allow several modes of operation. One mode always is the downwardly compatible 1525-emulation mode. This mode uses Commodore graphic characters stored in the interface ROM and blocks all non-Commodore printer codes from reaching the printer. This means that a fancy printer is essentially downgraded into acting like a 1525. This mode is useful only with ancient programs that don't support any other printer.

Printer interfaces also allow you to use all the features of your printer through what is aptly named transparent mode. This means that the output from your program is sent unaltered to the printer. In this case, the interface simply takes the Commodore serial data bit by bit and sends the information as eight parallel data bits. It also sends along a few handshake signals, which the printer needs in order to communicate with your computer. More about these later.

Then There's PETSCII

Not only is the 64's hardware nonstandard, but the numerical codes that it uses to represent characters is also nonstandard. Practically all printers use what is known as the ASCII standard, where a code value of 65 stands for an uppercase letter *A*. The 64, however, interprets an ASCII value of 65 as a lowercase *a*.

For the benefit of the printer—and your printouts—the interface translates the Commodore codes (sometimes called PETSCII or CBMSCII) that flow from the computer into ASCII codes. Some 64 word processors generate ASCII output directly, and these work very well if you set the interface to its transparent mode. Even if your 64 program sends true ASCII code, you still need the interface in order to supply the correct electrical signals for the printer.

Interfaces also allow you to print program listings in several ways. The embedded graphic characters and control codes that represent color changes, cursor movements, or screen-clearing functions that you see when you list a program on your monitor can be made to appear in the printed listing as graphic characters, key combinations, or a numerical code.

Some interfaces also have a hex-dump mode in which the hexadecimal values of all the characters that are sent by the computer are printed. This comes in handy when you're debugging should a program hang up the printer by sending an unwanted control char-

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acter. Since many printers can be set to work in this mode, you probably won't miss it if your interface lacks a hex mode.

Interfaces also allow you to turn linefeeds on or off as needed. This is another feature that's present on many of today's printers.

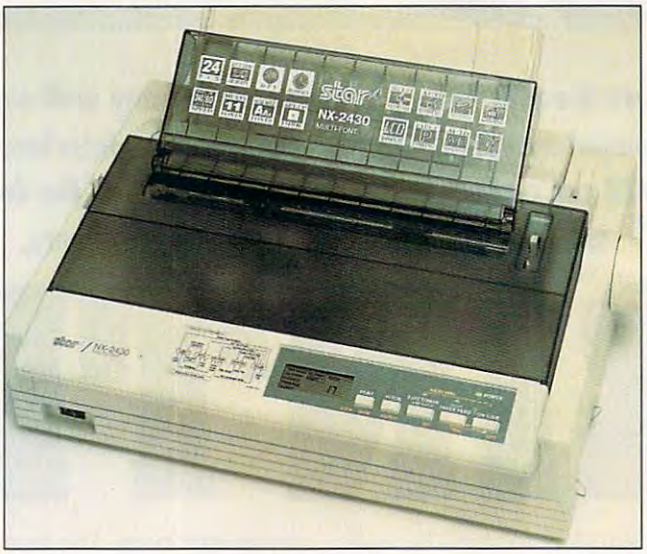
Most printer interfaces come with a buffer. This is memory that is resident outside the computer. It can be as tiny as 128 bytes or as large as 32K. Rather than waiting around for the printer to accept the printout information, the computer dumps it to the buffer. The computer is free to work on other chores, and the buffer hangs onto the information until the printer is ready to print it. The bigger the buffer, the sooner it frees the computer when you have a large file to print.

Making Contact

The printer and computer first establish a common time frame (handshake) by using a strobe signal, which is a volley of very fast and regularly occurring electric pulses. The computer then waits for the printer to signal its availability with a high acknowledge signal or a low busy signal. On receiving the appropriate signal, the computer sends the information that is to be printed. These characters, which are nothing more than electrical pulses, get sent at a rate of 400–600 characters per second.

Few printers can handle information this quickly. Since most are limited to printing at a much slower rate, typically 40–150 characters per second, the characters coming from the computer are stored in buffers, which may be in the printer or in the interface. When the buffers are full, the computer receives a signal to stop sending data. From that moment, the computer waits until the printer catches up and signals that it's ready for more data.

In a system with a tiny buffer, this waiting game can occur every few seconds until everything has been printed. If a big buffer is available, then the computer can send a large amount of data before it is interrupted. After sending the last packet of data, the computer becomes available for further use.



With a printer interface, you can connect your 64 or 128 to practically any printer, such as these multifont models from Star Micronics.

A Dip into History

Modern-day dot-matrix printers descend from line printers, dinosaurs that were used long ago when video monitors were prohibitively expensive. By firing a single column of six to eight pins as the printhead moved across the page, the line printer was able to reproduce characters and graphic shapes. Its printing speed was comparable with present standards, but the quality was terrible. The dots that made up the printout were visible from a mile away.

For those requiring better print quality, the only recourse was to acquire a heavy, expensive, noisy, and slow daisywheel printer. The daisywheel has all but disappeared with the advent of laser and ink-jet printers. (These latter printers still employ the dot-matrix method of printing, but they employ very tiny dots.)

Still on the Dot

Despite the poor quality of their early printouts, dot-matrix printers have remained popular. They've survived primarily by a fierce reduction in price, aided by an increase in features and a boost in print quality. In an effort to keep their customers and attract new ones, printer companies have increased the number of pins in the printhead, added color, and offered improved paper handling.

As lasers and ink jets continue to drop in price, it's quite possible that some day people will find it economical to have a laser printer for letter quality printouts and keep a dot-matrix printer on hand for printing multipart forms. Forms are beyond the capability of the mighty laser printer right now because it doesn't use impact technology.

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The print quality on today's dot-matrix printers is far from bad. Even 9-pin printers can produce near letter quality printouts by using multiple passes. This does affect printing speed, however. The printing speed in NLQ mode is about 30–50 percent slower than when printing in draft mode.

You may experience some reduction in print quality when using fanfold paper. Since the printer grips fanfold paper less firmly than friction-fed single sheets, you often get a line or two of text with jagged characters because of unavoidable paper movement between the multiple passes of the printhead. A 24-pin printhead avoids this problem by printing LQ characters in a single pass. Also, by using a denser dot-matrix (up to 30 × 48 dots per character as opposed to 18 × 18 on a 9-pin printer), a 24-pin printer produces letters that are better shaped with smoother curves than its 9-pin cousin. It generally prints faster, too.

Some Useful Features

As I mentioned earlier, prices of dot-matrix printers have dropped dramatically over the years, and to make them even more appealing, manufacturers have piled on the features. Here are a few that can make your printing sessions more enjoyable.

Paper parking. In older printers, at any given instant, you were limited to using either fanfold paper or single sheets. If you had fanfold paper in the printer and wanted to print on letterhead or other single-sheet stock, you had to remove the fanfold paper. When you'd finished with the single sheets, you then had to go through the whole tedious procedure of reloading and aligning the fanfold paper.

In newer printers, you don't have to remove fanfold paper in order to use single sheets. It can be "parked" out of the way while single sheets are used. When you're ready to switch back to fanfold, it can be brought back into position by moving a lever or pressing a switch.

In some printers, the parked paper is held in a curved shape. If the paper is left for a day or two like this, the curl can cause the paper to jam or at least give an unsightly top page on the next document that's printed.

Other printers hold the parked paper flat and don't have this curly problem. In fact, even when using fanfold paper, it's a good practice to park the paper at the end of each session. Paper left wrapped around the platen can definitely develop a curl, giving you a top page that looks unruly.

Zero-inch tear off. With earlier printers equipped with pull-tractors, when you finished printing a document, you normally had to advance the fanfold, tear off the printed pages, and then use friction feed to print the first half of the next page until it caught the tractor sprockets. You then took the printer offline, engaged the paper in the sprockets properly, disengaged the friction-feed, and printed the rest. It was as painful a procedure as it sounds.

This procedure was prone to numerous frustrating problems, especially when several people used the same printer. It was very easy to have misaligned sprocket holes. Often, someone would forget to disengage the friction setting after loading the fanfold. This situation usually occurred when you went for a cup of coffee after starting to print your 20-page document.

The other option was to use the fanfold from the beginning and to discard the blank top page. The trees would probably like to say something about this wasteful procedure.

In newer printers equipped with pushfeeds, it's possible to advance the page after printing, tear off the last printed page, and then retract the paper to the top printing position. Rather than going through the contortions outlined earlier, all you have to do is press a switch to move the paper.

Improved paper handling. Newer impact dot-matrix printers allow a greater adjustment of the gap between the printhead and the platen, thereby permitting the use of thicker forms. In general, paper handling is more positive, precise, and predictable on newer printers than on those from even a few years ago. The improvement makes it much easier to print envelopes, multipart forms, and labels.

Scalable fonts. No matter how good a regular font looks (even on 24-pin printers), the jaggies show up when you print them in double width or double height. Scalable fonts smooth out the jaggies. With them, new printers can print out slick-looking characters over a wide range of sizes. A few printers have scalable fonts built in, while others print those with the help of special software.

Quiet operation. While improved print quality attracts users, the noise that dot-matrix printers generate turns quite a few prospective users away. A typical workhorse, churning out 40–80 cps in letter quality mode, is noisy enough to render nearby conversation impossible. Printer hoods can bring the noise down considerably, but they take away easy access to the printer's controls and paper.

Most new printers come with a quiet

PRINTER LIFESAVERS

Dot-matrix printers typically need minimal care, but here are a few things to keep them online even longer.

- Use the best quality paper. Cheap paper sheds a lot of minute particles. This paper dust can mix with lubricants to form a dough that can clog moving parts.
- Clean the printer by lightly vacuuming, taking care not to touch ICs, cables, or other electronic parts. Static electricity generated during vacuuming can be damaging.
- Smoking, eating, and drinking near computer equipment is like playing Russian roulette! You'll win most of the time, but you'll remember the time you lose.
- Once or twice a year, depending on usage, clean the guide rail supporting the print head with a dry lint-free cloth. Lubricate the rail sparingly with a very light oil.
- Once a year, clean the rubber platen and paper bail rollers with ethanol (or special cleaning solution available for this purpose from office supply stores) and with a rubber-conditioning compound.
- If the print head becomes dirty and begins to smudge printouts, remove the ribbon and then use a strip of lint-free wipes, moistened in alcohol to gently floss the print head and the ribbon mask (the plastic or metal frame that lies between the print head and the paper).
- Never use a ribbon with a weak area, one that appears as a translucent patch when the ribbon is viewed against light. Don't use one that has an actual tear in it as this could snag the print head pins.
- Never use the printer for extended periods of time. Most printers have a detector that shuts the printer down automatically when the print head overheats. When printing more than a few pages, it's wise to leave the cover open for promoting ventilation.
- Re-inking a printer ribbon might appeal to the Scrooge in you, but it could cost you the print head! For proper operation, ribbons need to have the right amount of ink and lubricant. Darker printing ribbons may look good on paper, but they generally have less lubricants. A cheap ribbon that's short on lubricant could rip and catch the delicate pins, costing you an expensive print head replacement.

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mode, which reduces the printing noise by slowing down the printing speed. Panasonic, followed by others, has gone beyond this technique to equip newer printers with quieter moving parts and added insulation. There's even a superquiet mode that alters the method of firing pins in two passes. Even at regular speeds, these printers are supposed to produce about 1/8 as much noise as earlier printers.

Color. Practically all self-respecting dot-matrix printer manufacturers now have at least one model that prints in color. Color printers use a ribbon with tracks of colored ink and a motor which moves the ribbon up and down to bring one of the (usually) four-colored bands against the printing pins. By printing in one color and then reprinting over it in another color, up to seven colors can be generated.

Since accurate registration of superimposed characters is essential, most of the printers become unidirectional when printing in color. The resultant output is slower than when the printer is printing with a black ribbon, but the only other alternative would be to purchase an ink jet or color laser costing many times more.

Color intensity varies from printer to printer, and one band of color in the ribbons usually dries out faster than the others, leading to shifts in hue over a period of use. Colored ribbons are generally two to three times more expensive than black ribbon, and they have a shorter life.

Improved printhead movement. Printers rely on major movement in two directions. The paper moves up and down (vertical movement) while the printhead moves left and right (lateral movement). Some heads rest at the left edge of the printing line, while others rest in the middle. Most heads print a line from left to right and then the next line from right to left. Printers that use this bidirectional printing can often figure out after printing a line whether it would be quicker to start the next line from the left or right edge (logic-seeking).

When printing graphics, you can either select bidirectional or unidirectional movement for improving vertical alignment, the lack of which shows up when printing a long vertical straight line. The faster a printer is, the more likely it is to print a vertical line that appears to zigzag. Some printers compensate for this by allowing you to adjust the timing for the printhead to reach the starting point for each line (bidirectional timing adjustment).

As a printer grows old and the cog belts that move the head become loose, the misalignment becomes more noticeable. By adjusting the timing, you can get a few more miles out of it before you'll be forced to see a service technician.

Printheads must move parallel to the platen (paper) in order to make an even impression across the page. With age, this alignment could go out of whack, resulting in printouts with a darker left or right edge. A sawtooth test pattern that can be generated on some printers can readily reveal such a misalignment. The adjustment that corrects this problem shouldn't be attempted by an untrained person. This adjustment may also be required when replacing the printhead. (Such replacements aren't common unless you are heavily into printing bitmapped images and large banners.)

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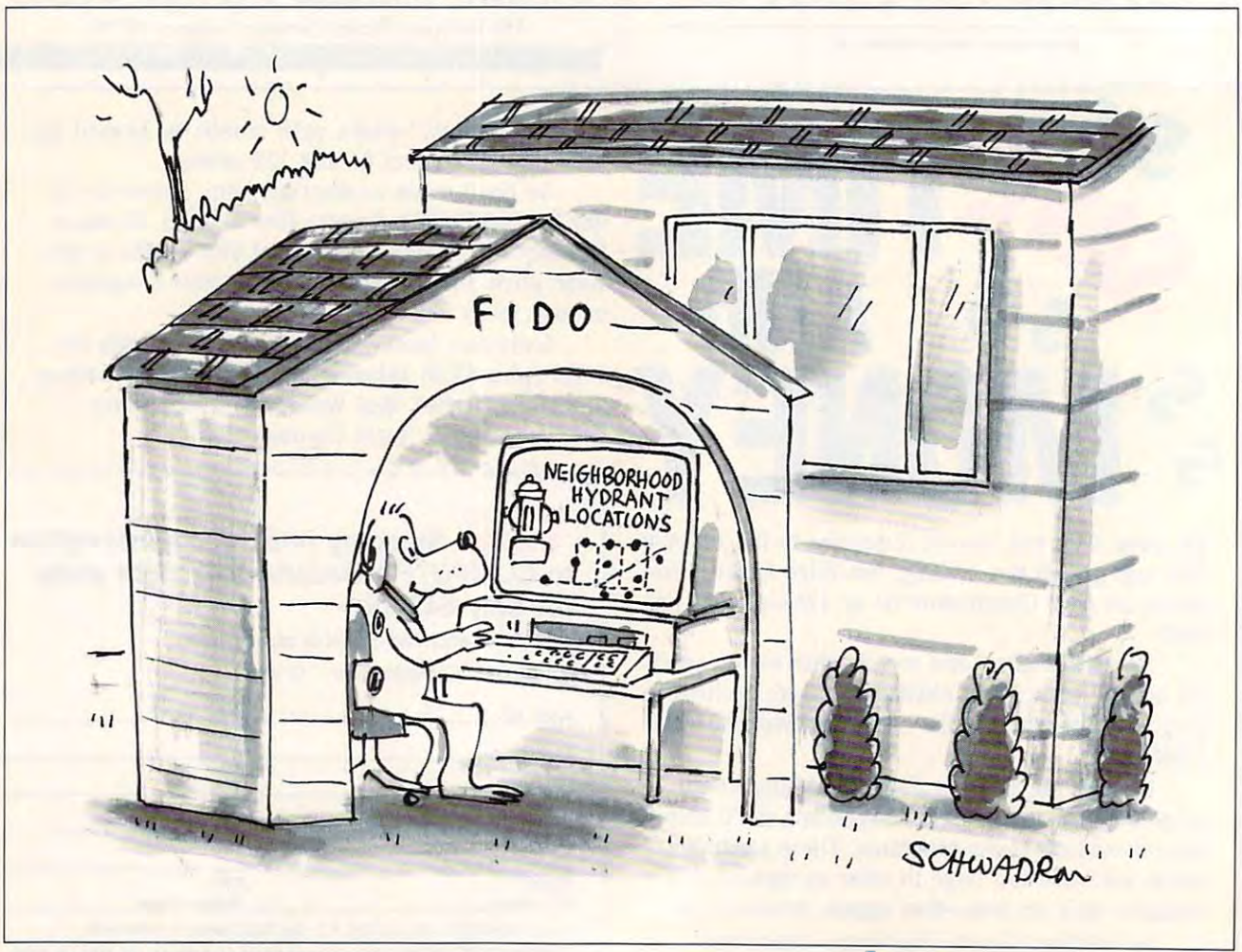

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BBU AND BBG

Experts said these products could never be made. It's a good thing Performance Peripherals didn't hear that, or it might not have created BBU and BBG. BBU is a battery backup cartridge for the 64 or 128 that provides permanent memory (nonvolatile) for Commodore RAM expansion units and geoRAM. BBG is a backup RAM disk for GEOS 2.0, GEOS 128, or Gateway (CMD's GEOS system). BBG is available in sizes ranging from 512K to 2MB.

BBU

One RAM cartridge technician told me that if a battery backup for an REU were developed, it would be the size of a car battery and wouldn't hold power for more than a few minutes. BBU uses an AC power supply backed up by four D batteries. While the power must be on for the cartridge contents to be accessible, I have left only the batteries connected for over a day without any loss of cartridge memory. With care, cartridge portability between computers should be possible as long as the batteries are connected.

BBU allows an REU to be used in its normal way. If you don't initialize the REU when you load the Commodore RAMDOS, whatever was previously stored in the REU will still be available. In my case, I've found programs that I'd copied between disks, SpeedScript, and images used by The Print Shop still in memory. Of course, if the program you use automatically initializes the REU, then its memory will be erased.

The Write Stuff word processor lets you use an REU to store its large dictionary and text files. I know an operator of a mail-order business who uses this word processor, and he would leave his 64 turned on from Monday to Friday, just to be sure he didn't lose anything. With BBU, the computer can be turned off without the fear of losing any files.

Many BBU users will place GEOS or Gateway in their cartridges. When Rboot is loaded from disk, GEOS and all required files are available in less than eight seconds. This technique makes GEOS a true operating system, since it no longer has to be loaded from disk like a program.

BBG

BBG doesn't use an REU. It holds only GEOS 2.0 or Gateway. Loading BBG Rboot from a floppy disk provides equally fast access to the cartridge contents. This backup cartridge is available in sizes ranging from 512K to 2MB. If GEOS 2.0 is used with the provided

BBU is a battery backup interface module for 1700- series REUs and geoRAM 512.

BBG is a battery backup RAM disk for GEOS 2.0 and GEOS 128.

software, the cartridge configures itself in sections like the 1750-series RAM disk. On the 2MB model, this is like having five RAM disks. If Gateway is used, BBG is configured as one large RAM disk. With Gateway's Slider and Browse functions, this makes all files easily accessible.

The Aprospand board has four slots that allow up to four cartridges to be switched on or off with a 64 or 128. I have connected one of these boards to my cartridge port via a ribbon extender. This ribbon allows more economical use of table space. In the Aprospand slots I have connected a Quick Brown Box (QBB) and BBU connected to a 1750 REU. A QBB-specific version of The Write Stuff word processor is in the QBB; the BBU-REU combination contains Gateway. With this setup, it's possible to stop writing in the middle of a text document, load geoTerm from the REU in eight seconds, and return to my word processor with no loss of text.

The Aprospand makes another interesting combination possible. I have used one board to access both BBU and BBG. I placed Gateway in both, and found that I could run GEOS from either with no interference from the other. This could increase your total available RAM for GEOS (separately accessible), or allow use of GEOS in one cartridge and Gateway in the other, since each system has different advantages. Employment of BBG and BBU together would require ordering BBG with the optional disable switch, so that it would not be available when BBU was being accessed. A reset switch is standard with BBU and available as an option with BBG.

None of my other cartridges works with either BBG or BBU. In order to use Gateway in my BBU-REU combination, I have sacrificed the ability to use the REU with other programs for fast disk and file copying.

Many Commodore users will choose to place BBG or BBU directly in their cartridge ports. This is how BBG and BBU were designed to be used. There should be no problems for any 64 or 128 with this configuration.

For very little money, REU owners can turn their 64s into permanent-memory machines with several thousand kilobytes of memory. GEOS users who don't own an REU should appreciate BBG especially for the large memory it offers. It's a tribute to Peter Fiset, the designer of both BBG and BBU, that a number of other combinations are possible with these devices.

Fiset is in a sense competing against himself, since he also developed the CMD RAMDrive, but RAMDrive is more expensive than these cartridges. BBU and BBG are for those of us who don't have a large budget, and who have more specific needs for our computers.

Although the experts said it couldn't

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