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COMPUTING GUIDE  
(SEE PAGE 51)**

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# COMPUTE

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AUGUST 1994

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Spring COMDEX, held this past May in Atlanta, was the site for a tropical heat wave. Attendees tried to keep cool by wearing Bermuda shorts and sipping mint juleps. I decided that the only way to fight the heat was to look for cool products, so here is the fruit of my labor—an ice chest of the ten coolest products I saw at this year's show.

10. Microsoft may have created a monster with Access 2.0 (206-882-8080, \$495). It's one of the few products that have reached the elusive goal of all software: It's easy to use and powerful. And queries are 100 times faster than version 1.1's.

9. If you think UPSs are boring, take a look at the SmartUPS 400 from APC (800-800-4272, \$399). When teamed with the company's PowerChute software, this power tool will protect your computer from surges, brownouts, and outages, and if the power goes out when you're away from your PC, PowerChute will close your files.

8. If you think you have some artistic talent and just need the right vehicle to express it, Fractal Design's Dabbler (408-688-5300, \$99) is the program you're looking for. It's designed to teach you how to paint with a computer, and its tools look like real-world paint media.

7. PagePlus made my COMDEX list last year, and here it is again in a new version with new features, the same great easy-to-use interface, and the same amazingly low price—\$60 (Serif, 603-889-8650). If you're into desktop publishing, take a look at PagePlus.

6. U-Lead Systems was a winner last year with ImagePals. This year, the company is back with MediaStudio (310-523-9393, \$349). This terrific toolkit includes all the excellent modules in ImagePals 2, plus video, sound, and morph editing.

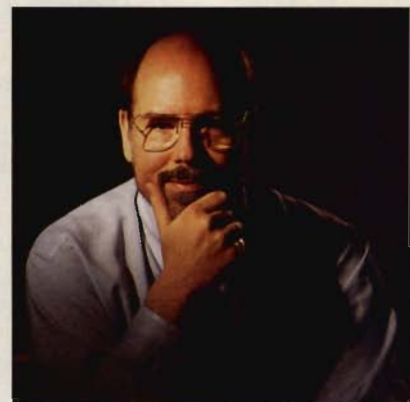
5. Creating 3-D objects is all the rage these days, and the best 3-D program I saw at COMDEX was Caligari's trueSpace (415-390-9600, \$795). This cool rendering program can create the most complex objects with just a few clicks and keystrokes.

4. Blue Sky Software was on my list last year, and it's here again with

MultiMedia WinHelp (619-459-6365, \$199). MultiMedia WinHelp is a set of tools that make it easy for Windows Help authors to integrate video, sound, and other neat effects into regular Windows Help documents.

3. In third place there's a tie between the Texas Instruments 4000M multimedia notebooks (800-848-3927) and IBM's Thinkpad 360 (914-766-1900). The top-of-the-line 4000M comes with a 75-MHz 486DX4 and a 340MB hard disk in a striking new design with a TrackPoint-like pointing device and an integrated sound system (\$5,299). An optional CD-ROM drive makes the 4000M really sing. The Thinkpad 360 boasts rock-solid construction, a great keyboard, and IBM's innovative TrackPoint (\$1,999).

2. WinFax Pro 3.0 is a super pro-

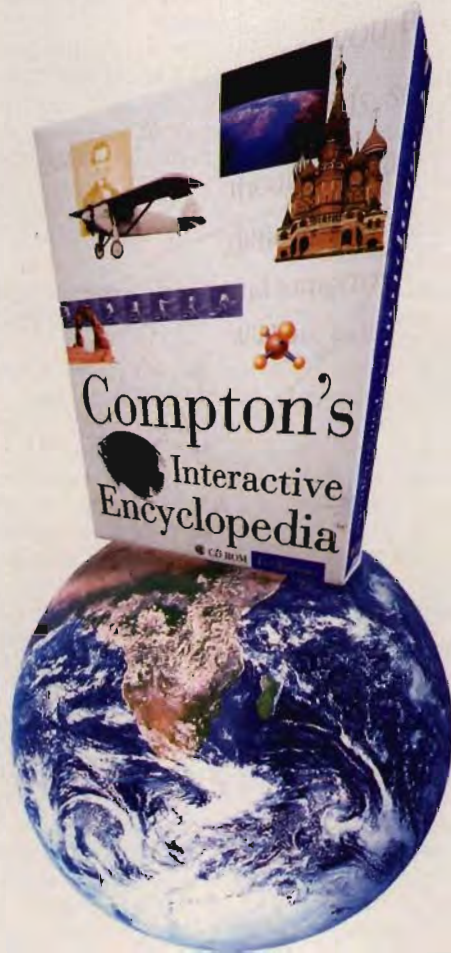


gram, but WinFax Pro 4.0 (Delrina, 800-268-6082, \$129) is even better. New features include folders with a drag-and-drop interface and the ability to send binary data and E-mail. Super add-on services include Fax Mail-Box (like E-mail for faxes) and Fax Broadcast (which allows you to send multiple faxes at one time).

1. At the top of my list this year is Sidekick for Windows from Simplify Software, a division of Borland (800-336-6464). Sidekick is a full-featured PIM with enough power to make the heavyweights tremble, and it's easy enough to use to make anyone who isn't already using a PIM want to jump on board. Sidekick has a great interface and an almost unbelievable price—\$29.95. Wow! Buy one for each of your friends. □



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# WINDOWS WORKSHOP

Clifton Karnes

## IN WINDOWS, IMAGE IS EVERYTHING

While you may not agree that image is everything, you'll certainly admit that images are a crucial element in Windows. They're everywhere—in icons, cursors, wallpaper bitmaps, screen savers, Clipboard files, GIF files, PCX files, video clips, and on and on.

The problem is managing these graphics. If you work with images much, you probably have scores of these files scattered everywhere on your hard disk, with little or no organization. To maintain and manipulate these graphics efficiently, you really need help, and you won't find a better helper than ImagePals 2 from U-Lead (310-523-9393, \$129). ImagePals 2 is a single package with everything you need to view, catalog, capture, translate, and manipulate graphics. It's configured as a suite of superbly crafted, highly integrated tools that make working with graphics fun—the way it ought to be.

ImagePals 2's core consists of four modules: Album, Image Editor, Viewer, and Screen Capture. Since Album is the control center of the suite, I'll start with it. Album lets you catalog your images, and it presents the images as thumbnails. There are two especially noteworthy things about Album. The first is that it supports an amazing array of graphics formats, including some unusual but useful ones, like icons (with ICO extensions) and cursors (with CUR extensions). The second is that it isn't limited to graphics. You can use Album to catalog video clips, WAV files, and MIDI files; and in the most general sense, you can place almost any kind of file on a thumbnail (like an

HLP file). When you double-click on a thumbnail, Album runs the program associated with the file (you can set associations inside Album, which is very handy), and if there is no association, it runs its own viewer.

Probably the best way to think about Album is as a visual file manager. In it, you place thumbnails, organized in groups you choose. You can keep groups active so they're on the Album desktop, or you can move them to Album's Bookshelf, where they're out of the way. One of Album's coolest features is its user-configurable button bar. You can place a program on this button bar and press the button to launch the program. But better than that, you can drag a thumbnail to a button to load a graphic (or WAV file or video clip) into the application. This feature really lets you customize Album to work the way you want it to.

After Album, the most important element of ImagePals 2 is Image Editor. This program lets you manipulate your images by changing colors, cutting and pasting, cropping, and applying special effects.

Specialized tools like Magic Wand, which selects similar colors throughout a picture, and Magic Lamp, which allows you to apply effects like blur, sharpen, darken, lighten, and smudge selectively to a small part of an image, make this editor powerful, flexible, and easy to use.

In addition to the small-scale effects you can create with Magic Lamp, Image Editor's Effects menu lets you blur, sharpen, despeckle, emphasize edges, find edges, and adjust for NTSC, as well as apply several very unusual effects with descriptive names like *average*, *blast*, *cool*, *emboss*, *facet*, *fat/thin*, *fish eye*, *mosaic*, *stagger*, *tile*,

*warm*, *watercolor*, and *windy*.

If you're interested in conversion, Image Editor can handle almost anything. You can move from formats that include BMP, CLP, EPS, IFF, JPG, PCX, PSD, PXR, RAS, TGA, TIF, and WMF. And conversion is fast!

Viewer is an important element of ImagePals 2, and you'll find yourself using it often. It works a lot like other viewers, but it has several very nice features. First, it's a drop destination, so you can drag graphics files to it from File Manager and Album. And instead of replacing the image in the window you drag to, Viewer opens a new window, which is a great feature. There are several items on Viewer's Control menu that make it easy to do things like close, restore, and tile all Viewer windows.

Viewer also has two neat buttons on its status bar. The first button lists all the active Viewer windows. The second lets you drag the contents of Viewer to any drop target, like Image Editor.

My favorite part of this ensemble is Screen Capture. While capturing screens in Windows can be easy (you just press Print Screen to capture the whole desktop or Alt-Print Screen to capture the active window), if your requirements go beyond this, you'll need help. ImagePals 2's Screen Capture will give you all the help you need and more. It's an MDI application that keeps each capture in its own document window. You can capture the cursor or leave it out, and you can grab any area of the screen you wish. Screen Capture even lets you change your windows' colors from inside the program and crop captured images.

That's a short introduction to ImagePals 2. If you work with graphics, you need it. □

If you work with graphics, you need ImagePals 2.





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Windows Magazine recently rated ALL the top desktop publishers and recommended PagePlus 2.0 for Windows – which combines tremendous

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# FEEDBACK

Edited by Robert Bixby

## Shiftless

Is it possible (in QuickBASIC) to scan for the Alt, Shift, or Ctrl key while no other key is being pressed?

ANDY J. JOHNSTONE  
PENNSBURG, PA

*Sure. You can do it a couple of different ways. Here's a program example that uses BASIC's KEY function to do it.*

```
KEY 15, CHR$(&H0) +  
  CHR$(&H36)  
ON KEY(15) GOSUB rightshift  
KEY(15) ON  
KEY 16, CHR$(&H0) +  
  CHR$(&H38)  
ON KEY(16) GOSUB leftalt  
KEY(16) ON  
KEY 17, CHR$(&H0) +  
  CHR$(&H2A)  
ON KEY(17) GOSUB leftshift  
KEY(17) ON  
KEY 18, CHR$(&H0) +  
  CHR$(&H1D)  
ON KEY(18) GOSUB leftctrl  
KEY(18) ON
```

```
looper:  
a$ = INKEY$  
IF a$ = "q" THEN END  
GOTO looper
```

```
leftshift:  
PRINT "The left Shift"  
RETURN  
rightshift:  
PRINT "The right Shift"  
RETURN  
leftalt:  
PRINT "The left Alt"  
RETURN  
leftctrl:  
PRINT "The left Ctrl"  
RETURN
```

*As you have probably surmised, you can't detect the right Ctrl or Alt key this way. (If you know of a way to do so, please let us know.) The scan codes for these keys are &H62 for the right Alt key and &H63 for the right Ctrl key. (Try them using the pattern in the above example. It's possible that*

*QuickBASIC has been upgraded since our version.)*

*The other way to detect them is to peek memory locations 1047 and 1048 where these keys are registered in memory. Here's a little program that will show you the values of these locations.*

```
DEF SEG = 0  
TOP:  
LOCATE 1,1  
PRINT PEEK(1047), PEEK(1048)  
A$=INKEY$: IF A$="q" THEN END  
GOTO TOP
```

*If you run this program and press the various modifier keys, you will see that they generate the following values in these two locations.*

Key	1047	1048
Left Ctrl	4	1
Left Alt	8	2
Left Shift	2	0
Right Ctrl	4	0
Right Alt	8	0
Right Shift	1	0

*You could use this in a program as follows.*

```
DEF SEG = 0  
TOP:  
IF (PEEK(1047) AND 7) = 4 and  
  PEEK(1048) = 1 THEN  
LOCATE 1,1: PRINT "LEFT CTRL"  
ELSE  
LOCATE 1,1:PRINT SPACES(10)  
ENDIF  
A$=INKEY$: IF A$="q" THEN END  
GOTO TOP
```

*The reason for the AND in line 3 is that the Insert key toggles the seventh bit of this memory location and other keys toggle other bits. You can also use these programs to sense other keys: Caps Lock, Num Lock, Scroll Lock, and Insert.*

## Commanding Presence

I like programming in BASIC, but there are a couple of

things I haven't figured out yet. How do you allow for parameters when loading a file? And how do you make a program memory resident?

JIM MOATS  
COLUMBUS, OH

*COMMAND\$ is the keyword used in compilable BASICs to get information from the command line. For example, if you create a BASIC program called HELLO.BAS and then compile it as HELLO.EXE, you could include as its first line*

```
A$=COMMAND$:PRINT A$
```

*and then run the program by typing hello Stephen. The program would print Stephen. You could use the contents of A\$ throughout the program as if you had defined the variable within the program. Since you can't enter a command line argument while working within the BASIC environment (while writing the program), QuickBASIC has an option on the Run menu called Modify COMMAND\$.*

*Selecting this option allows you to enter an argument in a dialog box as if it had been entered from the command line. While you run the program within the environment, it will take the contents of COMMAND\$ from this dialog box.*

*PowerBASIC 3.0 is said to have a way to make compiled BASIC programs memory resident, but as we haven't seen this language, we're unable to verify this.*

## New Opening Screen

I would like to know how to change the picture that Windows puts on your screen when it first starts.

RYAN WARNER  
REVERE, MN

*It's very simple, but there are a lot of steps. (This is excerpt-*

Scanning the  
keys, capturing the  
command  
line, and changing  
Windows'  
opening screen





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## Moving screen objects and downloading weaselBASE

ed from Clifton Karnes's book 101 Essential Windows Tips.) First, you must draw your opening screen. Start up Windows and start up Paintbrush. Pull down the Options menu and select Image Attributes. In the Image Attributes dialog box, select Pels in the Units section and type 640 into the Width text box and 480 into the Height text box. Click on OK. Draw your opening screen using the tools in Paintbrush.

One problem with Paintbrush is that you can't see the whole 640 x 480 image unless you zoom out and you can't draw when you're zoomed out. Draw an image as large as you want—even larger than the current screen, by scrolling. Then zoom out and use the rectangular selection tool to move the image to the center of the drawing area (this isn't necessary, but it gives your work a finished look). Limit the number of colors and the amount of color you use.

When your drawing is finished, save it as a 16-color BMP file.

Next, you must convert your BMP file to an RLE file. Use a commercial graphics conversion utility or download Wingif from your favorite online service (it's available on AOL). We'll assume that you're using Wingif.

Load your painting into Wingif; then select Save from the File menu. In the Save dialog box, click on the button marked Format. Select RLE 4 and save the file. For the purposes of our example, let's say that you save it as WINTHING.RLE.

Now you must close down Windows and return to DOS. Log to the WINDOWS directory and change the name of WIN.COM to \_IN.COM. Now log to the WINDOWS\SYSTEM directory and at the com-

mand line type copy /b win.cnf+vgalogo.lgo+ .\winthing.rle .\win.com. Note: There should be a space between .\winthing.rle and .\win.com.

Type win to see if Windows will start. You should see the painting you just created as the opening screen.

If Windows refuses to start, it probably means that you used too much color. Copy your \_IN.COM file to WIN.COM, restart Windows, redo your painting, convert it to an RLE file, and redo the copy procedure as described in the paragraph above. Continue the process until you create a WIN.COM file that works.

Warning: Never lose your original WIN.COM file, or you'll be sunk if there's a problem with the one you create.

## A Better Sprite

I read with interest the response in the March "Feedback" about moving an object on the screen without destroying the background. I have another method that captures the background first and then moves the object into the foreground with the DRAW command.

```
SCREEN 9: CLS
DIM A(500)
h = 150: v = 150
LOCATE 12, 1: PRINT
"BACKGROUND BACKGROUND
BACKGROUND"
moveit:
GET (h, v)-(h + 20, v + 20), A
DRAW "bm1,1 br=" +
VARPTR$(h) + "bd=" +
VARPTR$(v) + "c14 r18 g6 f6 g6
h6 g6 u18 b13 p2,14"
control:
z$ = INKEY$
IF z$ = "" THEN GOTO control
PUT (h, v), A, PSET
IF z$ = "i" THEN v = v - 3: GOTO
checkit
IF z$ = "j" THEN h = h - 4: GOTO
checkit
```

```
IF z$ = "k" THEN h = h + 4: GOTO
checkit
IF z$ = "m" THEN v = v + 3: GOTO
checkit
GOTO moveit
checkit:
IF h < 0 THEN h = 0
IF h > 400 THEN h = 400
IF v < 0 THEN v = 0
IF v > 400 THEN v = 400
GOTO moveit
```

JOHN J. VAN DYCK  
BOISE, ID

## COMPUTE Online

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

This month, the online program is weaselBASE, a simple database that you can use to enter and keep track of information and merge form letters. The program brings new meaning to the words *quick and dirty*. Yet weaselBASE will probably do 90 percent of what 90 percent of database users need. It makes data entry simple, it will sort any field, it will merge two databases (provided that they have the same fields in the same order), it will merge a printing, and it will respond to a simple query. Plus, since it's in QBASIC format, you can customize it at will.

THE EDITORS  
GREENSBORO, NC

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



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# INTRODOS

Tony Roberts

## ELEPHANTINE MEMORY

Upper memory is a 384K area of RAM that lies just beyond the first 640K in your machine. Back in the old days, this area was reserved. Video adapters were allowed to use that space, and the system was allowed to copy parts of its ROM to that area. This arrangement provided a boost in system performance because RAM is generally faster than ROM. Because the system and video programs are so frequently accessed, it makes sense to put them where they can be found most readily.

**Upper memory conflicts can be eliminated, if you approach the problem systematically.**

As it turns out, though, not all of the 384K upper memory area is used by the system. There are areas of free space in that 384K known as upper memory blocks. With the right hardware and software (a 386 or higher running DOS 5 or higher), you can use some of the extra space for DOS, your favorite TSR programs, or your network software.

Most of today's computers are set up to take advantage of the extra space in high memory. The result is a less cramped conventional memory area, which makes it easier to run large DOS applications and to make use of more TSR programs. If your system is set up this way, you'll see commands such as `DEVICE=HIMEM.SYS`, `DEVICE=EMM386.EXE`, `NOEMS`, `DOS=UMB`, and `DOS=HIGH` in your `CONFIG.SYS` file.

The `HIMEM.SYS` line provides access to the upper memory blocks and to other extended memory. `DOS=UMB` tells DOS that it should be aware of the presence of upper memory blocks, and `DOS=HIGH` tells DOS to load some of itself into those upper memory blocks. Finally, the `EMM386` line activates the `DE-`

`VICEHIGH` and `LOADHIGH` commands with which you instruct your device drivers and TSRs to load themselves into upper memory if possible. The `NOEMS` parameter indicates that you're using only extended memory and not expanded memory. If you have applications that require expanded memory, that parameter should be omitted.

The upper memory area is partially used by your system's hardware. Usually, your system is able to figure out what is in use. Sometimes, however, it decides that a certain area is unused and makes it available as an upper memory block when, in fact, some hardware is counting on access to that memory.

This is the dreaded upper memory conflict, and it results in erratic system behavior, crashes, reboots, and GPFs if you're using Windows. At this point, you must figure out where the conflict is occurring and eliminate it.

First, perform a clean boot of your computer. To do this in DOS 6 and above, reboot and press F5 when the *Starting MS-DOS* message appears. Next, run the Microsoft Diagnostic utility by entering `msd` at the command prompt.

MSD provides detailed technical information about your computer and its setup. If you explore the options, you'll learn a lot about your computer. But right now, press M. The screen that appears shows you a map of your system's upper memory area.

There's a legend at the top of the screen that explains the codes in the memory map. Scroll through the map and find any areas marked as ROM or RAM, and make a note of the starting and ending addresses of those areas.

Next, exit the MSD utility, open `CONFIG.SYS`, and edit the `EMM386` line to exclude

those areas that you identified as being in use. Here's an example: `DEVICE=EMM386.EXE` `NOEMS` `X=B800-C7FF` `X=D800-DBFF`.

Save the `CONFIG.SYS` and restart the computer, and the conflict should be resolved. If not, your system may include hardware that MSD is unable to identify. This is the case with the scanner on my system. MSD identified the range of memory from D000 to D3FF as possibly available, but as it turned out, that's the memory the scanner uses. So adding an `X=D000-D3FF` exclusion to the `EMM386` line in `CONFIG.SYS` solved the problem.

If the memory conflict still exists and your hardware documentation provides no clue as to what range of memory it might be using, you can go through a troubleshooting procedure to narrow down where it might be occurring.

First, edit the `EMM386` line to exclude the whole upper memory range: `X=A000-F7FF`. If that solves the problem, shrink the range by specifying `X=C000-F7FF`. If the problem recurs, it follows that the conflict exists in the `A000-BFFF` range. Test this theory by specifying `X=A000-BFFF` and rebooting. If the memory conflict is gone, you can start narrowing the excluded range to `A000-AFFF` or `B000-BFFF` to further isolate the affected area.

Keep narrowing the excluded range until you find the smallest possible area to exclude that still permits your computer to operate properly. Once you've done this, you'll have resolved your upper memory conflict, and you'll have preserved the most possible memory for your applications.

Before going through all of this experimentation, though, be sure to make backup copies of your system files so you'll be able to return to your starting point if necessary. □





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## COLOR PRINTERS

Edited by Mike Hudnall  
Reviews by William Harrel

**C**olor printers cost much less now than just a few months ago. In fact, some color printers are less expensive than entry-level monochrome lasers. If you shop around, you can find a printer that can do color for less than \$500.

So, you ask, why on earth wouldn't you buy a color printer? Well, there are several issues to consider. First (and, for some applications, most critical), no matter which type of color printer you buy, you'll take a tremendous performance hit. The fastest printer reviewed here is capable of only two pages per minute—and that's generating black-and-white text! By contrast, even the slowest monochrome laser printers churn out pages of text at the rate of four pages per minute.

Another important consideration is print quality. While some of these printers provide resolutions of 300 × 360 dots per inch (the Tektronix and the Hewlett-Packard DeskJet 560C and 1200C/PS print at 600 × 300 dpi), the different technologies required to produce color are not capable of printing text as well as lasers can. Although you may not notice until you look very closely, your text won't print as crisply and clearly on color printers, which also don't produce half-tone and gray-scale images as well as lasers.

Color printers can also be expensive to use. Laser printers typically print at a per-page cost of about \$0.01 or \$0.02. Some of the inkjet printers reviewed here, such as the HP 560C and the Canon, can match that price for black-and-white text, but most of these printers have a per-page cost well beyond that of lasers. At the extreme end, the FARGO printing

in dye sublimation mode costs \$2.79 per page.

But hey, you need color, right? And if you do presentations or create documents with lots of graphics, especially charts and graphs, the impact of your work will be greatly improved with color. So if you don't print high volume or a lot of strictly text documents, one of these color printers might be right for you. If you do print a lot of color documents or need heavy text capabilities, you might consider owning two printers.

### What Kind of Color Printer Do You Need?

OK, so you've decided you need color. You have several other issues to address, the two most important being price and the

parenencies and color runs, such as newsletters and fliers, you'd use an inexpensive inkjet. Recent releases of high-end technologies in low price ranges as well as formerly low-end technologies with newly enhanced capabilities have muddled this distinction.

FARGO's printer brings thermal wax technology to the desktop for less than \$1,000. On the other hand, typically inexpensive inkjet technology has moved into the higher-end market in printers such as the IBM and the HP 1200C/PS. Each lists upwards of \$2,500. When you contrast these more expensive inkjet printers with the Canon and the HP 560C, each of which costs something under \$600 on the street, you can see the necessity of understand-

ing what kind of technology you need and what features you should and shouldn't pay for.

### Inkjet Printers

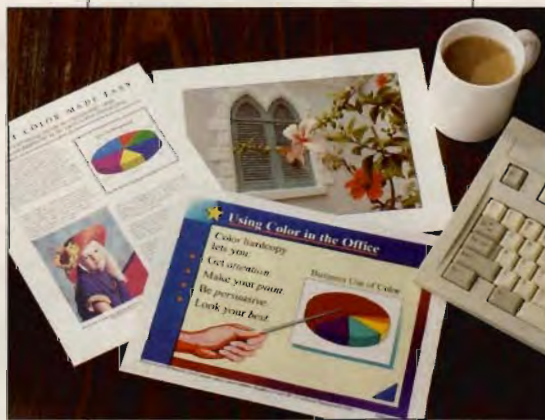
Typically, inkjet printers have been the color printers of choice for the average desktop. They're relatively inexpensive. Supplies (ink cartridges) won't send you to the poorhouse, and inkjets generally print reasonably well on plain paper and trans-

parencies. The technology works by spraying droplets of cyan, magenta, yellow, and (sometimes) black ink from ultrafine nozzles. This kind of printer is ideal for an office on a tight budget that produces a few presentations a year and wants occasional splashes of color in mostly text documents.

Four inkjet printers are reviewed here: the IBM, the HP 560C and 1200C/PS, and the Canon.

### Thermal Wax Printers

Thermal wax technology employs a very large ribbon coated with page-size panels of cyan, magenta, yellow, and (sometimes)



type of color printing your application calls for. Will you be printing on paper or transparencies? Do you need a proof printer for desktop publishing? Typically, the application determines the price. But not always. Things have changed over the past year.

The printers in this review range from \$500 to \$3,000 (you can pay a lot more, but the cutoff point for this review is a street price of \$3,000). Until this year, the kind of technology a printer used determined its price. At one time, you'd pay thousands of dollars for a high-end proof printer, such as a thermal wax printer or dye sublimation printer. For trans-





black wax. The ribbon passes over a tightly focused heat source, causing the wax to melt onto the paper. A thermal wax printer is ideal for an office that does a lot of presentations and handouts. Thermal wax delivers bold colors and reasonable quality. However, thermal wax printers are typically more expensive to use than inkjets. The FARGO, for example, costs about \$0.45 per page to run, compared to the HP 560C's \$0.02. Adding to the expense is the need for special paper. While many thermal wax printers can use plain paper, you'll get much better results on a glossy coated stock created especially for the wax transfer process.

Two of the printers reviewed, the Tektronix and the FARGO, use the thermal wax process. Another two, the Citizen and the Star Micronics, use a similar printing process called thermal transfer. The difference lies in the type of ribbon used. Instead of full-page panels of wax, the ribbon contains all four colors on a continuous strip. The heat mechanism runs over the ribbon as the pins in a dot-matrix printer do, printing one thin band at a time.

### Dye Sublimation Printers

Dye sublimation (often shortened to *dye-sub*) printers employ a printing technology similar to that of thermal wax printers. The differences are a specially coated paper and a ribbon coated with dye, rather than wax. Another

**Canon BJC-600**  
**Suggested retail price: \$719**  
**Estimated street price: less than \$600**  
**Warranty: two years**

**CANON**  
**2995 Redhill Ave.**  
**Costa Mesa, CA 92626**  
**(800) 848-4123**  
**(714) 438-3000**

**Pros: small, lightweight design;**  
**good text output; reasonable price;**  
**inexpensive operation**  
**Cons: paper delivered onto desktop,**  
**requiring a larger surface area**

major difference is that the heat source is capable of precise temperature variations, allowing for nearly perfect color reproduction. (Another name for dye-sub technology is *photorealistic*.) The typical users of this type of printer are desktop publishers and artists who use photographs.

Most dye-sub costs well beyond this review's cutoff point of \$3,000. However, FARGO offers an upgrade that turns its printer into a dye sublimation printer. Remarkably, the upgrade costs less than \$250, providing, with the original cost of the printer, photorealistic quality for under \$1,250.

### Other Color Technologies

There are two other types of color printers available: laser and solid-ink. Color laser printers work as black-and-white lasers do. Solid-ink printers use pellets or sticks of crayonlike wax. Solid-ink printers print on almost anything and are great for people who design product packages. Both technologies are expensive. I couldn't find any of either type that cost less than \$3,000.

If you're ready to add some color to your printing, read on. This month's Test Lab has reviews, samples, facts, and figures to help you with your choice.

WILLIAM HARREL

## CANON BJC-600

Canon calls its inkjet printer a Bubble Jet. This compact, lightweight printer (less than ten pounds) is a breeze to set up and use, and the 360- x 360-dpi print quality is remarkable. The printer comes with a comprehensive online user's guide, complete with full-color pictures and clear step-by-step instructions.

One of the few things I don't like about this printer is the way it delivers its printed pages. It feeds the output pages onto the desktop, which defeats the purpose of the printer's being so small. You need at least another 8½ x 11 inches in front of the machine to catch the final printed pages. Another drawback of this paper-delivery design is that your pages stack in reverse order; this is not a problem in printers that deliver the pages face-down. If you print many long documents, the reverse-order output can be a nuisance. But then, this printer is not designed for high-volume, long-document printing, and if I needed an occasional document containing color, I wouldn't let this output design deter me from buying a BJC-600.

Two other small problems I had with this printer were slow ink-drying times on coated paper and an atypically slow printer driver. While the BJC-600 turns out much better print quality on special coated paper designed for inkjet printers, you have to be careful not to pick up or move your pages too soon, or you can smear the ink. But smearing ink is a problem common to all inkjets.

The BJC-600 performed very well on the print tests. Text at various point sizes and typeface styles printed relatively crisply and clearly, even on plain paper, where ink absorption can greatly affect quality. On the PowerPoint transparency test, the BJC-600 performed a little slowly, but the results were well worth waiting for. The gradients in the back-



# TEST LAB



ground, behind the words and graphics, didn't contain any noticeable banding, and the colors were bold and surprisingly close to those on my color-calibrated desktop publishing monitor.

What really surprised me, though, was how well this printer reproduced some of the color photographs. Typically, inkjets don't do well with gray-scale and continuous-tone color photographs. Considering that the BJC-600 is an inkjet (you can't expect anything close to dye sublimation quality), it did quite well (see the sidebar "Photoshop Output Samples"). Colors are reasonably crisp, and the photograph details are discernible, which is about all you can ask of a printer in this price range.

While Canon claims the printer itself prints at 170 characters per second in high-quality mode, it takes a long time for the printer driver to rasterize (process) the data and send it to the printer—up to two or three times longer than with the other printers reviewed here. I encountered this sluggishness whether printing color graphics or monochrome text. In fact, the first time I printed from Word, it took so long for the data light on the printer to begin flashing that I thought the computer had crashed.

The BJC-600's drawbacks are minor and do little to take away from its overall quality and value. It's hard to beat this printer for quality.

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**Citizen Notebook Printer II**  
**Suggested retail price: \$399**  
**Estimated street price: \$329**  
**Warranty: two years**

**CITIZEN AMERICA**  
2450 Broadway, Ste. 600  
Santa Monica, CA 90411-4003  
(310) 453-0614

**Pros: small, lightweight, portable design; many options; good text output; low cost; inexpensive operation**

**Cons: color quality that's lacking compared to output from other printers in this review but good considering this is a portable**

## CITIZEN NOTEBOOK PRINTER II

Of all the printers in this month's roundup, the Citizen Notebook Printer II is the only true portable. If I couldn't find anything else nice to say about this printer, I'd have to admit that it's truly a remarkable testimonial to technology. It weighs in at under three pounds, and that includes the battery pack! It's about four inches wide and less than a foot long—small enough to fit neatly into a briefcase or the carrying case for your notebook computer. And you get it all for less than \$400 (except the battery, sold separately for \$69).

In addition to your small initial investment, you'll find that using the printer is inexpensive also. Black ribbons, which print up to 50 pages, are \$4.99, and color ribbons are \$6.99. The yield you'll get from the color cartridges is considerably less and depends, of course, on what you print.

The sheet feeder holds up to 5 pages, but Citizen offers a 30-page sheet feeder for \$69. If you plan to use the printer on your desktop, you should opt for the larger sheet feeder. The Notebook Printer II's built-in page feeder is a little temperamental. It took me a while to get the hang of inserting the

## THE TESTS

Usually, a primary printer-testing concern (other than print quality) is speed. Color printers are by nature slow. I did, however, note during the tests if a printer is atypically slow. Instead of concentrating on speed, the tests were designed to show print quality, primarily color and clarity. Other major concerns in this review are value and the appropriateness of a printer for specific applications, such as how well it fits into tight spaces.

To test how well each printer produces text, I printed a five-page Word for Windows document containing several different fonts in various point sizes. To test how well each printer performs on transparencies, I used a PowerPoint presentation containing several charts and graphs and multiple colors. To test how well each prints photographs, I printed several Photoshop images.

You can assess for yourself how well each printer performs by comparing the results of one of the tests (see the sidebar "Photoshop Output Samples").

paper just right, and even then it required some babysitting.

The Notebook Printer II uses a thermal transfer process and prints at 360 x 360 dpi. It did quite well on the text tests. The results were slightly better on coated paper. The plain-paper pages showed some slight blotchiness in large black letters. Frankly, the PowerPoint overheads were a little too sophisticated for this printer. It didn't do well on the gradient backgrounds. However, I did some tests using solid colors and was quite pleased with the results. If you're on the road and need to print a few transparencies quickly, this printer will serve you well, as long as you don't try to get too fancy.

As for printing photographs... well, if you plan to print photographs, this isn't the printer for you. Keep in mind that the primary application for this printer is to tote along with your



### PHOTOSHOP OUTPUT SAMPLES

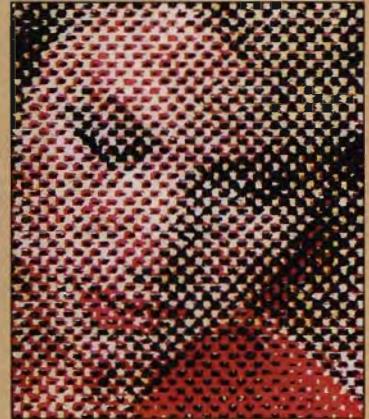
Below are examples of output magnified 400%. When comparing them to the original, look not only at the quality of the photograph but also at how well colors match. Depending on your application, color matching is often more critical than reproduction of photographs. Keep in mind, however, that some of these printers are not intended for photographic reproduction. The examples are offered to give you some sense of resolution capabilities.



Original



Canon BJC-600



Citizen Notebook Printer II



FARGO Primera (with dye sub.)



HP DeskJet 560C



HP Deskjet 1200C



IBM Color Jetprinter PS 4079



Star Micronics SJ-144



Tektronix Phaser 220e



# TEST LAB

notebook computer. It's really not practical to try to work with photographs on most notebook computers, anyway.

You can use this as a desktop printer, especially if your workspace is very limited. However, you should consider doing so only if your printing volume is very small—say, a few pages a day. And if your primary output is color, especially full-page color transparencies, you'll probably find the Notebook Printer II to be too slow. Citizen recommends an output ratio of 90 percent black to 10 percent color, which sounds about right. You should consider this printer as a color-is-there-if-you-need-it solution.

But hey, if you need a good notebook printer to whip out documents or print out faxes in your hotel room or car (a cigarette-lighter adapter is available for \$49), I can recommend this one. In fact, I'm considering adding it to my road-warrior arsenal. What's another 2.6 pounds, anyway?

Circle Reader Service Number 372

## FARGO PRIMERA

Of the eight printers reviewed here, the Primera is the most interesting and provides one of the more exciting options. This compact desktop printer provides thermal wax technology for less than \$1,000 and photorealistic dye sublimation printing for less than \$1,250. While this printer is not practical for high-volume color operations or desktop publishing settings where you need to proof large 24-bit photographs, it does provide good-quality color on a budget.

Out of the box, the Primera is a thermal wax printer. To get dye-sub, you have to spend another \$249.95 for a special ribbon, paper, and a Windows driver upgrade. At 203 dpi, the printer's maximum resolution, the thermal wax quality is mediocre. Colors are great, but the low resolution makes output grainy and jagged.

**FARGO Primera**  
**Suggested retail price: \$995.00**  
**(\$249.95 for dye-sub option)**  
**Estimated street price: less than \$900.00**  
**Warranty: one year**

**FARGO ELECTRONICS**  
**7901 Flying Cloud Dr.**  
**Eden Prairie, MN 55344**  
**(800) 258-2974**  
**(612) 941-9470**

**Pros: inexpensive thermal wax and dye sublimation output, good color, compact design**  
**Cons: low resolution, low speed, dependence on computer's RAM**

This printer is not really practical for printing text; the quality is not acceptable. However, FARGO does offer a black ribbon for text printing, so you could use the printer for that if you needed to.

The real story behind this printer is the dye-sub upgrade. Like magic, when you change the ribbon and paper, and then choose Photo-Realistic from the Windows driver, this printer is transformed into a high-quality color-proofing printer. The Primera's dye-sub output is nearly perfect (see the sidebar "Photoshop Output Samples").

However, photorealistic output comes at a price. Cost per page jumps from \$0.45 to \$2.79. And the printer slows to a crawl. Also, you need to be aware of the way the printer driver rasterizes images. The Primera really has no built-in processor. Image processing is performed in your computer's RAM, which means you'll need a good complement of memory in your computer to print big photographs. I have 16MB in my Pentium computer, and some of the large test photographs (over 8MB) locked up the system. For some reason, the printer didn't make good use of the 50MB virtual-memory swap file.

While FARGO claims that the Primera prints on plain paper, it doesn't really do so with the same



finesse as the other thermal wax printer reviewed here. As with most other thermal wax printers, you must leave a large (about three-fourths-inch) margin at the bottom of the page to accommodate the way the page passes in and out of the printer four times. For this printing system to work, you must use perforated A4-size paper and then tear the perforated strips away to cut the page down to letter size. You can print on plain letter-size pages, but only if you can live with the reduced print area. Keep in mind that using special paper adds to the expense of using the printer.

The Primera is not for everybody. In fact, it's more practical to use as a second specialized printer. One of my friends in the silk-screening business uses it to do dye-sub prints for showing his customers proofs of artwork. Then, if they want to see how a graphic looks on a T-shirt or sweatshirt, he prints a thermal wax version on T-shirt transfer paper and irons it onto a garment. This is an amazingly low-priced thermal wax and dye-sub printer, but it's not for everyday printing.

Circle Reader Service Number 373

## HEWLETT-PACKARD DESKJET 560C

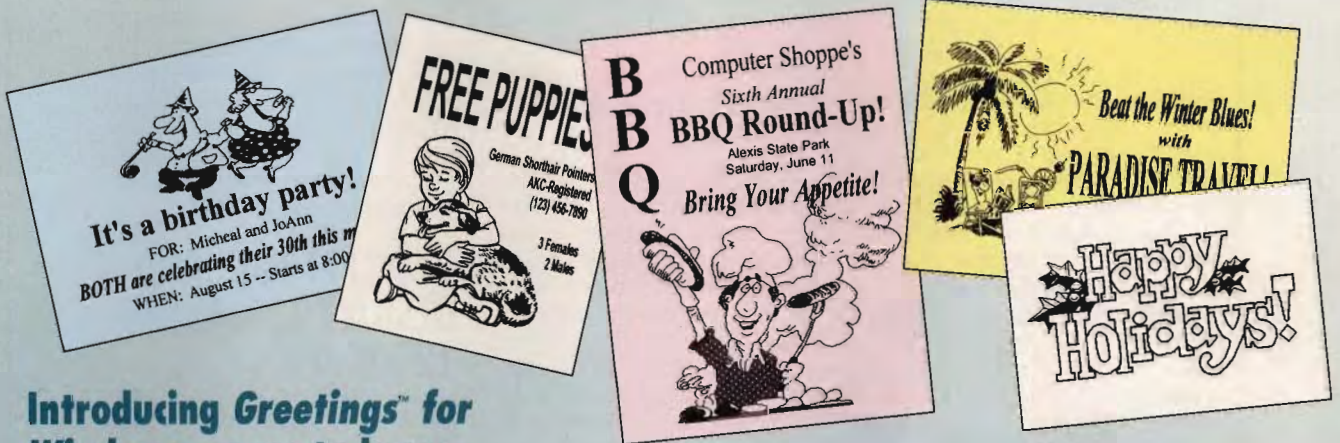
A recent upgrade to Hewlett-Packard's popular 550C, the 560C is a reasonably priced, well-built ink-jet printer. It prints well on plain paper and exceptionally well on



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Circle Reader Service Number 168

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# TEST LAB



special glossy paper and transparencies. This printer is easy to set up and a breeze to use. It takes up a little more room on your desktop (and costs a little more) than the Canon BJC-600, but it appears to be a bit sturdier.

Unlike many of the printers reviewed here, the 560C comes with a highly interactive printer driver that lets you select media and output types by clicking on easy-to-understand icons. The variety of options includes separate settings for printing graphics, such as charts and graphs, and for printing monochrome or full-color photographs. You can also choose separate settings for plain or glossy paper. When you select glossy paper, the 560C waits longer between pages, giving the ink time to dry and avoid smearing. There is even an Extra Drying Time setting.

On the print tests, the 560C performed like a champ. Text prints well at both large and small sizes, even on plain paper. Graphics print well on plain paper but appear a little washed out, which, because of absorption, isn't surprising. The photographs look good but hardly up to proof-printer quality, which you really can't expect from an inkjet. Where the 560C really excels is in printing transparencies. Colors and gradients are nearly perfect. The bars in my charts were almost identical to those in PowerPoint on the monitor.

The 560C is capable of resolutions of up to 600 x 300 dpi; however, except on large text (higher than 18 points), you'll notice little

**Hewlett-Packard DeskJet 560C**  
**Suggested retail price: \$719**  
**Estimated street price: less than \$600**  
**Warranty: three years**

**HEWLETT-PACKARD**  
P.O. Box 58059, MS 511L-SJ  
Santa Clara, CA 95051-8059  
(800) 752-0900

**Pros: low cost, good plain-paper printing, inexpensive operation**  
**Cons: none**

difference in the quality of the output, whichever resolution you use. For example, I couldn't tell the difference between the gray-scale and black-and-white graphics.

Like many of the printers reviewed here, the 560C supports a variety of paper sizes, including legal and envelopes. You can select paper size from the Windows printer driver or from the front panel on the printer. Other options, such as resolution and print quality, are also selectable from the control panel.

If you have an earlier DeskJet, you can use font cartridges designed to work with it. You cannot use emulation cartridges, such as the PostScript emulation cartridges typically supported by HP LaserJets. Emulation cartridge-

**Hewlett-Packard DeskJet 1200C**  
**Suggested retail price: \$1,839**  
**(\$2,749 for 1200C/PS)**  
**Estimated street price: less than \$1,500**  
**Warranty: one year**

**HEWLETT-PACKARD**  
P.O. Box 58059, MS 511L-SJ  
Santa Clara, CA 95051-8059  
(800) 752-0900

**Pros: PostScript option, good transparencies, good plain-paper printing, HP PCL compatibility, many options, high-volume capability**  
**Cons: high cost**

es require printer RAM. Inkjet printers typically have only small buffers for downloading fonts, and in that respect they're similar to dot-matrix printers. Exceptions are PostScript inkjets, such as the HP 1200C/PS and IBM Color Jetprinter PS 4079.

This is the part of the review where I usually discuss some of the product's shortcomings. But there really is no good reason not to recommend the 560C. You get a great printer at a great price, as well as Hewlett-Packard's exceptional reputation and quality.

Circle Reader Service Number 374

## HEWLETT-PACKARD DESKJET 1200C AND 1200C/PS

At first glance, the 1200C appears to be a grown-up version of the DeskJet 560C. However, a closer look reveals that it is much more. In its standard configuration, the 1200C emulates PCL5, the same language used by Hewlett-Packard's popular LaserJet printers. What this means is that the printer can use the same fonts, the same memory, and the same font cartridges. It also means that you get HP's Resolution Enhancement technology (REt), which improves the quality of certain types of graphics.

For \$910, you can upgrade the 1200C to PostScript, making the printer a 1200C/PS. For \$729 more, you can upgrade to PostScript Level 2, which provides





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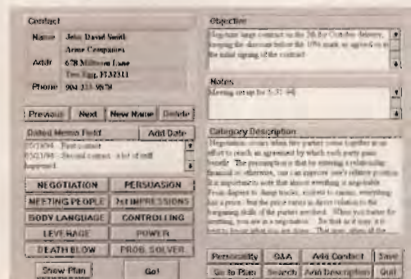
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- 9 Ways to get people to talk about themselves
- 3 Ways to find the bottom line in every deal



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# TEST LAB

increased speed and graphics quality but costs too much. The Level 2 upgrade takes the printer above the \$3,000 ceiling for this review. I looked at the 1200C/PS with 4MB of RAM.

This printer performs well and prints well, although a little slowly. The text and graphics overheads were exceptional. As with the HP 560C, you can print at either 600 x 300 dpi or 300 x 300 dpi. However, the 600 x 300 resolution is not available in color. I was especially impressed with how good text looks on plain paper. The Photoshop photographs were a bit disappointing, though. They were much too dark, and some of them were too large for the printer to handle in the 4MB of RAM. You can, however, upgrade the RAM to 20MB.

Hewlett-Packard sells several special paper selections and its own brand of transparencies. I got the best results on HP paper but saw no difference in different types of transparencies.

This is an ideal color printer for a network. It supports parallel, serial, and LocalTalk interfaces, and it can detect which port data is coming through and switch appropriately. What this means is that you can hook up both a Mac and a PC to the printer and use them simultaneously. You'll also find a variety of optional networking I/O cards for interfacing with Novell, Windows NT, UNIX, and just about any other network you can think of.

While this printer is a little too powerful and expensive for most desktops, it's certainly worth considering if you do high-volume color printing or even high-volume text printing with frequent color output. If you do only occasional color printing, this may be too much printer for your application. But if you do a lot of presentations, this is the ideal printer for overhead transparencies, and you can use it to proof 35-mm slides and print audience handouts.

Circle Reader Service Number 375

**IBM Color Jetprinter PS 4079**  
**Suggested retail price: \$3,199**  
**Estimated street price: \$2,600**  
**Warranty: one year**

**LEXMARK INTERNATIONAL**  
**740 New Circle Rd.**  
**Lexington, KY 40511**  
**(800) 358-5835**  
**(606) 232-2000**

**Pros: PostScript, good text output, oversize sheets, good plain-paper printing, many options**  
**Cons: high cost**

## IBM COLOR JETPRINTER PS 4079

Need a good color printer with lots of options? Check out the IBM Color Jetprinter PS 4079. It's the only printer I found in this price range that supports oversize sheets up to 11 x 17 inches. When you're printing color, there are a number of advantages to oversize sheets, including the ability to print out two-page newsletter spreads and to proof bleeds (areas where ink runs off the paper) on smaller sheets.

But oversize-paper support is certainly not the only feature to recommend this printer. It prints at a crisp 360 dpi. Text and graphics output is quite respectable on both plain paper and special coated paper. Transparencies are impeccable. About the only place where this printer falls behind the Canon and HP 560C models for output quality is in printing photographs. The Jetprinter reproduces colors and detail well enough, but backgrounds contain some slight unsightly patterns. However, as I've stressed throughout this article, you shouldn't rely on an inkjet printer to print color photographs.

The printer provides two emulation modes, both PostScript Level 1 and IBM-GL Plotter. And it automatically switches between them, without your having to change anything on the control pan-



el. Also supported are parallel, serial, and LocalTalk interfaces, and the printer can sense which port the data is coming through and switch appropriately.

You can upgrade the Jetprinter to 16MB of RAM. The unit I reviewed had 4MB. Unlike the HP 1200C/PS, the Jetprinter was able to print all of the test images with 4MB. I also hooked the printer to my Mac and PC at the same time to run simultaneous print jobs. The printer successfully communicated to the Mac that it was busy while I printed from the PC, and then successfully printed the Mac document when the PC had finished.

In addition to support for Windows, you also get drivers for the following DOS applications: Harvard Graphics 3.0, Lotus 1-2-3, Quattro Pro 3.0, and WordPerfect 5.1. You'll also receive support for the Macintosh, for RISC System/6000, and for OS/2.

Granted, this is more printer than most people need. But unlike some of the printers reviewed here, it is the only printer you'd need. It prints text quickly and transparencies flawlessly, and I even had reasonable results with a couple of gray-scale images. The ink cartridges are large and provide high yield. It costs only a few pennies per page to operate the printer.

Unless you're unable to handle the initial cost of the Jetprinter, which is much higher than the cost of the other printers covered in the roundup, there's really no reason not to buy it. It's a great printer for people who do a lot of color printing. And remember that you get what you pay for.

Circle Reader Service Number 376





## STAR MICRONICS SJ-144

Now here's a small, easy-to-use, and inexpensive-to-operate color printer for everybody. Like the Canon, this printer takes up practically no space on your desktop; however, unlike the Canon, the SJ-144 does not feed its output onto the desktop, making this a truly compact model. You can print anywhere. I set it on top of my monitor, and it ran perfectly.

I got a little bolder and balanced it on top of a pile of books. The SJ-144 hummed along, barely moving. The Canon, on the other hand, shook my desk slightly. I would not have considered setting it anywhere but on a secure surface. Frankly, however, I could have run the SJ-144 in the palm of my hand, sideways, or upside down. But keep in mind that there are trade-offs for everything. The SJ-144 doesn't print quite as well as the Canon.

A thermal transfer device, the SJ-144 supports two resolutions: 180 x 180 and 360 x 360. These resolutions are a little misleading. No matter how hard I tried, I could not get the output to look acceptable on plain paper. Text was faded and blotchy, and some graphics were almost unrecognizable. In fact, the output was so bad with plain paper that I was about to declare this printer unusable.

But what a transformation when I used the coated paper! Text printed clearly and crisply. My transparencies looked good,

**Star Micronics SJ-144**  
**Suggested retail price: \$599**  
**Estimated street price: less than \$500**  
**Warranty: two years**

**STAR MICRONICS**  
**70D Ethel Rd. W**  
**Piscataway, NJ 08854**  
**(800) 447-4700**

**Pros: low cost; good text output; inexpensive operation; small, quiet, compact design**  
**Cons: poor plain-paper printing**

too. About the only thing this printer can't do really well is photographs. At this price (\$599), though, you can't expect a perfect photorealistic proof printer. What you get instead is compactness and convenience at a reasonable price.

And the printer continues to be a bargain. Monochrome costs about \$0.05 per page. Color is a bit more expensive at \$0.94 per page. You should use the color ribbon only when you're ready to print your final draft.

A very impressive feature of this printer is its ability to sense which ribbon is loaded. When you try to print a completely black-and-white document with the color ribbon loaded, the printer gives you a ribbon error message

**Tektronix Phaser 220e**  
**Suggested retail price: \$3,995**  
**Estimated street price: less than \$3,000**  
**Warranty: one year**

**TEKTRONIX**  
**P.O. Box 1000, MS 63-583**  
**Wilsonville, OR 97070**  
**(800) 835-6100**  
**(503) 682-7377**

**Pros: excellent color, high-volume capability, PostScript Level 2, two paper trays, fast operation**  
**Cons: high cost, expensive supplies, large design**

and stops to allow you to change to black-and-white. This is a great way to make sure you don't waste your color ribbons while printing black-and-white.

Most likely, this is not necessary to point out, but the SJ-144 is not a high-volume printer. It's designed for people who use their computers occasionally and don't print often. It's also designed for people who don't have a lot of desk real estate to dedicate to their printers. If you meet both of these criteria and want a printer you can set (and easily carry) anywhere, this one's a good option.

Circle Reader Service Number 377

## TEKTRONIX PHASER 220E

Of all the printers reviewed here, this one is probably the most market-specific. The Tektronix Phaser 220e is a thermal wax printer in the traditional sense. It's large, it prints best on special paper or transparencies, and it's primarily designed for use on a network or by a desktop publisher who works with color. While its colors are not as photorealistic as those produced on a dye sublimation printer, it works great for overheads and for color proofing. It's not inexpensive to use, so you'll need a second printer for text and other monochrome documents.

A huge device, the Phaser 220e weighs about 40 pounds. The model I looked at came with an optional second feed bin so that you can





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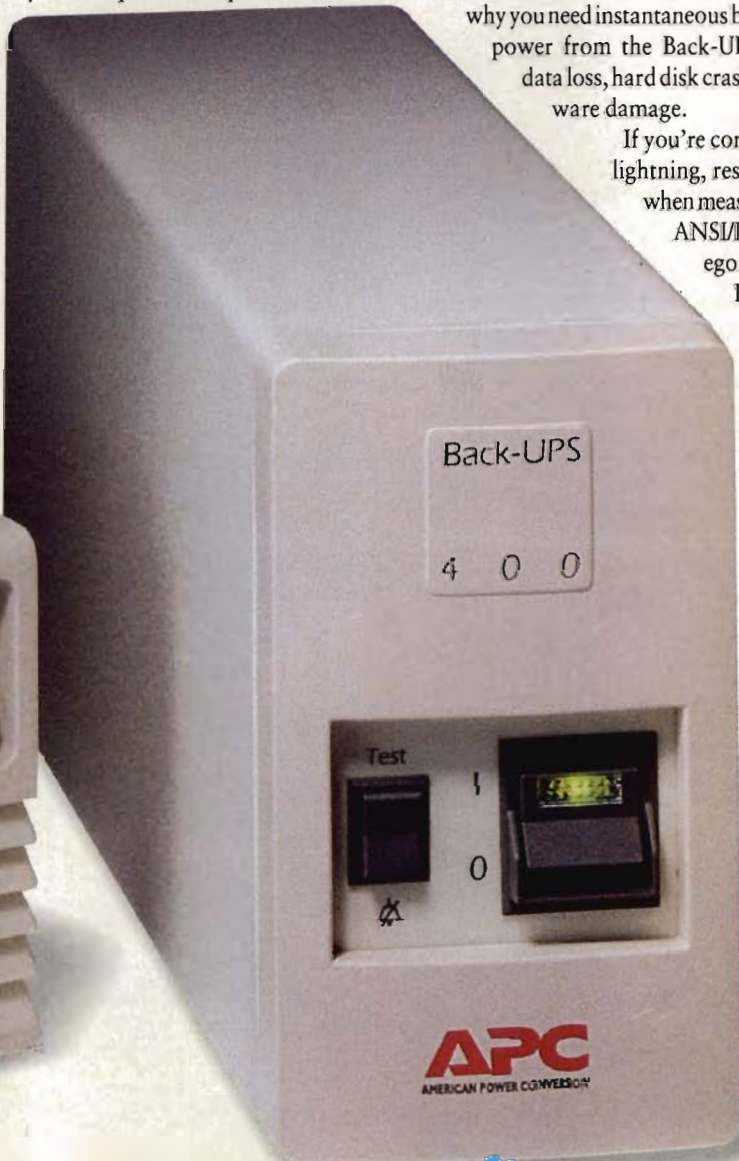
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# Back-UPS prevail



"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sisilli, Systems Analyst, City of Port St. Lucie. "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. The other brands are dying off. Typically they last just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."



Don Traux knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'holler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."



Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

virtually all separate surge suppressors. Surge performance is even backed by a \$25,000 Lifetime Equipment Protection Guarantee.

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

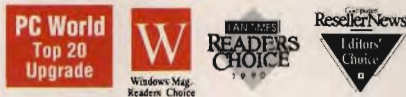


And since data processed on networked clients needs protection too, the \$139 Back-UPS 250 provides an



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APC has won more awards for performance and reliability than all other UPS vendors combined...including four consecutive LAN Times Readers Choice awards...



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awards than all other brands combined, field-proven reliability, and a two year warranty, Back-UPS are power protection you can purchase with confidence.

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LAN Interface (on Back-UPS 400 and up) provides automatic shutdown to all major OS: Windows, NT, NetWare, LAN Server, LAN Manager, LANtastic, Unix, OS/2, Vines, AppleShare/System7 and more.

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Back-UPS (R to L)	Application	Sugg. List
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400	Desktop 486, 386 systems, servers	\$229
450	Tower 486, 386 systems, servers	\$279
600	Heavily configured systems, CAD/CAM workstations	\$399
900	Multiple systems, longer runtime applications	\$599
1250	Multiple systems, LAN hubs, small minis, telecom equipment	\$799



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# TEST LAB

COLOR PRINTER FEATURES	Canon BJC-600	Citizen Notebook Printer II	FARGO Primera	HP DeskJet 560C
Technology used	inkjet	thermal transfer	thermal wax	inkjet
Configuration				
Standard/maximum memory	60K/60K	none	32K/32K	64K/64K
RGB or CMYK transfer	CMYK	CMYK	CMYK or CMY	CMYK
Paper sizes supported	letter, legal, A4, envelopes	letter, legal, A4, envelopes	A, A4, T-shirt transfer paper	letter, legal, A4, envelopes
Options				
Cost of optional paper trays or feeders	NA	\$69	NA	NA
PostScript	no	no	no	no
Cost of PostScript upgrade	NA	NA	NA	NA
Interfaces supported	parallel	parallel, serial, LocalTalk	parallel, LocalTalk	parallel
Optional interfaces	no	no	no	no
Cost of optional interfaces	NA	NA	NA	NA
Simultaneous support for multiple ports	no	no	no	no
Other options available	no	30-pg. feeder-\$69, battery-\$69, carrying case-\$50, cigarette-lighter adapter-\$49	dye sublimation upgrade-\$249.95	no
Cost of operation				
Number of ribbons or cartridges required	4 ink cartridges	1 ribbon	1 ribbon	2 ink cartridges
Price per ribbon or cartridge	black-\$7.50, color-\$6	black-\$4.99, color-\$6.99	thermal color-\$45, thermal mono-\$39.95, dye-sub-\$89.95/25 prints, \$279.95/100 prints	black-\$31.95, tricolor-\$34.95
Monochrome pages per ribbon or cartridge (Color numbers vary according to job.)	350	black-50, color-8	3-color-115, 4-color-80, mono-360	1000
Cost per page	monochrome-\$0.10, color-\$0.10	monochrome-\$0.09, color-\$0.87	thermal-\$0.45, dye-sub-\$2.79	monochrome-\$0.02
Special paper required	no (optional)	no	thermal wax paper required, FARGO paper required for dye-sub	no (HP glossy paper available)
Cost of special paper	\$20/200 sheets	NA	premium-\$19.95, standard-\$14.95	\$59.95/500 sheets
Plain-paper printing	yes	yes	no (requires smooth laser paper)	yes
Acceptable plain-paper printing	yes	yes	NA	yes
Specifications				
Dimensions	16.1" x 9.7" x 7.2"	11.7" x 4.1" x 2"	5.8" x 13.8" x 10.2"	8.2" x 17.5" x 15.3"
Weight	9.4 lbs.	2.6 lbs. with battery	15 lbs.	14.5 lbs.



HP DeskJet 1200C	IBM Color Jetprinter PS 4079	Star Micronics SJ-144	Tektronix Phaser 220e
inkjet	inkjet	thermal transfer	thermal wax
4MB/20MB	4MB/16MB	176K/176K	8MB/8MB
CMYK	both	CMYK	CMYK
letter, legal, A, A4	letter, legal, tabloid, A3, A4, B5, executive, envelopes	letter, legal	letter, letter perforated
NA	NA	NA	\$99
upgradable	yes	no	yes (Level 2)
\$910 (Level 2-\$729 more)	NA	NA	NA
parallel, LocalTalk	parallel, serial, LocalTalk	parallel	parallel, serial, LocalTalk
several network options	several network options	no	UNIX, VMS
\$199-\$499	varies	NA	free
yes	yes	no	yes
memory upgrades 1MB-\$119, 2MB-\$209, 4MB-\$309, 8MB-\$594	memory upgrades 4MB-\$299, 8MB-\$499	iron-on transfer paper-\$6.95/10 sheets, overhead transparencies-\$19.95/20 sheets	additional 22 fonts-\$595, 220i upgrade-\$2,300
4 ink cartridges	4 ink cartridges	1 ribbon	1 ribbon
black-\$29.95, CMY-\$34.95	black-\$24.75, CMY-\$34.75	black-\$9.99, color-\$7.50	3-color roll-\$165, Color Coat for laser paper-\$126
1439	800	180	3-color roll-342, Color Coat-214
monochrome-\$0.12	monochrome-\$0.15	monochrome-\$0.05, color-\$0.94	monochrome-\$0.56, color-\$0.56
no (HP glossy paper available)	no (optional), special transparencies required	no (but highly preferable)	laser paper required
\$59.95/500 sheets	\$0.10/1 sheet	NA	\$30/500 sheets 3-color, \$80/1000 sheets Color Coat
yes	yes	yes	no (requires smooth laser paper)
yes	yes	no	NA
11.1" x 19.1" x 16.9"	20.5" x 16" x 6.7"	12.8" x 5.5" x 6.9"	11" x 17.5" x 13.4"
29 lbs.	22 lbs.	5.5 lbs.	40 lbs.

run paper from one tray and transparencies from the other. All that users on the network have to know when printing is which tray holds which medium.

Interface options abound, including parallel, serial, LocalTalk, and SCSI; and the printer can switch ports automatically. You can use the SCSI port to install a hard drive for storing fonts. The printer also supports PostScript, HP-GL, and PCL5 emulation, meaning that you can print in either PostScript, HP plotter, or HP LaserJet mode. And unlike the HP 1200C/PS, it comes standard with Level 2 PostScript.

Also impressive is the color correction technology (called TekColor) built into the Windows and Mac printer drivers. You can tell the printer to correct color based on standard output values or to match the monitor. This doesn't work flawlessly (monitors are capable of many more colors than printers), but it's a step closer to true color WYSIWYG.

The Phaser 220e performed well on all of the output tests. Text was clear and crisp at all sizes. The colors and graphics in the transparencies were impeccable. Even the photographs, though not quite up to dye sublimation quality, printed quite well. However, as with the other thermal wax printer in this review, you'll have to use A4-size paper and then tear away the perforated tabs to get a full letter-size page. Another great application for this type of printer is creating iron-on patches for clothing.

This is not the printer for most desktops. You should spend this kind of money only if you print color often. Desktop publishers should get good use from the Phaser 220e, as should people who do a lot of presentations.

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# PROGRAMMING POWER

Tom Campbell

## QUESTIONS AND ANSWERS

This column is neither fish nor fowl. It's not the usual how-to column I normally present, and it's not exactly a review, either. Instead, it answers the questions I get asked more often than any other—namely, what programming tools I use and why.

Visual Basic 3.0. If you haven't programmed in BASIC for a few years and you have a Windows programming project coming up, you can probably do it in Visual Basic. Forget what the experts have been telling you about how underpowered and slow BASIC is. Visual Basic is sensational, the biggest thing to hit the programming world since C. With version 3.0, Visual Basic moved into the big leagues by offering built-in database support and the generally excellent Jet database engine, the same used by Microsoft Access. Visual Basic's greatest strength lies in its custom controls, which can take the form of anything from full-fledged image manipulation programs to industrial-strength word processors to communications modules to Windows 4-style bubble help controls—the possibilities are quite literally endless. Visual Basic has some shortcomings that C and C++ don't have (custom controls must be written in C, C++, or Turbo Pascal and can't even be written in Visual Basic), but there's always a custom control to fit your needs. The professional edition costs a couple of hundred more than the standard edition, but it is essential for most database work, comes with some killer custom controls that the standard edition doesn't have, and has the help compiler you need to create true Windows online help. It's by far the eas-

iest "real" Windows language to learn, and it's also the most fun. My biggest concerns about Visual Basic were speed and language limitations, but I've done a number of professional applications in Visual Basic, and neither of those issues has ever even come up.

Visual C++. In my day job I'm a systems programmer, doing things that generally require the maximum speed and flexibility. Because the programs I write are very close to the hardware, I use C and C++, and Visual C++ is the only compiler I've used for a year now. It's very clear to me that the future of Windows systems programming is C++ and that MFC will be the class library of choice. Microsoft has licensed it to other vendors, the source to MFC is included with the professional edition of Visual C++, and MFC is the best overall class library I've ever seen. More important, MFC is effectively the new Windows API, and most articles, third-party books, and examples will employ MFC. As Windows moves to other machines, the C API will change somewhat, but MFC will be much easier to maintain. Visual C++ 1.5 adds database and OLE support, the latter being unbelievably easy to add to your programs.

The SemWare Editor. If I could graft the Borland editor into the Visual C++ environment, I'd be in seventh heaven, but with The SemWare Editor for DOS, at least I'm in sixth heaven. It's very small, quite inexpensive, and totally reconfigurable; it edits files of any size; and it has a superconvenient temporary macro facility that I use several times a day. You can contact SemWare at (404) 641-9002.

Components. Spread/VBX from FarPoint Technologies (804-378-0432) is in many

ways more advanced than the spreadsheet core of Excel 4.0; it's very well designed and implemented. It has formulas (even user-defined formulas), cool little calendars you can use to enter dates, different fonts for each cell, in-cell editing, full Clipboard support, and even support for images in cells. Tab/VBX gives you those cool tabs that OS/2 and the upcoming Windows 4 will have. Manuals for both products are a bit skimpy and would be well served by more examples, but the software is bug-free and very, very slick. FarPoint has other products, but I haven't looked them over yet.

MicroHelp (800-922-3383) has some very fine Visual Basic custom controls in its 3-D Gizmos toolkit, almost all of which work with Visual C++, too. HighEdit Pro lets you bring full word-processing capabilities into your apps, conquering the 32K, single-font limitations notorious to Visual Basic hackers. MicroHelp's custom controls always work great, but the documentation is of only medium quality, sorely lacking in tutorial matter and real-world sample programs. MicroHelp also has an extensive communications library, a high-performance library of about 700 general-purpose routines, and other products.

Sheridan's VBAssist, which I covered in the April column, is worth its weight in gold when I'm developing database applications in Visual Basic. You can get by without it if you're not creating database apps professionally, but if you are, it's a wonder worker, attaching itself to the Visual Basic environment and giving you a feature set so well integrated into Visual Basic that you'll very quickly begin to wonder how developers can use Visual Basic without it. You can contact Sheridan at (516) 753-0985. □

**This isn't  
the usual how-to  
column I  
normally present,  
and it's not  
exactly a review,  
either.**





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# TIPS & TOOLS

Edited by Richard C. Leinecker

**Finding hidden files  
in File Manager,  
defragging floppies,  
and faking out  
your friends with a  
faux desktop**

## Unhiding Files

I've managed to find a way to see hidden and system files in Windows 3.1. You need to run File Manager (it's in the program group labeled Main). From File Manager, select the View pull-down menu. Choose By File Type, click on the check box that says Show Hidden/System Files, then click on the OK button.

Hidden and system files can be identified by the red ! character that appears on the file icon (which looks like folded pieces of paper). The ! character will appear in the middle of the icon.

DAVID MAGDA  
TORONTO, ON

## Faster Floppies

Here's a small batch file I created to defragment floppy disks. It requires DOS 6.2's CHOICE and DEFRAG. You'll find that accessing many floppies is much faster once they are defragmented. Here is DF.BAT.

```
@ECHO OFF
CLS
:AGAIN
ECHO.
ECHO Place disk to be
ECHO defragmented
ECHO in the A drive now.
ECHO.
PAUSE > NUL
DEFRAG A: /F /SN /H
CLS
CHOICE /C:YN /T:N,10 Do you wish
to defragment another
IF ERRORLEVEL 2 GOTO END
IF ERRORLEVEL 1 GOTO AGAIN
:END
```

The parameters in the DEFRAG statement are as follows: the drive, A; the switch to fully defragment the selected floppy, /F; the switch to sort files by name, /SN; and the switch to defragment hidden files, /H.

The parameters in the CHOICE statement tell which

keys to accept, /C:YN; how many seconds before the default engages, /T:N,10; and the text to display onscreen, *Do you wish to defragment another*. You don't need to place a question mark after the text. Choice does this automatically.

This will not run under Windows or any other multi-tasking environment.

JAMES S. ALLEN  
TRENTON, MO

## Windows Trick

If you use Windows and suspect that people are messing with your system, you can play a trick on them. Set up Windows the way it would look on a typical workday. Press Print Screen. This captures the screen image to the Clipboard. Next, load up Paintbrush. Pull down the Options menu and select Image Attributes. In the resulting dialog box, click on Pels and make sure the image size is the same size as your screen. My screen is 640 x 480, so I set the image size at 640 wide and 480 high. Go to the View menu and choose Zoom Out. Pull down the Edit menu and select Paste. A grid will appear in the Paintbrush window. Pull down the Edit menu and select Paste again. Your Windows desktop will appear on the canvas. Go to the View menu and choose Zoom In. Save the picture as DESKTOP.BMP and quit Paintbrush.

Start up the Control Panel (located in the Main program group) and choose Desktop. When the Desktop window appears, go to the Wallpaper section and choose DESKTOP.BMP. A picture of your desktop will now be the wallpaper.

When you leave your computer unattended, minimize the Program Manager and all other programs. Position

them in the bitmap picture of your desktop so that they are disguised. If others try to use your system, they'll end up clicking on the wallpaper and become confused. Of course, they'll eventually figure it out, but at least you'll get a laugh out of their reaction.

CLYDE LAW  
STONY BROOK, NY

## Undocumented WordPerfect

If you use WordPerfect 5.1 and have an extended keyboard, you can use three commands that aren't listed in the manual. Shift-F11 turns on italics, Ctrl-F11 turns on large print, and Alt-F11 turns on very large print.

JIM KROON  
WALLINGFORD, CT

## An Ounce of Prevention

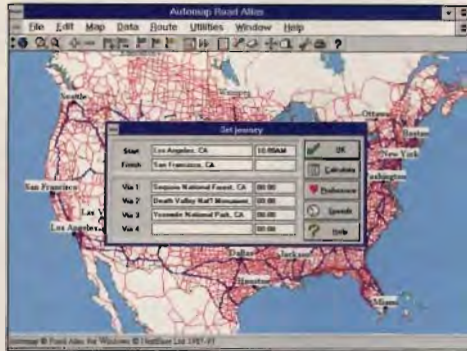
I've been going through my collection of past issues of COMPUTE and have seen at least two recent references to what to do when the inevitable battery failure occurs or the CMOS information is lost for other reasons. Mark Minasi's November 1993 "Hardware Clinic" had a very informative method for recovering the hard drive information. The adage about an ounce of prevention being worth a pound of cure definitely has merit.

The following two short BASIC programs should be stored on an emergency boot disk. (Every computer should have at least one emergency boot disk.) When SAVECMOS is run, it reads the values from the CMOS and stores them in a file called CMOS.RAM. If the CMOS loses its values, boot from the emergency disk, run QBASIC, and run RESTCMOS. This will restore the values saved in CMOS.RAM to the CMOS. Needless to say, the file CMOS.RAM needs to be



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**Requirements:** Hard drive with 5 1/2 MB free. **Windows version:** Windows 3.0 or above (not standard or enhanced mode). **DOS version:** DOS 3.0 or above, 640K RAM. **Destination Series add-ons:** Work with DOS or Windows versions of Automap Road Atlas. **Mac version:** Macintosh Classic II & up, or a Powerbook 140 & up. Does not run on Macintosh Plus, SE or original 128K or 512K Macintosh. Superdrive, System 6.0.7 or above, System 7 friendly.

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AUTOMAP® Road Atlas for Windows  
Route: Portland, OR to "Wabster, BC, Can"  
Via "Boulevard Falls, WA"  
Quick info: 431 miles, 7 hrs 37 min, \$56.31

Time	Instruction	Road	Dist	Dir	Towards
10:03	DEPART Portland (OR) on route	9	10 miles	N	Tacoma
10:14	At Vancouver stay on the	9	20 miles	N	Tacoma
10:32	At Vancouver stay on the	15	19 miles	N	Tacoma
10:49	At Kelso stay on the	16	10 miles	N	Tacoma
10:58	At Camas stay on the	27	28 miles	N	Tacoma
11:25	At Cathlamet stay on the	19	3 miles	N	Tacoma
11:27	At Cathlamet stay on the	19	24 miles	N	Tacoma
11:46	At Olympia stay on the	5	23 miles	N	Tacoma
12:01	Turn off onto	S582	5 miles	E	(Parkland)
12:11	At Parkland stay on the	S427	8 miles	E	(Parkland)
12:20	At Playlaw go onto	S347	8 miles	N	Blanton
12:27	At Algona turn right onto	S346	3 miles	E	(Hubert)
12:29	At Hubert stay on the	S218	23 miles	E	(Hubert)
12:55	Take a right onto	18	2 miles	E	Stoughton
12:57	Take the	S202	1 mile	N	
12:58	Take the	Local road	2 miles		
13:02	ARRIVE "Wabster, BC, Can"	Local road	2 miles		
13:02	DEPART "Wabster, BC, Can"	S205	6 miles	N	
13:06	Take the				



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on the boot disk, too. Here is SAVECMOS.BAS.

```
DEFINT A-Z
DIM CMOS(63)
FOR I = 1 TO 63
OUT 112,I
CMOS(I) = INP(113)
NEXT I
OPEN "CMOS.RAM" FOR OUTPUT
AS #1
FOR I = 1 TO 63
WRITE #1, CMOS(I)
NEXT I
CLOSE #1
SYSTEM
```

Here is RESTCMOS.BAS, which you can use to restore the CMOS settings.

```
DEFINT A-Z
DIM CMOS(63)
OPEN "CMOS.RAM" FOR INPUT
AS #1
FOR I = 1 TO 63
INPUT #1, CMOS(I)
NEXT I
CLOSE #1
FOR I = 1 TO 63
OUT 112,I
OUT 113, CMOS(I)
NEXT I
SYSTEM
```

RICHARD P. LEEDOM JR.  
CLERMONT, FL

## Undocumented Mem

If you have MS-DOS 6.2, there's an undocumented switch you can add to the Mem command. If you want to see the available space in high-memory area, add /A to the command line.

DANNY MULLEN  
FORT HOOD, TX

## Get the Rodent Right

Computer systems just get more and more complicated. Adding expansion cards can be a nightmare. One of the hardest things to do is install modem or fax cards. I always find myself asking what COM port and IRQ my mouse is on so I can avoid the conflict.

If you're lucky enough to see those parameters when your mouse driver first loads, great. The rest of us have to rely on deductive reasoning.

This month a program that you can type in will solve all of your problems. If you run it and your mouse driver is installed, it'll show you what kind of a mouse you have, what IRQ it's on, and for serial mice, what COM port it's on. It's called Rodent.

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

### debug rodent.com

#### File not found

```
-e 100 2B C0 8E C0 26 A1 CC 00
-e 108 26 0B 06 CE 00 0B C0 74
-e 110 49 2B DB B8 24 00 CD 33
-e 118 0B DB 74 3E 80 C1 30 88
-e 120 0E 88 01 8A DD 2A FF FE
-e 128 CB D1 E3 88 97 5E 01 B4
-e 130 09 CD 21 80 F9 30 74 22
-e 138 BA 87 01 B4 09 CD 21 80
-e 140 F9 33 7C 16 80 F9 34 7F
-e 148 11 80 F1 07 80 E9 02 88
-e 150 0E 93 01 BA 8D 01 B4 09
-e 158 CD 21 B4 4C CD 21 68 01
-e 160 6D 01 75 01 7D 01 83 01
-e 168 42 75 73 2C 24 53 65 72
-e 170 69 61 6C 2C 24 49 6E 50
-e 178 6F 72 74 2C 24 50 53 2F
-e 180 32 2C 24 48 50 2C 24 49
-e 188 52 51 20 32 24 2C 43 4F
-e 190 4D 4D 20 33 24 0D 0A 24
-RCX
CX 0000
:0098
-W
```

### Writing 0098 bytes

-Q

The checksum value is 14337 (see the July 1994 "Tips & Tools" for CHECKSUM.COM).

RICHARD C. LEINECKER  
REIDSVILLE, NC

## Extra Stuff

This month, four new programs appear on America Online. Three will help you give your batch files a professional appearance. One will give you a quick way to print out a few lines on your printer.

Sedit is a text-based paint program that lets you design screens for use with a companion program, Scrnshow. A program called Grabtext will let you capture text-based screens to load into Sedit or Scrnshow. You'll be amazed at how great your batch files will look. (Source code for Sedit and Grabtext isn't available right now.)

Typerte is an enhanced version of a program that appeared earlier in "Tips & Tools." This version works better and has more options.

If you have useful programs, please send them in, and we'll try to use them as our online bonus programs. We can't pay for them the way we pay for published tips, but a lot of people will appreciate them.

RICHARD C. LEINECKER  
REIDSVILLE, NC

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

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locating your mouse,  
and more

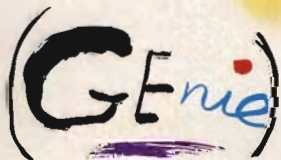




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# HARDWARE CLINIC

Mark Minasi

## PENTIUM SPEED

The clock speeds of Pentiums and 486s seem similar. But the Pentium is faster than the 486—how does it get faster?

Pentium chips are offered in 60- and 66-MHz varieties because Intel had trouble producing Pentiums that could handle 66 MHz. Many of those failed 66-MHz chips could perform reliably at 60 MHz, so Intel offered the 60-MHz chip. Most of the less expensive Pentium machines are based on the 60-MHz chips. A Pentium running at 60 or 66 MHz doesn't sound like that much of an improvement over the 486DX2-66 chip, but it's actually much faster. One reason for the higher speed is that the 60- and 66-MHz Pentiums run both internally and externally at those speeds. The 486DX2-66, in contrast, runs at 66 MHz internally but only at 33 MHz when communicating with the rest of the PC's circuitry.

A new Pentium chip, the P54C, runs at 90 or 99 MHz, but unlike the original Pentiums, it isn't a pure 90- or 99-MHz chip. Instead, the P54C is a 60- or 66-MHz Pentium equipped with a one-and-a-half-clock circuit. The motherboard would run at, say, 60 MHz, but internal P54C operations would run 50 percent faster.

Potentially, this P54C could be offered as an upgrade chip for existing Pentium systems, but only with a special socket. In any case, be aware that a 100-MHz Pentium system really has a jazzed-up 66-MHz Pentium at its heart.

Another way the Pentium racks up better speed is as a result of instruction pipelining. A CPU executes a program in memory by first fetching the instruction from RAM, then executing the instruction. Those two steps are unchanged regardless of the CPU. But be-

fore the instruction can be executed, the CPU must figure out what kind of instruction it is. For example, some instructions only require one byte of information, like the simplest CPU instruction, NOP. NOP means "no operation"; when the CPU encounters this instruction, it just moves along to the next instruction. Its opcode is hex 90. Here are the steps the CPU must go through in executing NOP.

1. Read the 90h opcode.
2. Recognize that there are no other bytes to read in this instruction.
3. Increment the instruction pointer (IP) by one so that the CPU knows where to get the next instruction.
4. Fetch the next program instruction.

By contrast, a command like MOV AX,[44], which tells the CPU to add the value in the AX register to whatever is in memory location 44, requires many more steps. In hex, it's three bytes: 03, 06, 44. Here's what the CPU must do to perform this operation.

1. Read the 03 opcode.
2. Recognize it as an ADD command, which requires at least one more byte.
3. Read the next byte, 06.
4. Recognize that the 03, 06 combination requires a third byte.
5. Read the next byte, 44.
6. Fetch the value at location 44 from memory.
7. Add the value in memory location 44 to the value currently in the AX register.
8. Put the result into the AX register.
9. Add three to the instruction pointer so that it can find the next instruction.
10. Fetch the next instruction from memory.

Early microprocessors would perform steps 1-10 above, and only when the tenth step was finished would they start working on the next

instruction. This would be like running an automobile factory by making an entire car without starting work on the second car until the first is completely finished. That's silly, as it's obvious that one group of people can be working on an engine while another group works on the wheels while another works on the doors, and so on. Microprocessors can do the same thing, and the first Intel 80x86 processor to do that was the 80286. The 286 incorporated 6 bytes of prefetch queue or pipeline. (The 80386 has 16 bytes, the 486 has 32 bytes, and the Pentium has two 64-byte queues.)

The prefetch queue can speed up a microprocessor in two ways. The first is what I just described—the assembly-line approach to decoding instructions. Before I explain the second, I need to explain the bottleneck between memory and the CPU.

The CPU spends a lot of time retrieving data from the system's memory. Typically, that requires two cycles of the computer's clock, during which the CPU is not decoding and executing instructions. Therefore, the prefetch queue can save time in another way: It can get the instructions out of memory in parallel with the decoder unit. While the CPU's execution unit is executing instruction X, the decoder unit is decoding instruction X+1, and the prefetch unit is retrieving instruction X+2 from the RAM.

This *sounds* great. Unfortunately, it doesn't always work. If the CPU's execution unit is in the middle of executing an instruction that moves data to or from memory, then the pathways between the memory and the CPU are already occupied for the moment, and the prefetch unit must wait. Despite that bottleneck, the instruction prefetch considerably

**The tricks Intel used to make the 66-MHz Pentium faster than the 66-MHz 486DX2**





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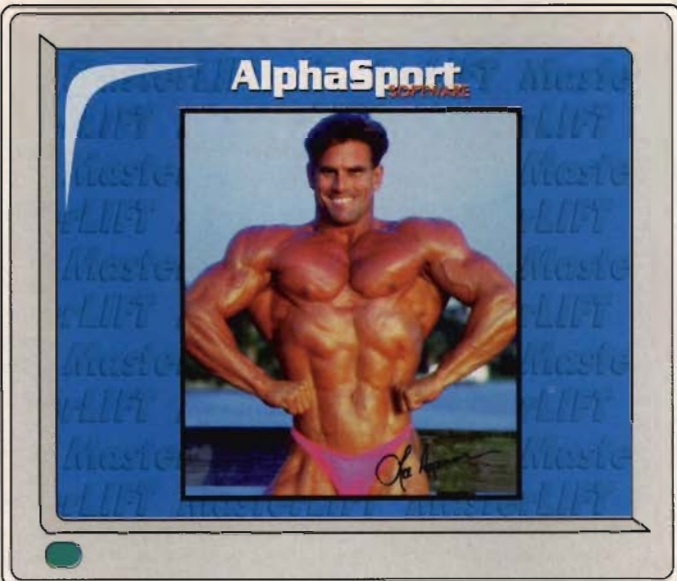
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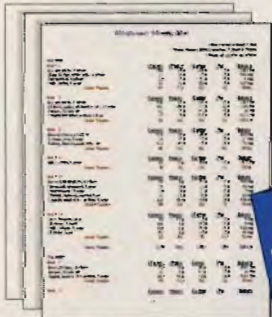
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# HARDWARE CLINIC

speeds up CPU operations.

That's not the end of the memory story, however. We discuss CPU speeds in terms of megahertz—and the more megahertz, the better. We discuss memory speeds in nanoseconds (ns) of access time—and the fewer nanoseconds, the better. As CPUs get faster, memory must get faster as well. The relationship between CPU speed and memory speed isn't straightforward, but you can get a rough equivalence using this formula: If you have a CPU of M megahertz, then it will require RAM with an access time of about  $2000/M$  nanoseconds. For example, a 50-MHz system would require RAM with an access time of  $2000/50$  ns—

which works out to 40 ns.

Most PCs use dynamic RAM, which is cheaper and slower than static RAM. Static RAM is about ten times more expensive than dynamic RAM, it takes up more physical space in a computer, and it generates more heat than dynamic RAM. For that reason, dynamic RAM is usually the primary RAM used in a PC. But dynamic RAM doesn't come much faster than about 65 ns, which is too slow for modern processor speeds. How can engineers design a machine with RAM that can keep up with the fastest CPUs?

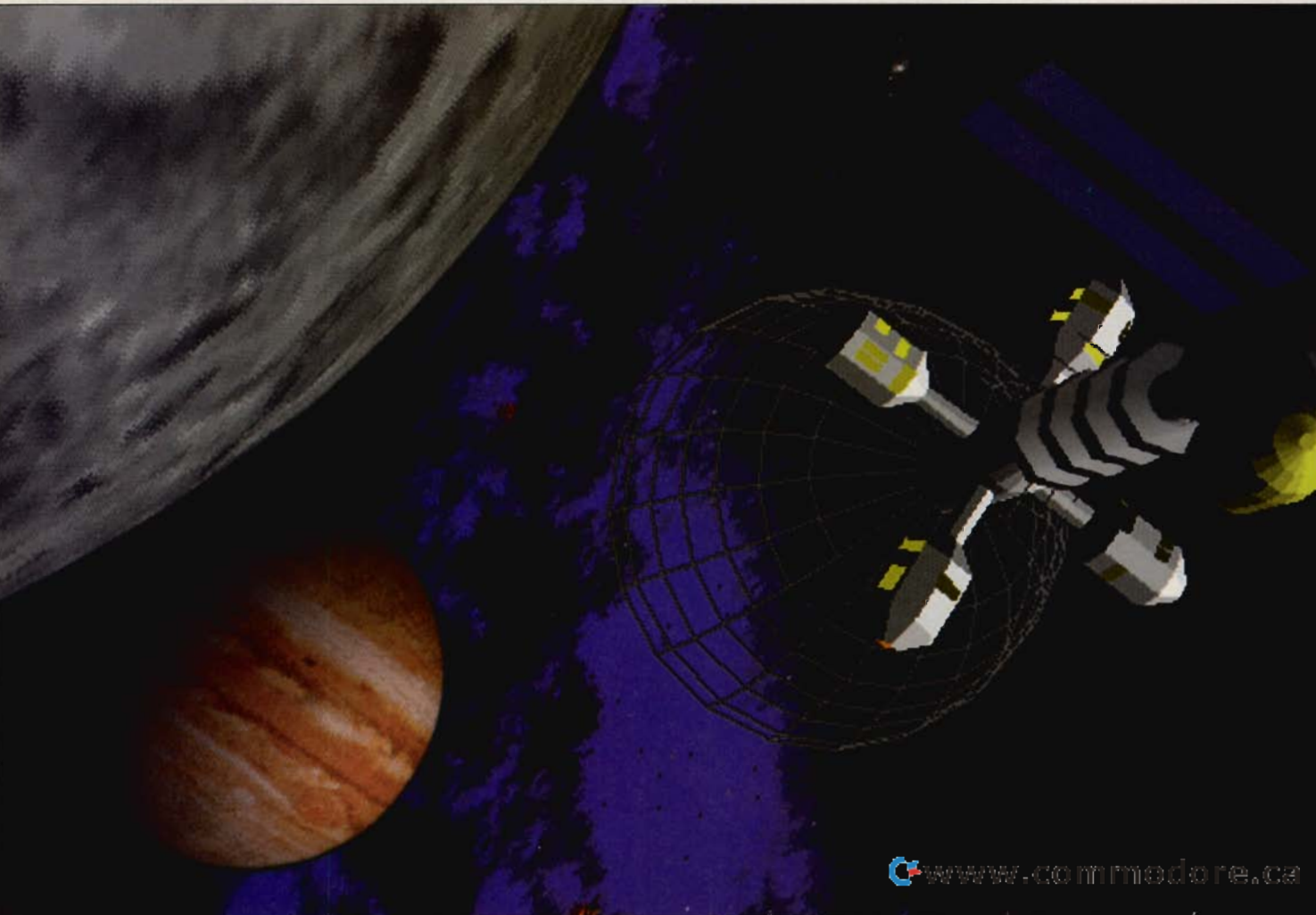
The answer implemented most often is to use a small amount of the faster, more expensive static RAM and a

much larger amount of the slower, cheaper dynamic RAM. The small amount of static memory is called an external cache. A chip called a cache controller looks into the future, guesses what data the CPU will soon need, and preloads that information into faster cache memory from the slower dynamic memory. Then, each time the CPU tries to read data from the memory, the cache controller checks to see if the data the CPU needs is in the cache. If it is, the cache controller zaps the data straight into the CPU, and as a result, the CPU only waits two clock cycles for the data to arrive.

If, on the other hand, the cache controller didn't

guess what the CPU would need, and the requested data is not in the cache, the cache controller will tell the CPU to twiddle its thumbs for a few extra clock cycles (known as wait states) while the cache controller goes through the time-consuming process of copying data from the slower dynamic memory into the faster static cache memory.

The 486 takes the process even further by incorporating a small amount of cache memory inside the microprocessor (the internal cache). Data can be fetched from this memory in one cycle rather than two. There is only 8K of processor cache on most 486s (the 486DX4 has 16K and the Cy-





rix 486 replacement chip for 386 machines has only 1K). But that cache may have heavy demands placed upon it, particularly because the prefetch unit fetches instructions at the same time the execution unit may be accessing cache memory. Suppose the CPU were executing an instruction that involved a memory operation. The prefetch unit under a 486 must idle, waiting for the execution unit on the CPU to yield access to memory so that the prefetch queue can retrieve the next instruction.

The Pentium improves upon that with two caches: an 8K cache for instructions and an 8K cache for data. A Pentium gets things done faster than a 486 of the same

clock speed partly because its prefetch queue can almost always run in parallel with its execution unit.

Using pipelining makes for a powerful solution to the memory access problem, but this solution is prone to a major hitch which occurs during program branching. The way I've described pipelining pretty much assumes that the CPU just plunks along in a linear fashion through RAM, going from the instruction at location X to the instruction at location X+1, and then X+2, and so on. But that's not always true. Programs very often will jump from one location to another, a process called branching. (If you've ever used a GOTO, an IF/THEN/

ELSE, a SELECT, a WHILE/WEND, a CALL, or a GOSUB in a BASIC program, you've caused your CPU to branch.) Branching is bad news because it essentially says to the pipeline, "Well, guys, I know you've been working hard at picking apart the next 64 bytes of instructions, but dump it all—we're moving someplace else, and we don't need those next 64 bytes." A branch forces a 486 or earlier processor to flush the pipeline and start gathering instructions all over again in a new section of the program.

The Pentium's answer is branch prediction. The Pentium features a look-ahead algorithm that sees branch instructions coming up in the

pipeline (such as "If AX is greater than BX, then skip ahead 100 bytes"), guesses which turn the branch will take, and starts disassembling at the place where the branch predictor guesses that the CPU will end up. This algorithm isn't always right, but it is right about 90 percent of the time.

The Pentium initially sounds like a nonstarter, with its CPU speeds that are about the same as the earlier 486 speeds. But if you take the time to look under the hood, you can see that Intel has pulled just about every possible trick to make the Pentium get your work done more quickly. You have to wonder what improvements are left for the Hexium. □

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# Get Ready for Windows 4.0 with OLE 2.0.

**O**LE 2.0 is hot off the drawing board, and it's one of the most important computing technologies of the nineties. It will help you move the focus of your work from the means you use—applications—to the end results—documents. It's also one of the cornerstones of Windows 4.0, and it will be even more important in versions of Windows beyond 4.0. Best of all, it's here now and ready to be explored. If you tried OLE 1.0 but gave up because it was too complicated, too limited, or both, don't give up on the technology. This completely new version of OLE is easier to use, more powerful, and more robust.

## OLE 2.0 Defined

OLE stands for Object Linking and Embedding, and it's pronounced "oh-LAY," just like the word you'd shout at a bullfight. It's an extension of the Windows operating system developed by Microsoft that makes working in a document-centric style possible. *Document-centric* is a ten-dollar word which simply means that documents, rather than the programs that create them, are the focus of your work.

Think about the way you work now. You probably approach your tasks in terms of applications. If you use a word processor, a spreadsheet, and an illustration program to create documents, your work is probably organized around running each of these applications, rather than focused on the documents the applications create.

Just what does OLE 2.0 do? OLE gives you the power to do four things:

- Create compound documents containing embedded or linked objects.
- Edit embedded objects in place (this is called visual editing).
- Drag and drop objects between documents.
- Control other OLE objects with OLE automation.

First and foremost, OLE lets you create compound documents, where one document is constructed from several other documents. For example, a word-processing document can contain a table from a spreadsheet and a picture from an illustration program. But you can add spreadsheet data and pictures to a word-processing document now with the Windows Clipboard. How is this different?

When you use the Clipboard, the application into which you are pasting doesn't know anything about the application that supplied the data. With OLE, it knows what application supplied the data, and by double-clicking on the OLE object, you can call the object's creator.

OLE 2.0 also supports drag and drop between applications, so an object—such as a text selection—can simply be dragged from one OLE app (called the source) to another OLE app (called the target). As you probably know, Windows 3.1 introduced drag and drop for files, with File Manager as the only application from which you could drag; but with OLE 2.0, you can drag and drop objects between applications as well.

And OLE automation makes it possible for one program to control another. This process is something most of us won't use, but it gives programmers a powerful tool for integrating programs and designing front ends.

Think of OLE automation as a macro language that gives you access to an application's internal commands and data structures. With OLE automation you could, for example, create a Visual Basic program that would manipulate three applications: a communications program, a spreadsheet, and a word processor. It would use automation to have the communications program call an online service and download stock information. It would update the spreadsheet with this information and automatically create a report with the word processor, embedding the spreadsheet data as part of the report.

**By Clifton Karnes**



## Fighting the Bull

The word *OLE* conjures up images of bullfighters and charging bulls, and just like a real-world bullfight, *OLE* has two primary players: the bull, which is the server application, and the bullfighter, which is the container application. The *OLE* goal is for the bull to embed his horn in the bullfighter.

In this bullfighting scene, we're the cheering, but occasionally confused, spectators. A little dose of jargon will help clear away the confusion. You've been bombarded with a little *OLE*-speak already, because it's impossible to talk about what *OLE* does without introducing some of it. Here is a short *OLE* lexicon. Once you learn these six terms, *OLE* will be much easier to grasp.

- Object
- Container
- Server
- Linking
- Embedding
- Visual editing

The most important player in the *OLE* drama is the *OLE object*. The object is anything you embed in a document or link to it (I'll explain linking and embedding later). For example, if you're working in a Word document and you include a selection from an Excel spreadsheet and a CorelDRAW! illustration, the spreadsheet and the illustration are *OLE objects*.

In the example above, the Word document that holds the spreadsheet and illustration is the *container*, the application that contains the *OLE objects*. The applications that supply the *OLE objects* to the container are called *servers*, so in our example, Excel and CorelDRAW! are servers. Just to keep us on our toes, Microsoft has changed the jargon a little here from *OLE* version 1.0 to version 2.0. Back in the days of *OLE* 1.0, the container was called the client (as in *client/server*), and you'll still hear that term used sometimes in connection with *OLE* 2.0.

While objects are the most important *OLE* element, servers—the applications that create the objects—are the most interesting, and there are two types: full servers and miniservers.

A full server is a stand-alone app that can run all by itself, like Excel, Word, or CorelDRAW!. A



*This compound document was created in Word for Windows 6.0, with three drawings from CorelDRAW! 4.0 embedded and one spreadsheet from Excel 5.0 for Windows embedded. With these four embedded objects, the Word document's file size is 1.34MB.*



*Is it live or is it Memorex? Or rather, is it Word or is it Excel? This example shows Word for Windows visually editing an Excel spreadsheet. Notice that the title bar is from Word for Windows, but the menus and toolbar buttons are those of the server application—Excel.*



*To find the *OLE* servers already on your system, run any *OLE* container and choose the *Insert Object* menu item. Finding all of the *OLE* containers isn't quite so simple. The best way is to start up each of your applications and pull down the *Edit* or *Insert* menu. If there is an *Insert Object* option, the application is a container.*

miniserver is an application that can't run by itself; it can only be called from a container. Microsoft Draw, which appeared with Word 2.0, is an example of a miniserver, and Word Art, which appears in Word 2.0 and Word 6.0, is another example. These applications exist only to serve containers.

Now to linking and embedding. When an object is *linked*, the data remains in the original file, and any changes you make to the original object's file are reflected in the linked object. If an object is *embedded*, the container gets a full copy of the object's data, which becomes part of the container document. If you make changes in the original file, these changes are not reflected in the embedded object.

With *OLE* 2.0, if an item is linked, you can double-click on it to run the server—its creator. If an item is embedded and the server supports *visual editing*, you can double-click on it, and the container will transform itself into the server.

The key to linking and embedding should be obvious: If you're working with a compound document, double-clicking on a linked or embedded item will summon its creator either by running the application or by turning the container into the server.

Now that we have some jargon under our belts, it's important to note that applications may support all of these *OLE* features or just a few. Some apps are containers only, some are servers only, and some may support everything but visual editing, drag and drop, or automation. Just knowing an application supports *OLE* 2.0 doesn't necessarily tell you much.

When you read in a flier or an advertisement that a product supports *OLE* 2.0, take the time to inquire as to which *OLE* features are supported. Not surprisingly, Microsoft products are among the products with the most complete *OLE* support.

## Three-Way Paste

There are three ways to place in a document in one application an object from another application. One of them doesn't involve *OLE* and two of them do. The three major moves, as you might guess, are simple pasting, *OLE* embedding, and *OLE* linking.

Here's the scenario: You want to insert a CorelDRAW! 4.0 picture into Word for Windows 6.0.



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You have three ways to do it.

**Paste.** Simple pasting is the way you normally move data using the Clipboard. If the picture has already been created, copy it to the Clipboard. Then, in Word, choose Edit, Paste. This gives Word a copy of the CorelDRAW! data in a format Word can use, but there's no link to CorelDRAW!. If you double-click on this object, Word runs its own graphics editor. Word has forgotten all about CorelDRAW!.

**Embed.** There are three ways to embed objects, depending on the object's state. You can embed new objects, files, or selections on the Clipboard.

If the picture has already been created, copy it to the Clipboard. Then, in Word, choose Edit, Paste Special, click on the Paste option button, and choose CorelDRAW! 4.0 Object. This embeds the illustration in the Word document, and double-clicking on the object in Word runs CorelDRAW!.

To embed a new illustration in Word, choose Insert, Object, select the Create New tab, and choose CorelDRAW! 4.0 Illustration from the list box. This will run CorelDRAW! with a blank document loaded. Create

your new illustration. When you've finished, select Exit and Return from the CorelDRAW! File menu, and the Corel document will be embedded in the Word document.

To embed a file in Word, choose Insert, Object, select the Create from File tab, and choose the CorelDRAW! 4.0 CDR file you want to embed. It's worth noting here that you can display your embedded object as an icon, if you wish.

**Link.** If the picture has already been created, copy it to the Clipboard. Then, in Word, choose Edit, Paste Special, Paste Link, Object.

To link a file in Word, choose Insert, Object, select the Create from File tab, check Link to File, choose the CorelDRAW! 4.0 CDR file you want to link, and that's it. Here, as with the example above, you can display your linked object as an icon.

To summarize these actions from another point of view:

- To paste, simply choose Paste from your application's Edit menu.
- To link or embed an object that's on the Clipboard, use Edit, Paste Special.
- To link or embed a file, use Insert, Object, Create from File.



## How We Got Here: Clipboard, DDE, OLE 1.0, and OLE 2.0

Despite its novelty, OLE 2.0 is not revolutionary, but the product of evolution that began with the humble but amazingly useful Windows Clipboard.

The Clipboard is the first means Windows users had of sharing data between applications. In many cases, it's all you need. You simply press Ctrl-C to copy and Ctrl-V to paste, and that's it.

Next came DDE, Dynamic Data Exchange, a precursor to OLE automation. With DDE, one application could control another and move data back and forth. As anyone who's programmed DDE can tell you, however, it's hairy. DDE connections are easily broken, and behavior is not always what you'd expect. DDE has proven popular and useful, however.

Next on our list is OLE 1.0. This first pass at OLE gave us the power to keep a connection between data pasted into an application and the data's creator. Through this link the data is automatically updated when the original is changed, and you can run the object's creator by double-clicking on the object.

OLE 2.0 carries everything in OLE 1.0 a big step further. With 2.0, you can not only double-click on an OLE object to call its server application, but if the object is embedded, your container will transform itself into the server. OLE 2.0 also adds object drag and drop between applications, and OLE automation, which will probably replace DDE.

- To embed a new object, use Insert, Object, Create New.

### Drag and Drop

If you want to embed an object, drag and drop may be the easiest way to move the data between your documents. Here's the procedure you'd follow to embed a section of an Excel spreadsheet in a Word document using drag and drop.

1. Tile Word and Excel side by side on the desktop.
2. Select the cells in Excel you want to embed in Word.
3. Place the mouse pointer on the selection's border, hold down the Ctrl key, and drag the selection to Word. (When you hold down the Ctrl key and





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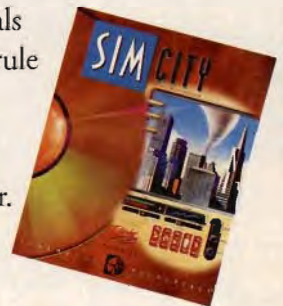
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## Windows 4.0 and Beyond

OLE is one of the cornerstones of Windows 4.0, and Microsoft is urging all developers to make their apps OLE compliant. In 1995, programs that don't support OLE will be the exception rather than the rule.

Although OLE 2.0 is being used now primarily as a way of creating compound documents that are easy to work with, in the future the container-server model will be extended to applications as well. In this just-around-the-corner version of OLE, applications will be constructed from containers populated with components, which are small, focused miniapplications. This extension of OLE is called the component-object model, or COM.

As an example of COM, you could build your own word processor with the container engine from one vendor, the spelling checker component from another, the thesaurus compo-

nent from another, and the graphics component from another.

You could also build your own PIM by putting together components from various publishers to create an application with just the features and functionality you need.

OLE also contains its own built-in file system, and in the future files may be replaced by OLE objects. These OLE files will know about themselves, and they'll know how to communicate with other OLE objects. They'll be able to export themselves in various formats and make information about themselves public.

In fact, it may not be long before everything on your Windows desktop is an OLE object. When this happens, we'll have a really intelligent operating system. I just hope the price of RAM goes down then, so OLE objects will have enough room to think.

drag, you copy data from the server to the container. If you want to move data, simply drag it, or hold down the Shift key and drag.)

It's worth noting that when you

drag and drop, the selection doesn't go through the Clipboard, so you can't paste another copy somewhere else without either dragging and dropping again or going through copying

and pasting with the Clipboard.

You can edit the object you've used drag and drop to embed the same way you would edit any other embedded object: by double-clicking on it.

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## Multiple-choice test

Now that you understand the differences between pasting, linking, and embedding, you may be wondering about the benefits of one versus another. Here are some guidelines.

If the object is very large, link it. In a linked object, the object's data stays in the original file, so it doesn't increase the container document's size.

If the original file will change over time, and you want the changes to be reflected in the object, link the object. Since a linked object's data stays in only one place—the file—the container's link always reflects the latest version of the file.

If the file is used in several places, and it needs to display the same data in each place, link the object.

If the object needs to be transferred and read by someone who doesn't have access to the original file, embed the object. When you embed an object, the container gets a complete copy of the object's data.

If there will never be a need to edit the object again with its creator, simply paste it.

Linking is often more useful than embedding. The downside with linking is that, if the linked file moves, your link is broken and must be repaired. Since an embedded object becomes part of the container document, you never have to worry about broken links.

## OLE Automation

One of the most exciting things about the new OLE specification is OLE automation, which lets you use one program to control objects in another program. Visual Basic and Excel's built-in Visual Basic for Applications are both OLE automation drivers. They can't control just any program, however. The programs you control must be written in such a way that certain features are exposed to other applications. Each OLE application must decide whether it will sup-

port automation at all, and if it does, which of its functions it will make available to other applications.

At the time of this writing, very few programs support OLE automation, but this is bound to change.

## OLE Servers and Containers

Now you're probably ready to try some linking and embedding yourself. You may be surprised at the number of OLE applications already on your system. Unless you have recent versions of Word, Excel, CorelDRAW!, and a handful of others, these are probably OLE 1.0 apps, but OLE 1.0 is still useful, and the two versions of OLE work together without conflict.

To find the OLE servers you have installed on your system, run Windows Write (or any application that's an OLE 1.0 or 2.0 container) and select Edit, Insert Object. You'll see a dialog box with a scrolling list of all your OLE servers. The list will include both OLE 1.0 and OLE 2.0 servers, but the two are completely compatible. With OLE 1.0 you can do most of the things you can with OLE 2.0, except visual editing, drag and drop,

and automation. When you look at this list, you may also discover that you have several servers listed that you've removed from your hard disk. How do you remove these from the list? It's relatively easy.

This list comes from something called the Registration Database.

When an OLE 1.0 or 2.0  
a p -  
pli-

# ACCESS Brings You a Virtual World Interactive Movie!

## What Reviewers are Saying:

"Lots of games claim to be pushing the envelope—*Under a Killing Moon* blows it to smithereens!"

—William Trotter, *PC Entertainment*

"*Under a Killing Moon*...the most elaborate graphic adventure to date. A ground breaking CD adventure!"

—Joyce Worley, *Electronic Games*

"*Under a Killing Moon* combines the best elements of movies and computer games and creates an amazing interactive experience that's better than either of them. It literally pulls you into the screen."

—Denny Atkin, Entertainment Editor  
*Compute Magazine*



This category-creating Interactive Movie from ACCESS Software goes light years beyond any other product labeled "interactive." *Under a Killing Moon* takes you to the streets of post World War III San Francisco and casts you into the role of Tex Murphy, Private Investigator, who first appeared in *Mean Streets*, then *Marian Memorandum*. *Under a Killing Moon* is a Virtual World full of



lication runs for the first time, it registers itself in the database so other apps can find it.

To delete an entry in the database, run the Registration Database by choosing File, Run from Program Manager or File Manager, typing *regedit.exe* in the Command Line box, and pressing Enter. Look in the Reg-

istration Database's list box to find the application you want to delete. Then select it and choose Edit, Delete File Type from the menu.

While it's fairly easy to find all the OLE servers on your system, there's no one place you can look to see all the OLE containers. However, any application that has an Insert Object menu option is almost certainly a container.

To find out if your application supports OLE drag and drop, simply try it. As for OLE automation, you'll have to check out the application's documentation to see whether that feature is supported and if it's supported, which of its functions are available.

### Building OLE 2.0 Apps

Creating OLE applications used to be a programmer's nightmare. The OLE 2.0 API (Application Program Interface) is huge, and there are literally thousands of details to keep track of. But two programming tools have changed the nightmarish aspects of OLE programming. The first is Visual C++ 1.5. This version of Microsoft's superb integrated development environment adds OLE classes to MFC (Microsoft Foundation

Classes), and it adds OLE creation to App Wizard. Creating a container, full server, or miniserver is almost as easy as choosing these options from the App Wizard dialog.

The second programming language that's made OLE 2.0 approachable is Visual Basic 3.0. With it, you can create OLE 2.0 containers and use automation. (There's no support for creating servers, however.) If you want to start experimenting with creating OLE 2.0 applications, Visual Basic 3.0 is the place to go. Its documentation also contains an excellent overview of OLE 2.0.

### The Good, the Bad, the Ugly

We've seen a lot of the benefits of OLE, but there's a downside, too. There are three primary disadvantages to OLE: broken links, large files, and big memory requirements.

Broken links occur when you move a linked file. If this happens, most containers have a way for you to manually repair the link, but it's a pain. The next version of OLE should do a better job of tracking links.

If you embed objects, your files can quickly become huge—easily several megabytes. Not only do these files take up lots of disk space, but they eat up RAM as well when you're working with them.

And speaking of RAM, when you edit an OLE object and run its server, both container and server must be running at the same time. With programs the size of Word and Excel, I'd consider 8MB of memory a minimum to accomplish this.

But the dramatic benefits of OLE really overshadow these problems. In the final analysis, OLE is the most powerful way to share data between applications today. And since you're going to be seeing more and more applications that offer OLE features in the future, now's the time to take the bull by the horns and begin linking, embedding, dragging and dropping, visual editing, and automating. □

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# COMPUTE READERSHIP SURVEY

We want COMPUTE to be as useful and interesting as possible and to provide you with the coverage you want. Please help us by taking a moment to fill out and send us this questionnaire. You can mail the completed questionnaire to us (photocopies are fine) or fax it. Send to COMPUTE Readership Survey, 324 West Wendover Avenue, Suite. 200, Greensboro, North Carolina 27408; (910) 275-9837 (fax).

## What computer(s) do you own or plan to buy?

- Own  Plan to Buy
- 8088/8086, brand \_\_\_\_\_
  - 80286, brand \_\_\_\_\_
  - 80386, brand \_\_\_\_\_
  - 80486, brand \_\_\_\_\_
  - Pentium, brand \_\_\_\_\_
  - Notebook/laptop, brand \_\_\_\_\_
  - Macintosh, model \_\_\_\_\_
  - Game system, brand \_\_\_\_\_
  - Other \_\_\_\_\_

## Which video display system(s) do you use?

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

## Which peripheral(s) do you own or plan to buy?

- Own  Plan to Buy
- 5 1/4-inch disk drive
  - 3 1/2-inch disk drive
  - CD-ROM drive
  - Dot-matrix printer
  - Fax modem
  - Hard disk
  - Laser printer
  - MIDI device
  - Modem
  - Mouse
  - PostScript printer
  - Sound card
  - Speakers
  - Tape backup system

## How much memory does your computer have?

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

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

- DR DOS version \_\_\_\_\_
- Microsoft Windows version \_\_\_\_\_
- MS-DOS version \_\_\_\_\_
- PC-DOS version \_\_\_\_\_
- OS/2 version \_\_\_\_\_
- Other \_\_\_\_\_

## Which parts of the magazine do you like the most?

- COMPUTE's Getting Started With
- Editorial License
- Fast Forward
- Features
- Feedback
- Game Insider
- GamePlay
- Hardware Clinic
- IntroDOS
- Multimedia Spotlight
- New Multimedia Products
- News & Notes
- Online
- Programming Power
- Reviews
- Test Lab
- Tips & Tools
- Windows Workshop

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

- Databases
- Desktop publishing
- Disk management and MS-DOS
- Education
- Games and entertainment
- Graphics (paint, draw, or CAD)
- How to upgrade your PC
- Integrated software
- Local area networks (LANs)
- Money management
- Multimedia
- New computer technologies
- New hardware
- Pen computing
- Programming

- Spreadsheets
- Telecommunications
- Windows
- Word processing
- Other \_\_\_\_\_

## Where do you use your PC?

- Home
- Work
- School
- Other \_\_\_\_\_

## Where did you get this copy of COMPUTE?

- Subscription
- Newsstand
- Other \_\_\_\_\_

## How long have you been reading COMPUTE?

- Less than two years
- Two years or more

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

- America Online
- BIX
- CompuServe
- DELPHI
- GEnie
- Internet
- Prodigy
- Other \_\_\_\_\_

## Comments

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## ONLINE COMMUNICATIONS

### HOW TO CHOOSE THE BEST MODEM

Before you can log on to any of the online services we're going to discuss in this Getting Started with Online Communications section, you've got to equip your PC with an appropriate modem. In today's market it's hard to buy a bad modem, but you'll be more comfortable choosing a modem with just a little basic information under your belt. (Incidentally, any modem you buy today will most likely be a fax/data modem; for simplicity's sake, we'll just call them modems.)

Even if you already have a modem, if it runs at 1200 bps or 2400 bps, you may well want to upgrade to a faster model. Prices are low (some under \$200) for 14.4K-bps models, which will soon be old technology.

#### Speed Kills, Doesn't It?

Why would you need extra speed? As speeds double or quadruple, your online time is cut by the same multiple—or is it? Aside from the technical truth that noisy lines and other physical factors often slow the effective speeds, you'll quickly realize that except for downloading files, only a small fraction of your connect time is spent actually passing data—at any speed. Instead, you're dealing with menus, reading screens of information, typing responses, and doing similar tasks while the modem sits idly by, waiting for you to initiate the next tiny spurt of data.

However, when uploading, downloading, and working with the graphical services (which have to send large quantities of data to paint a single

The screenshot shows the America Online interface. At the top, there's a menu bar with 'File', 'Edit', 'Go To', 'Mail', 'Members', 'Window', and 'Help'. Below that is a toolbar with various icons. The main window is titled 'America Online' and displays the 'COMPUTE' magazine content. On the left, there's a navigation menu with options like 'Windows Workshop', 'Multimedia PC', 'Games', 'Getting Started With', 'Test Lab', 'COMPUTE Ordering', 'Computer Lingo', 'Reviews', 'Books Online', and 'Special Interests'. The main content area features several articles and links, including 'KCOM Terrain Defense Force-A hot new demo from MicroProse', 'Get the mas from your modem with OmnidrivePro for Windows', and 'Getting Started With' which lists topics like 'Multimedia Applications', 'Upgrading Your PC', 'Desktop Publishing', 'Kids & Computers', 'Entertainment Software', 'Buying a New PC', 'Personal Networking', 'Databases', and 'Portable Computing'. At the bottom of the screenshot, there's a large 'CONTENTS' section with a table of contents listing various topics and their corresponding page numbers.

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WHAT YOU NEED TO KNOW ABOUT THE INTERNET .....	56
12 GREAT ONLINE PLACES .....	58
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screen), the modem's speed is critical and will indeed save you significant time and money.

#### The Jargon Jungle

Modem ads and reviews are full of exotic technical terms such as *V.32bis*, which is the current standard for 14.4K-bps transmission. Don't concern yourself with the lower V-dot numbers; they're history. Other current standards include V.42bis data compression and MNP-3 error correction, both of which are good to have.

You're going to see references to V.34 standards for 28.8K-bps speeds, also

known as V.FAST or V.TURBO. The international committee that issues these standards hasn't yet agreed upon and issued specifications for V.34 and its 28.8K-bps speed. Yet vendors are selling V.FAST modems right now. What's going on?

These vendors, which include the big names, are confident that their implementation of the proposed standard will end up working with the final standard. Right now, however, don't expect to use 28.8K-bps transmission unless you're sending to another modem from the same manufacturer. A clean phone line and a rabbit's foot will help, too.

The online services will eventually support this higher speed, but they're just now taking their first hesitant steps into 14.4K-bps lines.

Both U.S. Robotics and Supra are dealing with the uncertainty of the unissued standard by guaranteeing a V.FAST upgrade for some of their 14.4K-bps and 21.6K-bps modems.

#### Recommendations

We don't have the space this time around to test modems and make specific recommendations, but we can tell you that all of the major modem manufacturers are selling quality products. Your purchase decision will depend on features, price, availability, and software bundles. You can count on modems by Hayes, U.S. Robotics, Practical Peripherals, Supra, and any of a dozen or more other leading modem makers to be reliable, good performers.

—Richard O. Mann

### HOW TO CHOOSE THE BEST ONLINE SERVICE

Choosing among the national networks can be difficult. The services range from tightly focused to almost unimaginably vast ranges of information and communication resources. You can run up hefty bills and deplete your stores of time and energy just learning your way around a service, only to find that it wasn't quite what you had in mind.

We'll survey six online services for consumers and small businesses—America Online, CompuServe, DELPHI, GENie, the ImagiNation Network, and Prodigy—and give you the flavor of each. We'll save our discussion of



## ONLINE COMMUNICATIONS

the Internet, a vastly different animal, for a separate article later in this section. Before we start our survey, however, let's go over a few basic principles you'll need to understand in making this choice. You'll also find helpful advice on these matters in the subsequent article, "20 Top Online Tips and Hints."

Count the cost. These services are not cheap, so be sure you weigh the hourly fees and surcharges for special services as you choose your primary network.

Review the range of coverage. Each service has its own specialties and areas where coverage is particularly deep. Find the service that best matches your needs and interests. Each service has a targeted user; find the service that's targeting you.

Select the interface that works for you. Prodigy and America Online use graphical interfaces, working with mouse clicks on buttons and menus. GENie and DELPHI are still text-only services—which can be much quicker than their GUI-based cousins. (GENie has a Windows interface due any day.) CompuServe's native mode is pure text, but both DOS and Windows front ends are available to make it mouse-friendly.

And finally, consider using the service used by most of the others in your family, neighborhood, national hobby community, or business. You can't use E-mail effectively, for instance, if no one you know is on that network.

### America Online

AOL is a consumer service that's growing so explosively that it briefly overburdened its computing and

phone resources earlier this year. Its extensively advertised free trial period pulls a high response. Membership now exceeds 700,000.

AOL's Windows interface makes it the cleanest and easiest to use of all the services. It has the normal set

but AOL has plans to expand its Internet links.

On the surface AOL is excellent, but it falls short of CompuServe or GENie in depth of information resources available for serious research.

America Online charges



DELPHI offers full access to the Internet.

of hobby and special interest forums, along with a respectable number of hardware and software support groups. It's particularly strong in electronic versions of popular newsstand publications, including COMPUTE, *Omni*, *Time*, *Wired*, *Saturday Review*, *Atlantic Monthly*, *USA Today*, and other major magazines and newspapers. (You can read this article on AOL, along with over 50 of my previous efforts—all my relatives like AOL.) Magazine editors and staffers are often available online to answer questions.

E-mail is unlimited and easy to use. AOL is connected with the Internet such that you can send and receive E-mail simply by addressing it, without jumping through the hoops that most other services require for Internet connections. (When you see an E-mail address that ends @aol.com, it's that of an AOL user.) Internet access is currently limited to E-mail,

\$9.95 per month for five free hours, with additional hours billed at \$3.50. Call AOL in Vienna, Virginia, at (800) 827-6364.

### CompuServe Information Service

One of the oldest of the online services, CompuServe caters to the business user but has plenty to offer the home user as well. Just about everyone who's online has a CompuServe account; there are 1.7 million subscribers.

CompuServe's strength is its mass of raw information and wide range of forums and special interest groups. A full range of business databases is available, from Dialog and Knowledge Base (both with surcharges) to Phone\*File, a national telephone directory. National weather services and the AP and Reuters wire services head the news offerings, which are supported by the full text of over 60 newspapers.

Over 400 hardware and

software vendors run forums on CompuServe, where you can ask questions both of vendor personnel and of other users. Updated drivers, program patches, and other files are routinely posted on CompuServe for users to download. No other service has as many downloadable file libraries, where virtually all shareware and freeware programs are available.

You can interface CompuServe Mail with MCI Mail and the Internet and also send faxes or even postal mail through the service. You can reach almost anyone who's online through CompuServe's mail facility.

CompuServe's natural interface is bare ASCII text, but several front-end programs are available to both improve the interface and let you work with forums and E-mail offline to save money. WinCIM (CompuServe Information Manager for Windows) translates the service to Windows nicely.

Earlier this year, CompuServe's rates decreased about 40 percent to \$8.95 per month for 60 basic services plus \$9.60 per hour for extended services (including the forums). CompuServe is located in Columbus, Ohio, and can be reached at (800) 848-8199.

### DELPHI

This is a smaller text-based service primarily for business users and computer hobbyists that has found its own extremely popular niche: the Internet. DELPHI provides full Internet access for \$3 a month over its basic fees. The other services here provide only E-mail access to the Internet, but with DELPHI you're into the whole massive net.



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## ONLINE COMMUNICATIONS

Prior to the Internet boom, DELPHI struggled along as the home of computer nuts comparing notes on PC topics. Today, it's used primarily for Internet access and is the home of a large forum devoted to helping novices learn how to get into and use the Internet.

In addition, DELPHI provides access to the standard business databases at rates comparable to those of the other services. It has the usual assortment of forums and software libraries, but they're less extensive than those of GEnie or CompuServe.

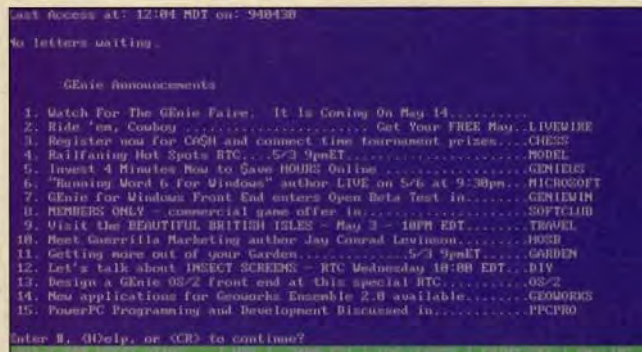
DELPHI charges a \$19 enrollment fee. After the free five-hour sign-up bonus period, monthly fees kick in through one of two plans. The 10/4 plan is \$10.00 per month for four hours with additional hours at \$4.00 each. The 20/20 plan is \$20.00 per month for 20 hours with additional hours at \$1.80 each. (As mentioned above, Internet access is \$3.00 per month above these base fees.) You can reach DELPHI in Cambridge, Massachusetts, at (800) 695-4005.

### GEnie

Our next service, GEnie, or the General Electric Information Service (hence the capital GE), offers its 400,000 subscribers the speed of a zippy, bare ASCII-text interface and access to a wide range of business databases and forums. Its forums and discussion groups are not as extensive or well populated as those on CompuServe, but it has a stronger feeling of community and neighborhood. Although I frequent the writers' areas on all the services, for example, only on GEnie do I have a strong

feeling of friendship with the dozens of writers that frequent the area.

GEnie has a strong selection of online games as well as a robust forum for gamers. Science-fiction fans and writers know that GEnie's SF RoundTables



*GEnie offers a strong sense of community and neighborhood.*

are the home of the SF online community.

Business users and researchers appreciate GEnie's extensive connections to the major commercial databases, though the surcharges can be frightening. The GEnie NewsStand offers full text of over 900 publications, including most of the major newspapers in the country and nearly all magazines of consequence—but the cost runs from \$2.50 to \$29.00 per search.

On the other hand, GEnie's basic rates include access to Reuters and Newsbytes newswires and a healthy set of investment analysis tools.

The interface is simple text, but you will need more than a few minutes to pick up the commands necessary to navigate the forums and libraries. The payoff of learning the commands—and learning them is not as difficult as it seems at first—is well worth the effort. You'll need a simple modem

communications program to log on to GEnie.

A new interface program, called GEnie for Windows, should be shipping any day now and will probably be available by the time you read this.

GEnie runs \$8.95 a

ed, however, and now the service provides E-mail and bulletin boards. Both, however, are harder to use than those of the other services.

Consumer information available on Prodigy includes up-to-the-minute news, weather, and sports, with full-color photos in the Windows version. Kids' features include clubs and games as well as an updated encyclopedia. Reference materials include *Consumer Reports*, the *Mobil Travel Guide*, a massive online cookbook, city guides, a movie guide, and daily television listings for 41 major networks.

Pricing is a little complex, involving two basic plans after the original software purchase and sign-up fee of \$29.95. For \$14.95 a month, you get the basic features, as well as two hours of special features: bulletin boards, EAASY Sabre airline reservations, Dow Jones Company News, and daytime stock quotes. Additional hours of these special features are \$3.60 each. A second plan offers 25 hours of any features for \$29.95 per month with additional hours at \$1.20 each. Prodigy is located in White Plains, New York, and can be reached at (800) PRODIGY.

### The ImagiNation Network

This online service is a different beast entirely from the others examined here. The ImagiNation Network (INN) exists for playing games and socializing. No news, no databases, no files to download, although INN does provide E-mail. The brainchild of the game-designing wizards at Sierra On-Line, the producer of

month for four hours, with additional off-peak hours at \$3.00 each. Users in smaller cities may be charged an additional \$2.00 per hour for access through a premium phone carrier. You can reach GEnie in Rockville, Maryland, at (800) 638-8369.

### Prodigy Interactive Personal Service

A high-profile joint venture of Sears Roebuck and IBM, Prodigy uses its highly graphical interface and strong variety of consumer services to attract an amazing 2 million users in 1 million households. Prodigy is a family- and home-oriented service that runs commercial advertising across the bottom of every screen. Some find the ads distracting, but it's surprising how often the ads and the screens they lead to will provide useful consumer information.

Prodigy was originally designed to deliver information, not to provide communications services. Users insist-



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8/94



## ONLINE COMMUNICATIONS

endary King's Quest and Leisure Suit Larry series), INN brings a new dimension to computer games—you play them with real opponents.

Logging on to INN, you'll see an aerial view of the ImagiNation, which contains the Town Hall, the ClubHouse (card and board games), Sierraland (action-arcade games), MedievalLand (fantasy role-playing games), CasinoLand (casino games for adults only), and the SchoolHouse (educational games).

As you enter a land for the first time, you use the FaceMaker software to select features (nose, eyes, hair, clothing, and so on) for your cartoon picture that's used onscreen to represent you to the others you'll meet.

Go into the waiting room and get together with others there to form a new game. Bridge, hearts, backgammon, role-playing games, miniature golf, and other games are available. The graphics will be familiar to anyone who's played Sierra games. You can also chat, send E-mail, and generally partake of this virtual community.

The ImagiNation Network costs \$5.95 for the sign-up software and 5 hours of connect time. After that, you can pay \$9.95 per month for 5 hours, \$49.95 for 25 hours, or \$99.95 for 50 hours. Additional hours are \$3.50 each. Contact INN in Oakhurst, California, at 800-IMAGIN-1.

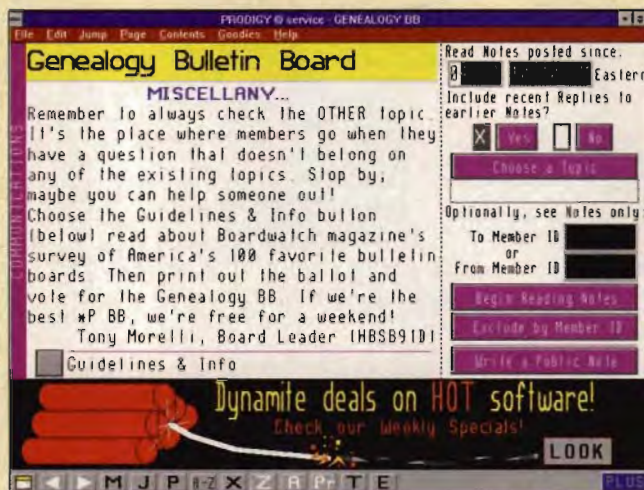
—Richard O. Mann

### WHAT YOU NEED TO KNOW ABOUT THE INTERNET

The Internet seems to be almost a myth or legend.

In fact, it's the closest thing we currently have to a true information superhighway. It connects 15 to 17 million users in 125 or more countries around the world on a bewildering array of 1 million or more individual computers of

Individuals and small companies most frequently connect through paid service providers, DELPHI being the most well known national provider. If you live in a large city, you may be able to find a less expensive local provider.



Prodigy excels in delivering news and consumer information.

every type imaginable.

It has grown from a loose confederation of government and research computers 20 years ago to today's ungoverned interconnection of computer resources. Nobody owns, operates, or controls the Internet, although the volunteer-staffed Internet Society tries to encourage the net to move in appropriate directions.

### How Can I Hook Up to the Internet?

Access to the Internet can be hard to line up. University, government, and some large corporations' employees can often wrangle a direct (hard-wired) connection to the Internet through a local network. If you can accomplish this, you'll have a freer access to net features than with a dial-up connection.

### What's Out There on the Internet?

Aside from the ability to E-mail to 17 million people, you also have access to millions of files stored on networked computers, over 4000 specialized discussion groups, global news almost the instant it's written, and a bewildering array of databases and other information sources. (Want to search the Library of Congress catalog? It's there.) The question isn't whether the data you need is on the net—it's whether you'll be able to find it and get to it.

The discussion groups, called newsgroups on the Usenet, vary from the sublime (*rec.music.classical.guitar* for classical guitar music) to the outrageous (*alt.cows.moo.moo.moo* for, you know, cow noises). If

you're interested in it, there's a Usenet newsgroup about it with discussion from all over the globe.

### How Hard Is It to Use the Internet?

Look at it this way: If 17 million people are using it, how hard can it be? Unfortunately, it's downright difficult. Not impossible—just difficult. It uses a UNIX command system that's cryptic at best. There's no online help or any other recognition of the fact that everyone there doesn't already know exactly what he or she is doing.

The best way to learn the arcane lingo of the net is to buy a book that teaches you the ins and outs of the net. I contacted the publishers of two publishers, asked if they had any Internet titles, and immediately received 15 books—as popular as the Internet is right now, there's no shortage of published assistance. Of the 15 titles, *Zen and the Art of the Internet: A Beginner's Guide* by Brendan Kehoe (PTR Prentice Hall, 515-284-6751) is the most succinct and interesting. *The Complete Idiot's Guide to the Internet* by Peter Kent (Alpha Books, 800-428-5331) offers layman's-level instruction in an amusing setting, along with a disk of files listing Usenet newsgroups and other resources that would be too bulky to print in the book. Michael Fraase's *The PC Internet Tour Guide* and *The Windows Internet Tour Guide* (Ventana Press, 800-743-5369) are entertainingly light reading with keystroke-by-keystroke instructions for basic Internet functions and disks containing programs that ease net navigation.



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## ONLINE COMMUNICATIONS

You might also take a look at *netguide: What's on in Cyberspace!* (Random House, 800-733-3000, \$19.00) and *The Whole Internet User's Guide and Catalog* (O'Reilly & Associates, 800-998-9938, \$24.95).

### Should I Sign Up?

If you're toying with the idea of getting an Internet account, buying one of these books will show you right away if the net is a place you're going to like. If you're willing to put the effort into it, the Internet can be a rewarding adventure.

—Richard O. Mann

### 12 GREAT ONLINE PLACES

#### COMPUTE Online (America Online)

America Online's Newsstand contains an electronic version of COMPUTE, including the full text of the articles and reviews for a year or so back. In addition, there are files for downloading that have been featured in the magazine's shareware columns and a robust message area.

Among the message topics are Ask the Experts, Talk to the Editors, and a variety of hardware and software topics. The Talk to the Editors topic is a lot of fun—it transforms the printed COMPUTE into an interactive medium where you can immediately go online with questions and comments for the editors (and many of the writers).

To become a participant in this magazine, drop by the COMPUTE forum on AOL. And if you need a copy of an article or review you remember from a recent issue, it's there on AOL, waiting to be downloaded and printed. Drop

by—the editors and writers would love to see you there.

—Richard O. Mann

#### Entertainment Drive (CompuServe)

It's billed as a "backstage pass to the entertainment industry." That pretty well describes E-Drive's wealth of information about movies, television, music, and theater—much of it direct from the movie studios, television networks, recording studios, and other entertainment companies. You'll find GIF files from recent film productions, up-to-date schedules for top cable channels, and the latest gossip from Hollywood columnists Marilyn Beck and Stacy Jenel Smith.

By browsing the libraries, you might learn how the Corporation for Public Broadcasting funds PBS and NPR, read trial summaries from the upcoming week on Court TV, chuckle at David Letterman's Top 10 lists going back to February 17, check out MGM's planned film releases for the rest of the year, and download the cover art for many recent hit albums.

There's also an active message area with intelligent and often highly opinionated discussions on such hot topics as how the cast of "Star Trek: Deep Space Nine" is developing and what we might expect from the new Turner Classic Movies channel.

In short, E-Drive is the latest hot ticket for anyone who wants to closely follow the entertainment industry or make better-informed entertainment choices.

—David English

#### Executive News Service (CompuServe)

I admit it: I'm a news junkie. I don't feel right unless I've

seen the daily newspaper or watched the evening news. Something may have happened since yesterday, and I need to know about it.

If you're similarly afflicted, check out Executive News Service on CompuServe (type *GO ENS*). You can configure ENS to match your interests and have the system search through thousands of news reports while you're offline. ENS currently scans 20 news services, including AP Financial, Reuters World Report, UPI Sports, The Washington Post, and OTC NewsAlert.

In addition to the public folders provided by CompuServe, you can set up three personal folders with as many as seven search criteria for each folder. For example, if you set a single search criterion (such as *computer*) and choose all 20 news services, you'll fill your folder to its capacity of 500 news stories in a matter of a day or two. On the other hand, if you choose several narrow criteria, such as *programming*, *Windows utilities*, and *icons*, while selecting only a few of the news services, it may take several weeks to fill your folder.

One word of warning: To use the Executive News Service, you must pay a \$15-per-hour surcharge on top of CompuServe's base connect rates. And to create personal folders, you must become an Executive Option subscriber.

—David English

#### The Fiction Workshop (America Online)

This is a plug for a writers' workshop operated by my friend Mesotron (that's his screen name). Each week, a member of the workshop submits a story or a piece

of writing. The writing is E-mailed to each of the other members of the group a few days in advance of the workshop. Each member can write a critique (including suggestions for improving the writing), which is E-mailed to all the members. That's a lot of E-mail. And often new rounds of E-mail will be initiated by some statement in the criticism.

At 10:00 on Wednesday nights, the group meets in the chat area in the Writers Club (just press Ctrl-K, type *writers* in the dialog box that appears, press Enter, and then double-click on the text *Chat Area* in the What You Can Select column).

In the actual workshop, the discussion is carefully controlled to prevent chaos. There are a lot of excellent writers in the group, but the range of experience among the writers runs from amateur to professional, so no one need fear entering the discussion. If you're interested in how fiction is created (or in creating better fiction of your own), the Fiction Workshop is the place to start.

—Robert Bixby

#### Genealogy Bulletin Board (Prodigy)

The Genealogy Bulletin Board on Prodigy takes advantage of that service's massive user base to put people with questions together with those who have answers. Genealogy—the study of the history of families and tracing of ancestors—is one of the fastest-growing hobbies in the world. Finding ancestors is a tough job, though, because it always involves searching records in distant places, often in other countries.

Using the Genealogy BB, you can post specific questions on topics that usually



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## ONLINE COMMUNICATIONS

specify locations. You might post a query saying you had family in Jackson County, Kentucky, in 1812 and wonder what reference sources are available. Chances are good that someone among the thousands who monitor this board will have useful information, which they can quickly post or E-mail to you.

The staff of the Family History Library of the Church of Jesus Christ of Latter-day Saints in Salt Lake City—one of the world's largest repositories of genealogical information—monitors this topic and posts answers to general questions. They report a positive response rate of better than 33 percent to questions posted here by Library patrons.

This terrific resource is helping hundreds of people every day.

—Richard O. Mann

### Morningstar (America Online)

Most small investors prefer buying mutual funds to buying individual stocks. But with thousands of mutual funds to choose from, how do you know which ones are best for you? Help is available online from Morningstar, the best known and most respected of the many mutual fund rating services. While the coverage of the online version of Morningstar Mutual Funds (keyword: *Morningstar*) isn't as complete as the coverage found in its many publications, you'll find a great deal of information about many of the 3400 mutual funds that Morningstar tracks.

For example, you can search the database of mutual funds by fund family name or even by the fund manager's name. Additionally, you can browse articles by individual fund name, fund type (such as Aggressive Growth or Specialty-Technology), or Top 25 list (such as Top 25 Overall Mutual Funds or Top 25 Balanced Funds—Ranked by 1-Year Return).

The screen for each fund includes the fund's

vidual fund name, fund type (such as Aggressive Growth or Specialty-Technology), or Top 25 list (such as Top 25 Overall Mutual Funds or Top 25 Balanced Funds—Ranked by 1-Year Return).

The screen for each fund includes the fund's

ers everything but programming, while the Microsoft Developer's Knowledge Base (type *GO MDKB*) covers programming topics only.

The Microsoft Knowledge Base is a master database of information about Windows, DOS, and all other

of hardware running under Windows, the Knowledge Base is the first place I look for help. And if I have some spare time and I want to find some tips on Windows programming, the Developer's Knowledge Base is the place to go.

—Clifton Karnes



CompuServe's strength is its mass of information.

basic goals and rules of operation; performance for the past one month, three months, one year, five years, and ten years; a relative risk rating; fee information (including front-end and hidden sales charges); minimum purchase; contact information; and overall rating. Morningstar updates the data once each month.

If you own one or more mutual funds, check out Morningstar Mutual Funds on AOL and see how well your investments are really doing.

—David English

### Microsoft Knowledge Bases (CompuServe)

For up-to-date information on computing, you can't beat Microsoft's two Knowledge Bases on CompuServe. The first area, known simply as the Microsoft Knowledge Base (type *GO MSKB*), cov-

ers everything but programming, while the Microsoft Developer's Knowledge Base (type *GO MDKB*) covers programming topics only. The Microsoft Knowledge Base is a master database of information about Windows, DOS, and all other

of hardware running under Windows, the Knowledge Base is the first place I look for help. And if I have some spare time and I want to find some tips on Windows programming, the Developer's Knowledge Base is the place to go.

My favorite hangouts on television are the political discussion programs on CNBC and CNN, and my favorite place to go on America Online is The New Republic. The New Republic uploads controversial articles by such writers as Michael Kinsley and Andrew Sullivan (often seen on public affairs programs on television), along with film criticism and occasional humor pieces. These are fun and educational to read, but the real action is going on under the button marked TNR Issues Discussion. In the discussion area, serious thinkers (meaning me) mix with cranks and crackpots (meaning everyone else) in a lively, ongoing discussion of the news and principles that shape our nation.

### The New Republic (America Online)

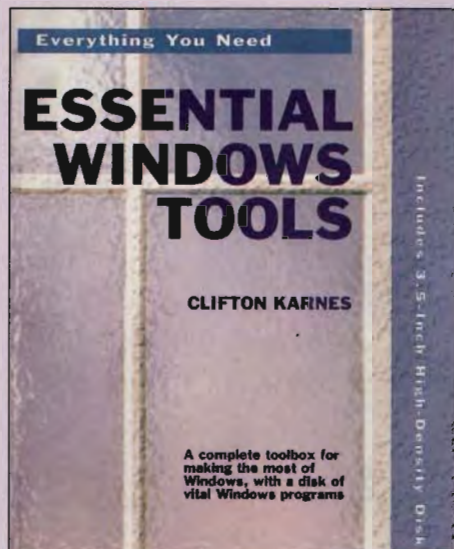
In high school, I developed a political bent. Ever since, I've loved discussing issues. But for whatever reason (perhaps it's my tendency to spit when I'm losing an argument), I've never been a debater. The online world is different from the face-to-face world, though. As long as I have plenty of Windex handy for cleaning stray spittle from my monitor, I can debate online until I'm blue in the face.

A word to the wise is in order, however: Strong language and flames are the rule rather than the exception, so cut on your cost-



# Become a Windows Power User

Transform yourself into a Windows power user. Inside *Essential Windows Tools* you'll find a feast of expert tips, tools, secrets, and shortcuts, all presented in an easy-to-understand style. Plus there's a disk chock full of the best shareware and freeware tools. You'll find complete explanations for how to integrate these into your power desktop.



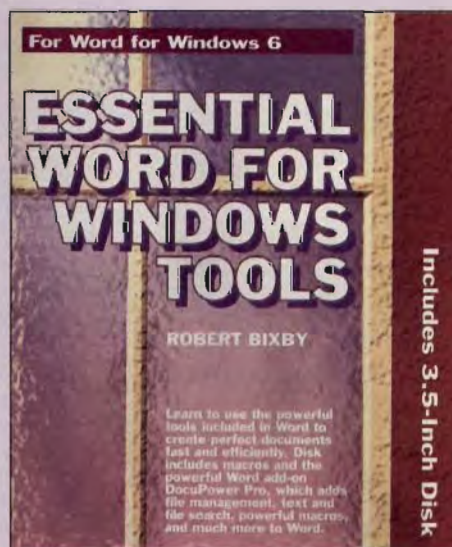
Here's a list of the hot software on the enclosed disk:

- ◆ ArrowSmith—Change your Windows mouse pointer and wait symbol
- ◆ The Runner Utilities—Replace Windows, Task Manager with a power tool
- ◆ BackMenu—Have every program on your system available at a keypress
- ◆ Icon Master—Create, change, and customize icons
- ◆ MegaEdit—Kiss Notepad goodbye with this powerful text editor
- ◆ Trash Man—Delete programs safely
- ◆ McAfee's Scan—Protect your system against viruses
- ◆ WindSock—Measure your system's performance
- ◆ WinGif—View, edit, and convert graphics files
- ◆ Fonts—A collection of the best available
- ◆ Screen Savers—Randomize your screen savers
- ◆ WAV files—Super sounds to get you started

Make Word for Windows 6.0 work for you. With *Essential Word For Windows Tools*, you'll be creating more attractive and more literate documents—and doing it faster than ever before. Using macros, page-layout tricks, and automatic processes to their fullest extent will ensure that you work more efficiently with Word.

Here's what is included on the *Essential Word for Windows Tools* disk:

- ◆ All the macros discussed in the book
- ◆ Carrier Pigeon, a useful tool for moving macros from one template to another
- ◆ DocuPower Pro, an extremely useful Word for Windows 6.0 document management add-on that contains a simple database; allows you to store documents in "folders," which allow the use of long filenames and multiple document summaries; and has a file-find and text-find utility that will locate a file or specific text anywhere on your hard disk



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## ONLINE COMMUNICATIONS

iron boxing trunks before entering the ring. Be prepared to face fierce challenges to all of your most fondly held preconceptions.

—Robert Bixby

### News Room (America Online)

Most people enter the News Room (a public room under the People Connection on America Online) hoping for a discussion of the news, but generally the room is far too busy debating current events in depth to waste time on the headlines. It's hard to state a position (or challenge one) effectively in the single line of text allowed in the People Connection interface, but that's part of the fun. Typically, parallel discussions will be in progress on gun control, abortion, separation of church and state, and the latest twist in the Whitewater saga. Pick out the issue that most interests you and jump in.

It's always a good idea to have an issue to discuss, just in case nothing interesting is happening when you arrive. My preference is to take a position that runs completely counter to common sense and then defend it against all comers.

Sometimes the discussion becomes more friendly, and during those lulls you might discover that the person with whom you were engaging in a hot debate only moments before is a real human being whose beliefs and concerns virtually mirror your own. If you can't find an interesting conversation in the News Room, you probably can in one of the Rush Rooms to be found in the Member Rooms section. (If there isn't a News Room or a Rush Room,

create one, and opinionated people will find you.)

—Robert Bixby

### Technology News (America Online)

One of my favorite online places is buried deep in America Online's internals. It's the Technology News section, which has up-to-

a little. This is the best place I know of to find out what's going on in the computer world.

—Clifton Karnes

### Windows Shareware Forum (CompuServe)

I'm a shareware junkie, and the best place to find shareware is CompuServe's

A huge, lively message base complements the file sections and keeps members on top of things. In short, if it's shareware, you'll find it here.

—Clifton Karnes

### Writers Ink (GEnie)

Writing is a lonely profession, done (in my case) in the wee hours of the morning when interruptions are rare. Yet writers feel a need to hang around with kindred spirits, to compare notes, commiserate over rejections, and rejoice over sales and successes. Professionals and wannabes alike enjoy being together.

All the services have writers' areas, but Writers Ink (WINK) on GEnie is exceptional in its congenial feeling of friendship and community. I have many friends I enjoy meeting there every day or two, exchanging messages on the WINK bulletin board.

WINK includes areas for poets, fiction writers, journalists, scriptwriters, writers of young adult materials, and so forth. We upload drafts of stories and articles and offer critiques. We compare notes on editors, agents, and publishers. We help with each others' research, give advice on dealing with non-writer-friendly spouses and relatives, and talk about almost anything.

If you're interested in writing, WINK is the place for fun, encouragement, and help. Join us.

—Richard O. Mann



*The ImagiNation Network lets you socialize over a friendly game.*

the-minute news stories on technology in general and the computer business in particular. Although you can't go directly to Technology News, the path you take has some interesting scenery.

First, you go to the News & Finance forum. As you might guess from the title, this area has all sorts of news, weather, sports, and business info, and it's definitely worth browsing itself. Next, click on the Technology button, and you'll find yourself face to face with a listing of all the computer magazines online (including COMPUTE). Next, click on the Technology News button and you're there. You can browse through stories in the list box or search for stories using a keyword. I usually search for *Microsoft* or *computer* to focus the list

Windows Shareware Forum (type *GO WINSHARE*). You'll see thousands of titles here in a variety of categories. I used to check out the new listings once a week, and it took me about an hour to do it. Now I use CompuServe Navigator to automate the process and check the forum every day because it's so easy.

The thing I really like about WinShare is that it contains the mother lode of Windows utilities. There are scores of file utilities, memory and resource utilities, general Windows utilities, font utilities, disk utilities, and general utilities. In addition, WinShare has full-blown applications, including communications programs, network apps, program manager replacements, business and finance programs, PIMs, and Windows NT programs.

## 20 TOP ONLINE HINTS AND TIPS

As you get started with the online services, there's a lot to learn. Here are 20 tips for selecting and learning to use the services, as well



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## ONLINE COMMUNICATIONS

as for avoiding problems. Let's make your first experiences positive.

1. Buy a book. For what you'd pay for a sign-up kit, you can often get a full-scale book explaining the service and including both the necessary software (if any) and usage credit. You're going to need the book anyway; you might as well have it from the start.

2. Get an offline reader. If you work with a lot of E-mail or forum (also known as bulletin board or club) messages, you'll save significant sums by using a front-end program that grabs material of interest off the network as quickly as possible. You read and respond to it offline, at your leisure. The program then posts your responses in another single, lightning-fast session.

3. Disable call waiting. The breaking noise used to indicate an incoming call will throw your modem offline every time. Your phone company has a way to temporarily disable call waiting (usually by dialing \*70). Use it every time you go online.

4. Monitor your online time. An hour seems like a lot of online time, but hours slip by so fast you won't believe it. If you really get into the service, you can run up a hundred-dollar monthly bill in no time. And, since it's billed to your credit card, you won't know right away.

5. Manage your costs. Know what you're paying and spend your money intelligently. For example, browse at the less expensive 2400-bps speed and download files at 9600 bps. (High-speed connect time is usually more expensive.)

6. Learn online etiquette. There's an unwritten code of conduct online—it pays

to know it. For instance, WRITING IN ALL CAPS is considered to be rude shouting (it's harder to read). Once you've learned the rules, be tolerant of newcomers as they learn the rules.

7. Use E-mail effectively. Get E-mail addresses for your friends and relatives and use them. You get instant written communications, often worldwide. You can usually send E-mail to users of other major services. Send longer documents as files. (I file my articles with my editors through CompuServe only minutes after I finish them. It's a full day faster than Federal Express—and much cheaper.)

8. Audition the various services. Try the competing online services one at a time. The free sign-up bonuses usually give you enough time to discover how well you're going to like the service. Even though you may like your present service, how do you know that one of the others isn't even better? And give them another try every few years—they change quickly and dramatically.

9. Don't give up too soon. It takes a while to get up to speed on even the best of the services. Give the service a fair chance and don't shy away from expending a little effort to really understand what's going on.

10. Don't get in a rut. It's easy to get comfortable with the online areas that you found early on and stop exploring. Spend a little time periodically looking over new features of your service and looking for other fascinating areas you never previously suspected were there.

11. Learn the jargon and

have fun. You'll encounter arcane symbols such as :) (which is a smiley face on its side) and acronyms such as LOL (Laughing Out Loud) and IMHO (In My Humble Opinion). Don't be afraid to ask—the old-timers enjoy enlightening newcomers.

12. Develop a thick skin. Unfortunately, people online lose some of their civilized inhibitions. Flamewars—angry diatribes and insulting behavior—pop up now and again on all the services. Learn to ignore boorish behavior.

13. Develop family phone-use rules. Unless you can afford a separate line for the modem, no one can make or receive calls while you're online—which is often for hours. I never go online before 10 p.m., for example, except for short necessary sessions—and then I warn everyone so they won't knock me offline by picking up an extension phone.

14. Explore local bulletin board systems (BBSs). Every city has local BBSs that offer some of the same services as the national networks at lower cost—some are even free. For file downloading and random chat with a local flavor, a local BBS is often the best bet.

15. Ferret out local commercial and public BBSs. Local public agencies (libraries and universities) and commercial entities (newspapers and television stations) often provide excellent services through BBSs. You might have to really dig to find the access numbers, but it's worth the effort.

16. Monitor kids' usage. If your teenager learns how to download shareware games, he or she can run up staggering bills just hav-

ing fun. Similarly, the online games, chat lines, and round tables can become all-consuming pastimes. Also watch out for unauthorized access to "adults only" areas of the online services and use of the separate adult BBSs (which can be openly pornographic).

17. Use the network for tech support. Hundreds of software and hardware vendors run forums on all the major services. Post your questions and problems online, and you'll get help from both the vendor and other users who've already beaten your problem. Also, monitoring other users' comments can help you prevent problems before they happen.

18. Be specific when requesting computer help. Don't say you can't get the sound to work on your new game. Instead, explain exactly what hardware you have and how it's configured—then ask why it doesn't work and what to do about it.

19. Write to your representative in the House—or write to the White House. Washington is online; you don't need to dig out your congressman's or congresswoman's address any more—just send him or her your comments instantly, online. The White House staff has a message area on several of the services, too.

20. Step back and reevaluate things periodically. Can you really afford the time and money you're spending online? I dearly love my writer friends in GENIE's Writers Ink area, but if I monitored every interesting discussion, I'd be spending three or four hours a night there—which just isn't reasonable.

—Richard O. Mann □



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# FREE UP MORE MEMORY FAST FORWARD FOR MULTIMEDIA PROGRAMS

BY DAVID ENGLISH

**H**ave you tried to run a new multimedia application only to be told you don't have enough memory? Today's more demanding multimedia applications and games are pushing the limits of your PC and grabbing every last bit of its memory to perform their tricks. Some programs need all the conventional memory you can give them. Others require megabytes of extended memory to run properly. Others need megabytes of expanded memory. Even with 4MB, 12MB, or 20MB of RAM, you can still run out of memory if your system doesn't optimize your 640K of conventional memory and you haven't set up your system to provide expanded and extended memory to the programs that need them. This month, I'll attempt to explain how these kinds of memory work and recommend some programs that can help you avoid the dreaded multimedia memory bite.

Generally, memory problems occur with DOS-based programs. Windows knows how to take any leftover memory and use it in the best way possible. DOS programs, on the other hand, are still limited by the original 640K that was allocated for programs with the first version of DOS and the original IBM PC—back when a 64K machine was considered fully configured. Today's PCs usually have at least 4MB, so most CD-ROMs and games grab as much of the 640K of conventional memory as they can and take the rest in the form of either expanded or extended memory. The expanded memory standard is a throwback to early attempts to move beyond the 640K limit. Few people actually buy expanded memory anymore, but there are many software methods that cause extended memory to mimic expanded memory. These methods generally involve using a program called a memory manager.

Most memory problems occur at boot-up, when your CONFIG.SYS and AUTOEXEC.BAT files load a series of drivers. Problems can occur even when you use DOS 5's or DOS 6's own memory manager, called EMM386, to load some of these drivers into the memory area just above the 640K (this area is called upper memory or high memory). If you have DOS 6, you can use MemMaker to

place each driver in the best position in order to save as much of your 640K as possible. It's not unusual for EMM386 and MemMaker to load 60K–100K of drivers entirely into upper memory, leaving you more than 600K for your DOS applications. Sometimes, though, MemMaker can't fit all the pieces of the jigsaw puzzle together and has to leave some of your drivers in conventional memory. Then you could end up with only 540K–580K free, which isn't enough for many DOS programs, especially multimedia programs and games.

To load more of your drivers into upper memory, you can use one of the dedicated memory manager programs, such as QEMM 7 (Quarterdeck Office Systems, 800-354-3222, \$99.95), 386MAX 7 (Qualitas, 800-733-1377, \$99.95), or Netroom 3 (Helix, 718-392-3100, \$99.00). These programs go far beyond DOS's EMM386, not only loading your drivers into upper memory but performing such specialized tasks as loading your Video BIOS into extended memory.

Of the three, I've had the best luck with Netroom, but I've talked to others who prefer either QEMM or 386MAX. Using Netroom, I've been able to load my multimedia drivers, network drivers, VESA video driver, Stacker 4.0 driver, and mouse driver, as well as Laptop UltraVision, SMARTDrive, and MSCDEX.-EXE—and still have 612K left over for DOS applications.

In addition to developing Netroom, Helix has recently released a program that frees up even more conventional memory. It provides replacement programs—each of which takes only a few kilobytes of conventional memory—for your mouse driver, SMARTDrive, and MSCDEX. The program is called Multimedia Cloaking (\$39.95); it can be used by itself, with EMM386, or with any of the dedicated memory manager programs.

The bottom line is that you can do something about DOS-related memory problems. If you have DOS 5, DOS 6, or Novell DOS 7, check the manual to get started using the tools you already have. For further relief, check out a dedicated memory manager program, Multimedia Cloaking, or both. You may be surprised to see how many of those unloadable programs will suddenly work on your computer. □







# MULTIMEDIA PC

By David English

Remember the TV ad where someone accidentally drops his peanut butter into a vat of chocolate? At first he's angry, but then he discovers that these two great flavors taste even better when mixed together.

Now imagine someone accidentally combining two of the computer industry's hottest products—a notebook computer and a multimedia desktop PC. Instead of a new culinary delight, you would have the first true personal computer. This new hybrid could run your multimedia business presentations, help you maneuver your plane in a flight simulator game, verbally congratulate you on your achievements, and even follow your spoken commands. And you would no longer be restricted to disk-based software; you could use the rapidly expanding universe of multimedia CD-ROMs. No doubt about it—this is what portable computing was meant to be.

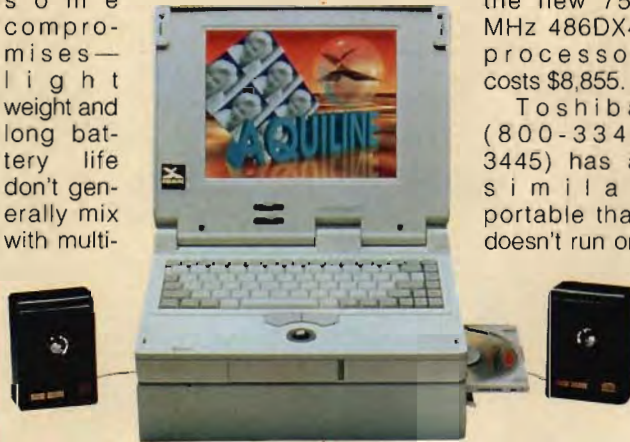
So how do we get from today's no-nonsense notebooks to tomorrow's song-and-dance, life-of-the-party portables? How much will it cost, and what do you have to give up in portability to get there?

We'll look at three different routes to portable multimedia: the new integrated multimedia portables, add-in PCMCIA multimedia cards, and multimedia devices that

plug into your portable computer's parallel port. Whether you plan to buy a multimedia portable in the future or want to add sound and a CD-ROM drive to your current portable, you'll find that there are more options than ever for taking multimedia on the road.

### Made to Order

In a perfect world, you could have a portable computer that included both a sound card and a CD-ROM drive—and still weighed less than four pounds. In our not-so-perfect world, you'll have to make some compromises—light weight and long battery life don't generally mix with multi-



media (though the situation is getting better each year).

If you want the whole thing in a single box, there aren't many choices. Aquiline (518-272-0421) makes a battery-operated portable, called the Hurricane, with an internal CD-ROM drive, a sound chip

on the motherboard, a ten-inch active matrix color screen that has 256 colors at 640 x 480, and a 540MB removable hard drive. It also includes a 66-MHz 486DX2 processor, 20MB of RAM, a Type II PCMCIA slot, and a Western Digital Graphics Accelerator Chip. Given the features, it's a wonder that the Hurricane weighs only ten pounds and, according to the company, has a battery life of over three hours. This unique machine may well predict the future of portable computing, but if you buy it today, it will set you back \$7,095. A version with the new 75-MHz 486DX4 processor costs \$8,855.

Toshiba (800-334-3445) has a similar portable that doesn't run on

color screen with 256 colors at 640 x 480, 8MB of RAM, an internal double-speed CD-ROM drive, Microsoft Sound System (built into the motherboard), built-in speakers and microphone, two full-length 16-bit ISA slots, and a SCSI port. With the built-in speakers and microphone, the T6600C/CD really is an all-in-one solution, though the weight and the \$8,299 price will slow down most of us.

The Toshiba also comes in two variations—one with more multimedia features and one with fewer. The version with more features is the standard T6600C/CD with an optional Zanatares/Intel ActionMedia-II upgrade (\$1,570). The upgrade uses both of the portable's 16-bit ISA slots and lets you add multimedia daughterboards based on DVI, JPEG, MPEG, and other full-motion digital video formats. The version with fewer features is the T6600C (\$7,699), which is identical to the T6600C/CD, except that it doesn't include an internal CD-ROM drive.

A nearly all-in-one solution is to buy a notebook computer with built-in sound and add a portable CD-ROM drive, either through a PCMCIA card or through a parallel-port adapter. Or you could buy a notebook computer with a built-in CD-ROM drive and add a sound device, either through a PCMCIA card or through a parallel-port

batteries, weighs more, and is somewhat larger. The 18.7-pound T6600C/CD features a 66-MHz 486DX2 processor with an optional 128K turbo cache, a 510MB hard drive, a video graphics accelerator chip with BitBLT, a 10.4-inch active matrix

# MULTIMEDIA



adapter. As I mentioned above, you can buy the sound card-equipped T6600C, which is a T6600C/CD without the CD-ROM drive. Similarly, Aquiline offers three models of its Hurricane notebook computer that don't include CD-ROM drives, though each of them includes a sound chip on the motherboard, has two Type II PCMCIA slots, and weighs about six pounds. The model with a 33-MHz 486DX/SL processor, a 200MB hard drive, and a dual-scan color display costs \$2,995; the model with a 33-MHz 486DX/SL processor, a 200MB hard drive, and an active matrix color display costs \$3,995; and the model with a 66-MHz 486DX2/SL processor, a 540MB hard drive, and an active matrix color display costs \$4,995.

Panasonic (800-742-8086) also sells a notebook computer with a built-in CD-ROM drive. The Panasonic V21 includes a multimedia pocket that accepts any of four optional peripherals: an internal CD-ROM drive, a video pack, a floppy drive, or an additional battery pack. The monochrome model costs \$2,599, while the active matrix color model lists for \$4,199. The optional CD-ROM drive is \$499.

### All in the Cards

Admittedly, the portables above are still expensive,

though the prices are coming down. And these dedicated portables are of little help to those of us who have already bought notebook computers.



Fortunately, most new notebook computers come equipped with one or two PCMCIA slots, which accept a variety of PCMCIA expansion cards—including sound cards, SCSI adapters for CD-ROM drives, and even a video input card. According to the Dataquest research firm, more than 80 percent of the notebook computers that will ship in 1994 will have at least one PCMCIA slot.

Some companies are even offering multimedia PCMCIA cards as options with new notebook computers. Compaq (800-345-1518) offers New Media's .WAVjammer PCMCIA sound card as an option with its popular LTE Elite series. Austin Computer Systems' new Multimedia

Notebook Systems include a MediaMagic PCMCIA sound card; a 32-bit local bus; accelerated video; a choice of active matrix color, dual-scan STN color, or monochrome display; and a set of stereo computer speakers. A PCMCIA SCSI interface is available as an option. The version with a 66-MHz 486DX2 processor, 8MB of RAM, a 340MB hard drive, and an active matrix color display with 256 colors at 640 x 480 costs \$4,999. And both Compaq and Toshiba offer proprietary SCSI adapters for many of their current PCMCIA-equipped notebook computers.

If your notebook has two PCMCIA slots, you should be able to convert it into an MPC-compatible machine. PCMCIA slots are backwardly compatible according to type. A Type III slot can accept Type I, Type II, and

Type III cards; a Type II slot can accept Type I and Type II cards; but a Type I slot can accept only Type I cards. Fortunately, among

the many PCMCIA sound and SCSI cards released over the past six months, there are several Type I cards that should work in almost any PCMCIA slot.

For a fully MPC-compatible sound card, check out the Pro Audio PCMCIA from Media Vision (800-348-7116). It's a Type II PCMCIA sound card that's fully compatible with both Level 1 and Level 2 MPC standards. The 16-bit card supports sample rates as high as 48 kHz and is fully Sound Blaster and Ad Lib compatible. It includes an on-board FM synthesizer, a built-in MIDI interface, 4 : 1 audio compression/decompression, and even a joystick port. The bundled utilities include a voice recogni-



tion program, a text-to-speech program, and a set

# ON THE ROAD





## MULTIMEDIA PC

of applications for recording audio, editing audio, and controlling audio CDs in a CD-ROM drive. The Pro Audio PCMCIA has a suggested retail price of \$299.

The .WAVjammer from New Media (800-453-0550) is also a 16-bit PCMCIA sound card, but—being a Type I card—it will fit into any PCMCIA slot. The .WAVjammer has an on-board FM synthesizer, a 32K DMA buffer that allows the card to operate using less than 2 percent of the CPU, low-power 100-mA operation with 1-mA standby mode, and an ultrathin six-inch cable with one-eighth-inch stereo jacks for headset, microphone, line-in, and line-out. The card is bundled with Microsoft Windows Sound System 2.0, which includes voice recognition, text-to-speech, compression/decompression, and audio-recording and -playback programs. It's both Sound Blaster and Ad Lib compatible (in DOS) and costs \$399.

Yet another full-featured PCMCIA sound card is available from I/O Magic (714-721-6960). The Tempo (\$399) is a Type II card with 8- and 12-bit stereo recording, four-operator FM synthesis, a 32K on-card buffer, full MIDI playback support, and a MIDI output interface. The card is compatible with Windows Sound System and Sound Blaster and Ad Lib games, and comes with several Windows audio drivers and controls.

DSP Solutions (415-494-8086) will take a slightly different approach with its soon-to-be-shipping PORT•ABLE Sound PCMCIA card (price not available). It will come with

everything you might need, including a built-in microphone, portable speaker, stereo jack for headphones, and volume control. The Type II card will be Sound Blaster compatible (except with DOS-based applications that use a DOS extender), will play back in either 8- or 16-bit mode, and will support various forms of compression in realtime.

If all you need is mono sound from Windows, check

which can produce a sustained random read and write data rate of over 1MB per second, with burst rates as high as 5MB per second. That makes it as fast as a standard ISA-bus SCSI interface card. The Bus Toaster is a Type I card that draws just 190 mA when in use (250 mA is the proposed standard) and 15 mA when asleep. It ships with CorelSCSI version 2 and should work with virtually all SCSI and SCSI-2 peripherals.



Add video input to your notebook with I/O Magic Focus.

out Audio Advantage from Turtle Beach Systems (800-645-5640). This 12-bit mono-only Type II PCMCIA card offers three different interface connectors, two full-featured MIDI ports (with MIDI In, MIDI Out, and MIDI Thru), and a power management system that ensures the lowest possible power consumption when the card isn't being used. Best of all, the list price is only \$159.

For a PCMCIA card that will let you hook your notebook computer into an external SCSI-based CD-ROM drive, take a look at New Media's Bus Toaster (\$359),

QLogic (714-668-5359) recently announced its second-generation *Fast!SCSI* PCMCIA host adapter, which has a transfer rate of 10MB per second. This Type I card features hot insertion and removal, includes the CorelSCSI software for both hard drives and CD-ROM drives, carries a full five-year warranty, and has a suggested list price of \$229.95.

Other SCSI PCMCIA cards include the Explorer (\$399) from I/O Magic, a Type I card that features hot insertion and removal; SlimSCSI (\$349) from Adaptec (800-934-2766), a

Type II card that features a 2MB-per-second transfer rate; and SCSI2GO (\$329) from Future Domain (714-253-0400), a Type II card that features data rates as high as 10MB per second, a 2K internal buffer, and a power requirement of 210 mW when operating.

Finally, I/O Magic lets you capture live video with its I/O Magic *Focus* video input card. The Type II PCMCIA card can capture live-motion video at up to 30 fps (frames per second), with a typical capture rate of 15–24 fps. *Focus* uses 100 mW when operating and just 1 mW in standby mode; it costs \$499.

### Old Dogs, New Tricks

What about older portables that don't have PCMCIA slots? What can you do to upgrade them to multimedia? Unless they have a special provision for a SCSI adapter (as Compaq, Toshiba, and NEC have with some of their portables), you're pretty much restricted to using the parallel port. And you'll probably be able to plug in either a CD-ROM drive or a sound device—but not both at the same time.

The major problem with using the parallel port is speed. Unless you have an EPP (Enhanced Parallel Port), your CD-ROM drive won't be fast enough to meet the MPC specification (even the Level 1 spec), and your sound device won't be able to support true 16-bit sampling and playback. The new EPP standard promises to turn the parallel port into a daisychain for peripherals, much like the SCSI standard, though few of today's portables support it, and almost none of the portables



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## MULTIMEDIA PC

from years past do.

If your portable has only one PCMCIA slot and your parallel port isn't an EPP, your best bet is to use your PCMCIA slot for a SCSI card and your parallel port for a sound device. You won't have 16-bit sound, but that's generally not as bad as having a CD-ROM drive that's far below today's Level 2 MPC standard.

DSP Solutions offers a powerful, if somewhat bulky, sound device that plugs into the parallel port. The PORT•ABLE Sound Plus (\$198.95) has a built-in speaker, 16-bit stereo playback, full Windows audio support, Sound Blaster and Ad Lib emulation (except with programs that use a DOS extender), a parallel-port pass-through for your printer, and DSP (Digital Signal Processor) technology. It runs on AA batteries, a nicad battery, or AC power.

If you don't need DOS program support, take a look at AudioMan (\$179) from Logitech (800-231-7717). It works only with Windows, but is more compact than the PORT•ABLE Sound Plus. It doesn't have a parallel-port pass-through, which may not be a problem unless you use a printer when traveling.

Media Vision has designed a very compact parallel-port sound device, called the Audioport. It's pocket-size, and it has full Windows support, limited Sound Blaster and Ad Lib compatibility (generally, it works with any DOS program that will run under Windows), a built-in speaker, and both microphone and external speaker jacks. In addition, it can run on either batteries or AC power. When

it first came out, the Audioport cost \$199. I've seen it available through Media Vision Resource (800-684-6699) at the closeout price of \$65, which is a terrific deal if you need a parallel-port sound device this small.

There are quite a few portable CD-ROM drives that can plug into your parallel port—but keep in mind that if your portable doesn't have an EPP, your parallel-port CD-ROM drive will run much more slowly than the standard internal CD-ROM drives found on desktop computers. Of course, you can plug these same portable SCSI CD-ROM drives directly into a SCSI

PCMCIA card and retain the full speed of the drive.

The portable MultiSpin 3Xp (NEC, 800-NEC-INFO, \$455) is a triple-speed drive (450K per second) with an access time of 250 ms. It's fully MPC Level 2 compatible, and it features a switchable (SCSI and SCSI-2) interface. The 3Xp weighs just 2.4 pounds without its optional battery pack and also runs on AC power. The parallel-port kit, which supports EPP, is an extra \$160.

An especially versatile portable CD-ROM drive comes from Media Vision. It's called the Reno Personal CD-ROM Player (\$349), and it doubles as a stand-alone

audio-CD player. Reno is a double-speed drive (306K per second) with a 64K buffer, has an access speed of less than 180 ms, features a SCSI-2 interface, and can run on a nicad battery or AC power. It doesn't come with a parallel-to-SCSI adapter, so you would have to buy the adapter separately.

Toshiba's newest portable CD-ROM drive weighs just 1.5 pounds. The CD-400A is a double-speed drive (300K per second) with an access time of 320 ms. It's fully MPC Level 2 compatible, and it costs \$415. For more information, you can call Toshiba's Disk Products Division at (714) 457-0777.

Finally, DISCTEC (800-553-0337) sells a family of parallel-port devices that fall under the name of RoadRunner Express. The RoadRunner Express CD-2x (\$529) is a double-speed drive (up to 350K per second), has a motorized front tray for convenient loading, and weighs 3.5 pounds. Using its autosense, it can pick the optimal data rate, whether your parallel port is a unidirectional port, a bidirectional port, an ECP (Extended Capabilities Port), or an EPP. The CD-2x runs on AC power only.

### On the Road Again

By the end of the year, we should see more notebook computers with built-in sound, more EPP support, and a new PCMCIA 3.0 standard, which will feature a faster throughput using a 32-bit data path. With the faster processors, larger hard drives, and color screens found in today's notebook computers, portable computing is about to go multimedia in a big way. □



Hook a CD-ROM drive to your notebook with SCSI2GO.



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Requires a 386DX PC compatible or better; hard disk drive; VGA graphics; 4 Megabytes of memory. A 486 is recommended. Multiplayer options require a network which uses the IPX protocol, a modem or serial link. Digitized sound effects require a 100% Sound Blaster™ compatible card, Gravis Ultra Sound™, or Pro Audio Spectrum™-16. DOOM is a trademark of id Software, ©1993. Other trademarks are the property of their respective companies.





## NEW MULTIMEDIA PRODUCTS

EDITED BY POLLY CILLPAM

### Say "Cheese!"

Logitech has recently announced its MovieMan Video & Audio Capture Board. It captures true-color video and high-quality audio together at a full 30 frames per second. Because the signal capture is integrated, sound and video are always synchronized, and there's no need for a separate Windows sound card. It's the only board on the market that's "digital video ready," supporting both NTSC and PAL analog signals, as well as the Digital Video Connector Interface (DVCI), an emerging digital video interface standard. MovieMan can capture still images in resolutions of up to 640 x 480 in 24-bit color. It can play CD-ROM-based multimedia titles through support for Microsoft Video for Windows, as well as audio WAV files.

able and easy way to add both video and sound to the PC and promises to open the market to a new class of consumers—"next adopters," a group of PC-savvy end users who are enthusiastic and knowledgeable about new technologies but wait for products to become more affordable," says Susan Egnoto, Logitech product manager.

The product will ship with a set of software programs, including a complete version of Adobe Premiere, which is the best-selling video-editing program, and two packages from Logitech: FotoTouch Color image-editing software (for single-frame editing) and EasyClip image-capture software (for one-touch drag-and-drop image capture). According to the company, this combination of hardware

### Twist and Shout!

Compton's NewMedia is entering its first venture with Rhino Records, a division of Rhino Entertainment. Compton's NewMedia, a leading developer, publisher, and distributor of multimedia titles, plans to issue a series of jazz, rhythm and blues, and early

Family Doctor from Creative Multimedia. Video clips, animations, and audio bring the disc's medical information to life. Not only is it relevant for the family, but physicians, nurses, and health educators will find it valuable for patient information.

The latest edition features a video introduction by Allan Bruckheim, physician, educator, and author of Tribune Media's syndicated "Family Doctor" column. The first of two new sections is called The First Aid. It has four areas: Introduction, What to Do First, First Aid & Emergency Care, and Your First Aid Kit.

The second section is on rare diseases, based on information from the National Organization on Rare Disorders (NORD). This section defines each disorder, gives synonyms for the disease's name, discusses causes and therapies, and identifies researchers and clinics that may be contacted for information or assistance.

Updates to the previous edition include The Anatomy of the Human Body, divided into five sections reflecting the major systems of the human body. The New Prescription Drug Reference Guide (1993 edition) offers valuable information such as brand and trade names, uses, side effects, and contraindications. It also explains how each drug works and includes photos of medicines. The Question and Answer section has more than 300 new entries, now totaling over 2300. It covers a wide range of topics, including 282 common medical conditions, common



rock multimedia records based on a wealth of audio and visual material. Each CD-ROM title will contain 10-15 full song tracks, accompanied by the musicians' biographies and discographies, as well as news events from the year the songs were released.

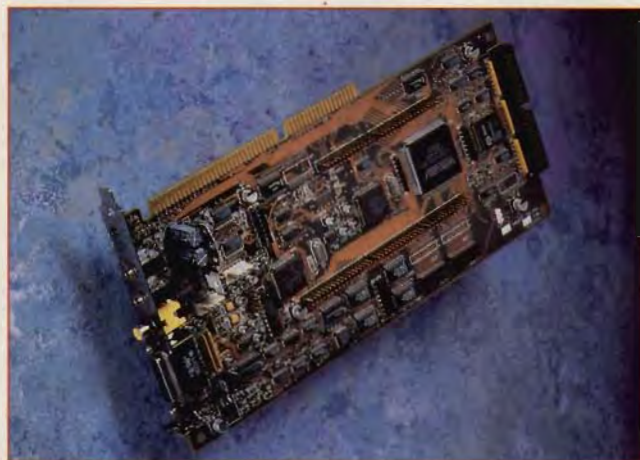
Rhino Records is known as the music industry's premier archival label and for its comprehensive audio collections. In addition to its own extensive vault of recordings, Rhino sometimes purchases entire catalogs from other labels, tapping as many labels as it takes to collect and reissue a compilation of historic hits.

Initially, Compton's will issue one rhythm and blues title and one jazz title based on the Roulette and Atlantic labels.

Compton's NewMedia  
(619) 929-2500  
\$29.95  
Circle Reader Service Number 532

### What's Up, Doc?

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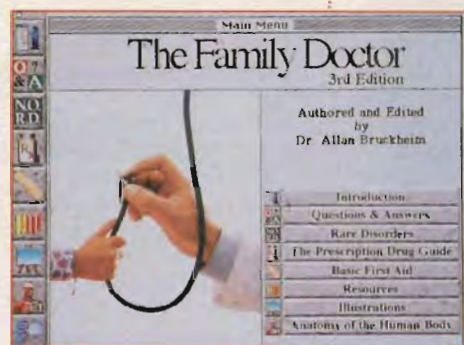
Because compression technology is evolving so rapidly, the board's modular design allows expandability for more powerful compression add-ons. "MovieMan represents the most afford-

and software would represent a retail value of \$700.

Logitech  
(800) 231-7717  
\$299  
Circle Reader Service Number 531



illnesses, the patient-physician relationship, sports medicine, surgical procedures, and more. Education-



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al Resources, Associations, and Health Update Booklets are all updated and consolidated into a single section titled Resources. A glossary and more than 300 illustrations are provided for your reference.

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Circle Reader Service Number 533

### Tommy Goes Multimedia

Rock 'n' roll fans of the sixties, rejoice! Another legend will soon be available on CD-ROM. RoundBook Publishing Group, Kardana Productions, and Pete Townshend will collaborate on a comprehensive multimedia exploration of the *Tommy* phenomenon—ranging from Townshend's original compositions and recordings (including the legendary sunrise performance of *Tommy* in 1969 at Woodstock) to the current Broadway musical (winner of a 1993 Tony award).

"Pete's creative works and insights have been the driving force behind every

version of *Tommy*, and the CD-ROM will be no different," says Greg Smith, president of RoundBook. Townshend has also accepted an offer to become corporate adviser and consultant on a number of future interactive projects.

In other news, RoundBook is expanding its line of edutainment titles. This fall, three new titles will premiere: *The Man with the Underwater Eyes*, *The Surfinary*, and *The Realist*.

*The Man with the Underwater Eyes* is based on the work of award-winning underwater photographer and cinematographer Al Giddings. It will include over 500 still images and 30 minutes of film and video. Giddings is known as the photographer who obtained and aired the first images of the *Titanic* after its more than 70 years in the North Atlantic, as the photographer who took the first photos of hot vents underwater, and for his work for "National Geographic," the Discovery Channel, and such movies as *The Abyss* and *The Deep*.

*The Surfinary* is based on the book of the same name by well-known surfing aficionado Trevor Cralle. The CD-ROM will include original surfing footage, licensed film and video on the history of surfing, and more than 500 black-and-white and color photographs and surfing illustrations. The disc will also include music performed by surf bands—made up of surfer-musicians who per-

form in clubs up and down the California coast. A surfing game that tests the user's knowledge is also included.

"*The Realist*," by Paul Krassner, was first published as a magazine in 1958. It offered readers a look into the mind of a man that government investigators considered a raving, unconfined nut. This CD-ROM will feature 45 minutes of stand-up comedy and political satire performed by Krassner. In addition to his work as an editor and author, Krassner is best known as cofounder, with Abbie Hoffman, of the yippies in 1968.

RoundBook Publishing Group  
(408) 438-4222  
Prices TBA

Circle Reader Service Number 534

### Multimedia-Minded Professor

Learn about multimedia while experiencing it. Professor Multimedia is a comprehensive tutorial which teaches the elements of multimedia, how multimedia can affect you, and how you can unleash the power of multimedia to improve communication. It can help you transform your PC into an interactive arena of lights, sound, and action.

For example, Professor Multimedia can teach the difference between a wave file and a MIDI file, and how each incorporates the ele-

ment of sound. Learn how frame and object animation produce different animated and moving effects. See how different resolutions affect the look of a presentation, and discover video capturing and how to incorporate live action into a multimedia presentation. Master the MPC and its powerful tools and accessories to develop personal sound, video, and photo libraries.

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Professor Multimedia is designed to let you work at your own pace. You can follow the program or randomly select the lessons that



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## MULTIMEDIA SPOTLIGHT

By Bob Lindstrom

### MUSICTIME 2.0

This program is designed for the multitudes of musicians and music hobbyists who need to preserve their musical brainstorms in standard musical notation. It combines basic MIDI recording, editing, and data file importing with a surprisingly sophisticated notation engine. In short, if you can play it or load it into your computer, MusicTime can display it onscreen and print it out as sheet music.

MusicTime's Score window lets you create music manuscript pages with as many as eight staves, each with as many as four independent voices. Then you can fill them using one of several music entry techniques.

MusicTime can also play your score on external MIDI synthesizers, an internal sound card (such as a Sound Blaster or Pro AudioSpectrum), or a combination of both. MusicTime's dual MIDI port design allows you to assign some music parts to the card and others to the external devices.

Finally, MusicTime prints the score using your choice of TrueType or PostScript fonts. The result is a polished, professional-looking manuscript that outclasses those hand-copied, agony-of-writer's-cramp scores.

There are several ways you can enter notes into MusicTime. You can import files in MIDI Type 1 or Passport format (the latter from Passport's Master Tracks Pro or Trax). Or you can drag and drop notes and symbols from the icon menus. You can also use step-time recording to select note lengths with the mouse and then play note pitches

with an external music keyboard or your computer's alphanumeric keys. Finally, you can record music in real-time with an external music keyboard or your computer keyboard.

In MusicTime's Staff Sheet window, you can assign each line (or track) of music to separate computer ports, MIDI channels, and synthesizer instruments, as well as use sliding volume controls to set the relative volume of each instrumental line.

additional markings or—since the automatic process can't produce perfect notation—refine the score notation. If you're writing sheet music for a song, you can also add lyrics for one or more verses. You can even improve visual clarity by assigning various colors to different musical lines and, if you have a color printer, print out the results.

An extensive array of musical symbols is available, including treble, bass, tenor,

the equal of those in full-fledged MIDI sequencing software. Fortunately, MusicTime's solid file importing and exporting make it easy to use a separate MIDI sequencer either before or after notating or printing a score.

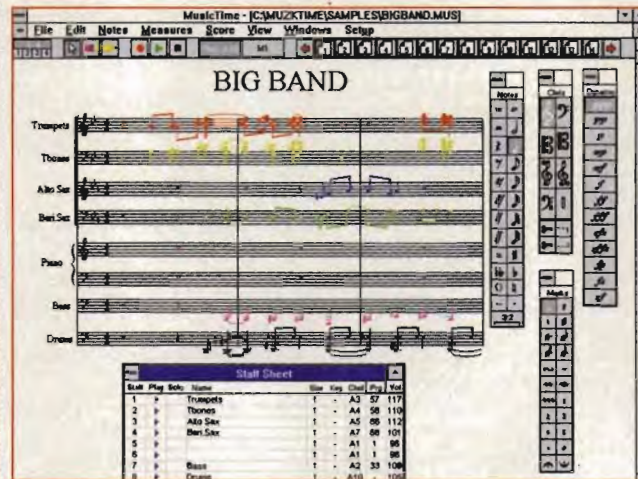
Even though MusicTime puts the emphasis on notation and printing, it still lacks the ability to extract and print parts from a full score, unless you're prepared to go through a time-consuming copy-and-paste process for each staff. Since musicians can't be expected to read their parts from the full score, the lack of this feature limits the program's versatility for music ensemble teachers, composers, and arrangers who need to output individual parts. For them, Passport's Encore would be a better choice, as it includes automatic part extraction.

Also, MusicTime scores can't contain more than eight staves. While this is sufficient for lead sheets, piano-vocal scores, small combo sheet music, and most choral writing, it's insufficient for larger band and orchestral scores.

MusicTime's priority is superior printed output, and the printed results do look excellent. Additionally, the mouse-driven editing tools are very easy to use and require only a brief learning curve. For musicians or hobbyists whose main needs are lead sheets, piano-vocal scores, choral scores, or small combo sheet music, MusicTime is a good choice for producing first-rate printed manuscripts.

Passport Designs  
(415) 726-0280  
\$149

Circle Reader Service Number 550



Create your own sheet music with MusicTime 2.0.

Once you've entered the notes, MusicTime automatically guesses how they should be notated as written music. While this is a complex process, MusicTime does an impressively good job. In most cases, you end up with an intelligently written, fully realized score onscreen, missing only interpretive markings such as dynamics, phrasings, ties, and slurs.

For a perfect manuscript, MusicTime provides a well-equipped array of graphic-editing tools and musical symbols so you can insert

and percussion clefs, along with trill, mordent, octave transposition, and guitar fret chords. Composers can mix keys and time signatures throughout a score, but they won't find all the exotic symbols needed for some contemporary scores.

Similarly, musicians needing intricate control over MIDI playback may want to fine-tune their work in a separate MIDI sequencing program. MusicTime's tools to edit velocity (volume), pitch, duration (note length), and quantization (rhythmic placement) are good, but hardly



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# PRODUCTIVITY CHOICE

*This update takes The Norton Utilities into the Windows environment with power and ease—and further develops its relationship with DOS.*

Tom Campbell

## THE NORTON UTILITIES 8.0

If you left The Norton Utilities behind when you left DOS and opened Windows, it's time to renew an old acquaintance. Symantec's evergreen Norton Utilities—a PC disk repair standard for a decade or so—is making a graceful transition into the Windows world.

Reviewing The Norton Utilities 8.0 came at an opportune time for me. I was writing a program that uses three similar animated icons, all based on the same picture. DOS was confused about the location of one of the files. The installation process, normally speedy, halted itself almost before it started, explaining correctly that the DOS file allocation table on drive C was damaged. It suggested I use Norton Disk Doctor on the aptly named Emergency disk to diagnose and correct the problem. I did so, and NDD quickly found the culprits—two TMP files that I knew I could safely delete. I was then able to continue the installation, this time passing the rigorous hard disk check. I gratefully loaded all 9MB of The Norton Utilities, although I could've installed only those I selected.

The Windows utilities include Norton Disk Doctor, the centerpiece of the collection; Speed Disk, a hard disk efficiency expert; System Watch, a stay-on-top utility that allows you to monitor everything from available drive space to free graphics resources; File Compare, which shows graphically the differences between two text files (for example, the differences between AUTOEXEC.BAK and AUTOEXEC.BAT);



INI Tracker, which lets you keep track of changes to Windows INI files; INI Tuner, which gives you an amazingly easy way to view and learn about a wide variety of those mysterious INI files that proliferate so abundantly; INI editor, a vast improvement on the benighted SysEdit; and INI Advisor, a dynamite help program that coordinates the other Norton INI applications and gives you tons of handy Windows tips. Those are just the Windows utilities.

The DOS tool set is wonderfully familiar to grizzled vets. It includes Disk Doctor; System Info, which gives pages and pages of information about your computer system; Change Directory, a supercharged replacement for DOS's opaque CD command; the ever-handly FileFind, which lets you locate a file or files on the hard disk, find out how much disk space they consume (and how efficiently the disk uses that space), and even search for text within those files; Diskreet, a disk

security program; DUP, a great disk-duplicating tool that lets you copy a drive to the same drive without swapping; File Fix, which tries to repair corrupted files; dBASE, WordPerfect, and other files; NDD, a notably superior replacement for COMMAND.COM; INI Enhancer, which gives you files a streamlined, professional finish; and more. They're tied together with Norton Utilities, but they work equally well on their own.

Speed Disk performs a task that's far more complex to describe than it is cute. Seldom having to put a file on a hard disk to put a file in one location, it can be forced to move over the disk when accessing a single file—a process that can cause noticeable latency as your files become more and more fragmented.

Speed Disk analyzes the disk and figures out how to shuffle the fragments so they're closer together, so



ing up your hard disk and—an important fringe benefit—helping protect against data loss. This used to take hours and was paradoxically dangerous: The very act of rearranging your disk meant that if your computer lost power or you accidentally rebooted during defragmentation, the disk could be rendered unusable.

Speed Disk for Windows analyzed my 200MB drive in just a few minutes; a complete defragmentation took only about an hour. Better, it worked its magic as I used Windows and DOS in the background. Speed Disk can be safely interrupted, and despite its blinding speed, it allowed me to write this review as it did its job.

DUPDISK is a classic Norton utility, performing a single, apparently simple task so well that you're almost surprised that it's not already part of DOS. If you have two identical floppy drives, DOS makes copying a floppy disk fairly painless. The problem is that most machines have either a single 3½-inch drive or a 3½-inch drive and a 5¼-inch drive—and Diskcopy won't work across dissimilar media. If your machine is thus configured and you want to make a copy of a 3½-inch disk, you have to employ an old DOS hack in which the single drive literal-mindedly does the work of two, forcing you into innumerable disk swaps.

DUPDISK takes a much more straightforward approach. It copies the entire disk image into RAM, asks you to insert the destination disk, and then creates a copy in one pass. Depending on how much you rely on floppies, DUPDISK alone could

be worth the price of admission. It eliminates the tedious, time-consuming disk swapping that can really bog down your copying time.

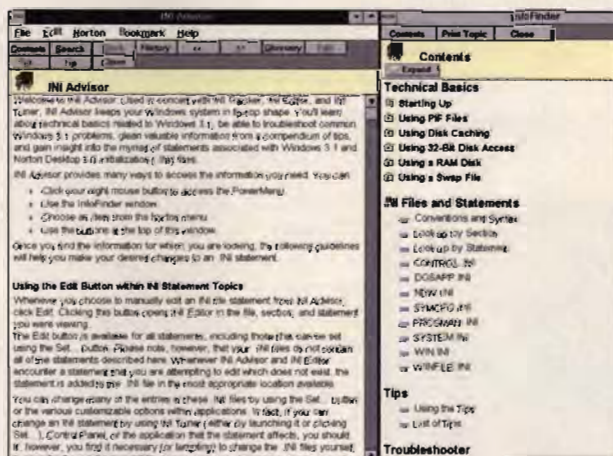
The NDOS replacement for COMMAND.COM boasts a staggering 200 commands, but it mercifully loads itself into high memory, making its DOS footprint smaller than COMMAND.COM's. If you're an infrequent visitor to the DOS command line, you'll probably get by just fine without NDOS. But NDOS will be a dream come true if you're a Luddite like me, who wonders why DOS has never provided commands to accept input in batch files or let you change both disk and directory in a single command, use subroutines in batch files, move a file to a different directory, and so on. I took to NDOS instantly, disappointed only when I used machines at work that didn't have it.

Batch Enhancer is unrelated to NDOS, but it offers some of the same features to users who are running only COMMAND.COM, not NDOS. It lets you create interactive, flashing, beeping batch files with a minimum of fuss—and it can do a great deal with just a few commands. Some of the sample scripts are elaborate and quite handy to use. Batch Enhancer was developed separately from NDOS, so some of their functions overlap; this can be a source of confusion to the novice.

The Norton Utilities is a class act, well worth the \$179 list price if your job depends on PCs. From the superlative installation program to the manuals to the online help and the programs themselves, The Norton Utilities exudes skill, reliability, and crafts-

manship. The utilities are fast where they need to be, conservative where they need to be, and insistent where they should be.

The online help and screen prompts still have the preternatural lucidity that made Peter Norton a player, but they do miss a few tricks. There are many places in the DOS utilities documentation in which short batch files illus-



trate a particular tool at work. It seems like missed marketing opportunities that these batch files don't use Batch Enhancer to display a dialog if a file is missing, for example, and that they aren't written in the vastly extended batch language NDOS provides. My pet peeve is that NDOS is only documented online—you have to pay extra for a manual. Granted, only a small number of Norton users rely on NDOS, but if it comes with the product, it ought to be adequately documented.

In all, however, you'll find you simply can't go wrong if you buy The Norton Utilities 8.0. And you may very well go wrong if you don't. □

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Robert Bixby

## TOTALLY WIRED

Let's take a look at what the future of cable access will be. To see the complete flow, we need to look at the history of telecommunications. (The source for much of this information is *Cable TV Technology Information Kit*, provided by the National Cable Television Association.)

Once, telephones and telegraphs were very rare things. Information flowed fitfully and in small packets. The problem (or one of the problems) was wiring. It would take nearly a century just to string wire to every house and to develop a nationwide network of lines. Wireless communication seemed to solve many of these problems. Within a few years of the invention of the wireless (radio), most homes had sets.

When television arrived, it could do more things than radio, but in order to broadcast its more complex set of signals, it had to use a wider band than radio so there could be fewer stations.

When satellites in geostationary orbit came into play, virtually half of the earth was in direct view of any given satellite. Bandwidth was less of a problem, too, since from the beginning, communications satellites could handle hundreds of channels.

Satellite reception is currently in a bit of a muddle. All cable providers use satellite receivers, many homeowners have installed satellite dishes in their backyards, and people will soon receive transmissions using 18-inch receivers on top of their televisions—satellite dishes barely more imposing than rabbit ears. But the big money is on central receivers and distribution through fiber-optic cables.

As you can see, the development of electronic commu-

nication has been a continuing battle between distribution (who's included in the net) and bandwidth (the amount of information that can move across the net). Shortwave can distribute a little information to billions of people while television transmissions can move a lot more information but serve at most a few million people close to the transmission tower.

Wire communication faces similar challenges. Twisted-pair wires (used for telephone and some computer networks) can carry only about 1/900 the information a coaxial cable can carry. But coaxial is also prone to problems. Signals are attenuated rapidly along the wire, requiring constant amplification. A coaxial cable must have an amplifier every 2000 feet, or the signal will drop off to nil.

Each time a signal is amplified, a little bit of noise is introduced into the system, so you can't string a cable out indefinitely without making the signal so noisy that it's useless. It's the noise of amplification that limits most cable systems to about 40 channels. If there were a way to feed a clean signal down a cable without amplification, you could boost the number of channels to between 100 and 200.

The key to this is fiber-optic cable, which requires less amplification and can provide a clean signal close enough to your home that an unamplified coaxial cable (called a drop line) can run the rest of the way to your receiver with little degradation in signal and up to 200 channels of infomercials and home shopping networks. But that's not all.

Where cable and computers come together is the point of interest. Think back to the 1980s—those dim days at the dawn of time when people bought magazines and books

with type-in programs in order to spend long hours creating software for themselves by typing in code at the keyboard. CompuServe and The Source had some programs available online for downloading, but at 300 bps, who could afford all of the online time?

Disk-based software was available at 80K and 160K at a time. In the blink of an eye, we have moved from those times to the era of CD-ROMs capable of providing 3000–6000 times as much information as the first floppy disks on platters that are smaller and less fragile than floppies. Although CD-ROMs are more convenient, more capacious, and more rugged than floppies, they are on the verge of being supplanted by online technology, which provides far more convenience, capacity, and ruggedness than CD-ROMs provide.

Online connections will make concern over distribution of data a thing of the past. You will be able to access as much data as you need—at least for today's applications—virtually instantaneously. You will pay fees not for collections of disks and manuals but for access to code and text files online. But the key phrase is "for today's applications." Applications will rapidly begin to push the envelope for data transmission. Once, the 600MB CD-ROM full of highly compressed code and data was seen as the answer to distribution problems that made 1.44MB floppies virtually obsolete. A few months later, manufacturers found themselves shipping applications and games on two and even three CD-ROMs. Similarly, I have confidence that the demands of presenting the virtual worlds we will soon inhabit will quickly outgrow the capacity of cable. What will we do then? □

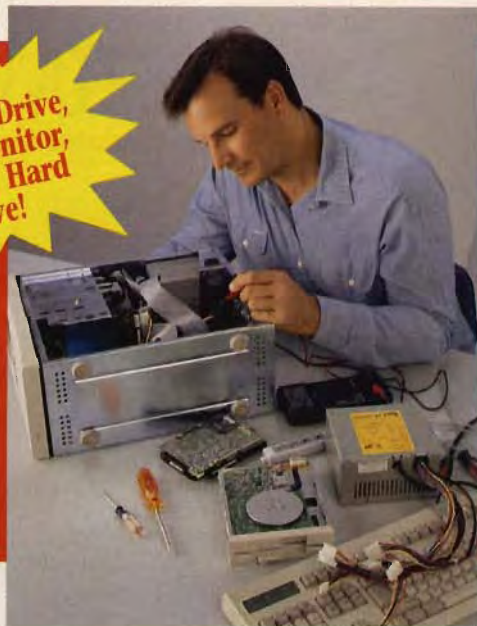
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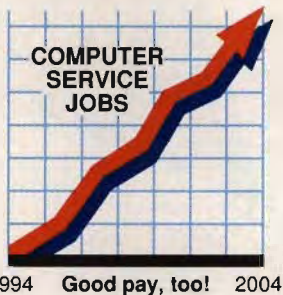


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# DISCOVERY CHOICE

*This entertaining and educational paint program gives kids the confidence and freedom to create on and off the computer.*

Peter Scisco

## FINE ARTIST

The stick man may be seeing his last days. Microsoft's Fine Artist not only combines a tutorial with a powerful multimedia paint program, but also throws in templates and step-by-step instructions for creating special projects. It puts a paintbrush in the hands of kids 8-14 years old and gives them the guidance and encouragement to reach beyond the stick man.

The Fine Artist studios are located in a street in the whimsical town of Imaginapolis. As in Microsoft's other kids' program, Creative Writer, the town acts as an interface between kids and the various activities the program provides. In Fine Artist, a building "houses" the program's activities in the same way that there's a building for the activities in Creative Writer. Each floor within the building supports a different job. It's an odd interface for adults accustomed to files, directories, and folders, but it's very easy to navigate.

In the Fine Artist building, for example, the bottom floor plays host to the Lobby and the Gallery. Kids can hang their pictures on the wall here and then pull them down and work on them some more. They can rearrange the display, exchange the pictures on the wall for others in the library, or bring a picture to the screen to work on it.

Kids can take the elevator or slide up the fire pole to the Painting Studio on the second floor. This may be the most familiar part of the program, as it uses many of the same elements found in other paint programs. To start a new drawing, kids double-click on the blank canvas resting on the ea-



sel at the center of the screen. If they have created a picture before, that picture is displayed on the wall. Since the program remembers all of this when it's turned off, kids can easily return to their current project.

The Painting Studio introduces a whole wall of tools that are designed to make the creative process both fun and easy. Kids can choose from standard tools such as paintbrushes, line and shape drawing, and paint buckets, each with special shapes, colors, and patterns. Kids will also find transformers, which will bend and twist and otherwise modify pictures. Original pictures can be started or dressed up with the Sticker Picker, which includes more than 125 different clip art images of several types, from animals to landscapes.

Multimedia events can be added quickly by selecting from menus. Sound effects ranging from the roars of dinosaurs to the mooing of cows to musical notes are easily as-

signed by clicking on the horn icon. Kids can then play their selected sounds back by using a magic wand option to click on the appropriate spot in the picture. If kids don't find the sounds they want, they can import WAV files or record their own.

Some of the pictures and backgrounds are even animated. While this doesn't translate to the printed page, of course, kids can still enjoy making their own live pictures, complete with slithering snakes, leaping lizards, fugitive spacemen, and so forth.

Mistakes are no problem, thanks to the Fine Artist vacuum. It sucks up misplaced stickers, words, and paint drops. It can also be used to copy and paste from the Windows Clipboard. It's designed to sniff out and whisk away only those elements that it's told to find. That's a handy feature when you're working with a complicated picture and it's only a sticker that has to be erased, not the background.

Fine Artist does a good job



with words, allowing kids to use the Windows font library in their computer and to assign special shapes and colors to the words in their pictures. Special effects, like drop shadows, outlines, and extruding type, are as easy to apply as pressing a button.

All of these tools are available both in the Painting Studio and on the Projects floor. If kids discover they need help with any of the tools, the comical McZee character provides explanations.

Most kids will draw without encouragement (especially on the wall), but as they grow older, many stop experimenting, convinced that they lack the talent or the skill. But most drawing skills can be learned—they're not always based on talent or intuition. Fine Artist really shines here as it teaches these skills with short lessons featuring a character named Maggie.

As they move through the lessons, kids learn such terms as *negative space* and *positive space*. The terms are illustrated so that kids can immediately grasp the concepts. After all, it's the technique, not the vocabulary, that counts at this point.

Kids also get some pointers in art appreciation as they move through the lessons. By clicking on the Challenge button (located at different intervals within each lesson), kids get a real-life example of the concept being covered. M.C. Escher, for example, explains negative and positive space (with words—none of Escher's pictures are displayed). Anyone familiar with Escher's work knows that he achieved his illusory effects by playing with these concepts.

Other lessons include in-

struction on giving depth to drawings by teaching how an artist uses a vanishing point on the horizon or how overlapping elements and added detail create the illusion of three dimensions. Not only does Fine Artist explain these concepts, but it also supplies all the tools kids need for pulling off their own visual tricks. They can repeat the same lessons over and over, and then translate those lessons into drawings—on the computer or on a sketch pad out in the backyard.

Learning techniques is a great way to build confidence in kids who might otherwise never attempt to draw. For those who are visual learners, a program like this can engage them in the creative process and lead to discoveries beyond the canvas.

Fine Artist also shines as a project maker. Excellent online help takes kids through the process of making a comic strip, a poster, stickers, and even an electronic flip book.

All of the projects include step-by-step advice from Maggie. When kids are making a comic strip, for example, she helps them decide how many panels to use, guides them in creating a word balloon, directs them to the backgrounds, and then shows them how to use the program's sticker library for characters in the strip.

If they like, kids can create a comic strip from scratch, drawing their own backgrounds and characters. Or they can import pictures from other Windows programs (WMF and BMP formats).

Importing pictures into comics or into other projects works the same way as import-

ing a sound effect, and it illustrates one of the odd characteristics of Fine Artist. The program's interface is designed as a toy, not a toolbox. Where most other art programs ask the user to move through directories or disks to find a picture, Fine Artist uses a frisky fellow named Ratdog to fetch appropriate graphic files from the user's disk.

Such a tool solves the prob-

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lem of kids having to search through a hard drive for pictures when they may not understand the concepts of file names and directories. As a protective measure, it guards their parents' machine against mistaken deletions. It's a great feature for the many parents who are anxious about sharing the computer with their kids.

There are plenty of paint and draw programs on store shelves. Many of them are suitable for kids as open-ended discovery toys, but few of them take the time to teach as well as entertain. Fine Artist gives budding artists room to create without ever painting them into a corner. □

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# GAME INSIDER

Peter Olafson

## HARVESTING CONTROVERSY

If nothing else, Merit's forthcoming SVGA horror game, *Harvester*, is likely to be controversial. I'm not even talking about the skull-and-spinal-column video that grabbed people's attention at Winter CES. This CD-ROM role-playing game, designed by Gilbert Austin (who wrote the stories for Origin's *Wing Commander II*, *Strike Commander*, and *Privateer*) and the Maelstrom team, ultimately offers you the option to become a killer.

"The censors can't wait to get their hands on it," said Roddy McGinnis, Merit's director of product development.

**Merit reaps controversy with *Harvester*, where becoming a killer is an option.**



It sounds like something out of a movie. (Indeed, an MPEG full-motion version is being considered.) You wake up in a bizarre small town straight out of "Leave It to Beaver." The only person you know is The Girl Next Door (evidently your fiancée). She disappears. Evidence points to an odd lodge in town, and let's just say it isn't the home of the Shriners.

The perspective in this adult-level adventure is split between that of a filmed character and a view similar to the one in *Mortal Kombat*. You

have the ability to fight in modest fashion (with a baseball bat), as well as in more dedicatedly *Mortal Kombat*-like fashion (with a sickle). Look for it late this summer.

Also in the works from Merit is *The Fortress of Dr. Radiaki*—a 30-level would-be *Doom* rival that aims to better the original in terms of background detail and animations. Stills from this work in progress suggest the designers are going for a more photorealistic, and more bizarre, effect.

Merit also has under wraps an as-yet-unnamed flight sim said to be accessible in the style of *Comanche: Maximum Overkill*, and to use Gouraud-shaded graphics and a virtual cockpit. The game will sport a range of interesting missions, from capture-the-flag to cooperative ventures.

Cooperative? Yes, it will be sold in a single-player version, but you'll be able to call Merit for a code to unlock the network version, which permits up to eight players per side.

Also look for a new version of the free-scrolling horror-comic *Isle of the Dead* that tunes up the sound and music, and a major upgrade to *Command Adventures: Starship*, which will include a mission disk. Finally, Merit has picked up the U.S. rights to *Sink or Swim*, a Lemmings-like arcade/puzzle game from England's *Zeppelin* label that finds you saving fire-hydrant-shaped passengers from a doomed liner.

*Slings and missiles*. *VR Sling-shot* has the feel of a flight sim, but it's more like a virtual sport. In this airborne duel from *Ixion* (originally released for the Amiga and due this summer for the IBM), you and a human or computer opponent square off in triangular craft in an environment graced with a very persuasive simulation of physics. Flight is as smooth as you could wish, but the under-

lying math makes it feel real, and with 3-D glasses (which plug into a parallel-port adaptor that's available separately), the game takes on an incredible you-are-there feeling. You don't fly through this space so much as inhabit it.

The game has undergone some changes since its original Amiga release. It's now full-screen with improved sound (the Gravis *Ultrasound* works great with it), and the IBM version has two full games—*Energy Duel*, where you try to wear down your opponent's power, and the new *Cyberball*, a sort of virtual hybrid of air hockey and racquetball in which you try to butt and shoot a faceted sphere through a Stonehenge-like goal.

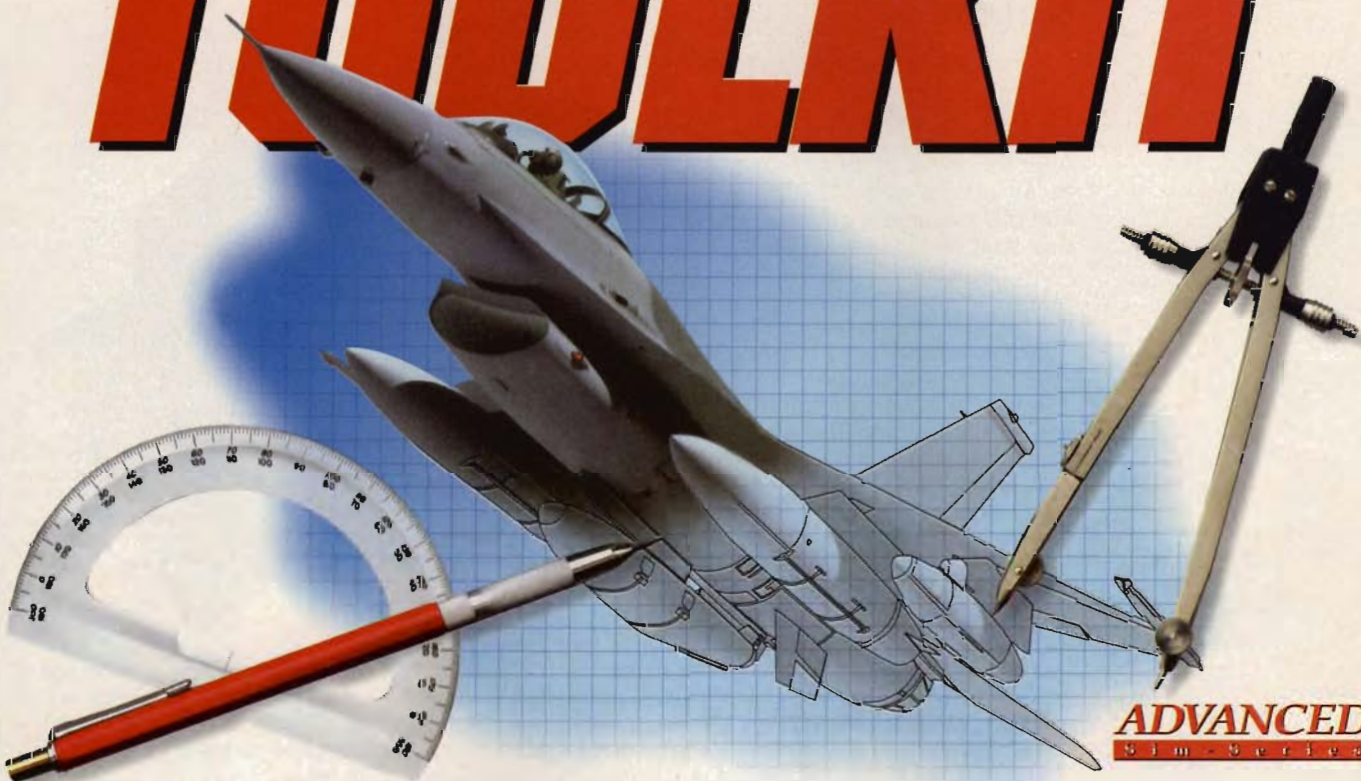
*Simmering sequels*. How do you follow up an act like *Doom*? With a game called *Doom II: Hell on Earth*. Id's CEO, Jay Wilbur, indicates that it will pick up where *Doom* left off, on a devastated Earth populated by really evil things, and have "everything that *Doom* had, and more of it." Levels will be much larger, and the game will no longer be episodic. Expect it for Christmas from GT Software.

*Armored Fist*, NovaLogic's new tank game that uses the *Comanche* voxel space technology, should be available soon. Set in the future, *Armored Fist* places you in command of an armored infantry company using hardware from either the U.S. or the former Soviet Union. You can control the U.S.'s M1A2 Abrams and M3 Bradley, or the Russian T-80 and BMP 2. A wide range of scenarios is planned, and the included battle construction set will allow you to create your own challenges. From preliminary screen shots, it appears that the smooth hillsides and detailed images here are even crisper than those in *Comanche*. □



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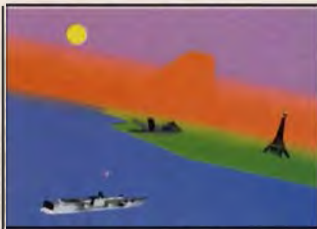
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# ENTERTAINMENT CHOICE

*Atmospheric graphics, intriguing puzzles, and vivid storytelling make CD-ROM history in this multimedia masterpiece.*

Bob Lindstrom

## MYST

After ten years of struggling as an almost-ran, CD-ROM abruptly became a success. And just as suddenly, CD-ROM games have sprouted everywhere. Unfortunately, this bumper crop of games is a largely unimpressive harvest of shovelware, mainly older titles enhanced with spoken dialogue and familiar game concepts garbed in up-to-date graphics.

Standing out from the weeds, however, is a rose: Brøderbund's *Myst*, a true multimedia masterpiece that ingeniously exploits a CD-ROM's hefty 650MB storage capacity. More important, *Myst* makes you believe its eye-boggling alternate reality. It breathes life into a world of fantastic vistas and fanciful ideas, bringing fresh air and riveting entertainment to computer adventuring.

An ominous, atmospheric introductory sequence launches your visit into *Myst*. A lone human silhouette plunges through a dark fissure in time and space; a foreboding narrator makes allusions to mystical books and unwritten endings. At the end of the sequence, a single, worn book remains onscreen.

The polished production values of this intro demonstrate that *Myst* is no ordinary computer game, but the intro doesn't prepare you for the visual feast that follows.

Click on the book, and it opens to reveal a yellowing page with a small full-motion video display. Within the display is a flyby of a breathtaking, 3-D island world with soaring evergreens, majestic marble temples, and a craggy coastline. A click within the vid-



eo window drops you into *Myst*'s spectacularly visualized world.

As you move through several worlds searching for clues, objects, and experiences to reveal *Myst*'s secrets, you'll piece together a tale of a brilliant but possibly demented inventor, his overly ambitious sons, and a set of magical books that can be gateways to new worlds or oppressive prisons for unlikely souls.

Wandering within *Myst*, you behold more and more of the rich visuals that designers Robyn and Rand Miller of Cyan meticulously developed in 3-D modeling programs and then exquisitely rendered in striking visual detail. While other games have used this technique to create their virtual-reality worlds, none have lavished such imaginative and tasteful art direction on a game. The lure of seeing all of *Myst*'s stunning locales is a major motivator pulling you through the game.

When you reduce *Myst* to its component parts, the game is just a latter-day computer adventure game. You puzzle out a story, find ob-

jects, and then use them to achieve a final goal. But as with all breakthrough achievements, *Myst* goes far beyond its roots.

*Myst*'s challenges aren't shoehorned into the landscape. The puzzles, for the most part, are logically and integrally linked to place, time, and story. Instead of confronting you with brainteasers that have no more purpose than extending play time, *Myst* demands that you have a hands-on interactive experience manipulating the clocks, valves, machinery, and gadgetry found in the game. To solve *Myst*, you must become a participant—rather than just a passerby—in this virtual world.

Nor are *Myst*'s graphics mere state-of-the-art decoration. The visual elements, from majestic architecture to evocative paraphernalia, provide insight into the background story, the characters, and the events of *Myst*. Further, under Robyn Miller's art direction, everything is rendered in elegant detail—whether it's a grandly conceived ceil-



ing fresco of clouds or a subtly sadistic collection of toys.

Robyn also contributed one of the few computer-game musical scores that don't make you want to tear out your audio card. A moody mix of New Age atmosphere and old-fashioned movie music, the soundtrack provides a softly persuasive but dramatically supportive undercurrent to the sights and situations in *Myst*.

Special mention must be made of Chris Brandkamp's impressive sound effects. His contribution adds the last bit of reality to *Myst* with lapping waves, gentle breezes, chirping birds, and gear-crunching machinery. Note that these are no weak sound-card burbles, but brilliant digital samples with the realer-than-real impact that we normally associate with motion-picture audio. Brandkamp's sounds are as essential to *Myst*'s fantasy as explosions and gunshots are to an Arnold Schwarzenegger action flick. You can't imagine one without the other.

Finally, *Myst* overcomes the limits of adventure-game interfaces by almost entirely doing away with the interface. In *Myst*, what you see is what you click. An intelligent cursor changes appearance as you position it over potentially active objects. With no artificial computer layer between you and the game, *Myst* effectively lures you into its own reality and enhances its hands-on illusion of life.

One handy computer device, however, is Zip mode. After exploring *Myst* and solving some puzzles, you'll find areas that you can bypass without compromising gameplay. Activate Zip mode, and *Myst*

turns your cursor into a tiny lightning bolt. Clicking on the bolt immediately transports you to a destination, bypassing the transition screens. As you near the game's end, the ability to rapidly traverse *Myst*'s vast landscape augments your progress as well as your enjoyment.

*Myst* comes to MPC computers virtually intact from its original Macintosh release. Graphics, sound, and system performance are all on a par with those of the original. However, take the system RAM requirements seriously. *Myst* needs at least 4MB of RAM; more will accelerate gameplay. The game runs quite well on an 80386-33, but I recommend a double-speed CD-ROM drive to shorten the numerous disc accesses.

With its combination of CD-ROM technology, 3-D-rendered graphics, and puzzle-solving challenges, *Myst* inevitably will be compared with that other groundbreaking CD-ROM game, Trilobyte's *Seventh Guest*, published by Virgin Software.

On the technology front, *Guest* can boast full-motion video movement that *Myst* lacks. As you go from point to point in Trilobyte's game, you smoothly move forward as if you were actually walking through a haunted mansion. *Myst*, in contrast, contains hundreds of still images with limited full-motion video inserts. Transitions between locations consist of simple dissolves from one still to the next, although you can speed up gameplay by eliminating those somewhat time-consuming transitions.

In *Myst*, the problem solving is fully a part of the story and surroundings. On this cri-

terion, *Myst* surpasses *Guest*, whose puzzles are arbitrarily tacked onto the environment. And the worlds of *Myst*, in addition to being larger in scope, exceed those of the competition in concept and execution.

Finally, while *Guest* takes the lead for inventive uses of live-action video, *Myst* pulls ahead on the music-and-sound front with a sweeping



soundtrack that outdoes The Fat Man's routine music for *Guest*. But we're talking about the difference between great and great here. Both products are cutting-edge achievements.

To add to *Myst*'s riches, the CD-ROM includes a 14-minute digital movie, *The Making of Myst*. This behind-the-scenes look discusses the people, technology, and effort that were involved in developing *Myst*.

*Myst* is a watershed achievement in games that's not likely to be surpassed until the Millers create the inevitable (and highly anticipated) sequel. It ranks with those rare computer games that are equally satisfying as story, as technology showcase, and as interactive entertainment. □

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# GAMEPLAY

Denny Atkin

## OF GODS AND GIANT ROBOTS

What do you get when you combine Greek mythology with a touch of Bill and Ted? You get *Wrath of the Gods*, the first game from upstart publisher Luminaria. This CD-ROM graphic adventure (you'll want a double-speed drive) is faithful to classic Greek myths, but it tosses in bits of dialogue like "Surprised to find Hercules in Hades? These are the Elysian Fields, where the cool guys go when they croak."

The game is packed with smooth-scrolling animation, dozens of digitized backgrounds of actual Greek sites,

**Wrath of the Gods is Greek to me, and Battledrome is another Herculean effort.**



and 300 digital movies of heroes, gods, and monsters. But unlike most prior games designed specifically for CD-ROM, *Wrath of the Gods* actually features a good underlying game. It's not the most difficult adventure game you'll ever play, but neither is it a collection of video clips wrapped around very few player choices, as too many of its predecessors are. A small icon box at the bottom of the screen offers a few basic choices: walk to, pick up, look at, talk to, and in-

ventory. Choose an icon; then click your pointer on objects to manipulate them.

The puzzles are mostly of the typical "find the right object to complete your goal" variety, but they're not just random obstacles tossed in your way. In fact, many of the puzzles are based upon actual decisions encountered in mythological quests. You can pull up an Info window that describes the mythological analogue of the current scene (complete with an historical painting or picture of a Greek artifact), which can offer hints as to how to solve the puzzle. If that's not enough, you can use *Wrath's* innovative Oracle help system, which offers progressively more direct hints in exchange for some of the points you've earned.

Along the way you'll encounter gods including Hermes, Athena, Zeus, and Hera, as well as monsters such as the Hydra, Cyclops, and Medusa. The humans and gods are portrayed by actors who do a pretty good job of it—the acting is generally on a par with what you'd find at a local playhouse, but with dialogue like "Hey, dude. We can't fight you if you don't have a blade," you're not going to expect the Royal Shakespeare Company anyway. The monsters are rendered using stop-motion animation that's just wonderful—better in many respects than what we've seen in the old Harryhausen films.

With over 40 hours of gameplay, one of the best combinations of multimedia and storyline yet, and historical educational value, *Wrath of the Gods* should be a real winner.

**Dynamite Dynamix.** I just received early beta versions of two of Dynamix's summer releases, and it looks like I may have to cancel that beach trip. **Metaltech: Battledrome** is a giant robot fighting game to

play with your best friend (or worst enemy), while **Aces of the Deep** takes the Dynamix 3-Space graphics engine on a dive from the skies into the deep seas.

In **Battledrome** you pilot a large robot called a Herculean in an arena battle against another Herc. Choose your mount from a variety of Hercs of different capabilities; then enhance it with your choice of weapons, armor, internal components, and even custom color schemes. Then it's off to the arena to toss laser bolts and missiles at the bad guy. The sound is spectacular, with rockin' tunes, but the graphics are fairly simple, with polygon robots and a cartoonish heads-up display. Gameplay against the computer is interesting, but not groundbreaking. **Battledrome** comes into its own when you duel another player via modem. There are few joys greater than admiring the meticulous construction of a friend's Herc and then blowing it to smithereens. If you have a friend with a modem who's a local call away, you should definitely pick this game up.

**Aces of the Deep** lets you take the helm of seven different U-boat types for missions ranging over the entire course of World War II. Attack merchant shipping in the Caribbean early in the war when the Germans enjoyed a tactical advantage, or just try to stay alive in the North Atlantic in May 1945. Graphics are a cut above those in the Dynamix flight sims, and the fast-moving waves on the heavy seas are stunningly realistic—you'd better stock up on Dramamine before booting this baby. You'll face a variety of surface ships in individual missions and campaigns, and you'll have to watch the skies for attack aircraft. This game is definitely not subpar. □



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For years, computer-game enthusiasts have enjoyed great success conquering alien hordes, outwitting evil wizards, and battling mach-speed bandits. However, their most elusive adversary doesn't reside on a hard disk or CD-ROM: It's the widespread notion that computer games are a simplistic, mindless form of entertainment. These days, nothing could be farther from the truth.

Software publishers and hardware manufacturers have long understood the potential of personal computers as learning tools. Educational software has grand intentions and often sells well, but it suffers in comparison to today's exciting entertainment products. One of the hottest industry buzzwords is *education*, a noble attempt to help educational software break out of its traditional niche market. This piggyback approach sometimes fails, though; ironically, the intended audience might endure dull academics, but won't sit still for inferior gameplay.

It's not surprising, therefore, that some of the most enduring and valuable software teaching tools were never intended to be educational. These are games first and foremost. They're designed to entertain, but in the process they enlighten players. The final results are neither education by rote nor lessons sugarcoated and force-fed; you experience real-world learning through fun and

practical applications.

Simulations account for the majority of these titles, providing interactive experiences whose value extends far beyond the computer screen. There are, however, excellent products in other genres—such as arcade, sports, and strategy games—which incorporate

# GAMES THAT ARE GOOD FOR YOU

knowledge that's beneficial outside the realm of computers. Although each program's relative importance is, of course, subject to individual interests, the titles covered in this article are excellent examples of this seemingly paradoxical class of software: games that are good for you.

## **(Sim)Life Lessons**

While most games fall unwittingly into the realm of real-world education, Maxis (800-336-2947) actively pursues the art of incidental learning with its revolutionary "software toys." Indeed, nearly every title in the publisher's catalog mer-

its special mention.

It all began with the 1989 release of *SimCity* (\$39.95), designed by Maxis cofounder Will Wright. Your job, as mayor and chief city planner, is to create order out of chaos. Start with one of eight existing city scenarios or build a new one from scratch. Design optimum living areas for your simulated citizens, with all the trimmings: factories, schools, recreational areas, farms, hospitals, and churches. Beneath this soft outer layer of calm, however, rage

multifarious responsibilities. You must worry about power and resources, traffic control, fire and police protection, unemployment, inflation, air pollution, and many other factors. Then there are the random elements,

such as natural disasters (tornadoes, earthquakes, and floods) and even rampaging monsters (a not so subtle reminder that it's only a game).

Wright and codesigner Fred Haslam have recently come full circle with the release of *SimCity 2000* (\$69.95). Beyond the 3-D SVGA graphics and crisp stereo sound, the big news is an even more complex integration of highway systems, public transportation, higher education, museums, parks, zoos, prisons, and more. A new multilayered interface lets you control both degree of difficulty and simulation detail. More than ever, the

By Scott A. May



game offers a hands-on understanding of city services, from bus lines and water systems to the complex and often controversial area of land-zoning ordinances. Learn to interpret and react to detailed feedback from concerned constituents and government subordinates—much of which, true to life, is rarely complimentary. Learn the advantages and drawbacks of different types of city power supplies, from inexpensive but dirty nuclear and coal generators to clean but expensive wind, solar, and hydroelectric plants.

So what can we learn from these games? For one thing, that being mayor of a metropolis isn't all it's cracked up to be (with or without monsters). More important, the games provide a firm grasp on a community's overall structure, as well as how changes in one area directly or indirectly affect another. As an interactive model of urban engineering, the SimCity games are simple enough to allow easy access, yet amazingly sophisticated in their insight into the myriad sociological ingredients that decide quality of life. Whether either game inspires future city planners is yet to be seen, but the tools are certainly here to spark imagination and interest.

Other popular titles from Maxis take game-based resource management to disparate extremes. SimEarth (\$49.95) puts you in charge of an entire planet, where you can tweak and tune the biosphere and then study the results. In the game, you'll get a firsthand look at the delicate balance of nature—from atmospheric science to plate tectonics—with an astonishingly accurate planetary model. For the ultimate so-called god sim, Maxis offers SimLife (\$49.95), allowing you to create your own ecosystem from the ground up, all within a surprisingly addicting game environment. Dabble in gene splicing and slicing, plant and animal mutations—or study the effects of both natural and man-made ecological disasters on the survival of your race of sim creatures.

A little closer to home—for some, in fact, right out the back door—Maxis offers SimFarm (\$49.95), arguably the most practical of the Sim series. Learn the ins and outs of agriculture, from planting and harvesting to livestock and market fluctuations, without getting your fingers dirty. You'll never take our food supply for granted again after walking a mile in the boots of this complex, frustrating, and incredibly rewarding simulation. When you tire of scratching the surface, dig a little deeper and uncover SimAnt (\$49.95), the Maxis electronic ant farm. If the rat

race has you bugged, try life and death in this fascinating microcosm, battling killer spiders, ant lions, lawn mowers, pesticides, and giant feet. More than an ant's-eye view of entomology, the game draws striking similarities between social orders above and below ground. As with all Maxis games, half of the fun comes from the product manuals, which rate among the best written, most informative, and most entertaining in the business.

## Be All That You Can Be

One of the greatest benefits provided by computer simulations is the ability to learn through experience, in activities that might otherwise be beyond



*Some flight schools accept hours logged on to MS Flight Simulator 5 as part of training.*



*SimCity offers amazing insight into the sociological elements that decide quality of life.*

our reach. Not everyone can take a shuttle to the moon or race a \$2 million car at Indianapolis, but these games offer viable alternatives for the rest of us. If you'd like to learn to fly, for example, you can't do better than Microsoft Flight Simulator 5 (Microsoft, 800-495-4242, \$54.95), the premier PC flight simulation. The program puts you in the cockpit of a Cessna 182 RG, a Learjet 35 A, a Schweizer 2-32 sailplane, and even a Sopwith Camel. This is serious fun, introducing you to basic and advanced aerodynamics in a sensory-rich environment. It's so realistic, in fact, that many flight schools accept hours logged on to the game as part of your initial training. From here you can graduate to any number of vintage or modern air combat simulations, learning more about history, sophisticated military hardware, and the dynamics of flight

in a wide variety of friendly and hostile scenarios. Some of the best air combat sims that strive to teach as well as entertain include Red Baron (Dynamix, 800-757-7707, \$49.95), Chuck Yeager's Air Combat (Electronic Arts, 800-245-4525, \$59.95), Falcon 3.0 (Spectrum HoloByte, 800-695-4263, \$79.95), and Secret Weapons of the Luftwaffe (LucasArts, 415-721-3300, \$49.95).

One game deserving special mention is Stunt Island (Disney Software, 800-688-1520, \$59.95), a rare crossover title that combines a wild assortment of 45 accurately simulated aircraft—from prop planes and jet fighters to hang gliders and space shuttles—and Hollywood-style cinematography. You'll don many hats on this job: production designer, prop master, stunt pilot, director, and film editor. These individual components are flawlessly integrated into one of the most original works ever to grace the computer screen. Endlessly challenging and educational, this is the one you'd want to have if stranded on the proverbial desert isle.

Buzz Aldrin's Race into Space (Interplay, 800-969-4263, \$69.95) combines science, history, and politics in a captivating one- or two-player game, simulating the real-life U.S.-Soviet race to the moon. Besides learning high-tech goal setting and mission planning, you'll find yourself embroiled in a realistic portrayal of tension-filled Cold War politics. Other outstanding business, political, and resource management games include Railroad Tycoon (MicroProse, 800-879-7529, \$69.95), Rags to Riches (Interplay, \$59.95), A-Train Construction Set (Maxis, \$69.95), Air Bucks (Impressions, 203-676-9002, \$59.95), and Shadow President (DC True, 708-866-1864, \$49.95).

Computer games also help blow the cobwebs off history lessons, which come alive within the context of interactive entertainment. At the top of this list is Sid Meier's epic game of human survival, Civilization (MicroProse, \$59.95), a fascinating portal to the past and, depending on how you play it, a glimpse of the future. Splendidly drawn from the pages of world history, it's the perfect primer for both history buffs and budding social anthropologists. War games, by nature, are also rich with social, political, and military history. The best encompass more than the battles they re-create, attempting to impart greater understanding of the real-world events before, during, and after the conflict. This field is extremely well represented, but suggested titles



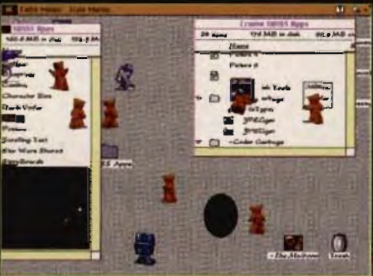
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might include the V for Victory series (Three-Sixty Pacific, 800-653-1360, \$69.95 each), Gettysburg: The Turning Point (SSI, 408-737-6800, \$59.95), Great Naval Battles (SSI, \$69.95), and Harpoon II (Three-Sixty Pacific, \$69.95).

### It Takes One to Know One

Sometimes, the best way to learn a new game is to play it first on the computer. This is especially true in the area of sports, where simulations can not only help improve your real-world performance but also provide an excellent resource for learning the history, rules, and technical background of your favorite sport. In the realm of golf, you can do no better than David Leadbetter's Greens (MicroProse, \$59.95), without a doubt the finest instructional golf simulation on the market. Leadbetter, one of the most

highly regarded golf instructors in the world, leads you through both basic and advanced play. Test your skills on the exquisite 3-D-modeled courses, featuring more than a dozen single- or multiplayer game variations, including modern play. Digital duffers will also want to check out Microsoft Golf, which includes live video instruction on its CD-ROM version (\$64.95).

Armchair quarterbacks who can't tell a free agent from a goalpost will find Front Page Sports: Football Pro (Dynamix, \$69.95) the ultimate simulation of their favorite sport. The game tackles professional pigskin from the gridiron to the locker room and all the way to the front office. In this action game, you'll learn what it takes to read defenses or contain a driving offense. As head coach, turn to the chalkboard to design and test new plays and formations. And as general manager and

team owner, learn to trade for top players. Other sports games that offer an informative look behind the scenes include APBA Baseball for Windows (Miller Associates, 800-654-5472, \$69.95), IndyCar Racing (Papyrus Publishing, 800-874-4607, \$74.95), World Circuit (MicroProse, \$59.95), NHL Hockey (Electronic Arts, \$69.95), and Jack Nicklaus Golf and Course Design, Signature Edition (Accolade, 800-245-7744, \$44.95).

### Closing the Books

Next time you get the urge to boot up a game, remember that you often do learn something while you're having fun. The programs mentioned in this article illustrate the fact that a program doesn't have to be dry and staid to be educational. With apologies to Shakespeare, when it comes to learning, sometimes the play's the thing. □

## Learning to Have Fun

Hollywood's growing influence on the computer-game industry leads many to believe that interactive software poses a viable alternative to more passive television viewing. Likewise, teachers such as Tom Dubick of Charlotte, North Carolina, are among a growing number of educators who see many of today's sophisticated computer games as exciting alternatives to traditionally passive textbook materials.

Dubick teaches seventh-grade science, as well as seventh- and eighth-grade engineering, at Charlotte Latin School. His students use a wide variety of games as hands-on learning tools. One example is Disney Software's Coaster (\$39.95), which the students use to study acceleration and velocity by building roller coasters. Dubick's students even served as beta testers for the final product, and they routinely apply their software discoveries with field trips to local amusement parks.

Flight simulators appear to be the most popular interactive teaching tools. Dubick's students use several: Microsoft Flight Simulator 5, for basic avionics and flight instruction; Falcon 3.0, where they learn the difference between potential and kinetic energy; and Flight Sim Toolkit (Domark, 800-695-4263, \$89.95), where they not only learn 3-D modeling and aircraft design but also enjoy immediate, invaluable feedback on their work. Such response is often the spark needed to launch young minds into new worlds of academic interest.

"We've got kids doing 'hard' math, science, and art," Dubick says, "and having fun at it." He hopes to use programs such as Flight Sim Toolkit to stage virtual fly-ins with other like-minded schools, where kids can model their own aircraft, compete in air races, and then discuss the principles of design with fellow students. Dubick also sees this approach to learning as a way of breaking down



Will game software replace school textbooks?

barriers. "Everyone can compete," he says, "because the computer doesn't care if you're male or female, black or white, young or old, physically challenged or whatever."

Other games used by Dubick's students include IndyCar Racing, The Even More Incredible Machine (Dynamix, \$29.95), Castles (Interplay, \$19.95), Rome: Pathway to Power (Maxis, \$29.95), Virtual Reality Studio 2.0 (Domark, \$79.95), and A-Train Construction Set. "When the kids get involved with A-Train and their business is losing money," he notes, "it forces them to do some

fairly advanced calculations, but it's so much fun that they don't think about it as work." Indeed, Dubick finds his program so effective that kids gladly work on classroom assignments after school.

But will using entertainment software in the classroom cause kids to find traditional textbooks boring? "I think it changes the way kids will approach passive learning," Dubick says. On the other hand, the more interest these games spark in subjects like math and science, the more kids will realize they must hit the books to learn more. Will software replace textbooks, or worse, will computers replace teachers? Dubick doesn't think so. However, he contends that computers are definitely changing the role of the teacher—from dispenser of passive education to someone who actively directs students' pursuit of knowledge. "Some teachers feel threatened by it," he admits, but he sees computers as important tools, just like pencils and paper, that schools should be using in their repertoire of teaching tools.

"The dilemma," Dubick warns, "is that it's really easy for it to just become a toy, just a game. You can't allow the classroom to become playtime because there's so much to be learned." In effect, teachers are forced to become computer-literate—to learn the software and develop a curriculum. "When it's going well," he beams, "I have to chase kids out of my class when the bell rings." All teachers should be so lucky.



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## DATASTOR 486-66

If you're still struggling along in Windows with a 386 standard-bus machine, you may wonder if a 486 VESA system might help. The answer is definitely. Compared with a 386-40 8MB ISA machine, the DataStor 486 DX2-66 ran *four times faster* in a benchmark that was designed to predict PC performance with word-processing, spreadsheet, and draw and paint programs.

This DataStor system has 8MB of RAM (eight 1MB x 9 SIMMs) that are expandable to 32MB, a 245MB 15-ms Maxtor hard drive, a sound card, a CD-ROM drive, two VESA local-bus slots (one free), four 16-bit slots (three free), 5 1/4- and 3 1/2-inch floppy drives, and 256K of cache memory. It uses the AMI BIOS.

The Toshiba XM-3401B internal dual-spin SCSI-II CD-ROM drive, both single- and multisession Photo CD-compatible, is plenty fast, but it requires disk caddies—perhaps more reliable but less convenient. Its front panel includes a headphone jack, volume control, busy light, and eject button.

Supplying the video is an STB PowerGraph VL-24 S3-based VESA Windows accelerator card with 1MB of RAM. It's quick and steady, supporting 1024 x 768 256-color 70-Hz noninterlaced mode for reduced flicker and image bounce. Maximum resolution is 1280 x 1024 with 16 colors, the greatest color depth is 16.7 million at 640 x 480, and the highest text resolution is 132 x 50 at 16 colors.

The 14-inch nonglare Super VGA Philips monitor with 0.28-mm dot pitch is ca-



*If you're thinking of upgrading and can't spring for a Pentium, DataStor's 486 DX2-66 makes a nice alternative.*

pable of a wide range of non-interlaced and interlaced modes. Not only do you have the usual controls, but you can also patch the output of your sound card into the back of the monitor and conveniently use the headphone jack and volume control on the monitor's front panel. (Headphones and cables are included.)

The system's Sound Galaxy NX Pro 16 stereo sound card, with standard ports and a SCSI CD-ROM drive interface, supports Sound Blaster Pro II, Ad Lib, Windows Sound System, COVOX Speech Thing, and Disney Sound Source. Digital playback and FM synthesized sounds are good, and you can also upgrade to 16-bit PCM wave-table synthesis for sampled instrument sounds.

Sound software includes utilities for mixing sound,

playing audio CDs, playing MIDI/WAV/VOC files, and converting text to speech; a Windows OLE utility for creating voice annotations; and a Windows audio program that works somewhat like a home stereo.

A great 101-key tactile-click keyboard and a Logitech serial mouse round out this DataStor system nicely. Two serial ports, one 9-pin and one 25-pin (neither has a 16550 buffered UART); a parallel port; and a game port are all drawn off the motherboard.

There are three 5 1/4-inch and two 3 1/2-inch bays and a 230-watt power supply. Access to the inside of the computer is easy, layout is uncluttered, and the processor and SIMM sockets are easy to reach.

Laser Resources' CD-ROM Library for DOS, bundled with the 486-66, in-

cludes Software Toolworks' Multimedia Encyclopedia 5.0, World Atlas 3.0, U.S. Atlas 3.0, and Reference Library (which includes a spelling checker, thesaurus, dictionary, quotations source, concise writing guide, and more). And you get a pretty decent assortment of DOS games with this system: Chessmaster 2100, Beyond the Black Hole, Lucas Arts' Secret Weapons of the Luftwaffe, Life & Death (a medical game), Gin King, Cribbage King, Backgammon, Robot Tank, Loopz, and Puzzle Gallery at the Carnival.

DataStor supplies and installs both DOS and Windows and also includes HSC InterActive, a multimedia-authoring system.

If you're thinking of upgrading and can't spring for a Pentium, a 486-66 VESA system with at least 8MB of RAM might be a good choice. DataStor certainly makes a nice one.

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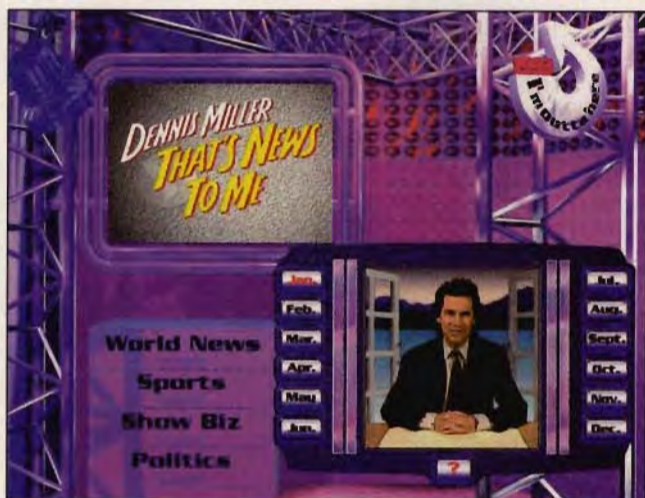
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## DENNIS MILLER, THAT'S NEWS TO ME

So, Cha-Cha, it seems that lately your computer's CD-ROM drive is filled with nothing but information highway road kill, eh? If you'd like to use multimedia to access something more exciting than complete rainfall statistics for London back to the year 11, then Dennis Miller, That's News to Me may be just what you seek—serious fun.

If you've enjoyed Dennis Miller's comedy on "Saturday Night Live" or his Home





From Heidi Fleiss to the Bobbitts, if it made news in 1993, it's likely to be made fun of in Dennis Miller, *That's News to Me*.

Box Office specials, you'll enjoy this unique, biting look back on 1993. The CD-ROM chronicles the top stories of 1993 and features more than 200 different topics in four categories: world news, politics, sports, and show biz. Each news story is presented by Dennis Miller in a short, full-color digitized video. From Heidi Fleiss to the Bobbitts, if it made news in 1993, it's likely to be made fun of in *That's News to Me*.

This is the first offering in Sanctuary Woods' I Laugh series. The company has also released Dennis Miller, *That's Geek to Me*, which gives his definitions of more than 180 computer and multimedia terms. (Don't cancel that computer course, though.)

If you're a fan of Dennis Miller's biting, sarcastic brand of humor, *That's News to Me* will be a welcome addition to your CD-ROM collection. If you think I'm going to give away any of the punch lines, though, you're sadly mistaken, Cha-Cha. Suffice it to say that 1993 was a very funny year.

And before I tell you the one that keeps me laughing, I am outta here!

BOB ELLER

Sanctuary Woods  
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## COMANCHE CD

Retooled for greater efficiency and maximum enjoyment, Comanche CD is definitely not just another example of shovelware (floppy-based computer games hastily crammed onto a mostly empty CD-ROM in an attempt to cash in on the multimedia craze). Not only does this package combine the best-selling original and three mission expansion sets (for a total of 100 missions), but the game's flight model and memory handling appear to have been significantly tweaked. Contrary to past experience, the CD-ROM version of Comanche actually runs smoother, faster, and more reliably than the floppy-based original.

The game simulates tactical air combat aboard the

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# AMTEX PinBall

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Boeing-Sikorsky RAH-66 Comanche attack helicopter. Because this amazing vehicle is still in the prototype stage—the U.S. Army's real Comanche isn't slated for active service until 1999—the game's flight model is based on a combination of conjecture and applied physics. Likewise, the combat settings are pure fantasy with a hint of real-world conflicts.

Newcomers to the world of helicopter simulations will appreciate the multiple training missions. Here you'll learn to use the craft's integrated computer-controlled navigation, sensor, and weapon systems. You'll appreciate the Comanche's ground-hugging flight capabilities (due to the air cushion created by your rotor blades) as well as the automated fly-by-wire ground-distancing sensors. The use of terrain masking—flying low amid mountains, valleys, and tree lines to avoid detection—is key to your success. Simplified controls make this bird a breeze to fly, lending the game a slight arcade-style feel, which might put off hardcore flight sim enthusiasts. Otherwise, it's fast, fun, and tremendously challenging.

Missions are divided among nine campaign groups. There are 12 environments, including arctic, desert, and jungle settings, each having unique characteristics. Individual missions also vary according to objectives, ordnance, enemy types, friendly support, and overall difficulty. Enemy intelligence ranges from surprisingly weak (Operations Overload and Silver Dome) to wickedly tenacious (Operations Terminal Velocity and Over the Edge).

Graphics are often stunning, utilizing NovaLogic's



*Comanche CD's mesmerizing graphics speed, rich color palettes, and 3-D effects help draw you into the overall combat experience.*

Voxel Space technology, which generates photorealistic fractal imagery on the fly. Many closeup renderings are a bit chunky because of the low 320 x 200 VGA resolution. But the graphics speed, rich color palettes, and 3-D effects are mesmerizing, drawing you into the overall experience. The CD-ROM version also offers digital stereo sound and expressive full-speech capabilities for all on-board systems and pilot communications. What enhancements are missing from the CD-ROM? How about an on-board mission recorder or, considering the game's speedy graphics engine, a head-to-head modem option?

System requirements are high, but not unusually so: Although a 386SX is the minimum configuration, the game plays best on a midrange 486DX or Pentium-based computer. The CD performs extremely well in a single-speed CD-ROM drive, even without software caching. In fact, because it runs in the computer's 32-bit native mode, most users will have to create a bare-

bones boot disk or DOS 6 configuration, sans expanded memory managers and extraneous device drivers.

Comanche CD can't begin to compete with other high-end flight simulations in terms of depth of gameplay or strategic diversity. However, for cinematic graphics and pulse-pounding action, this value-packed CD edition will keep you glued to the edge of your seat.

SCOTT A. MAY

NovaLogic  
Distributed by Electronic Arts  
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## THE NEW GROLIER MULTIMEDIA ENCYCLOPEDIA

The 1994 edition of The New Grolier Multimedia Encyclopedia contains the text of 21 volumes of *Grolier's Academic American Encyclopedia*. It also adds sights and sounds, as well as tools to help you quickly find informa-

tion in over 32,000 articles.

Grolier's toolbar puts most functions just one click away. As you'd expect, Grolier lets you view and search an article title list, a word index, and an extensive list of historical events. In addition, there are specific indices for sounds, regular and multimedia maps, pictures, videos, and animations. When Grolier displays an article, the available options appear in an icon bar above the text. This lets you access an outline, an animation, a sound, or another related special element with a mouse click.

The Knowledge Tree lets you enter the encyclopedia by area of interest. The main branches of this expanding outline are The Arts, Geography, History, Science, Society, and Technology. The Knowledge Explorer provides narrated multimedia essays on general topics. The titles include Asia, Australia, and the Pacific; Europe; Foundations of Science; Human Body; Music; North America; Painting and Sculpture; Physical Earth; Plant World; South America; and Space Exploration.

Multimedia Maps are animated maps with narration which show important events like the colonization of America and the spread of the Roman Empire. Some of the better ones are related to wars and conflicts in which the U.S. has been involved (notably missing are maps of the World Wars). Other general-topic animations, which also include narration, are useful learning tools.

Like other CD-ROM encyclopedias, Grolier lets you jump to articles via highlighted words in the text. And, since it's easy to forget where you found information, you can set bookmarks.





The Multimedia Maps feature of The New Grolier Multimedia Encyclopedia narrates and animates important historical events.

When it's time to produce a report, Grolier lets you print or save articles to disk (it supports appending, so you can build one file from many sources). Other items, including some graphics, may be saved and printed.

Like most CD-ROM encyclopedias, Grolier is broad but not extremely deep in its coverage. It has plenty of visual material, but its interface is less visual and more text oriented than Microsoft Encarta's. Still, it entertains while educating, making it one of the best choices from the current crop of CD-ROM encyclopedias.

J. BLAKE LAMBERT

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## COMPAQ PRESARIO 425

Since Compaq is the most experienced maker of IBM-compatible personal computers, Compaq's PCs are a frequent choice for conservative buyers. Compaq's repu-

tation for solid service and overall quality helps it maintain its hold on a large chunk of the corporate PC market, where these sturdy virtues are most honored. While the Presario 425 might have a nontraditional layout, combining the monitor and the CPU in a single case, it's cut from the same worsted-wool cloth as Compaq's higher-priced models. There isn't much excitement, but there's plenty of necessary functionality.

The all-in-one package includes the basics: a 14-inch color monitor, a 200MB hard disk, and a single 3½-inch floppy drive. The compact case is great for busy desktops, and with just three cables to connect—power, keyboard, and mouse—setup couldn't get much easier. The system board resides in a rear-opening drawer underneath the integral monitor, allowing easy access for maintenance and upgrades. However, the hardware mounted on that board pushes the lower limits of acceptability. The 4MB of RAM included meets the standard for entry-

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Imagine arriving at the lake as the morning mist starts to burn off the quiet waters. You stop at the bait shop to select your rod, reel and lures, thinking you'll try for some walleye this morning. You load the boat and consult your map. It's the end of August and its getting colder, the walleye will be feeding in shallower waters to prepare for winter. You remember a spot your fishing buddy told you about and set out. You arrive at the location, check your sonar and position yourself near the edge of that underwater shoal. The peaceful solitude is broken only by the waves lapping at the boat and the loons haunting call echoing across the lake. After a few casts, you feel a sharp tug and your rod bends suddenly towards the water, this must be the big one! With a quick jerk you manage to pull him towards the boat but he gets another burst of energy and speeds towards the deeper water, it's a good thing you had the drag set correctly on the reel! After a strenuous and exhausting battle you pull your quarry to the side and net him into the boat. What a beauty! You can't wait to get back and see your name proudly displayed in the fishing lodge for all the other anglers to look at with envy.

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level Windows boxes, but the 25-MHz 486SX processor is a step behind faster competitors; a 33-MHz CPU would have added some much-needed muscle at a minimal extra cost. The Cirrus Logic video chip accelerates Windows graphics nicely, but with only 512K of display memory, there's no support for full-color display modes beyond 256 colors.

Preinstalled software also helps Compaq Presario buyers get up to speed quickly. In addition to DOS 6 and Windows 3.1, there's PFS:WindowWorks, a basic productivity package that incorporates word-processing, database, spreadsheet, and telecommunications functions. Other selections include Quicken personal accounting software, sign-up kits and modem software for Prodigy and America Online, and Max Fax software for the Presario's built-in fax/data modem.

The internal modem supports data, fax, and voice communications, but with only a 2400-bps data rate, it's a mixed blessing. At this point, most online systems worth calling support at least 9600-bps connections, and with so many services charging by the hour, a faster modem can pay back the small price difference in just a few months.

With the modem's voice support, the Presario can also act as a telephone answering machine. At first glance, one might question that feature's value—how many computer buyers don't already have an answering machine? But if you leave a modem online to receive faxes, it'll grab every incoming call on the line, so a separate answering machine is useless. Max Fax can distinguish between in-



For basic productivity tasks, the Compaq Presario 425 is a staid and solid performer that's commendably easy to get up and running.



*Kronolog: The Nazi Paradox* allows you to experience the terrible consequences of Nazi Germany's winning World War II.

coming voice and fax calls, routing each to the appropriate software module, and that's a very useful feature. It also recognizes caller ID codes and allows multiple voice mail boxes with private access numbers, features not found on most answering machines.

The Presario can play audio recordings through an internal speaker via the modem, and it can record voice memos using a telephone handset as a microphone, but there's no Windows sound driver for this interface. It's just about im-

possible to use these audio functions to annotate business documents or to add some punch to education and entertainment software. That's a surprising omission from a company as thorough as Compaq.

With no multimedia features and no room inside the case for an internal CD-ROM drive, a tape backup unit, or a second floppy drive, the Presario doesn't offer the versatility that home computer buyers should be looking for. A lot of new games and entertainment titles also demand more proc-

essing power than the 25-MHz CPU has to offer. But the Presario 425 is a staid and solid performer for basic productivity tasks, and it's commendably simple to get up and running, making for a fine low-cost, low-hassle office system.

(Editor's note: At press-time, Compaq announced the Presario 433. This system sports a 33-MHz CPU and is otherwise identical to the Presario 425.)

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## KRONOLOG: THE NAZI PARADOX

Imagine for a brief, frightening moment what the world would be like had Nazi Germany won World War II. *Kronolog: The Nazi Paradox* does more than just speculate on this horrific twist on world history—it allows you to experience the terrible consequences of it as if it had really happened. Although the basic premise is far from original—read Philip K. Dick's *The Man in the High Castle* or, more recently, *Fatherland* by Robert Harris—this interactive graphic adventure provides a few compelling new twists on this popular genre of speculative fiction.

Set in the year 2020, the game paints a bleak image of life in an America ruled by descendants of the Nazi regime. As the story goes, near the end of World War II, Nazi spies stole the U.S. plans for the Manhattan Project, allowing Germany to develop the first atomic bomb, which it dropped on Boston, thus forcing full Allied surrender. Through the years,



# 500 miles from nowhere, it'll give you a cold drink or a warm burger...

NASA space flights inspired this portable fridge that outperforms conventional fridges, replaces the ice chest and alternates as a food warmer.

By Charles Anton

**R**ecognize the ice cooler in this picture? Surprisingly enough, there isn't one. What you see instead is a Koolatron, an invention that replaces the traditional ice cooler, and its many limitations, with a technology even more sophisticated than your home fridge. And far better suited to travel.

What's more, the innocent looking box before you is not only a refrigerator, it's also a food warmer.

## NASA inspired portable refrigerator.

Because of space travel's tough demands, scientists had to find something more dependable and less bulky than traditional refrigeration coils and compressors. Their research led them to discover a miraculous solid state component called the thermo-electric module.

Aside from a small fan, this electronic fridge has no moving parts to wear out or break down. It's not affected by tilting, jarring or vibration (situations that cause home fridges to fail). The governing module, no bigger than a matchbook, actually delivers the cooling power of a 10 pound block of ice.

## From satellites to station wagons.

Thermo-electric temperature control has now been proven with more than 25 years of use in some of the most rigorous space and laboratory applications. And Koolatron is the first manufacturer to make this technology available to families, fishermen, boaters, campers and hunters- in fact anyone on the move.

Home refrigeration has come a long way since the days of the ice box and the block of ice. But when we travel, we go back to the sloppy ice cooler with its soggy and sometimes

spoiled food. No more! Now for the price of a good cooler and one or two seasons of buying ice, (or about five family restaurant meals), all the advantages of home cooling are available for you electronically and conveniently.

**Think about your last trip.** You just got away nicely on your long-awaited vacation.

You're cruising comfortably in your car along a busy interstate with only a few rest stops or restaurants. You guessed it... the kids want to stop for a snack. But your Koolatron is stocked with fruit, sandwiches, cold drinks, fried chicken... fresh and cold. Everybody helps themselves and you have saved valuable vacation time and another expensive restaurant bill.

**Hot or cold.** With the switch of a plug, the Koolatron becomes a food warmer for a casserole, burger or baby's bottle. It can go up to 125 degrees.

And because there are no temperamental compressors or gasses, the Koolatron works perfectly under all circumstances, even

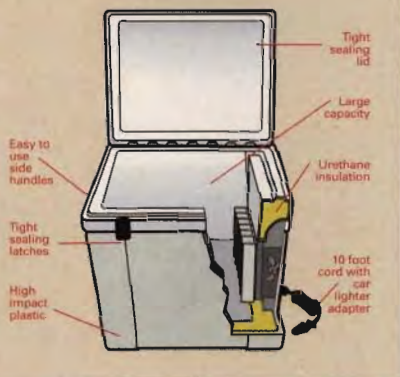
upside down. Empty, the large model weighs only 12 pounds and the smaller one weighs just seven. Full, the large model holds up to 40 12-oz. cans and the smaller one holds six.

**Just load it up and plug it in.** On motor trips, plug your Koolatron into your cigarette lighter; it will use less power than a tail light. If you decide to carry it to a picnic place or a fishing hole, the Koolatron will hold its cooling capacity for 24 hours. If you leave it plugged into your battery with the engine off, it consumes only three amps of power.



## The refrigerator from outer space.

The secret of the Koolatron Cooler/Warmer is a miniature thermo-electric module that effectively replaces bulky piping coils, loud motors and compressors used in conventional refrigeration units. In the cool mode, the Koolatron reduces the outside temperature by 40 degrees F. At the switch of a plug, it becomes a food warmer, going up to 125 degrees.



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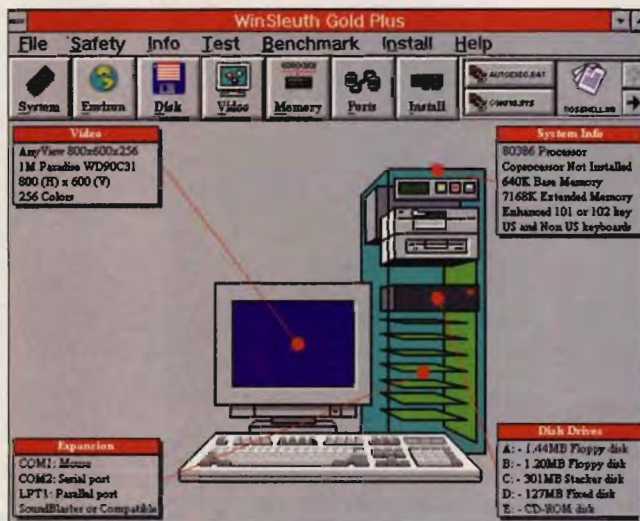
The versatile Koolatron is available in two sizes. The P24A holds 30 quarts and the smaller P9 holds seven quarts. An optional AC adaptor lets you use them in your rec room, patio or motel room. They plug into any regular outlet.



America became known as the North American Democratic Alliance. Beyond the human atrocities inflicted by this new world order, years of environmental neglect have resulted in a civilization on the brink of ecocide.

You play Mark Hoffman, famed biochemist, who's working full-time for the Nazis developing waste-eating bugs. Secretly, however, you're part of the Unknowns, a covert network of political dissidents struggling to overthrow this dictatorship. As the game begins, the government plans a bloody celebration of 75 years of world domination, while the clock ticks down to ecological disaster. To make matters worse, you've just learned that your son, a leader of the Unknowns, has been targeted for execution by Nazi leaders. It's up to you to stop the madness before it's too late. This sinister web becomes even more entangled with the introduction of another plot thread: time travel.

But just as the intriguing script draws us into the story, the game's outdated graphics and clumsy user interface push us *back*. While most new adventures step boldly into photorealistic worlds of digitized multimedia, this game remains firmly entrenched in the past with stiff cartoon characters and flat backdrops. Although the game feigns a 3-D environment by allowing characters to walk from foreground to background, the effect is hindered by awkward movement around objects. Likewise, the user interface is remarkably unintuitive, requiring a whirlwind of relentless mouse clicking to move, talk, touch, look, or manipulate onscreen objects. This is a game that



*WinSleuth Gold Plus, a Windows diagnostic and analysis program, lets you "pop the hood" to see what's going on inside the PC.*

cries out for CD-ROM treatment, if only to retrieve the 19MB required for hard drive installation. On the bright side, the game features voices for characters and some pseudo full-motion video clips during character conversations.

Too bad about this alternate-future stuff—imagine how different this game could have been in the age of multimedia. In an ironic twist on its own premise, *Kronolog: The Nazi Paradox* is, despite its intriguing story line, a game that's out of step with the times.

SCOTT A. MAY

Merit Software  
(800) 238-4277  
\$69.95

Circle Reader Service Number 439

## WINSLEUTH GOLD PLUS

Computers are like cars. Some people just want to use them; they don't care how they work. Others want to pop the hood and look inside, even if they might not

really understand everything that's going on in there. WinSleuth Gold Plus, a Windows diagnostic and analysis program, is for the latter group.

WinSleuth's main screen presents basic information and a toolbar with icons. The program has a file editor and a Tune Up feature, which makes some suggestions for optimizing your AUTOEXEC.BAT and CONFIG.SYS files. You can also save your CMOS settings and other important system files to a bootable disk.

The System icon accesses BIOS and CMOS details, along with all 256 hardware and software interrupt vectors (listed and described) and network information (if connected). It also provides tests for your CPU (including a benchmark test), keyboard, mouse, and internal speaker.

The Environ icon provides DOS and Windows info (version, files, buffers, Windows files added, control blocks, and LASTDRIVE settings) and disk cache version, size, and effective-

ness. There's a wealth of Windows information here—the program lists all active Windows tasks and modules, displays all terminate-and-stay-resident programs and drivers, shows current windows and window class info, and describes all currently open files.

If you want to look into how Windows uses memory, WinSleuth can help. It displays graphs of memory usage for conventional (including upper) and global memory (extended, expanded, virtual), and the GDI and User Heaps. For the hard-core Windows investigator, the program displays the Windows Descriptor Tables (an index to physical memory) and all memory objects. It also runs memory benchmarks and a memory test (DOS-based).

The Disk section lists basic info, BIOS definitions for hard drives, and partitions. It performs a percentage usage analysis, benchmark tests, and disk integrity checks as well. (However, the program found nothing but errors on the noncompressed portion of a drive that was working fine, and it provided no explanation.)

Looking into video is easy. WinSleuth describes in great detail which basic, raster, curve, line, polygonal, and text routines your video supports. System Metrics lists a plethora of parameters regarding windows, frames, cursors, scroll bars, and so on. Hardware Info lists more details, and there are extensive benchmarks and tests.

You can check your ports, printer capabilities (similar to the information on the video system), multimedia extensions, and—with optional hardware loop-back plugs—serial and parallel



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ports. (For some reason, WinSleuth incorrectly identified both of my serial ports as having 16550 chips; only one port actually does.)

Installation Assistant is handy when you're installing new expansion boards. It lets you look for free I/O port addresses, DMA channels, and IRQs specifically or by range. You can load and save test parameters, including some standard configurations.

The WinSleuth manual is helpful, providing some background explanations and even some useful suggestions; but the Help files are weak, lacking depth and having a rough, unfinished appearance.

WinSleuth could be improved with thorough, context-sensitive help, and with advice on what upgrades might make the most cost-effective improvements to a particular system. Still, the program makes it easy to thoroughly access a wealth of information about your PC's hardware and software.

J. BLAKE LAMBERT

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## HOME MEDICAL ADVISOR PRO

If you're among the faint-hearted, Home Medical Advisor Pro from Pixel Perfect isn't for you. On second thought, maybe it is. Let's just say HMA Pro isn't very pleasant to look at. In some ways, however, it's very easy to look at.

Confused? Don't be. Actually, HMA Pro is an excellent CD-ROM reference tool for looking up medical concerns large and small. The only things hard to look at



Home Medical Advisor Pro's graphics aren't for the faint-hearted, but finding medical information couldn't be simpler or more intuitive.

are the graphic medical images—the picture of a guy with a knife in his back, for instance, or the video footage of joint replacement surgery. So if you *are* faint-hearted, just keep the graphics turned off. And while you may not want to use the very graphic medical graphics for your screen saver, they can be invaluable for illustrating any number of ailments and maladies.

The program is *easy* to look at in the sense that finding information couldn't be simpler or more intuitive. Let's say you have an inexplicable rash on your skin—1 of the more than 1000 symptoms covered by HMA Pro. If so, there are a number of easy routes to a quick diagnosis. Since HMA Pro employs a fairly standard Windows interface, it's easy to take action using a mouse and only slightly more difficult to employ the keyboard.

To begin with, from HMA Pro's main screen you can use the mouse to move the cursor to the body part giving you trouble. You select a male or female image and see the full body from the

front and rear and a closeup view of the head, allowing you to choose any part of the body. Once you select a part, HMA Pro gives you a choice of symptoms to explore further. After clicking on a symptom, you can get more information from 1 of more than 20,000 hypertext links, or you can take a question-and-answer test for a diagnosis of your particular problem.

There are other ways to go about getting more information, too. Just pressing a button will take you to files for diseases, injuries, poisons, health and diet, and prescription medicine. You can do text searches, scan photograph and video libraries, consult a medical glossary to look up unfamiliar words, and check your own medical history with a new HMA Pro feature: Your Medical Records. It allows you to enter your own medical history from a series of menus, and its Interact feature allows you to check the effects of mixing prescription drugs with each other or with other substances, such as alcohol or vitamins.

I can't personally attest to

the accuracy of HMA Pro, but according to Pixel Perfect, a large number of doctors in many different fields make up the board of review for the program. The information is presented in straightforward layman's terms, with a medical glossary always handy for terms that are unfamiliar.

Photographs and videos appear in 256-color Super VGA. And everything loaded quickly and ran smoothly when I used the program on a 486-66 machine with 16MB of RAM and a double-speed CD-ROM drive. Even though it's CD-ROM based, the program takes up about 5MB on your hard drive.

While some of the video images are unquestionably gratuitous (how helpful or universal, for instance, is a video of two people cruising by using underwater scooters with a message about their safe use?), most of the features of HMA Pro serve a clear and useful purpose. And HMA Pro improves on its floppy-based predecessor not only by adding full-color photographs and videos but also by allowing you complete control over what you see. You can choose from several color combinations for the text and set the graphics to come on automatically, only after the program prompts you for them, or not at all. So even if you are faint-hearted, don't shy away from Home Medical Advisor Pro. Whether you're just checking the interaction of two prescriptions or looking into a major disease, it's a quick and simple way to get helpful information.

EDDIE HUFFMAN

Pixel Perfect  
(800) 788-2099  
\$99.95

Circle Reader Service Number 441



## PRAXIM

One of the frustrations of using Windows is that some simple tasks take many clicks. You can either get used to it or get Praxim, a terrific, inexpensive Program Manager add-on or replacement that combines the ease of use of the Windows GUI with the speed and flexibility of the DOS command line.

Praxim offers two primary interfaces, a set of toolboxes and a command line. The command line lets you enter, edit, and review DOS, Windows, and Praxim commands. It adds a number of custom commands, including Tree, Browse, Prune, Touch, FF (Find File), Search, Head, Tail, LC (Line Count), Eval (math), Hist (command history), and Alias. Praxim puts the results of each command into a separate scrollable window. If you prefer, it can send all output to one scrollable window, to the Clipboard (great idea), or to a message box. Items in the scrollable output window are linked to the operating system. After performing a Dir command, for example, you can click on filenames in the scrollable output window to delete files, run programs, and so on.

Click the right mouse button, and you'll see a toolbox that varies according to the most likely operation for the currently highlighted item. There are separate autoselected toolboxes for files, directories, drives, commands, disk images (byte-for-byte copies of floppies), and numbers.

The command line runs DOS and Windows programs from the filename (such as PBRUSH.EXE), the application name (Paint-



*Praxim, a terrific Program Manager add-on, combines the ease of use of Windows with the speed and flexibility of DOS.*



*Take a Break! Crosswords Deluxe, an addictive puzzler, is an ideal way to jump-start your brain on particularly slow mornings.*

brush), or a unique part of the name (such as PBR). Praxim will find the program and run it, or give you a pick list if you fail to enter a unique string. Praxim also supports enhanced batch files.

On installation, Praxim creates a toolbox called Favorite Tools (generally, the biggest programs it finds). The toolbox is compact; each tool has a button that's easy to move and copy. Toolboxes can even be nested, with

toolboxes inside other toolboxes (something that's impossible with Windows Program Manager groups). There's even a trash can into which you can drag files, for those with Mac envy.

Praxim keeps track of your Program Manager groups and creates a toolbox for each one. In addition, Praxim has a Browser that serves as its File Manager. Praxim features internal multitasking, so you can, for instance, start an applica-

tion while copying files or formatting a disk.

Praxim is a great program and an exceptional bargain. Having equally easy access with the keyboard or the mouse makes Windows simpler and quicker to use, and who wouldn't want that?

J. BLAKE LAMBERT

Developed by the Sundial Group  
Produced by Wesson International  
(800) 634-9808  
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Circle Reader Service Number 442

## TAKE A BREAK! CROSSWORDS DELUXE

Sierra deals another blow to Windows productivity with the release of Take a Break! Crosswords Deluxe, an addictive puzzler guaranteed to keep you glued to the screen long after break time has ended. A more appropriate title, at least in an office environment, might be Get Back to Work! Crosswords.

This deluxe edition contains a total of 750 Dell magazine puzzles, divided into three difficulty levels (easy, medium, and hard) and four size groups (13 x 13, 15 x 15, 17 x 17, and 19 x 19 letters). In addition, three skill levels (Apprentice, Puzzler, and Fanatic) let you toggle player handicaps such as partial or whole-word hints, as well as automatic word checking. The program tracks total puzzle-solving time, awarding or subtracting points for correct answers, wrong guesses, hints taken, and time bonuses or penalties. Although only one puzzle can be active at a time, the game lets you save and resume work on as many different puzzles as you like. You can even print out blank or partially



completed puzzles to take with you on your commute home.

Special features include fast two-button mouse controls for selecting word direction (down or across), optional 256-color backgrounds and animation, and automatic letter advance to speed keyboard entry. One caveat: The game is something of a resource hog and will slow down your system considerably when multitasked with other Windows applications. Although designed for breaks in the workday, Crosswords Deluxe is an ideal way to jump-start your brain on those particularly slow mornings. It's more natural than caffeine, but no less habit-forming.

SCOTT A. MAY

Sierra On-Line  
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Circle Reader Service Number 443

## SUBWAR 2050

They say the sky's the limit, but when it comes to combat simulations, it's getting mighty crowded up there. For a refreshing change of pace, dive into SubWar 2050, a superb blend of the speculative simulation and arcade action genres. Set in the year 2050, the story line speculates—and rightly so—that the earth's oceans will be recognized as our greatest natural resource. Technology once used to reach for the stars now casts its gaze to the oceans, mining their rich bounty of food, energy, and minerals. As expected, where there's money to be made, you'll find greed and covert competition. That's where you come in: As a mercenary sub pilot, you're employed by huge corporations to defend their underwa-



Object scaling, lighting effects, and surround sound make SubWar 2050's sense of depth and inner space utterly believable.

ter interests against military-industrial sabotage. Unlike land and air, the deep-sea arena opens a whole new world of fantastic, dangerous stealth activity.

The game is divided into four multimission campaigns of increasing difficulty, based in the Antarctic, North Atlantic, South China Sea, and Sea of Japan. Thousands of square miles of 3-D-rendered seascapes unfold beneath the murky depths—breath-taking vistas of jagged mountains, narrow canyons, and sloping valleys. A running story line links individual missions in each campaign scenario, with various medals, awards, and promotions available to top combat pilots. There's also a valuable training campaign, set in the relative calm of the North Pacific, where you'll learn the finer points of navigation, active and passive sonar reading, evasive maneuvers, and weapons deployment.

Depending on your mission, you'll pilot a vessel specially designed for either exploration, reconnaissance, or combat. Cockpit controls are virtually identical to their flight sim counterparts, including familiar HUD indicators for horizon line, bearing,

speed, depth, sonar range, weapons targeting, and way points. There are also full-screen displays for damage control, wingman orders, and 3-D object viewing. Multiple cockpit and outside views include flyby, chase, tactical, inverse tactical, and weapons perspective. Unfortunately, there's no mission recorder. Available ordnance—depending on mission and sub type—includes torpedoes, antitorpedo torpedoes, cluster rocket torpedoes, cruise missiles, surface-to-air missiles, and particle-beam rockets. More than 15 types of friendly and enemy vessels include transports, tankers, missile subs, sub carriers, deep-sea recon units, and light fighters. Watch closely, and you'll see a variety of sea creatures.

You can choose enemy skill level (high, medium, or low), control mode (joystick, mouse, or keyboard), collision damage (on or off), and terrain/object shading (textured, plain, or wireframe). The game runs well even on a 386, so you'll want to keep the graphics detail on high to enjoy the excellent 3-D terrain contours and Gouraud-shaded objects. The game's cornerstone fea-

ture is its incredible ambience, without doubt among the most compelling ever put to disk. The sensation of depth and the ocean's tremendous inner space is utterly believable, accomplished through object scaling, lighting effects, and stereo surround sound. Few sights are more breathtaking—or downright creepy—than your sub's spotlights probing the blackness of the ocean floor, or the shadow of a monstrous vehicle on the edge of darkness. Another key to both graphics and gameplay is the onscreen representation of the ocean's thermal layers (boundaries between warm and cold water) seen as a series of contoured grid lines. These thermals add to the illusion of depth and serve as a natural sonar cloaking defense.

Overall, the missions offer moderate-to-difficult challenges, while the underwater battles rival the intensity of classic arcade-style space- and air-combat games like Wing Commander and Comanche. Hard-core sim fans will be intrigued but ultimately disappointed. All others will find SubWar 2050 to be an imaginative strategy and action game absolutely dripping with atmosphere.

SCOTT A. MAY

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Circle Reader Service Number 444

## PETER PAN

The trouble with some children's software is that it's written by adults, and kids simply don't think like adults. Adults are conditioned to solve problems with rigid solutions, but children enjoy a much more pliable logic, where anything is possible.



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.

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

## 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.



Breakthrough wireless speaker design blankets your home with music.



These wireless stereo headphones have a built-in receiver.

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.

**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.

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Recoton's Design and Engineering Award





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# REVIEWS

Peter Pan, from EA Kids, adopts this natural approach to interactive storytelling, offering youngsters remarkable freedom to paint multiple paths through a colorful adventure.

You assume the role of Peter Pan, the boy who wouldn't grow up, in this



Paintbox Pals help kids rescue Wendy in this Peter Pan CD-ROM title from EA Kids.

tale based on J. M. Barrie's fantasy classic. As the story begins, Peter snatches a buried treasure map from the clutches of the notorious Captain Hook. Vowing revenge, Hook instructs his band of pirates to retrieve the map and kidnap Peter's best friend, Wendy. It's up to you to direct Peter on his quest to rescue Wendy, with the help of the Paintbox Pals, a collection of four animated drawing tools: Sally Sprayer, Jazz Painter, Winston Whoosh, and Nick Lead. When Peter gets stumped, you must paint a solution using one of the Paintbox Pals. For example, Jazz can paint a pirate's sword into a harmless flower, Winston's super eraser can rub out almost any trouble, and Nick can connect dots to create a helpful object. Each pal offers several possible solutions to each predicament, and a special instant replay feature, named Sandy Hourglass, lets you try them all. While enjoying a rich adventure with the Lost Boys, Tinker Bell, Tiger Lily, and other characters of Never Land, kids learn the value of teamwork as well as alternative problem solving.

The CD-ROM version of the game features full-voice narration and the option to view the complete story as a full-length, noninteractive cartoon. Floppy disk users hear only limited speech, augmented with easy-to-read text bubbles. The voices are exceptionally clear and well acted. Most surprising, however, is the sophisticated dialogue and graphic humor, rendered in a style that will remind adult players of LucasArts' Secret of Monkey Island. The CD-ROM version runs smoothly straight from the disc, saving about 10MB of hard drive space compared to the floppy version.

Designed for ages 6 to 10, Peter Pan is by far the most polished entry in EA Kids' growing lineup of imaginative children's software. Hopefully, this Peter Pan adventure isn't the last we'll see of the delightful Paintbox Pals.

SCOTT A. MAY

Electronic Arts  
(800) 245-4525  
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Circle Reader Service Number 445

# ONTOP

It's only a matter of time before most Windows users abandon the default desktop shell, Program Manager, in favor of more powerful, versatile, and intuitive third-party products. OnTop from ThoughtWare is an alternative to Program Manager that will appeal to the basic needs of beginners; however, it leaves much to be desired for more experienced Windows users.



OnTop, a Program Manager alternative, is best suited for Windows beginners.

OnTop's minimalist design takes its cue from Hewlett-Packard's sensational Dashboard 2.0 for Windows. The program appears as a thin horizontal button bar, placed at the top or bottom of the screen, leaving lots of room for windowed applications or wallpaper backgrounds. Features include an exit button, a digital alarm clock, a resource monitor, a DOS shell, online help, and a file search button. Rather than a total replacement for Program Manager, however, OnTop merely serves as a dedicated front end, offering a hard-wired selection of 12 basic Windows tools (Notepad, Terminal, Calculator, Control Panel, and so on). Indeed, beyond the alarm clock and ten customizable application buttons, OnTop is a closed book. It's difficult to imagine any serious Windows user with a repertoire of only ten favorite applications. To access more, you must enter Program Manager. For a program that touts itself as "the perfect replacement" shell, such limitations make absolutely no sense.

Other problems include heavy re-



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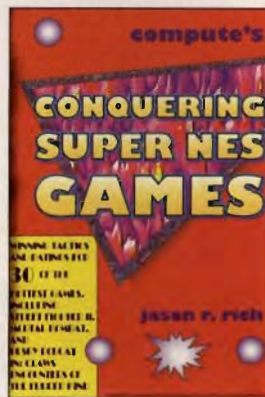


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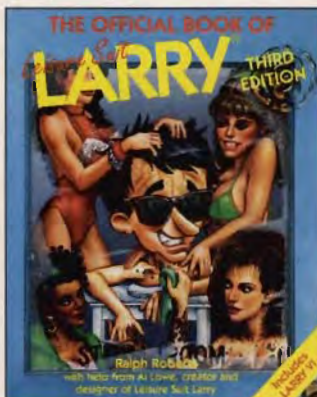


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source usage, which is ironic, considering the program's exceptionally small size. In side-by-side comparisons to HP's Dashboard (fully loaded with four times as many application buttons), OnTop opens Windows with 9 percent fewer available resources. And when they say, "OnTop," they aren't kidding: The button bar is a permanent screen fixture, obscuring menus and other important information within most full-screen applications. It's even immune to screen savers.

OnTop might be acceptable on systems with rigidly defined user input, such as in an office or small-business environment. For more adventuresome Windows users (that is, just about everyone else), the program proves far too inflexible.

SCOTT A. MAY

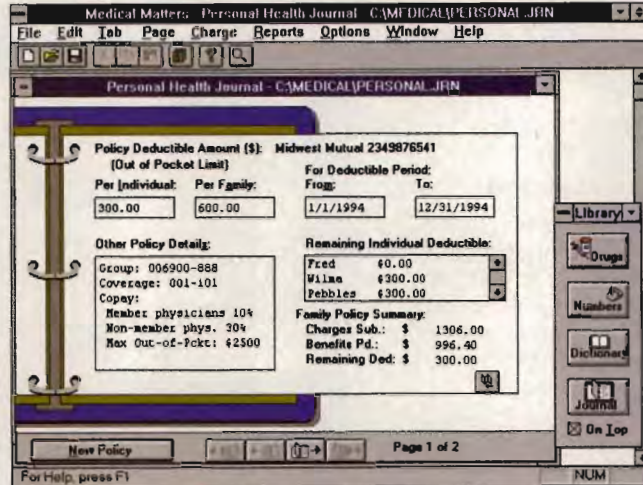
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## MEDICAL MATTERS FOR WINDOWS

If you like to track your medical expenses or if you'd feel more comfortable knowing more about medications than what's listed on the labels, Parsons Technology has a collection of medical recordkeeping and reference tools for you. Medical Matters for Windows provides a family health journal, a medical dictionary, a drug reference, and a database of health and medical hot lines.

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Medical Matters for Windows offers a health journal, medical dictionary, drug reference, and hot-line database.



As you can guess from its subtitle, *Metal & Lace: The Battle of the Robo Babes* isn't meant to stimulate your brain.

growth rates. You create a separate record for each family member and for each insurance policy. Printouts are preformatted for financial, insurance policy, and health history reports.

While at first the journal seems to be the primary focus of Medical Matters, the reference tools prove to be far more useful. The medical dictionary contains plain-English definitions of more than 7000 terms. The drug reference tells you how to store

and take your medications and what side effects you might experience. It lists possible interactions and precautions to follow for more than 4000 brand-name and generic drugs. The program's database of hot lines provides contact information for national and state agencies, organizations, and advocacy groups. Since these reference tools are simply Windows Help files, you can access them independently of the software program itself.

The program offers helpful information, which you can keep current with updates from Parsons Technology. If you need a quick-access medical reference or if you need to track medical histories, Medical Matters for Windows is a smoothly running program that may be just what the doctor ordered.

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## METAL & LACE: THE BATTLE OF THE ROBO BABES

Metal & Lace merits attention as one of the first PC titles to exploit the kick-'n'-punch fighting frenzy currently sweeping the coin-op and videogame arenas. What makes this game unique is its unusual graphics style, called Anime, which fans of Japanese comics will instantly recognize for its titillating caricatures of women: large doe eyes, sharp nose and chin, and other oddly proportioned features. As you can guess from the subtitle, this isn't the kind of game meant to stimulate your brain. It's aimed at an excitable teenage audience, who'll be enticed by the NR-13 rating, which warns of violence and sexually suggestive content. Some will find the NR-18 version even more alluring; it's available only through mail order, and it features above-the-waist cartoon nudity.

The setting is MeCha Island, a tropical proving ground for illicit staged fighting. You've come here to test your mettle, one-on-one, against the best of the Robo Babes, fighting your





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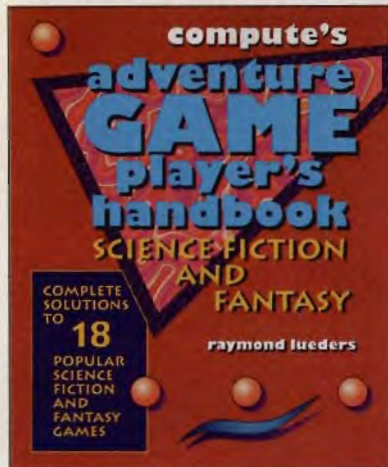
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## REVIEWS

way through multiple stages of increasingly difficult opponents. Victories earn cash, which you can use to purchase better armor and power-ups (batteries, shields, and various neural boosters). In addition to not-so-subtle variations of standard punches and kicks (sweeping, leaping, flying, stomping, and so on), each armor class features its own special moves, such as the Thunder Break, Hover Clash, and Roller Blade Butchery. Interestingly, tournament fighting is the weakest aspect of the game; although well rendered in hires graphics and smooth animation, the action suffers from mind-numbing repetition.

When you're not fighting, grease the palms of some shady characters at the local watering hole, where you can learn of upcoming matches, pick up some secrets, or borrow money from the musclebound loan shark. Here, you can also engage in some two-player practice bouts, which for many will be the highlight of the game.

You can play with the keyboard or a standard joystick, but multibutton sticks such as the Gravis PC GamePad and ThrustMaster FCS allow easier access to the game's convoluted combination moves and provide better response.

While sound effects are clean and expressive, with full-voiced characters lending a great deal to the atmosphere, as in many games of this type, the storyline and dialogue are flat and amateurish. Your incentive for advancement—a furtive peak beneath the armor of the tough-talking, pouting, scantily clad Robo Babes—simply isn't enough to justify the effort. Metal & Lace succeeds in spicing up a rather well-worn genre, although its amendments are merely cosmetic.

SCOTT A. MAY

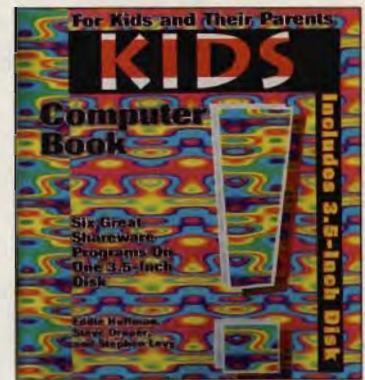
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## CANON IX-4015

Canon has introduced the perfect desktop flatbed scanner for the desktop publisher and home user, the IX-4015. And lest you think \$1,175 is steep for a scanner, take a moment to consider its features. It can scan 24-bit color at 400 x 800 dpi and monochrome at 1200 dpi (this requires a lot of complicated setup in the included OFOTO scanning software). You can also scan images in 256 levels of gray.

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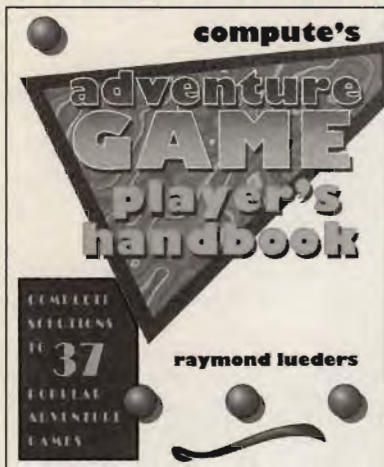
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## REVIEWS

The scanner ships with an OEM version of OFOTO, but I didn't enjoy using this product; instead, I used Corel PHOTO-PAINT! for most of my work.

Early on, I had trouble getting the scanner to operate, so I took the opportunity to check out the wizards at Canon. Canon technical support was not up to its usual snuff. It turned out that the scanner wouldn't work because the SCSI terminator wasn't installed, but tech support never suggested this solution (I found it in the troubleshooting section of the manual). Since the printer comes with a very tiny SCSI board (about two-thirds the size of a normal half-size board), I asked whether the board could be used to drive daisy-chained SCSI devices. Canon stated that the board had never been tested with other SCSI devices.

I scanned a number of pictures and found the colors to be true. An 800 x 400, 24-bit scan of a full-page graphic took a total of about 13 minutes: a little more than 8 minutes for the scan itself, then a little more than 5 minutes for the automatic processes in OFOTO to take place, along with straightening and cropping the image. Lower-resolution scans and scans that don't make use of automatic features go much faster.

This isn't a review of TextBridge (an OCR product from Xerox), but since I had it nearby, I installed it and used it with the scanner as well. I can report that TextBridge is a very good OCR (it lists for only \$99). The great thing about the TWIN standard supported by the Canon scanner is that it works with nearly all modern scanner-related software and hardware, including TextBridge. TextBridge did an excellent job, particularly with high-resolution scans (though they take longer). TextBridge can be installed as an OLE server to your word processor so the scanned text is automatically transferred to the currently open document.

The IX-4015 scanner is barely larger than its scanning area—11<sup>1</sup>/<sub>4</sub> x 15<sup>15</sup>/<sub>16</sub> x 3<sup>1</sup>/<sub>8</sub> inches. Installation was very simple (just don't forget to install the SCSI terminator). Canon claims its xenon-tube light source is more reliable and distributes light and color more evenly than fluorescent lights used in small, inexpensive scanners. A 20-sheet document feeder for the IX-4015 is available for \$349.

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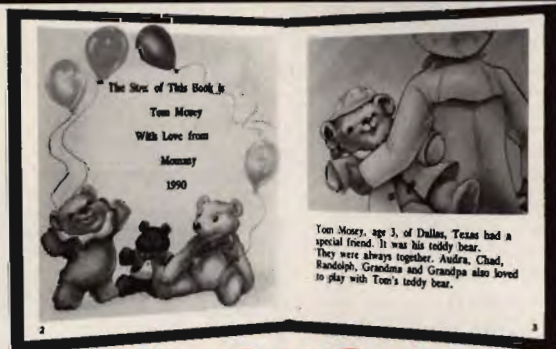
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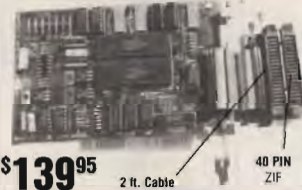
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(continued from page 128)  
the Vatican Library, IBM, and the Pontifical Catholic University of Rio de Janeiro are working together to make selected works electronically accessible worldwide.

A pilot project has been launched to convert the library's pre-1985 catalog of nearly 2 million cards into an electronic database, as well as to create a digital image database—along with the documents—enhancing the scanned images along the way. The project should prove invaluable in furthering the acceptability of digital storage as a means of preserving and distributing information in rare books.

The library's card catalog should be available to Internet users late next year.

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Thanks to grants totaling over \$400,000 from the Alfred P. Sloan Foundation, the program promises to deliver visual and hands-on instruction which will make it possible to fulfill the requirements for a 16-credit Advanced Professional Certificate in Information Technology. Lotus Notes will be used for telecourse delivery. Although students will be working independently, computer conferencing, E-mail, and voice mail with faculty and other students will be provided.

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## Educational Teamwork

The leading independent publisher of educational software, Davidson & Associates, has joined forces with Paramount Publishing to mount a tour de force on the educational software front. Davidson will develop curriculum-based software for Paramount, which is investing \$50 million in hopes of cashing in on the \$1 billion educational multimedia market. These products, carrying the Paramount name, will be aimed at educational markets.

Under a Simon & Schuster/Davidson imprint, the two companies also plan to create and publish a range of consumer multimedia products, tapping into Paramount's library of over 300,000 titles. The first titles you can expect to see are multimedia versions of Peter Lynch's bestseller *Beating the Street*; *Money Doesn't Grow on Trees*, Neale

S. Godfrey's best-selling children's guide to managing money; and *Chicka Chicka Boom Boom*, featuring the voice of Ray Charles. Paramount, which has been digitizing its books since 1991, expects to have 90 percent of its publications ready to be multimedia products by 1996.

To find out more, contact Paramount Publishing, 1230 Avenue of the Americas, New York, New York 10020.

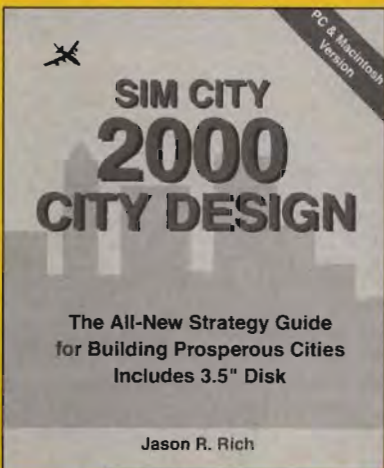
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# NEWS & NOTES

Byron Poole

## Love Hurts

It is better to have loved and laughed than never to have laughed at all. At least that's the way Comedy Central sees it. The second multimedia spin-off from the all-comedy network's popular "Short Attention Span Theater" takes a humorous swipe at love—being in it, being out of it, and being smothered by it.

For \$49.99, *Dating & Mating* lets you pick from 50 of today's hottest comedians and 19 joke categories to find the comedy routines that best suit your mood. The video

Love can be funny. Comedy Central's *Dating & Mating* is its latest multimedia comic extravaganza.



clips you like the most can be loaded into your existing screen saver to appear whenever your computer is idle. To find out more about *Dating and Mating*, contact Time Warner Interactive, 2210 West Olive Avenue, Burbank, California 91506; (800) 482-3766, (818) 955-9999, (818) 955-6499 (fax).

## Link to the Real World

For the 1.25 million U.S. high-school students who bypass college and head directly for the work force, a helping hand is near. WORKLINK, a computer-based system connecting high schools to local businesses, is getting a major push via a recent partnership agreement between the Educational Testing Service (ETS)

and the National Association of Secondary School Principals (NASSP), which would like to make WORKLINK available at all public and private schools nationwide. Students are encouraged to develop a WORKLINK record on a voluntary basis. It can include information such as an expanded student transcript, ratings of work habits, and results from various job-specific skill assessments. These records can then be reviewed by potential employers recruited into the program.

Timothy J. Dyer, NASSP executive director, says that WORKLINK should help businesses, which are often lacking the most relevant information on a student's workplace skills—namely, attendance, punctuality, and motivation. Software and materials for WORKLINK are available for high schools and business organizations through the NASSP; call (800) 253-7746 for more information.

## Reaching the Stars

You've seen their addresses floating around the net, but now the E-mail addresses of famous people have been compiled in a book. *E-Mail Addresses of the Rich and Famous* is 150 pages of access to the stars. The author, Seth Godin, who coauthored *Internet White Pages*, hopes it will arouse fruitful exchange among computer users, famous and otherwise. The nearly 1000 entries include politicians, programmers, authors, and academics. Among them you'll find the likes of Ross Perot, Bill Gates, and the man who provides the voice of Barney. The book, published by Addison-Wesley, is organized by vocation and category, and each entry has a brief background description. And all this costs only \$7.95.

## Empower Windows

WinWear, the maker of the only application to add productivity-building enhancements to the Windows Program Manager, has introduced a new version of its WindowMagic. WindowMagic 3.0, like its predecessor, expands the abilities of Program Manager by ena-



bling the user to create push-button toolbars for instant application launches and to drag and drop icons in minimized groups for later viewing and launching with the right mouse button.

New features for WindowMagic 3.0 include drag-and-drop printing, a resource monitor alerting users of exceeded thresholds, and a one-button task manager for launching an application from *anywhere*. WindowMagic's list price is \$89.95. Upgrades are available for \$25.00 plus shipping and handling.

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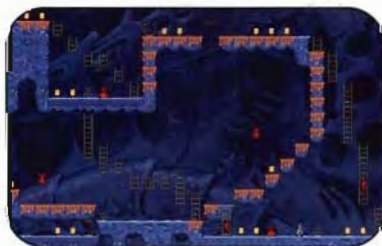
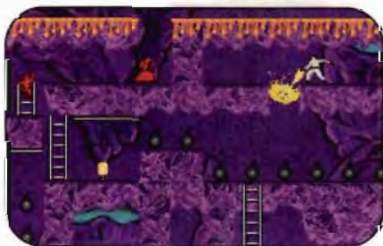
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