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OCTOBER 1998

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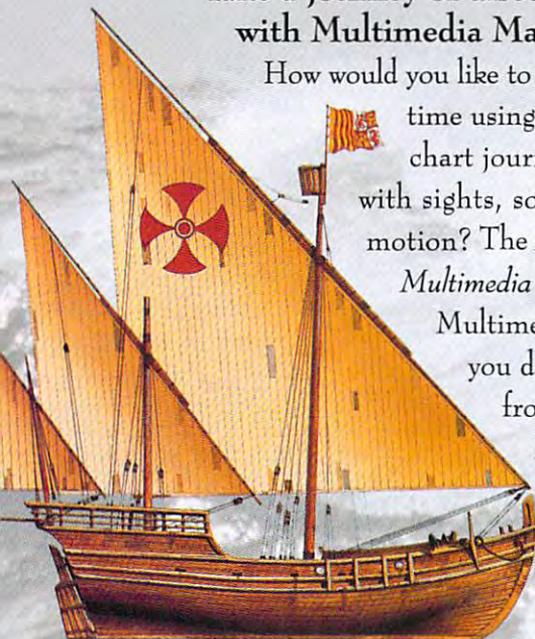


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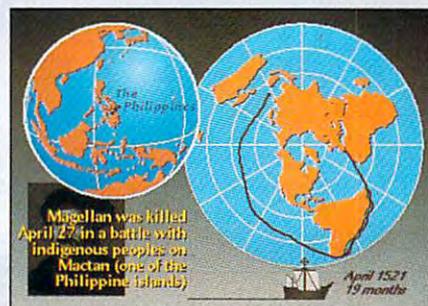
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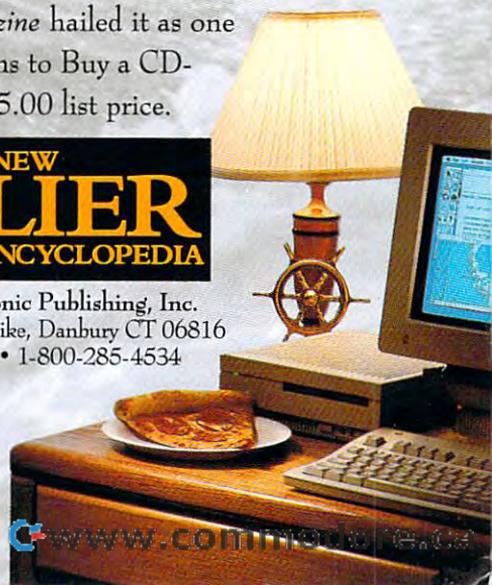


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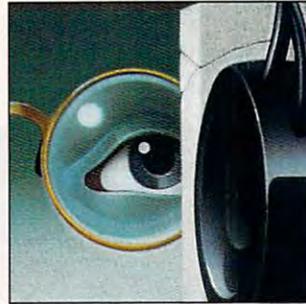
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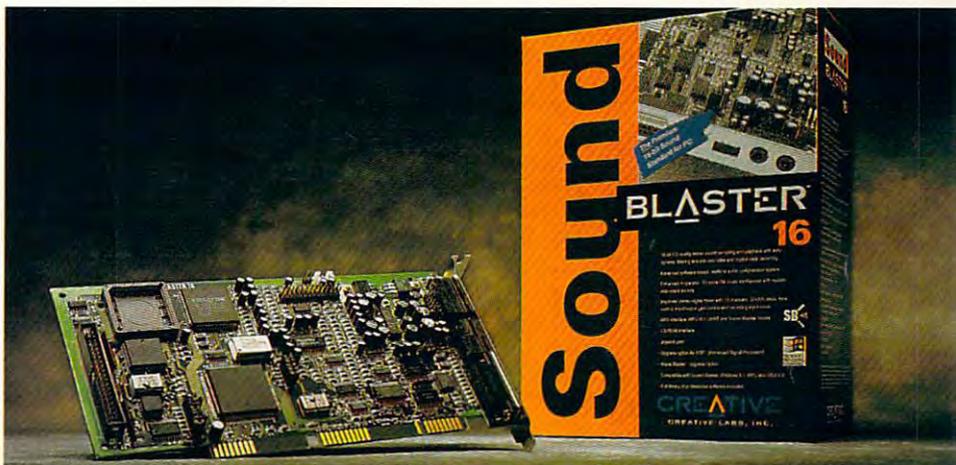
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Clifton Karnes

Today, we're seeing the birth of a radical new model of computing, one that will dramatically change the way computers work and the way we use them. I call this new model of computing content-centered computing, and its emergence marks the beginning of the second computer revolution.

Before discussing the new model, however, I want to talk about the current one, which we might call process-centered computing. The computer was invented more than 50 years ago to process information, and its ability to do this has accounted for its amazing success. In the process-centered computing model, raw data goes into the computer, the machine processes it, and useful information comes out. Examples of process-centered computing include spreadsheets, word processors, databases, and almost every type of productivity application.

In the content-centered model, instead of raw data going into the computer, information goes in, and the computer's power is used to deliver this information in a form that's more useful, engaging,

and entertaining. Examples of content-centered computing include multimedia and online services.

If you think about what happens when you use a multimedia encyclopedia, you'll see that something is going on that's fundamentally different from massaging data with a spreadsheet. With a multimedia title, the computer isn't crunching numbers or text; it's delivering text, sound, and often, video. The same thing is true with online networking. When you dial up an online service, your computer enters another state. It's not working to process data into information; it's working to deliver information—content.

It's interesting that although networking is a much older technology than multimedia, multimedia is much more advanced. The reason for this is that multimedia's medium—CD-ROM—is a much more powerful, higher-bandwidth conductor for content than networking's medium—the telephone line.

This is changing rapidly, however. In the next two years, the speed of telephone transmission may increase 100 times or more, and we'll be able to do things via computers networked with phone lines that are only possible now with CD-ROM-based multimedia.

This birth of content-centered computing can be viewed as both good and bad. Historically, other technologies that have made a transition from process to content have moved from small niche markets to large, broad-based consumer markets. Hardware companies that survive these transitions do very well. Many magazines do poorly, though, because enthusiasts tend to be more interested in process rather than content.

As background, some examples of pure content-cen-

tered consumer technologies include the telephone, television, and VCR. These are the consumer technologies with the broadest consumer base. For examples of technologies that began as process-centered but made a transition to content-centered, you have stereo, photography, and video. These all began as technologies that needed lots of user interaction for success.

What does this emergence of content-centered computing mean for COMPUTE? Will COMPUTE go the way of most of the stereo and photography magazines of the 1980s? We don't think so, because computers are different from stereos and cameras in three ways: Computers are general-purpose devices (stereos and cameras are dedicated devices), computers are deeply programmable devices (stereos and cameras are very thinly programmable devices), and computers are much more complicated.

In fact, this emergence of content-centered computing is actually good news for COMPUTE for three reasons. It gives us two exciting technologies to cover (multimedia and networking), the interest in the new technologies is coming from the home market (which is COMPUTE's home territory), and these new technologies give us two new media to use as delivery systems for COMPUTE information.

It's this last point I want to emphasize, because COMPUTE is going back online. Beginning in September, you'll be able to find COMPUTE on America Online by searching for the keyword *COMPUTE* or exploring the Omni forum, of which we're a part. Check us out. We'll be covering the same process-centered topics we've always covered plus all the hot, new content-centered ones. □

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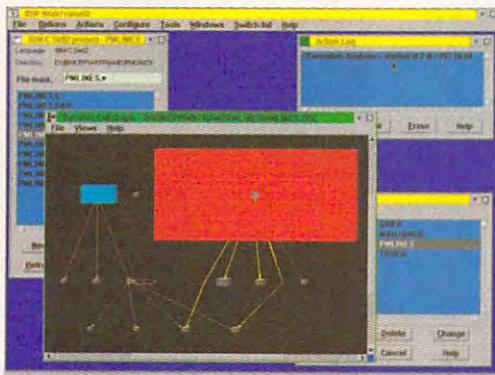


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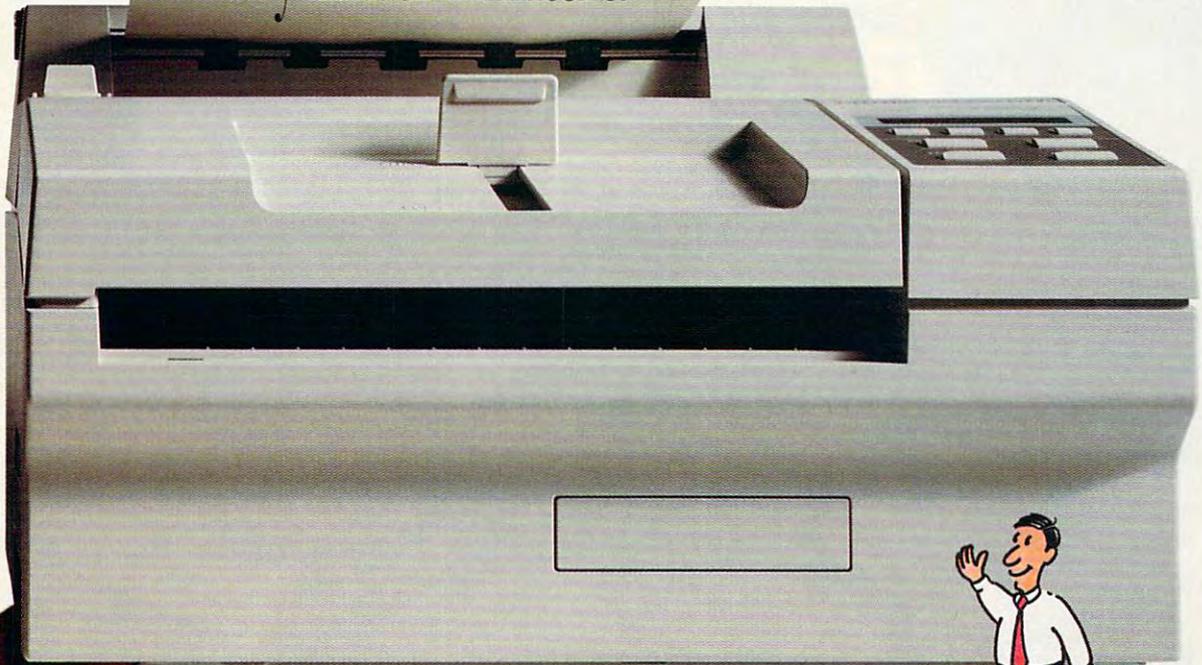


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SUPER RECORDER MACROS



Illustration by Theo Rudnak

Supercharge your desktop with this collection of essential Recorder macros.

Windows' Recorder has received a lot of criticism for being an underpowered app, and some of this criticism is justified. The biggest drawbacks to Recorder are that you can't edit the macros you create and that there are no provisions for dialog boxes and advanced functions.

Recorder is a simple keystroke recorder (hence the name) that can play back your keystrokes. Once you understand Recorder's power and its limitations and start using it, it quickly becomes an indispensable application.

Recorder Basics

Recorder looks like most other Windows applications. It has a menu bar with options that look familiar. The File menu has selections for New, Open, Save, Save As, Merge, and Exit. With the exception of Merge, these are options we'd see on any File menu.

Probably the best way to get started with Recorder is to record a sample macro. For the first macro, let's choose a global macro that will save the current document. (We'll use the term *global* to describe the macros that can be played back to any application.) Here's some background.

As you know, much of Windows' interface is standard across applications. Most windows have a title bar, menu bar, and scroll bars (if they're needed), and the windows themselves can be moved

and resized. You'll also note that almost every menu bar includes entries for File and Help. Digging deeper, if you examine almost any File menu, you'll see entries for New, Open, Save, Print, and Exit. This structure is all part of Windows' standard interface, and it's one of the reasons that Windows is so easy to use—the parts of different applications that work the same way have the same menu choices.

If you look at the keyboard shortcuts in several different File menus, however, you'll see a variety of key combinations. The Save command, for example, may be Shift-F12 in one application, F2 in another, Ctrl-S in a third, and many programs will have no shortcut key at all. Unlike menu options, shortcut keys are not standard.

You can change all that, however, with Windows' Recorder.

Let's say that you want Ctrl-S to save the current file in all your Windows applications. I use Ctrl-S because it's easy to remember, and Microsoft is recommending that developers use this as the shortcut key to save the active file.

1. Run Recorder.
2. Run any application (like Write) that can save files.
3. Select Macro, Record and under Macro Name, type *Save file*.
4. Under Shortcut Key, put Ctrl-S (type s in the text box at the top of the Shortcut

Article by Clifton Karnes

Key area in the Record Macro box, and make sure only the check box next to Ctrl is checked).

5. Under Record Mouse, select Ignore Mouse.

6. Under Playback To, choose Any Application.

7. Click on Start, and Recorder will minimize itself and start flashing to remind you that it's recording.

8. In your application, press Alt-F, S to save the current file. (Alt-F activates the File menu, and S selects the Save command).

9. Stop recording by pressing Ctrl-Break, choose Save Macro, and click on OK.

Now your macro has been recorded. Even though this Recorder file has just one macro in it, you'll want to save it, so pull down the File menu, select Save, and in the Save dialog box type *mymacros* under File Name. (Recorder will supply the REC extension.)

Now Ctrl-S will save the current file in any Windows program that follows the minimum Windows standards. To play back this macro, you simply press the shortcut key you assigned in the Properties dialog box. Alternately, you can double-click on the macro name in the Recorder window, but this is an option you will probably never use.

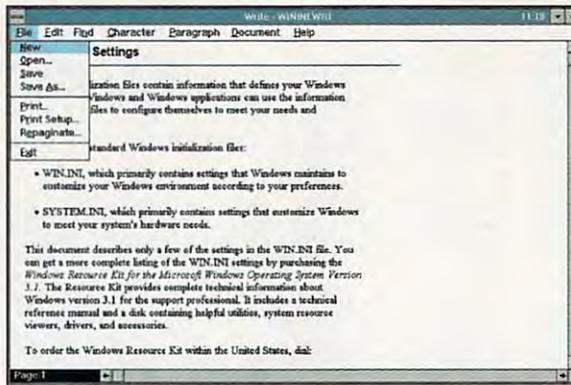
You may wonder what happens when you press Ctrl-S in an application that already has a Ctrl-S shortcut key defined. Is the macro played back, or does the application's key take precedence? When it comes to shortcut keys, Recorder is king, and its shortcut keys take precedence over an application's.

Since the applications with the built-in Ctrl-S keystroke almost certainly follow the Windows conventions that our Recorder macro is assuming, our Recorder Ctrl-S will work just as well in them as their native Ctrl-S.

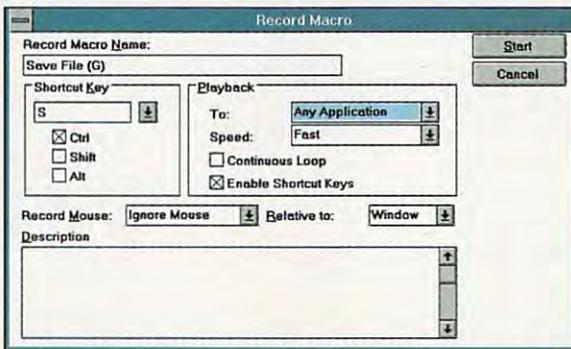
In this one simple example we have demonstrated that

- It's best to ignore mouse movements, because using them depends on your recording and playback screen layouts being identical. Any change in the layout of your screen can result in unexpected problems.

- Recorder macros can be played back either to the same application that you recorded them with (local macros or application-specific macros) or to any application (global macros).



Almost every Windows program with a menu bar has a File menu with entries for New, Open, Save, Print, and Exit.



To view the properties for any Recorder macro, all you have to do is select Options, Properties.

Local Macros

Let's take a look at some of the alternatives available to you. Pull down the Options menu and select Preferences. Under Playback To, select Same Application (we'll change this for our global macros, like the one we just created, but it's safer to have this as the default).

Under Playback Speed, select Fast. With this selection, no matter how slowly you record your keystrokes, the playback will be as fast as possible.

Under Record Mouse, choose Ignore Mouse, for the reason stated above. The last option, Relative To, is only relevant if we're recording mouse movements, so you can leave it as it is.

Also, under the Options menu, make sure Control+Break Checking, Shortcut Keys, and Minimize On Use are all checked.

Control+Break Checking allows you to stop recording by pressing Ctrl-Break. Shortcut Keys lets you nest macros inside macros. Minimize On Use causes the Recorder to be minimized so it's out of the way when you start recording.

Macro Number 2

Let's walk through another macro-recording session, but before we do, let's go back to the first macro. Select

it and choose Options, Properties. You'll notice from this dialog box that you have the convenient option of changing the name, shortcut key, and other properties of your macro at any time.

One convention I follow with macros is to put in parentheses at the end of the macro name an abbreviation for the application to which the macro plays back. If it's a global macro, I use (G); if the macro plays back to File Manager only, I use (FM); and so on.

For the Ctrl-S macro, the new name should read Save file (G). This little bit of housekeeping will come in handy later, so I urge you to do it.

Our previous macro was designed to save the active file. But almost as often, you'll be opening files. Many applications (but not all applications) use Ctrl-O to call up the Open dialog box, which is easy to remember. And just as Microsoft is now recommending that developers use Ctrl-S for saving a file, it's recommending they use Ctrl-O for opening a file.

Here's a step-by-step guide for creating an Open macro. The name for this macro is Open file (G), and its shortcut key is Ctrl-O.

1. Load any application that can open files.
2. Begin recording (choose Macro, Record and type in the macro's name and its shortcut key).
3. Press Alt-F, O.
4. Stop recording (press Ctrl-Break, choose Save Macro, and click on OK).
5. Save your macro file.

Now Ctrl-O will call up the Open dialog box in any Windows application that opens files. If that application uses Ctrl-O already, this macro will still work, as long as the application has a File menu with an Open entry.

One thing you'll often find yourself doing is saving the current file and exiting the application. If you're using Ctrl-S to save a file, it makes sense to use that keypress but to add another key to intensify it. The key combination I like is Ctrl-Shift-S for save and exit. The macro name is Save file and quit (G).

1. Load any application that can save files.
2. Begin recording (choose Macro, Record and type in the macro's name

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and its shortcut key).

3. Press Alt-F, S, Alt-F, X.

4. Stop recording (press Ctrl-Break, choose Save Macro, and click on OK).

5. Save your macro file.

Now test the macro. Load a file into any application that saves files, and press Ctrl-Shift-S. You'll save the current file and exit the application.

More Global Macros

One of the differences between Windows 3.0 and Windows 3.1 is the change in the edit keys used for copying, cutting, and pasting.

	Windows 3.0	Windows 3.1
Cut	Shift-Del	Ctrl-X
Copy	Ctrl-Ins	Ctrl-C
Paste	Shift-Ins	Ctrl-V

The new keys are like the Mac's, and they do have the benefit of not requiring you to move your hands away from the home keys.

The problem is that not all applications use these keys.

What's going to help us with a solution is that Microsoft has recommended that even those products that support the new keys keep the old ones for compatibility (for users who don't want to change).

What this means is that all Windows applications should support Shift-Del, Ctrl-Ins, and Shift-Ins, but only some applications will support Ctrl-X, Ctrl-C, and Ctrl-V.

We can even things out so all applications support the new keystrokes by creating three Recorder macros. What these macros will do is map the keystrokes Shift-Del, Ctrl-Ins, and Shift-Ins to the shortcut keys Ctrl-X, Ctrl-C, and Ctrl-V. With these macros in place, our new edit keys will work in all Windows applications. Here are the three macros.

Macro Name: Cut (G)

Shortcut Key: Ctrl-X

Playback To: Any Application

1. Load any application that lets you edit text (such as Write) and select some text.

2. Begin recording.

3. Press Shift-Del.

4. Stop recording.

5. Save your macro file.

Macro Name: Copy (G)

Shortcut Key: Ctrl-C

Playback To: Any Application

1. Load any application that lets you

edit text (such as Write) and select some text.

2. Begin recording.

3. Press Ctrl-Ins.

4. Stop recording.

5. Save your macro file.

Macro Name: Paste (G)

Shortcut Key: Ctrl-V

Playback To: Any Application

1. Load any application that lets you edit text (such as Write), select some text, and cut or copy it to the Clipboard.

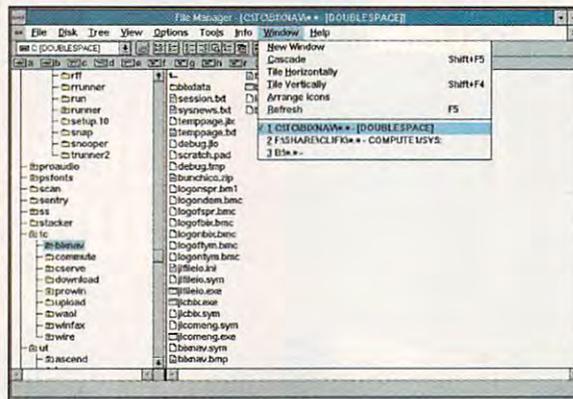
2. Begin recording.

3. Press Shift-Ins.

4. Stop recording.

5. Save your macro file.

With these three macros ready to go, Ctrl-C, Ctrl-X, and Ctrl-V should copy, cut, and paste in virtually any Windows program that supports cutting and pasting with the Clipboard.



All Windows MDI applications have a Window menu entry with the open document windows numbered.

Switching Windows

One of the best things about Windows—and what lets us create these global macros—is that much of the interface is standardized. MDI (Multiple Document Interface) applications are one of Windows' neat standard features. These programs, such as Program Manager, File Manager, SysEdit, and many others, let you work with several document windows at once inside an application that acts as a minidesktop.

Switching between these internal document windows, however, is something of a pain. You can always go to the Window menu and select the window you want, but that's slow and tedious. There are two key combinations that let you cycle through open documents (Ctrl-F6 and the undocumented Ctrl-Tab), but these keystrokes cycle through all open documents rather than moving you to the one you want. We can solve this prob-

lem, however, and Windows' MDI standards will help us.

If you look at the Window menu in any MDI application, such as File Manager, you'll see that each window is numbered. So Alt-W (to activate the Window menu) followed by a number will move you to the window associated with that number.

All we need to do is create a group of macros that make switching windows simpler.

Since some applications support these window-navigation shortcuts and use the key combination Alt-1, Alt-2, and so on, we'll use those shortcut keys. Here's the first macro.

Macro Name: Switch to window #1 (G)

Shortcut Key: Alt-1

Playback To: Any Application

1. Load any application that supports multiple documents.

2. Begin recording.

3. Press Alt-W, 1.

4. Stop recording.

5. Save your macro file.

Now, when you press Alt-1, you'll move to window #1.

You'll want to record eight more macros to switch to windows 2-9. Simply follow the keystrokes above, replacing the number 1 in Macro Name, Shortcut Key, and step number 3 with the new number.

This group of macros makes using a program like SysEdit much easier. In that application, the windows are always in the same order, and they always have the same numbers in the Window menu.

Window #1	WIN.INI
Window #2	SYSTEM.INI
Window #3	CONFIG.SYS
Window #4	AUTOEXEC.BAT

Say you want to edit SYSTEM.INI. As soon as the program loads, press Alt-2, and you're up and running. Switching to AUTOEXEC.BAT is simply a matter of pressing Alt-4. These shortcut keys will save you lots of time and help keep your work organized.

Minimize and Maximize

We usually use the mouse to adjust our windows' sizes, but a keyboard macro can come in handy. Here are three global macros to minimize, maximize, and restore windows.

Macro Name: Minimize window (G)

Shortcut Key: Ctrl-Alt-down arrow

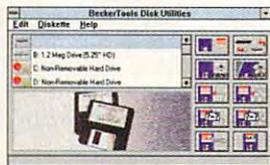
1. Load any application that you can minimize.

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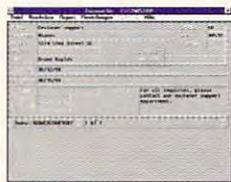
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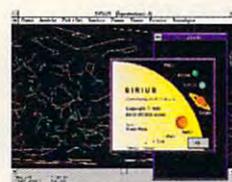
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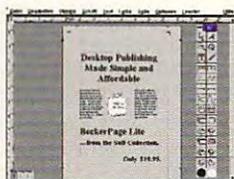
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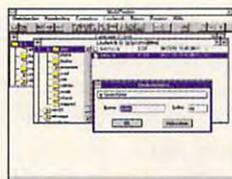
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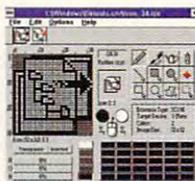
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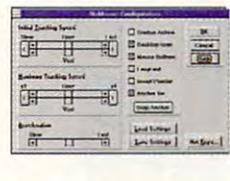
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2. Begin recording.
3. Press Alt-space bar.
4. Press N.
5. Stop recording.
6. Save your macro file.

Macro Name: Maximize window (G)

Shortcut Key: Ctrl-Alt-up arrow

1. Load any application that you can maximize.
2. Begin recording.
3. Press Alt-space bar.
4. Press X.
5. Stop recording.
6. Save your macro file.

Macro Name: Restore window (G)

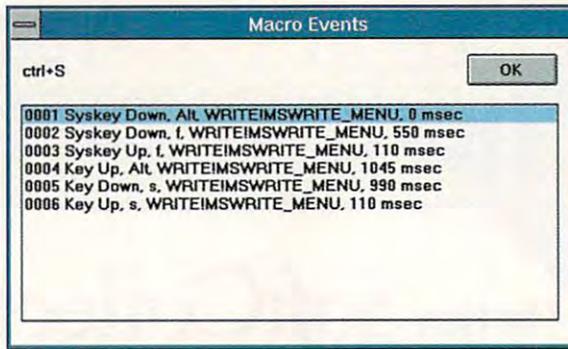
Shortcut Key: Ctrl-Alt-right arrow

1. Load any application that you can restore.
2. Begin recording.
3. Press Alt-space bar.
4. Press R.
5. Stop recording.
6. Save your macro file.

Two Additional Macros

Here are two final macros. Whether you decide to use them or not, you should at least give them a try.

Macro Name: Exit (G)



To see the keystrokes used in a Recorder macro, hold down the Shift key and choose Macro, Properties from Recorder's menu bar.

Shortcut Key: Alt-X

1. Load any application that can exit.
2. Begin recording.
3. Press Alt-F4.
4. Stop recording.
5. Save your macro file.

Macro Name: Save As (G)

Shortcut Key: Ctrl-A

1. Load any application that has a Save As menu option under File.
2. Begin recording.
3. Press Alt-F, A.
4. Stop recording.
5. Save your macro file.

I find the Exit macro much easier to execute than pressing Alt-F4, but that's part of the problem with it. Many people may find it *too* easy to press: You might press the key combination by accident. Alt-F4 isn't easy to remember, but it's hard to hit accidentally.

The Save As macro is useful, but what if you hit it by accident in an application that has no Save As menu option? In that case, Recorder thinks for a very long time and displays a dialog box that essentially says something's wrong. This will occur whenever a Recorder macro can't find the command it's looking for.

Managing Macros

Recorder doesn't have lots of bells and whistles, but it does have a couple of neat features—and one of the most useful of these features is undocumented.

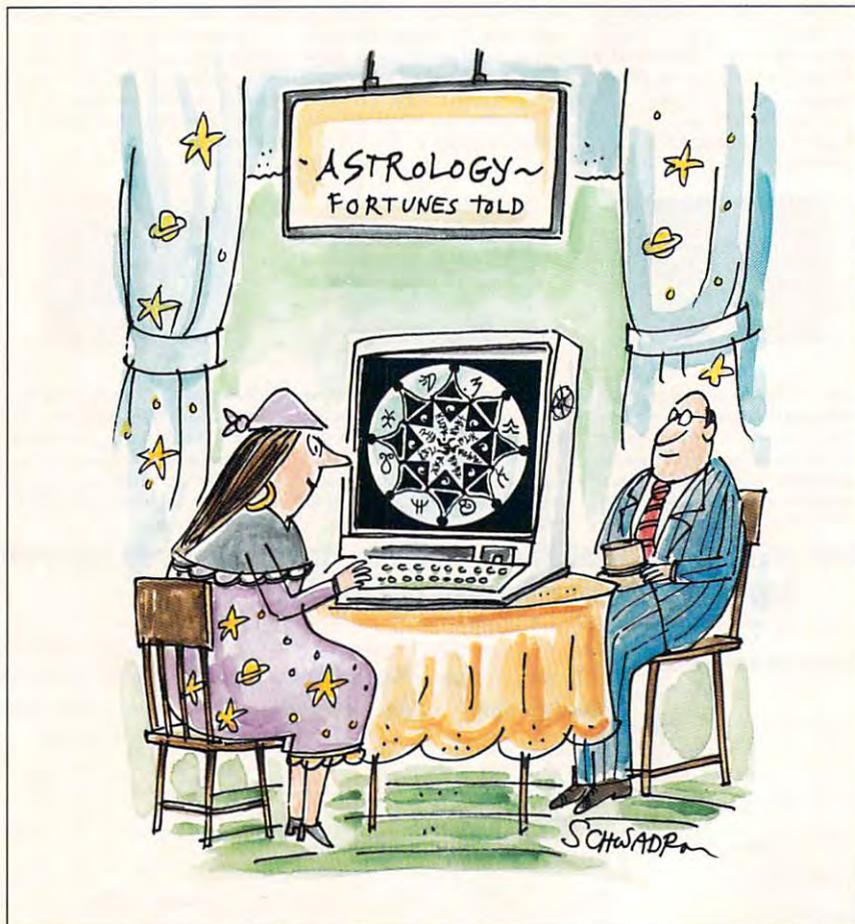
First, there's no way to change the order of your macros in Recorder's macro window. After a few months of recording, you'll have a mess. I've found that dividing macros into three groups and keeping these groups separate can make working with Recorder much easier. These are the groups I use.

- Global macros
- File Manager macros
- Miscellaneous macros

I keep each group in a separate file. You'll want to have all of your macros available on your desktop at the same time, however. You don't want to have to load in a new file when you need a global or miscellaneous macro. Adding the extra step of loading a macro file defeats the purpose of macros: to make complex processes occur with the press of a couple of keys. The solution is to maintain separate files, but to create a master macro file from these, using Recorder's Merge command. Here's how it works.

1. Load Recorder and choose File, New.
2. Let's say your macro files have the names GLOBAL.REC, WINFILE.REC, and MISC.REC. You choose File, Merge and select GLOBAL.REC.
3. Choose File, Merge again and select WINFILE.REC.
4. Choose File, Merge a third time and choose MISC.REC. Now you should save this macro file using the filename MYMACROS.REC.

Now you have a master macro file



TECHNOLOGY UPDATE

900 MHz breakthrough!

New technology launches wireless speaker revolution...

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

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.

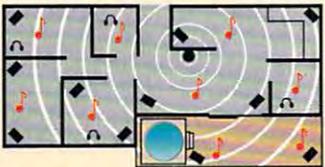
Full dynamic range.

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.

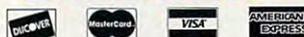
Stereo or hi-fi, you decide. These speakers have the option of either stereo or hi-fi sound. You can use two speakers, one set on right channel and the other on left, for full stereo separation. Or, if you just want an extra speaker in another room, set it on mono and listen to both channels on one speaker.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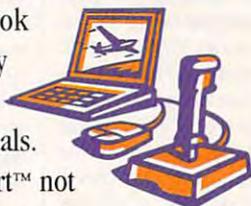


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with the macros organized by type. To keep this file organized this way, before you record a new macro, load the file it should go into. When you've finished debugging the macro and you're satisfied with it, create a new master.

Peeking at Macros

One problem you'll run into when managing your macros is not knowing for sure what the macro does or which keystrokes it uses. There's room for a description in the Macro, Properties dialog box, so you can leave yourself a note about the macro's purpose, but you often need to know the keystrokes the macro uses, and that would be a tedious thing to enter into the description.

Help arrives in the form of another undocumented feature. Choose Macro, Properties with the mouse, but hold down the Shift key. You'll see a display of the macro's keystrokes.

This display is a little hard to read when you first tackle it, however, because each keypress is represented by two entries in the list: one for when the key was pressed and one for when it was released.

Here's a rundown on each entry in the display: the number of the keypress, the key state, the key, the class name of the program played to, and the time between the keystrokes.

Recorded History

Recorder is a powerful tool. Although each macro may save you only three or four keystrokes, sometimes this savings may mean the difference between a boring grind and a simple pleasure. Anytime you find yourself about to enter a series of keystrokes for a second time, simply start up Recorder first. Give the action a shortcut key, and automate your Windows work.

Next month, you'll find a feature with more ideas for using Recorder as well as other advanced (but underused) features of Windows.

This feature is an excerpt from Clifton Karnes's Essential Windows Tools, a book-and-disk combination from COMPUTE Books that combines the author's best Windows hints, tips, and secrets with a disk of high-quality software tools.

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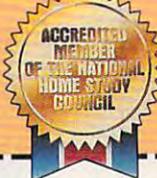
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TEST LAB

Edited by Mike Hudnall
Reviews by Richard O. Mann

Anyone using a PC daily for any length of time soon begins to fantasize about using it to control the details that make up daily life. Years ago, when I got a terminal at my desk attached to the company's quarter-million-dollar minicomputer, the first thing I did was write a FORTRAN application to control my to-do list.

Today's personal information managers (PIMs) routinely handle to-do lists, schedules, address books, and phone dialing. To these core functions, the programs add a dazzling variety of other bells and whistles, tools and utilities. You'll find calculators, inspirational quotes, project managers, Gantt charts, check-book processors, prayer rolls, phone logs, contact histories, daily scripture readings, alarms, personal journals, customizable databases, daily cartoons, sales follow-up information, and dozens of other clever and useful ways to manage your life.

No other type of software offers so much variety. Because personal information is ultimately individual (even intimate), you probably won't find a program that precisely matches your work style, your personality, and your particular information needs. The trick in choosing a PIM is to find

the one that most closely approximates the way that you think and the way that you work.

To help you find that program, Test Lab looks at ten outstanding Windows PIMs this month. While PIMs were interesting under DOS, they didn't achieve major success until the age of Microsoft Windows. The ability to keep your PIM running on the desktop at all times and to whiz back and forth among calendars, task lists, note windows, and other PIM modules makes Windows the ideal PIM environment.

Windows PIMs make up a dynamic field; COMPUTE's editors and I decided to hold up these reviews to await the release of major upgrades of PackRat and Commence, as well as the significant new Sharkware—all in the same week, well after our initial deadlines. Unfortunately, we weren't able to get our hands on another highly touted new PIM, ECCO Professional, in time for a full review in this Test Lab, even though it will be shipping by the time you read this. However, a sidebar does cover this product.

It was a true delight to work with these programs; they offer a diversity of unique tools for special purposes while still covering the core functions admirably. With so many facets to these programs, I wasn't able to tell you everything about each program in the space available. To give you the most useful information possible, I've listed the most important items in the features grid, which will answer many of your questions.

In the reviews of these personal information managers, I've char-

acterized each program, mentioning the depth of the program, special features, the work style it supports, and its central focus. You can assume that unless otherwise specified, the programs cover the basic core features.

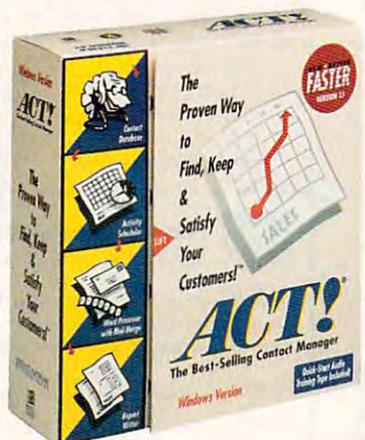
These programs exemplify the power of the metaphor in Windows software. Each of them has chosen a basic approach to the job that mimics a familiar desktop tool. YourWay is a card file. Ascend is an electronic Franklin Day Planner. Lotus Organizer, using perhaps the most visually appealing metaphor, looks like a pocket-size ringbound notebook. Info Select, believe it or not, is a mass of virtual Post-it Notes. Many of the programs imitate a desktop calendar. One of these metaphors is likely to strike you as just right.

You may wonder which personal information manager is the best. That I can't tell you. I know the characteristics of the programs, but which one is the best for you depends totally on your personality. Other writers and editors have recommended their choices over the last year. These include Lotus Organizer, Info Select, PackRat, DeskTop Set, Ascend, Commence, YourWay, ACT!, and In His Time. Had it been available for review, I'm sure Sharkware would've been chosen as well. Obviously, there is no consensus.

One important area I haven't addressed is networking capacity. Many of these programs have network versions that add amazing levels of work group effectiveness. Only a few of COMPUTE's home and small-business readers, however, use networks—so far.

If you're ready to tackle that unorganized, frustrating mass of unrelated yet desperately important details we call personal information, one of these programs is likely to be a good match for your needs. Test Lab has the information to help you find it.

RICHARD O. MANN



ACT! for Windows 1.1—\$395
1stACT! for Windows—\$149

SYMANTEC
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(800) 441-7234
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ACT! FOR WINDOWS 1.1

ACT! for Windows 1.1 is nominally a contact manager, not a PIM. It has, however, all the necessary features to function as a PIM, even though its core, its reason for being, is contact management. We review it here because it's a perfectly good PIM that's an excellent choice for someone with heavier-than-normal contact management needs.

ACT!, of course, is the longtime best-selling contact manager for DOS. The company applied its marketing mastery to the Windows version, taking several years to develop it. You may have heard that it was painfully slow and had many bugs when it was first released last year. Version 1.1 has corrected all that, resulting in a relatively bug-free program that runs at an acceptable speed.

ACT!'s basic contact record has more than 70 fields laid out in a logical two-screen spread. In addition to the normal information, it provides fields for results of the last sales call, the scheduled date for the next call, and similar sales-related information. Any or all of the fields can be redefined, renamed, and moved. There's a wealth of flexible information storage capacity at your fingertips.

Filling in fields is almost fun. Common choices for many fields are available in pull-down list boxes, but ACT! also moves through the list to the closest match as you type in the field. Often two or three letters are all you need to fill in a field quickly.

Appointment scheduling and to-do list processing are not as deep or flexible as in some of the other high-powered PIMs, but they're good enough to handle most normal needs.

As part of its contact management features, ACT! provides a useful set of letter templates and word-processing functions,

though it also comes with automatic DDE links to the primary Windows word processors.

A feature unique to this program is its link to the HP95LX palmtop computer. A special version of ACT! for the HP95 comes with automatic links to the desktop versions of ACT! so you can quickly and easily exchange data between computers. If you use a laptop or notebook computer, ACT! can merge the data in both your laptop and desktop computers so that all data is in both databases.

ACT! is really a whole family of products, including 1stACT!—a streamlined, limited-feature version that could be adequate for many users. There's a 1stACT! version for DOS and another for Windows. The program limits you to one database, prints only five preformatted reports, and cannot send faxes directly, but it retains the full set of 70 fully user-definable fields.

ACT! for Windows 1.1 is an excellent choice if you happen to be interested primarily in tracking discrete bits of information on many contacts and don't have an extremely complex schedule or to-do list.

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MAPLIX FOR WINDOWS

A fascinating add-in for ACT! for Windows is MapLinx for Windows, a database of maps with 23,000 U.S. city names and all the ZIP codes. It reads your ACT! database and shows the locations of your contacts on a series of maps which can be printed or exported to other Windows programs.

For more information about MapLinx for Windows (\$399.95), write to MapLinx, 5068 West Plano Parkway, Plano, Texas 75093. Or call (800) 352-3414.

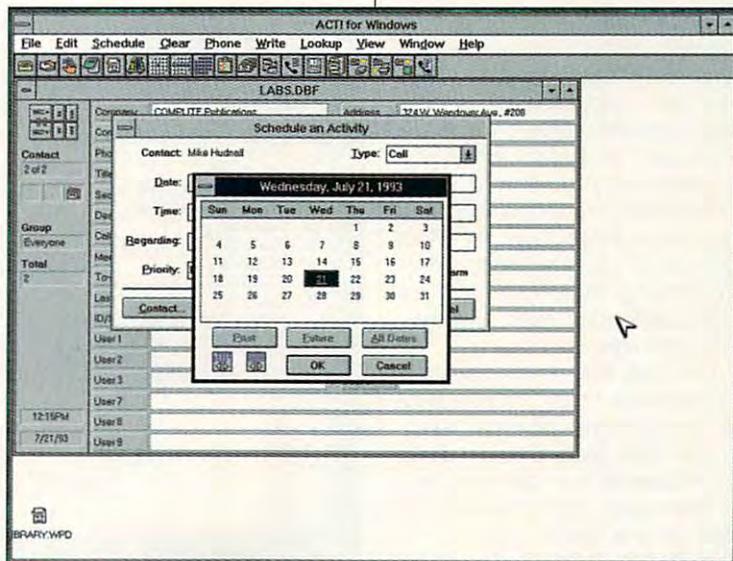
—RICHARD O. MANN

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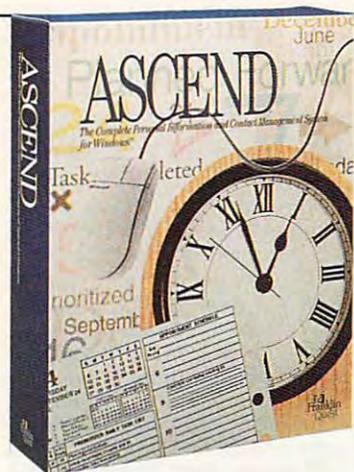
ASCEND 4.0

Ascend, like Sharkware, is designed around a specialized management philosophy. It's an electronic implementation of the Franklin Day Planner, the million-selling time management tool used by people trained in Franklin Quest seminars. If you're a Day Planner user, you'll love Ascend. If not, you'll want to buy the version that comes with a copy of the paper planner and the four-hour audiocassette seminar that teaches the system.

The Franklin system starts with



TEST LAB



your values and goals and shows you how to select daily activities leading to your longer-term goals. For those willing to undertake this thoughtful evaluation of their lives, this is powerful stuff indeed.

While Ascend's screens don't try to look like the paper book (the way Organizer does), the 12 basic functions of Ascend mimic the 12 primary parts of the Day Planner. The Prioritized Daily Task List is the base of daily operations; it's a to-do list with priorities in letter-number pairs such as A1 and B4. (Hard-core time managers insist on precision in priority rankings.)

The Appointments window handles daily scheduling nicely, including provisions for recurring events. You can drag and drop appointments and to-do items between lists and link them to a person's contact history. The daily, weekly, and monthly views take every opportunity to present your committed time graphically.

Almost all basic records—appointments, to-do activities, and so forth—have unlimited free-form note fields built in. Most note fields provide basic word-processing features, such as fonts, justification, italic, and even date and time stamps.

The Daily Record of Events is a journallike listing of whatever comes up during the day. You enter the data, recording details of commitments you make as well as information you receive. It's all kept on that day's page and is available to you through Global

**Ascend 4.0—\$199.00 (software only), \$299.00 (full package, including Day Planner and taped seminar)
Values Quest—\$49.95**

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Search at any time.

Other features include Turbo File (a minidatabase for organizing small bits of loose information), a phone log, the Master Task List (for storing tasks without specific deadlines), a database of motivational quotes, a separate personal journal, and the Red Tabs section, which mimics the Day Planner's numbered red tabs for keeping pages of related information on topics of your choice.

Underlying it all is the values pyramid, a four-level compendium of your basic values, long-term and intermediate goals, and daily tasks. Here you build down from what you'd like to accomplish through the steps it'll take to get there. Include the daily steps in your to-do items, and you may achieve your goals more quickly

than you thought possible. Values Quest, an add-on program priced at around \$50.00, provides extra guidance in setting up your pyramid.

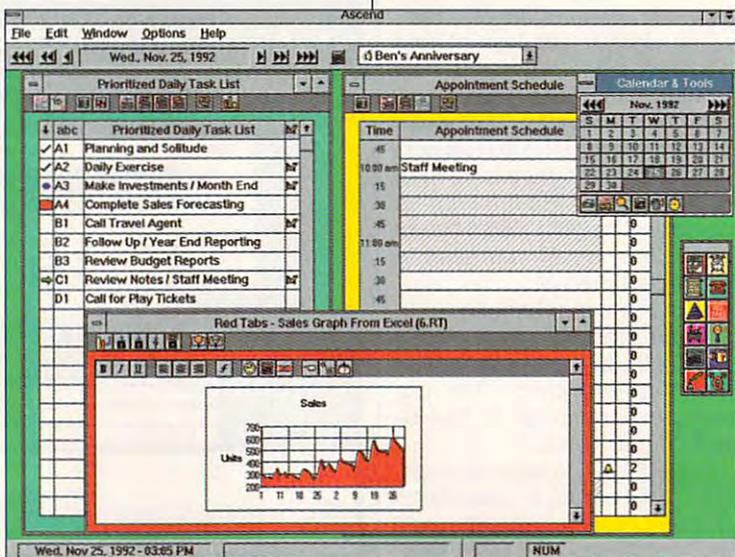
Ascend prints pages in Franklin format for use in Franklin binders, another reminder that the program is aimed directly at Franklin users. But, like the Day Planner itself, Ascend can be useful to anyone; it's just at its finest when used with the full Franklin philosophy.

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COMMENCE 2.0

Commence 2.0 has a distinguished history. The developer, Jensen-Jones, sold the marketing rights to IBM, which sold the product as Current 1.0. Current was OK, but it suffered from IBM's lack of savvy regarding the style of the PC software market. The manuals were stuffy and hard to use, and the program wasn't particularly friendly.

When Jensen-Jones reacquired the rights to Current, it reworked the program, named it Commence 1.0, outfitted it with decent manuals, and started to market it intelligently—with much more success than IBM. The new Commence 2.0 adds maturity



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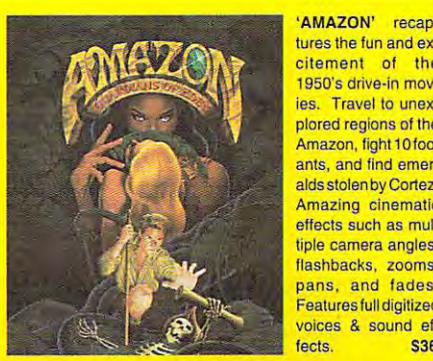
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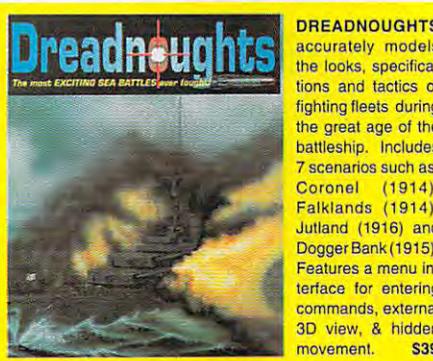
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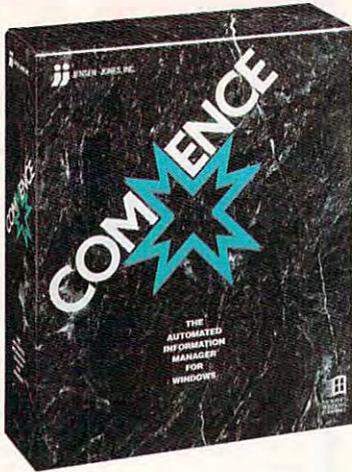
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and refinement to an already capable PIM.

Comence exhibits remarkable power. Its agent technology uses supercharged macros that launch themselves whenever predefined conditions occur—not just at a preset time. For instance, you can tell Comence to automatically print out your to-do activities and appointments for the days you'll be gone the evening before each of your trips.

It's highly customizable—you can create entire applications with custom databases, custom links, and agents. Version 2.0 adds an extremely versatile set of networking tools that can make Comence an officewide source of shared information and integrated personal management tools.

Best of all, however, is the interface, which is logical, intuitive, and pleasantly easy to learn. Menus for the powerful features (such as agents) remain out of your way until you want them, while buttons for the routine features (such as calendar, to-do lists, and phone dialer) are right up front where you can't miss them. Comence feels natural; things work the way you expect them to.

The linking system of Comence is also visible and understandable. As you set up tasks, address book items, projects, appointments, and other basic data records, the dialog box shows the possible links, each in a list box of its own. Links include

Comence 2.0—\$395

JENSEN-JONES
Parkway 109 Office Center
328 Newman Springs Rd.
Red Bank, NJ 07701
(908) 530-4666

Relates to Project, Assigned to To-Do Item, Relates to Note, and many more, with only appropriate links offered for the type of record being added. Thanks to these dialog boxes, you can use the PIM more effectively.

I find Comence remarkably well balanced. PIMs often have one module that serves as the base, around which all else revolves. You can't pick out such a base in Comence; all the functions seem equal. Comence has no ax to grind, no vaunted system of personal management you must learn. It's a neutral tool that you can customize to emphasize your style.

This PIM contains a number of pleasant extra features, including conference room scheduling (including display of floor plans and seating arrangements), expense reports, time-tracking and billing reports, and simple Gantt charts.

Drawbacks and weaknesses

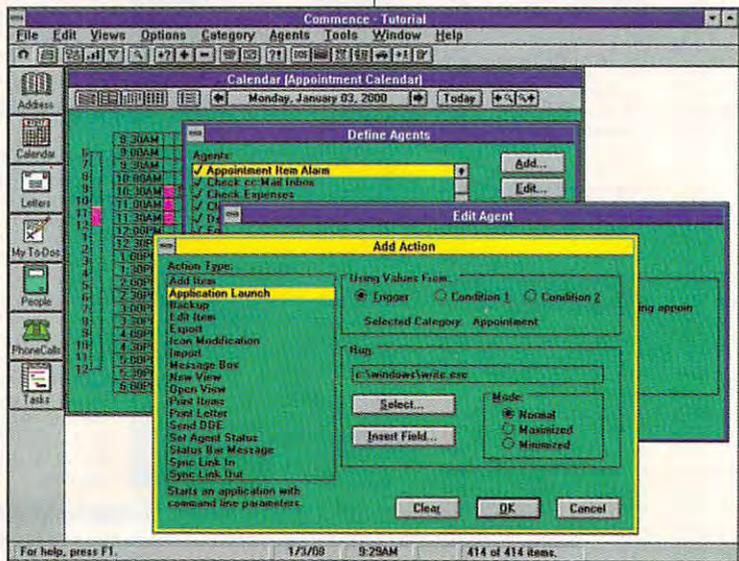
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are few. Task priorities are limited to a paltry 1 through 3. Version 2.0's manuals are a little awkward because the company didn't rewrite them from scratch. There's a new manual with version 2.0 changes. Look there first; if your topic isn't there, use the version 1.0 manual.

Comence is ideal for someone who needs to get to work quickly but may eventually need to create complex PIM applications. It's flexible and powerful, yet easy to learn and use at its uncustomized, basic level.

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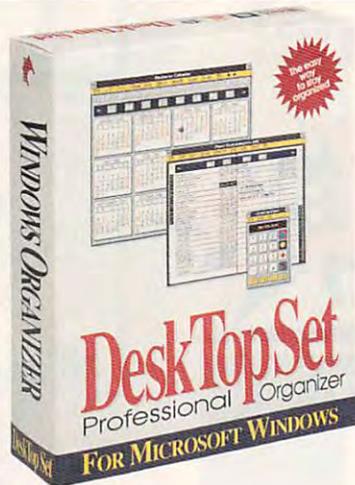


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Appointment Calendar for Windows is also available at participating retailers nationwide.

TEST LAB



DESKTOP SET 4.0

Of all the PIMs examined in this month's Test Lab, DeskTop Set 4.0 from Okna has the most powerful phone management system, accompanied by a first-class calendar and scheduling module and a printing calculator that allows you to put words on its tape along with the numbers. Written for mouse lovers, this program lets you do a surprising amount of work without ever touching the keyboard.

The phone management features are so remarkable that it takes some effort to shift your attention to other matters. Phone functions start with the address book, which offers unusual depth, with eight phone numbers per name, a window for business information and another for home data, and 32 blank fields for you to define.

The dialer function in this PIM provides 21 push buttons for your most frequently dialed numbers. The dialer can handle international codes, long-distance service codes, credit card calls, and least-cost routing. If you have Caller ID service in your area, DeskTop Set displays the caller's personal information as you answer the call. Also, it creates phone logs of incoming and outgoing calls. Clearly, this personal information manager is a phone enthusiast's dream.

Each name in the phone book

DeskTop Set 4.0—\$195

OKNA

12 Rte. 17 N, Ste. 212
Paramus, NJ 07652
(201) 909-8600

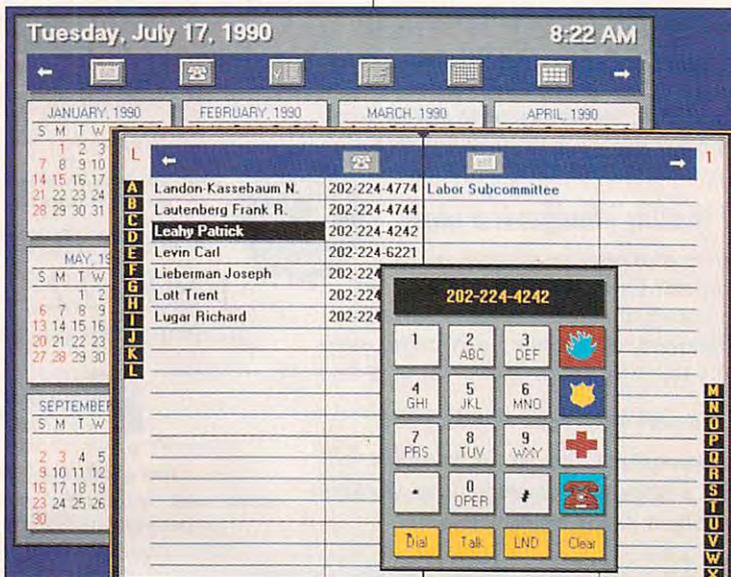
can have an unlimited number of notes attached (up to 16K each), along with linked reminders, follow-up tasks, links to events, and even links to files in other applications that you can launch on the spot. Most of these functions reside in separate windows, so ferreting out all your information on a person is a multistep process. PIM users concentrating on industrial-strength contact management may find the constant window diving tedious.

Scheduling of time-related events is just plain fun, as you can often do it entirely without the keyboard. An ingenious event window lets you click on a clock face to show time or paint a range on a time scale to show beginning, ending, and duration times. From a list of common task descriptions you've created (dentist appointment, weekly staff meeting, tennis at the club), you can select the task title by mouse.

In addition, you can set up any number of separately named to-do lists which are not time related. These tasks carry priorities and deadlines, and you can move or copy the tasks to your daily to-do list as appropriate. Priorities run 1 through 10 only.

DeskTop Set has an excellent icon-driven backup and restore function, which not only writes the data files to disk but compresses them as it goes. It also merges data from a second computer's set of files (for users of laptop computers).

DeskTop Set makes thorough use of the Windows interface. You can drag and drop many objects in order to copy, move, or link them into other modules. The right mouse button pulls up a floating, context-sensitive menu of appropriate function choices. By pushing to the limit, however, it does things with the mouse that are decidedly nonstandard in the Windows world. They make sense, but they can be disconcerting when you're not expecting them. In order to save desktop space, DeskTop Set uses smaller-than-normal fonts throughout and makes many windows nonsizable. This may be an advantage,





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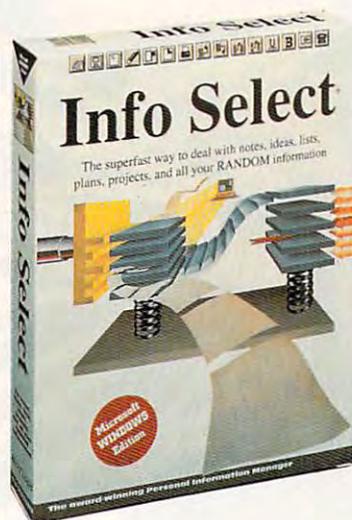


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TEST LAB



but for me, using 800 x 600 resolution, things were a bit too small for comfort.

DeskTop Set is a finely crafted, powerful tool for tracking phone activity, contacts, and daily scheduling, containing hundreds of subtle little touches of elegance that are delightful to discover. If your PIM needs run heavily to phone work, this is the program for you.

Circle Reader Service Number 374

INFO SELECT FOR WINDOWS

Although Info Select for Windows lacks many of the features of the structured PIMs found in this Test Lab, it's the only thoroughly personal manager of information in the bunch.

That's because Info Select is almost totally free-form—if you want it to be. You can add any structure you desire, however—as much as suits your style. It's the most versatile, adaptable tool you're ever likely to see.

Think of it as electronic stacks of paper. You can put absolutely anything you can type on paper (but not Windows graphics) into any stack. Once it's there, Info Select can instantly retrieve any piece of paper (each in its own window) by searching in a variety of clever ways.

Info Select for Windows—\$149.95

MICROLOGIC
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(800) 342-5930
(201) 342-6518

That's the totally free-form style. A more structured alternative involves using forms—windows with a data structure predefined, rather like paper forms. Info Select provides 19 ready-made forms, including address book entries, phone messages, fax covers, to-do lists, order forms, purchase orders, and so forth. It's a snap to design your own forms as well, including automatic features such as time and date stamps and sequential form numbering.

With any stack, searching for individual windows of information is a snap. You can search for text matches using *and*, *or*, and the equivalent of *not*. A "neural" search checks for a list of words, returning a stack of windows with the most matches through the least matches. Date searches are easy, as are size searches based on the number of characters in the window.

If you've built your stack in database format, each window has a data marker field, which al-

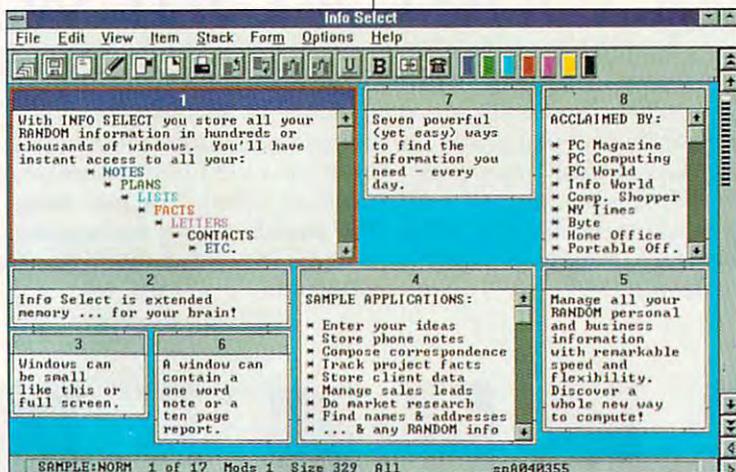
lows you to sort them—a good choice for an address book stack, for instance. Mail merge is available, as is an autodialer function.

While Info Select is the very essence of flexibility, it doesn't provide all the necessary functions of other PIMs. When possible, Info Select provides an equivalent function (such as the address book described above), but some functions are either missing or only partially covered.

Take daily scheduling of appointments, for example. Info Select's tickler system works with any window containing two asterisks followed by a date. Activating the tickler searches these windows, showing you a stack of all items with today's date or earlier. This works, but it's a far cry from a standard PIM's daily schedule view and alternative week-, month-, and year-at-a-glance views. In addition, most PIMs also let you link appointments with contact records, notes, or other information.

If you deal in free-form data that you'd love to be able to access instantly, Info Select is a dream come true. If you need a more formally organized tool, you might want to use Info Select on the side. Having all that loose, random data instantly at your fingertips is a powerful feeling.

Circle Reader Service Number 375



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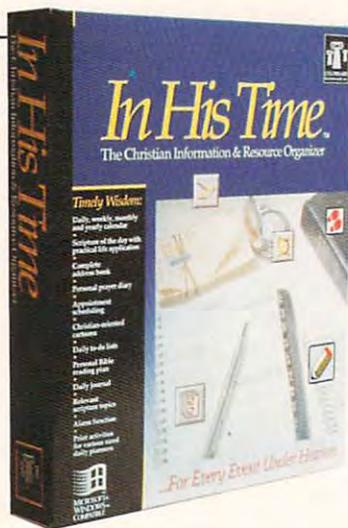
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TEST LAB



IN HIS TIME

For Christians who would like their PIMs to help organize the spiritual aspects of their lives as well as the daily grind of work, In His Time: The Christian Information & Resource Organizer is a, well, godsend. It brings management of prayers, Bible study, personal journals, and spiritual meditation under the PIM's umbrella. While it doesn't try to match the most complex PIMs feature for feature, it's a highly polished program that shows capable professional programming throughout.

In His Time is in the same general class as Lotus Organizer; it's simple and easy to learn, and it doesn't aim for the top of the market. Its basic metaphor is a small notebook with side tabs for changing sections.

Its address book covers the basics nicely, capturing home and business addresses, four phone numbers, and spouse's name, along with a 1000-character free-form note field. It doesn't, however, link to events or to-do items or dial phone numbers. It prints the address book (and other information) in all the popular organizer book sizes.

Appointment scheduling and to-do lists are similarly uncomplicated. You can schedule recurring items or normal appointments. A check box posts an appointment to your prayer list. The Events to Remember page reminds you of

In His Time—\$79.95

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important upcoming dates.

To-do item processing is similar. Priority choices are low, medium, high, and critical, numbered 1 through 4 in most screens. A Master To-Do List box sets up recurring tasks. Both to-do items and appointments have 1000-character scrolling note fields.

In addition to the normal printing options, In His Time also prints an elegant two-sided, single-page report that includes a monthly calendar, daily to-do items and appointments, your prayer list, events to remember, a daily devotional thought, and your scheduled Bible reading. Similar to OnTime for Windows' wonderful three-fold report, this single page is all you need to carry to organize your day.

Each day's calendar page presents a scripture from a variety of Bible translations. The Walk with Wisdom button pulls up a paragraph of commentary on the scrip-

ture. (Additional daily devotional topics are available separately.)

The Bible Reading plan lets you pick portions of the Bible to read this year, then creates a plan with specific chapters and verses for each day.

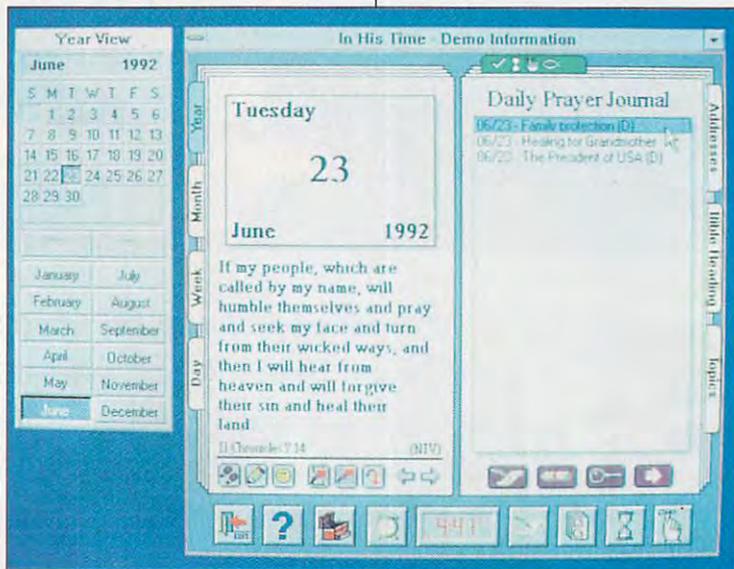
The Daily Prayer Journal tracks your prayer requests, reminding you of items you want to pray about daily or weekly. Your appointments, to-do items, and upcoming events can also be posted to the Daily Prayer Journal. When the prayers are answered, you record the details in the Praise Report section.

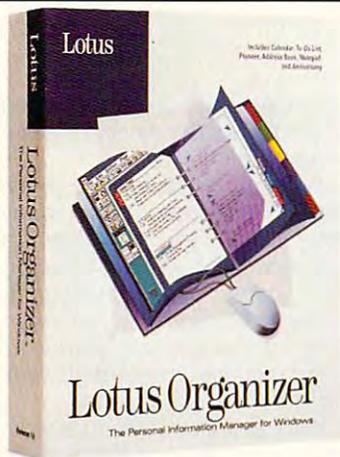
A Topics section lists dozens of spiritual topics. Highlight one, and a half-dozen or so Bible references will appear. If you have a Windows Bible program, you can call up the Bible text through a DDE link. If not, you'll have to read it from the Good Book itself. You can personalize this section by editing topics and adding new ones.

The Make a Joyful Noise section provides an appropriate daily Christian cartoon, and you can create a daily journal by linking to any word processor.

In His Time is a rich environment for managing your spiritual life along with your daily activities.

Circle Reader Service Number 376





LOTUS ORGANIZER

It had to happen. With Windows' graphic capabilities, someone was certain to give us a PIM in the form of an onscreen pocket notebook. Lotus Organizer does it brilliantly, delivering a fully realized low-end PIM in a virtual notebook that's complete down to the six rings in the middle and colored tabs down the side. And, best of all, it works.

The notebook has tabs for six sections: calendar, to-do, address, notepad, planner, and anniversary.

The calendar pages spread a week over two facing pages. Adding an appointment is great fun, using a clever mouse-dragged

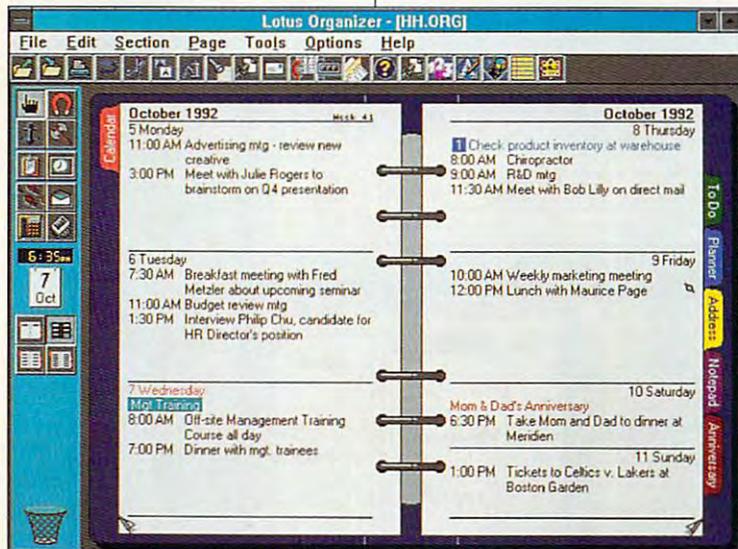
Lotus Organizer—\$149

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pair of tiny clocks to mark the beginning and end of the appointment. It's the most effective, quickest way to set times that I've found in any PIM yet.

Instead of a number of daily to-do lists, Organizer has one list arranged chronologically by due date. Priorities are limited to 1 through 3 only. Lengthy notes for to-do items and appointments involve linking to the notepad section. Create a link by clicking on an anchor icon on the source and again on the target. Once the link is created, click on the little link symbol to see what's available, and then move to the linked item. It's not as easy as having note fields or windows for each item, as many PIMs do.

You can, however, build more extensive links. Organizer can link any item to another application and file, including non-Windows applications. For instance, if you plan to write a letter to the



ECCO PROFESSIONAL

Arabesque Software's hot new personal information manager, ECCO Professional, shipped too late to make our deadlines. We can, however, give you some brief information about it in this sidebar.

ECCO works in outlines, with each basic piece of information as an outline element. A normal to-do list might include "Finish painting the garage." That's the first-level outline entry. Under it, you can lay out the remaining steps, such as "Buy the paint," "Strip the old paint," and whatever else may be involved. Through linking, you can also show "Buy the paint" on your shopping list. Under that entry, you could add your notes on the color, the amount needed, and even a map of how to get to the store. These indented outline elements would show in both outlines.

Outline items can be collapsed, expanded, moved, copied, or indented. Drag a name from the phone book to a time slot in the calendar, and ECCO creates a meeting. You can link items in any way imaginable; linked items show up in all outlines that they've been linked to.

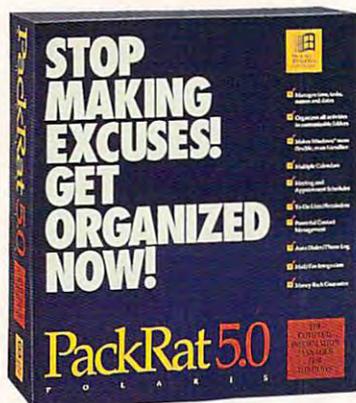
Once you get the hang of outlines, you can move them into folders, which group related items. You might have folders for projects, coworkers, and so forth. With nested folders, you can organize your work in virtually any way your mind can conceive.

ECCO presents a new metaphor—the outline—in a fully developed, extremely useful program that's endlessly customizable. And surprisingly, it's easy to learn. If you find quick outlines helpful in organizing your thinking, you'll fall in love with ECCO at first sight.

ECCO Professional retails for \$395, although the company is offering a \$99 introductory price "while supplies last." Call Arabesque Software at (206) 869-9600, or write the company at 2340 130th Avenue NE, Bellevue, Washington 98005.

—RICHARD O. MANN

TEST LAB



PackRat 5.0—\$395

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 San Diego, CA 92127
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 (619) 592-7400

don't have dozens of appointments and meetings a day—all of which could overwhelm the information presentation abilities of Organizer—then Organizer is an excellent choice.

Circle Reader Service Number 377

PACKRAT 5.0

PackRat 5.0 is more than a PIM; it's practically an entire operating environment. Among its many functions are desktops that include not only PackRat objects but icons to run other applications, even DOS apps.

PackRat's metaphor is file folders. Each file folder—you can have as many as you want—has a tab on top; all you have to do is to click on the top to change folders. Each folder is a desktop unto itself, containing a selection of PackRat objects, icons for other applications, and OLE client objects (parts of files from other

programs open on your desktop in PackRat without running the other applications).

PackRat objects include all the normal PIM functions and many more. Each of the 30 objects is a mini application window, including such functions as clock, commitments chart, list viewers, calendar, to-do list, day or month view, document manager, memo pad, spelling checker, and so forth.

With all these tools available, you can create a desktop folder with everything needed to work on a certain project, including your spreadsheets and word-processing documents, without ever leaving PackRat. Third-party objects for PackRat are in the works, such as MapLinx demographic data and MasterSoft file viewers and converters.

All of this customizability, if presented with blank folders, could be overwhelming. PackRat's SmartStart function lays out a set of standard folders for 11 typical occupations, including sales/marketing, legal, medical, and real estate. Pick the one that comes closest to your occupation, and PackRat will give you a good starting point.

This new version of PackRat uses all the latest interface innova-

editor of COMPUTE next week, you can link Clifton Karnes's address record and a to-do item dated next week to your word processor, assigning a filename for the letter. Then, from either place, clicking on the link symbol would run the word processor and open that file.

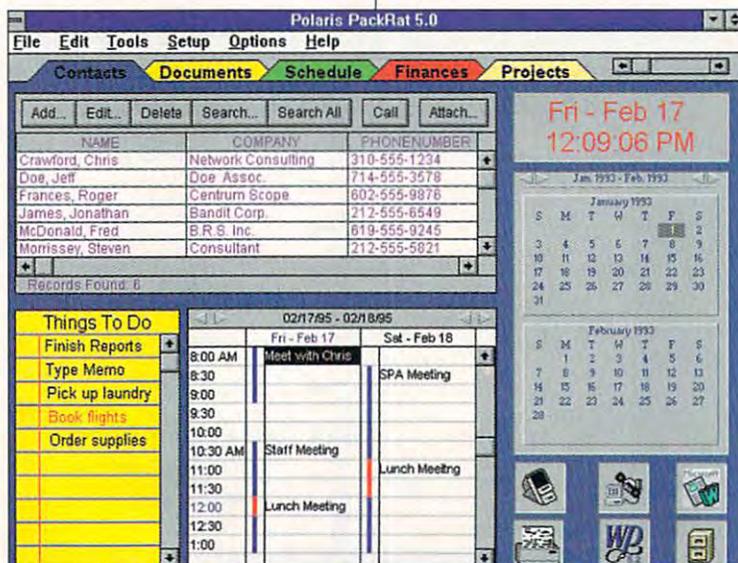
The address book presents a small page per entry with three user-defined fields, two phone numbers, and an unlimited text note field. You can change the display to show as many as six abbreviated entries per page.

Notepad keeps any kind of text you wish. Each note has a title, which is used to create a table of contents. Many of your notes, of course, will be linked to other parts of the program.

The planner section comes on a clever foldout page that shows a year at a time. On this long-range planner, you can mark out 15 different time spans for things such as vacations and major projects.

Finally, the anniversary section tracks recurring dates of importance, such as birthdays and anniversaries.

Organizer isn't meant to compete with the full-scale PIMs. By limiting its scope, Lotus made Organizer so easy to learn and use that you'll be up and running within a half hour. If you don't plan to keep thousands of address records, don't need to shuffle dozens of tasks a day, and



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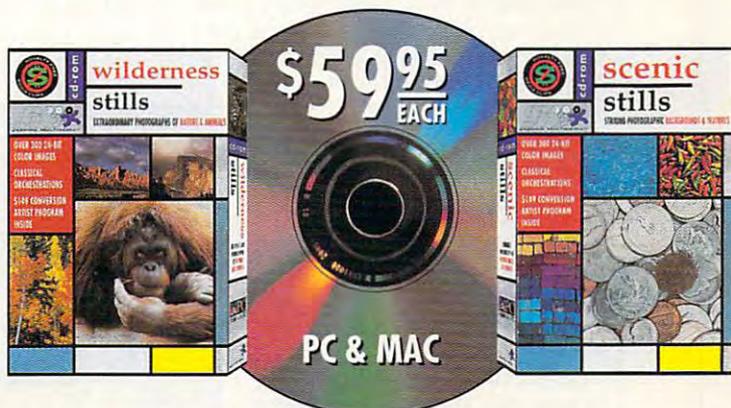
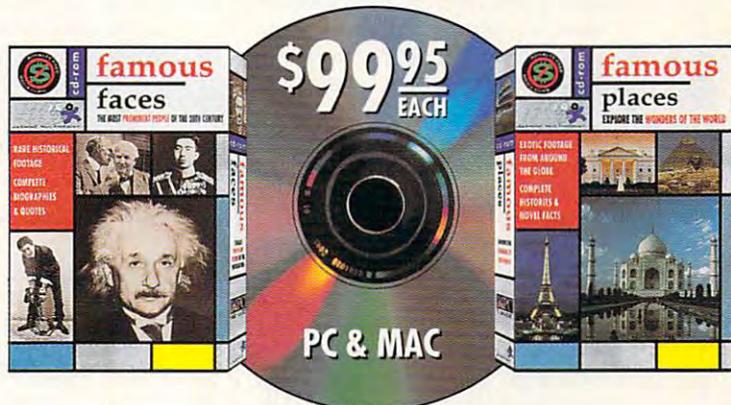
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TEST LAB



tions, including tabbed pages (folders), drag-and-drop object movement and linking whenever possible, and right-button clicking for floating custom menus that relate to the object in question.

Unusual features of PackRat include financial journals, which are essentially check registers for financial accounts with reconciliation routines built in; the document manager, which maintains an annotated database of documents that you can launch at any time; a full macro programming language; and a project manager complete with Gantt charts. (Unfortunately, the project manager and two other objects did not ship with the initial copies of PackRat; they're promised within a few weeks.)

It's safe to assume that PackRat can handle any normal PIM function, though perhaps not always as quickly and directly as in some of the simpler PIMs. With its incredible power comes complexity, which occasionally gets in the way of otherwise simple things. All that power makes it slower than its simpler competitors as well. It's easy to become impatient as you wait for PackRat to load, switch folders, or pull up dialog boxes.

You also might get the impression that Polaris wasn't quite finished with PackRat when it was shipped. A 92-page supplemental manual documents changes and additions after the main manual went to press, and a long

Sharkware—\$129.95

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README file covers changes to the supplemental manual. Combined with the missing objects mentioned above, it makes you wonder if too much emphasis was placed on shipping the same week as two major new competitors and an upgrade of another.

Nevertheless, there is no question that PackRat is the most powerful, most feature-rich general PIM available and that its new move into desktop management through folders takes it a step ahead of the field.

Circle Reader Service Number 378

SHARKWARE

In his three best-selling books, beginning with *How to Swim with the Sharks Without Being Eaten Alive*, Harvey Mackay shares his secrets of success. He says that it's not what you know or even whom you know that leads to suc-

cess, but what you know about whom you know. In short, contacts and networking are everything.

Working with Mackay, Cognitech has created a powerhouse PIM called Sharkware. It automates Mackay's system, down to the smallest details, and even includes an audiotape to build enthusiasm for the system. It's not just a PIM; it's a way of life.

Even if you don't want to adopt the entire Mackay methodology, Sharkware can still be a fine PIM choice. It handles all normal PIM tasks, including linking between contacts, appointments, and to-do items; keeping phone logs and contact histories; and attaching unlimited free-form notes to almost anything. Then it goes on to give you an arsenal of unique Mackay-designed custom tools.

Take the Mackay profiles. The Mackay 5 are general principles of success. The Mackay 66 are detailed questions that capture essential contact information. Additional questionnaires help you analyze your employees, understand your competitors, and evaluate potential employers. The Mackay system teaches you to use all this information effectively in networking and understand-



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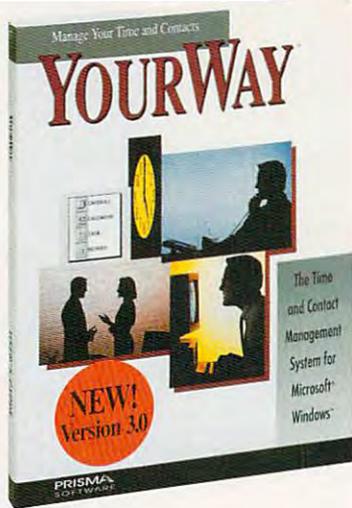


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TEST LAB



ing people. It's powerful stuff.

Then there's the contact database. The predefined screens capture the traditional information, including four phone numbers and as many addresses as you might have (you can include vacation homes and so forth). Moving to the custom fields screen, you find fields for family information and customer profiles. That's over 60 fields already, but you can define up to 10 million additional field sets with up to a thousand fields in each. And there's no limit to the number of contacts.

Sharkware, then, is a potentially massive personalized custom database for your contacts. It can quickly set you up to track virtually any specific data sets you can imagine—with the only practical limits being hard disk space and your willingness to enter all the information.

The screens are always full of information, but it's organized well enough to keep it from being overwhelming. While Sharkware is no pushover to learn, it's not unduly challenging, either. Again, the organization makes sense; it doesn't often leave you wondering how to do something.

As with almost any first version, there's plenty of room for improvement and refinement in Sharkware. While the interface is generally good, it could be streamlined in a dozen places with logical shortcuts, such as typing the first few

YourWay 3.0—\$99

PRISMA SOFTWARE
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letters of a field and having potential matches pop up. In this version, getting to the right contact or the right choice in a list box often seems cumbrously slow. I also expect to see redialing, a way to set recurring events, and more than three to-do priority levels in subsequent versions.

Sharkware is a power-hungry, RAM-eating beast. On a 486/25 computer with 4MB of RAM, it's noticeably slow, and it seems to be constantly accessing the Windows swap file. The minimum RAM requirement is 4MB, but 8MB is recommended, with good cause.

If you have the hardware to run it and want to benefit from the accumulated wisdom of the Mackay method, you'll find Sharkware to be an intensely powerful, laserlike tool for your quest to success.

Circle Reader Service Number 379

YOURWAY 3.0

If you tried YourWay in an earlier version and didn't like it, come back for another look. Virtually a new product, YourWay now offers additional PIM features that make it worth a look, and the price is right at \$99.

YourWay's heart is a visually presented card file. You navigate the fanned-out deck of cards with alphabetical tabs or by searching for a specific text string. The program comes with a preformatted simple address and phone file, but you can quickly set up a contact database using whatever fields you like. Each card file database is a separate file, so you can have as many card files as you want—but you can work on only one at a time.

Each card holds as many as 50 fields of information. Unlike most address book functions, however, these fields have no types—you can put any data in any field. Each card has an external note attached, holding up to 10,000 characters of free-form data. Linking from cards to events or phone logs is easy, but it only works with the card on top of the deck.

Daily calendaring and to-do list handling are together on a calendar-page screen that shows daily events, daily tasks, master tasks, and daily calls. Items on the two task lists show priorities with a letter (A-C) and number (1-6) combination. A daily task is one you plan to finish the day you record it; a master task will stretch over many days.

Each task, event, or call has a dialog box that includes a scrollable note field for free-form notes. Tasks also have fields for categories, due dates, and persons assigned to the tasks, as well as a timer for tracking elapsed time on the task.

Appointment scheduling is weak. The small daily events section shows up to nine lines and a scroll bar. You can't see the whole day's schedule at once. The week-at-a-glance and month-at-a-glance screens show either summary info (two daily tasks, one daily call) or the first couple of words of each entry for the day. Neither is particularly informative. To get a truly useful display of your daily information, you need to print it in one of the many organizer book formats available.

The reporting module is innovative and interesting; clicking on the Reports icon pulls up a blank spreadsheet. YourWay provides four basic reports: Card and Note reports (generated from card file information), as well as Free Event Time and Activity reports (generated from the events, calls, and task lists). Calling up any of these reports pops up a dialog box where you pick



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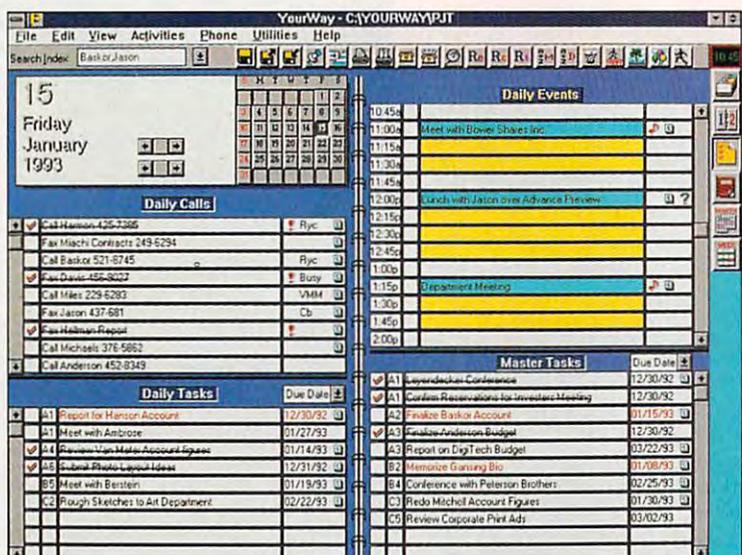
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TEST LAB



the various report elements. The time- and task-related reports are unimpressive, but the card-based reports give you a lot of flexibility in reporting on your basic database information.

YourWay really shines at data import; you can lay out your card file with fields in the same order as the source data.

YourWay is best suited for database-related work, whether it be your address book or other personal data that lends itself to a card file metaphor. If you're looking for ease of use, power enough to handle future growth, and flexibility in data handling, YourWay is a natural for you—and the price is easy to take, too.

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CALENDAR SOFTWARE

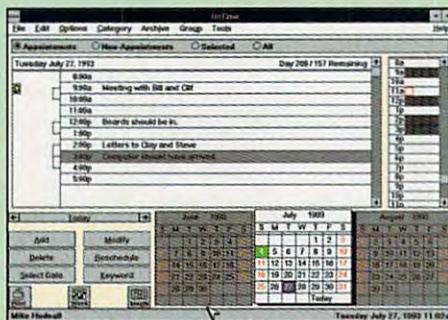
If you don't need all the features of the Windows personal information managers covered in this month's Test Lab, maybe a good calendar program is what you need instead. Here are two.

ONTIME

Is your desk buried in scraps of paper reminding you of appointments, messages, and assignments? OnTime, a calendar program available in both Windows and DOS versions, can help you organize that clutter into a comprehensive calendar.

OnTime is a combination appointment book, to-do list, pocket secretary, desktop planner, and alarm clock. It can display your schedule by the day, week, or month and can maintain your calendar to the year 2079. The program will also alert you to conflicting appointments as you schedule them.

One of OnTime's most useful options is its print capability. On one sheet of paper, OnTime can print your itinerary for the day, week, and month that you specify; your to-do list; and a list of important dates such as birthdays and anniversaries. When you fold the print-out in thirds, it becomes a brochure of your personal schedule.



CALENDAR CREATOR PLUS

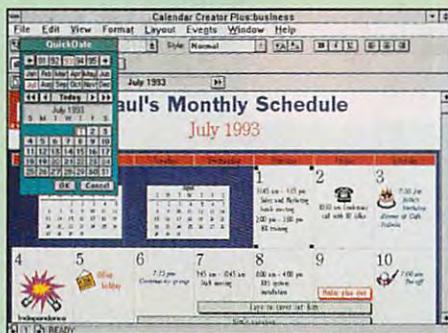
Even with the multitude of calendars on the market, it's still difficult to find one that's exactly what you need. Spinnaker Software's Calendar Creator Plus, in both Windows and DOS versions, lets you design your own.

Both versions give you a wide range of design options, including control over calendar format, font selection, print colors, and paper size and orientation. You can also include scalable clip art in or around the calendar. While both versions give you the flexibility of using scalable fonts, the Windows version lets you use any of your TrueType or Type 1 fonts.

Calendar Creator Plus for Windows has a few more features than its DOS counterpart. It comes with the PowerAlbum, an electronic clip art book with nearly 300 images in nine categories. Events lists for national and international holidays and famous birthdays are also included with the Windows version. Versions 1.0 for Windows (\$79.95) and 5.0 for DOS (\$69.95) are available from Spinnaker Software, 201 Broadway, Cambridge, Massachusetts 02193; (617) 494-1200.

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—PHILLIP MORGAN and LISA YOUNG



The Windows version 1.5 of OnTime lists for \$129.95, while the DOS version 2.5 is \$69.95. For more information about the product, contact Campbell Services at 21700 Northwestern Highway, Suite 1070, Southfield, Michigan 48075; (800) 345-6747.

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Proven acceptance in business, industry, and government.

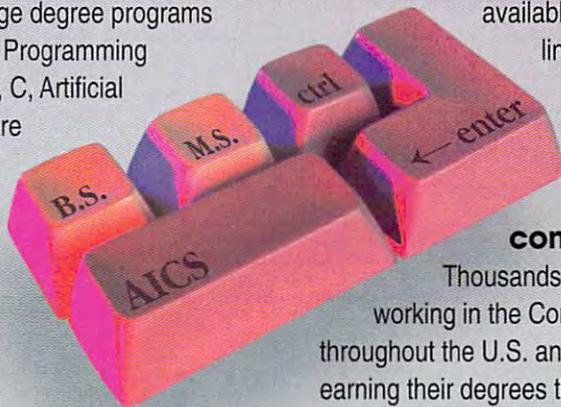
Many leading corporations have approved the AICS program for their employees. More than 75 employers have paid the tuition for their employees, including a number of Fortune 500 companies and government agencies.

AICS lowers the cost of a college degree without lowering the standards.

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TEST LAB

Windows PIM Features				
	ACT! for Windows 1.1	Ascend 4.0	Commence 2.0	DeskTop Set 4.0
General				
RAM required	4MB	2MB	3MB	2MB
Hard disk space—fully installed	3MB	2MB	6MB	3MB
Uninstall feature	no	yes	described in manual	no
DDE/OLE	yes/no	yes/yes	yes/no	yes/no
Macros supported	yes	yes	yes	no
Telephone/Address Book/Contact Management				
Autodial/redial	yes/yes	yes/yes	yes/no	yes/yes
Links phone log with contact file	yes	yes	yes	yes
Automatic follow-up reminders	no	yes	yes	yes
Customizes field names	yes	no	yes	yes
Maximum fields per record	70	33	50	72
Maximum characters per note field	unlimited	unlimited	30,000	16,000
String search of note fields	yes	yes	yes	no
Phone numbers per entry	5	5	customizable	8
Maximum number of records	unlimited	unlimited	16,000	unlimited
Calendar/Time Management				
Schedules recurring events	yes	yes	yes	yes
Warns of schedule conflicts	yes	yes	yes	yes (visually)
Snooze alarm	yes	yes	yes	yes
Can change time increments	yes	no	yes	yes
Drag-and-drop schedule items	yes	yes	yes	yes
User can include entries from other modules	no	yes	yes	yes
To-Do Lists/Task Management				
Sorts lists by priority	yes	yes	yes	yes
Attaches notes to tasks	no	yes	yes	yes
Assigns tasks to others	no	no	yes	no
Task alarm	yes	no	yes (via agents)	yes
Rolls uncompleted tasks forward	yes	no	yes (via agents)	yes
Printing				
Prints labels/envelopes	yes/yes	yes/yes	yes/yes	yes/yes
Reduced sizes for DayTimer, Franklin, and so on	no	yes	yes	yes
User-defined reports	yes	yes	yes	yes
Word Processing				
Form letters	yes	no	yes	yes
Full access to Windows fonts	yes	yes	no	yes
Letter templates	yes	no	yes	no
Spelling checker/thesaurus	yes/yes	no/no	yes/no	no/no
Uses name/add. with Windows word processors	no	yes	yes	yes
Import/Export				
Import formats	DBF, TXT, RTF, PackRat, Maximizer, Lotus Organizer	ASCII	ASCII, DIF, dBASE	ASCII (CSV), Windows Cardfile
Export formats	DBF, TXT	ASCII	ASCII, DIF, dBASE	ASCII (CSV)

Windows PIM Features

Info Select for Windows	In His Time	Lotus Organizer	PackRat 5.0	Sharkware	YourWay 3.0
2MB	2MB	2MB	2MB	4MB	2MB
750K	4.8MB	3MB	8MB	7MB	1.5MB
no	no	no	no	no	no
no/no	yes/no	yes/no	yes/yes	yes/no	yes/no
no	no	no	yes	no	yes
yes/no	no/no	yes/yes	yes/yes	yes/no	yes/yes
no	no	no	yes	yes	yes
yes	no	no	yes	yes	yes
yes	no	yes	yes	yes	yes
NA	29	15	unlimited	unlimited	50
30,000	1000	unlimited	32,000	2,000	10,000
yes	no	yes	yes	yes	yes
unlimited	4	2	50	4	50
10,000,000 characters	unlimited	65,000 per section	unlimited	unlimited	5000
no	yes	yes	yes	no	yes
no	yes	yes	yes	yes	yes
no	no	yes	yes	yes	yes
no	no	yes	yes	yes	yes
no	no	yes	yes	yes	yes
no	no	yes	yes	yes	yes
no	yes	yes	yes	yes	yes
no	yes	yes	yes	yes	yes
no	yes	no	yes	yes	no
no	yes	yes	yes	yes	no
no	yes	yes	yes	yes	yes
yes/yes	yes/no	yes/yes	yes/yes	yes/yes	yes/yes
no	yes	yes	yes	yes	yes
yes	no	no	yes	limited	yes
yes	no	yes	no	yes	no
yes	no	yes	yes	yes	no
no	no	yes	no	yes	no
no/no	no/no	no/no	yes/yes	no/no	no/no
yes	yes	yes	yes	yes	yes (through macros)
ASCII	ASCII (CSV)	ASCII (CSV), dBASE III and IV, Windows Cardfile	ASCII, Paradox, dBASE, Excel, B-Trieve	ASCII, dBASE IV	TXT, CSV, dBASE, DIF, Windows Cardfile
ASCII	none	ASCII (CSV)	ASCII, Paradox, dBASE, Excel, B-Trieve	ASCII, dBASE IV	TXT, CSV, dBASE, DIF, Windows Cardfile

**.95 MACH, NINETY FEET ABOVE
THE GROUND, BOTH SIDES
TRYING TO SHOOT HIM DOWN.
WOUNDED IN THE ARM, KAPITAN
ALEXANDER ZUYEV GUIDED HIS
MiG-29 TO FREEDOM
LEFT-HANDED. COULD YOU?**

On May 20, 1989 MiG-29 pilot Alexander Zuyev began a desperate plan to steal the Soviet Union's most advanced combat aircraft and fly it to political asylum.

The pilot who wrote the book on the MiG-29, Alexander Zuyev, tells his harrowing story (including authentic Soviet dogfighting tactics) in Fulcrum from Warner Books.

Turkish air defenses to land safely on a civilian airfield in Turkey.

THE FINEST TECHNOLOGY RUBLES CAN BUY

The plane he flew is the MiG-29 Fulcrum, the crowning achievement of Soviet aeronautics.

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Shot in a life and death struggle with the sentry, Zuyev managed to take off. Then, flying dangerously low to avoid radar, he eluded pursuing fighters and deadly Soviet and

MiG-29: Deadly Adversary of Falcon 3.0™ Spectrum HoloByte's add-on to *Falcon® 3.0*, you can climb into the cockpit of the F-16's nemesis.

down to the Russian-accented cockpit warnings.

IT'LL TEST YOUR SKILL AND YOUR PATRIOTISM

Unlike the F-16, the MiG-29 isn't a fly-by-wire aircraft, so a

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 For technical questions call (510) 522-1164 (M-F: 9AM-5PM Pacific Time).

computer never limits your control inputs, whether inspired or foolish. Its twin Isotov RD-33 engines produce 36,600 lbs. of thrust, to the F-16's 25,000. And superb aerodynamics make it controllable at low speeds and high angles of attack that would have enemy pilots

The most fearsome opponent is a human one. With EBS, up to six players can go head-to-head.



fighting to avoid a spin.

THEY WON'T EVEN KNOW WHAT HIT THEM

Your MiG's IRST (Infrared Search and Track) system can track an F-16 without revealing your presence on his threat display. So you can get on his six o'clock before he even knows you're there. Once in range, you'll be able to lock on to the Falcon just by turning to look at him with the MiG-29's helmet mounted sight. Then call "pusk" (launch) as you fire missiles or "ogon" (firing) as you ventilate him with your computer-accurate 30mm gun. Either way, his plane will make a satisfying crunch when it hits the ground.

Next time you have an F-16 glued to your tail, try the MiG-29's "Cobra" maneuver.

1) You pull up past a 90 alpha climb.



2) Your airspeed drops rapidly; the F-16 zooms past.

Now you can choose from multiple aircraft, multiple theaters, even which side of the conflict to fight on. And you can go head-to-head over a modem or with up to six

3) You abruptly pitch the nose back to level flight. Now you're on his six, with a little score to settle.

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NEWS & NOTES

Jill Champion

Environmentally Correct

A number of computer manufacturers are joining the Green movement as part of the EPA's voluntary Energy Star program, which encourages PC makers to incorporate energy-efficient technology into their designs. Specifically, Energy Star computers are those that either operate at less than 30 watts in their normal state or power down to 30 watts or less to save energy when not in use.

Compaq is designating a number of its computers as Energy Star PCs as part of its own initiative, called Design for Environment, to incorporate sound environmental principles into Compaq products. This initiative includes energy-

saving features of laptop computers, including a flat-panel display and an automatic sleep mode that powers down to less than 20 watts when the computer isn't in use. During normal use, the IBM PS/2 E consumes 60 watts of electricity per hour, compared to the 150 to 220 watts consumed by most desktop PCs.

Virtual Fiction

How original can one more book about sex, drugs, and movie stars be? Not very. So, why would a publishing house even bother with this one? It's a computer-authored novel—partially, that is. The human author, Scott French, spent eight years and \$50,000 of his own money customizing an artificial intelligence program to "think" like the late Jacqueline Susann to help him write a Susann-style novel. The result is the 295-page *Just This Once* (hardback; Birch Lane Press, 1993), with drugs, sex, suicide, and depression among four self-indulgent Hollywood brat types you couldn't care less about. If Susann had written it herself, she probably would have added another 295 pages—and hopefully enough of a plot to make the \$18.95 price worthwhile. In other words, don't look for this one to show up on the *New York Times* best-seller list.

XyWrite for Windows

XyWrite loyalists (plenty of whom are in publishing) don't often hear the words *new version* in conjunction with *XyWrite*. But this favorite word-processing and text-editing program of writers and editors everywhere now has a

new lease on life. XyWrite for Windows, announced by The Technology Group, which acquired XyWrite in 1992, was scheduled for an August release and should be available by the time you read this.

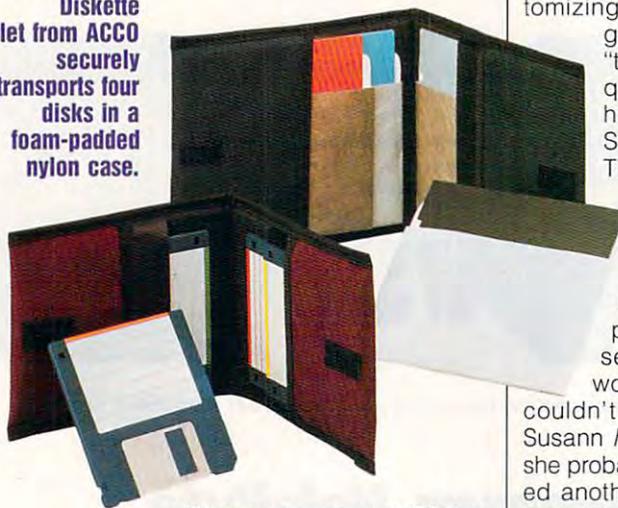
The new proprietors wisely left XyWrite's unique command line interface intact while adding some fantastic new features made possible only by Windows' powerful capabilities. For example, with Log and Resume, you can create multiple notebooks to hold different work projects; Auto Replace lets you produce your own glossary of shorthand notation (personal abbreviations that are automatically expanded when you type them in); Styles helps maintain uniform formatting throughout extensive writing and editing projects, such as books with numerous chapters spread out in separate files; a comprehensive library of buttons lets you create an unlimited number of format and button-bar sets that include your most often used commands; and there's much more. XyWrite for Windows is available for \$495 from software and electronics superstores by special order. For special introductory and upgrade prices, current XyWrite users and those who use competitive word processors should contact The Technology Group at 36 South Charles Street, Baltimore, Maryland 21201; (410) 576-2040, (410) 576-1968 (fax).

This Is No Flight Simulator

Instead of flying in an endless holding pattern because of ground fog or heavy precipitation, planes will soon use their own synthetic vision to land you safely—even in near-zero-visibility conditions.

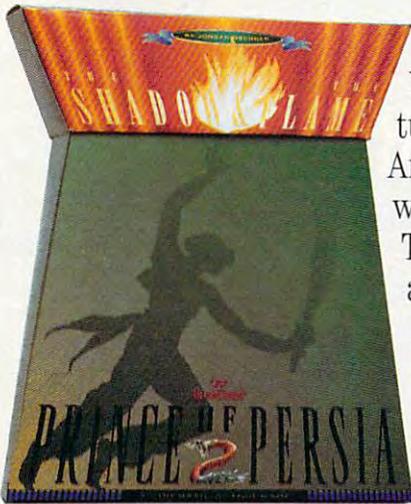
The FAA and the U.S. Air Force, with the help of researchers from two Georgia In-

For travelers, the simply designed Diskette Wallet from ACCO securely transports four disks in a foam-padded nylon case.



efficient computers, CFC-free manufacturing processes, and product recyclability. Intel announced that its entire Intel486 microprocessor family—including the Pentium—is now available with energy-efficient technology, allowing PC manufacturers to design energy-efficient desktop systems that can exceed the EPA's Energy Star program requirements. IBM recently introduced its PS/2 E line of desktop PCs; these PCs incorporate a number of the ener-

Bad Day in Bagdad!



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

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stitute of Technology labs, are experimenting with synthetic vision (infrared sensors and millimeter-wave [MMW] radar) to penetrate the kind of thick fog, haze, and precipitation that can blanket an airfield and make landings treacherous. The infrared sensors provide the pilot with a realtime perspective of the runway on a head-up display (HUD), a glass screen that unfolds in front of the pilot when in use. Instead of blocking the pilot's normal view, however, the HUD's holographic image appears to "float in space," according to Brian Hudson of Georgia Tech, one of the principal researchers in the program. "The synthetically generated image al-

lows the pilot to actually visualize the runway rather than merely guess its location. As the plane descends into clearer, lower altitudes, the synthetic image lines up directly with the actual runway view through the cockpit window, requiring little mental transition on the part of the pilot, who can easily continue on into the final landing approach."

If this program yields successful results, computers will eventually be able to do more than just autopilot commuter planes, jumbo jets, and military aircraft; they'll help bring these aircraft safely to the ground when they might otherwise have been stuck in a holding pattern circling the airport.

Government by the People

The best link is a direct link, especially when it comes to making your voice heard in Washington. The White House and Congress need a piece of *your* mind, not meaningless statistics from the latest "nonpartisan" political pundits and pollsters who supposedly give voice to what you think. Give them all a piece of your mind using Political Action, a software package that acts as your personal D.C. lobbyist. The program can generate dozens of letters, telegrams, mailgrams, and faxes to the Washington "machine" as easily as it can generate one. Political Action has a built-in database of Congressional members,

White House staff members, governors, political interest groups, business executives, Supreme Court justices, foreign leaders, and even news anchors and other members of the press.

Enter your message, select your targets (the president, the Speaker of the House, the Senate minority leader, and the *Washington Post*, for example), and press a few keys to dispatch your message to the entire group. Letters can be transmitted via CompuServe, AT&T EasyLink Services, MCI Mail, or GENie; faxed; or printed and mailed. The program also includes biographical information about members of Congress, hypertext versions of

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'TIL THE SUN  COMES UP >>>

the Constitution and the Declaration of Independence, a list of government BBSs, tips for effective action, and complete online help. Suggested retail price is \$195. Contact Political Systems, 200 Seventh Avenue, Suite 200, Santa Cruz, California 95062; (800) 945-5973, (408) 462-9338 (fax).

Free Nets for All

Community computing systems, better known as free nets, seem to be increasing in number as of late. Currently, there are 25 of these much-needed network services operating in the United States and several other countries, and dozens more appear to be about to start. Such nonprofit networks—

usually funded by grants, fund-raisers, donations, and sometimes annual user fees of no more than, say, \$20, and most often based at a college or university—offer access to vast amounts of information, including public government records and documents, education and business information, and medical and legal advice, which you can access from your home if you have a computer and modem. However, most of the free nets have public-access terminals in various locations, such as at a public library, so the information is available to virtually everyone (which is the whole idea). Those who traditionally have been left out of the information-technology

boom of the last decade, the elderly and the poor, for instance, now have a means to interact with others and become computer-literate through these networks. Also, communication and information aren't limited to a network's community; through the Internet, a global network of more than a million computers, users can communicate with others around the world and search for and retrieve information worldwide.

Unencumbered Disks

If you're looking for a disk storage unit for home or office use, you're bound to find something that meets your needs, with the abundance and variety now avail-

able on retailers' shelves. If you're planning to travel with your disks, however, take a closer look at a neat new product from ACCO. The Diskette Wallet is a lightweight, nylon-fabric case that holds four disks, is foam padded for travel security, and has a Velcro closure. The wallet's simple design is what makes it so appealing. Available in black, navy, or wine, the wallet for 3½-inch disks retails for \$6.99, while the wallet for 5¼-inch disks retails for \$8.99.

If you would like to have more information on the Diskette Wallet, contact ACCO USA, 770 South ACCO Plaza, Wheeling, Illinois 60090-6070; (708) 541-9500, (800) 247-1317 (fax). □

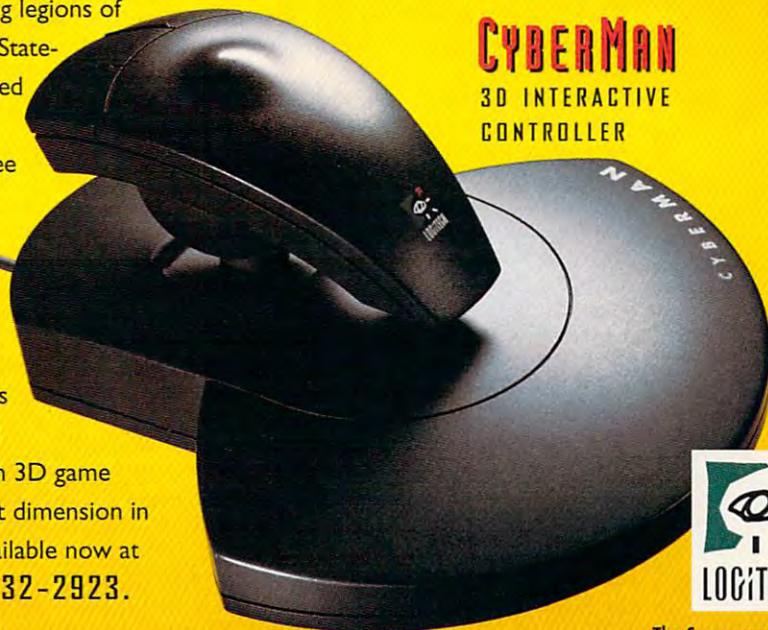
YOU NEED PROFESSIONAL HELP.



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

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

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Amplified Feedback

Last month, we gave some tips for operating Windows with larger type. Since there's no way (within Windows) to enlarge the typeface used in Windows Help files, Microsoft recommended an alternative for visually impaired Windows users.

The following programs (all of which work in both DOS and Windows) will enlarge the display to facilitate reading small print.

Business Focus (Artic Technologies; 313-588-7370); MAGIC and MAGIC Deluxe (Microsystems Software; 800-828-2600); #9 GXi, #9 GXi TC, and #9 GXE (Number Nine Computer; 617-674-0009); Vista (Telesensory; 415-960-0920); and ZoomText Plus (Ai Squared; 802-362-3612).

The following programs will read a Windows screen to you.

SLIMWARE WINDOW BRIDGE (Syntha-voice Computers; 416-578-0565), out-SPOKEN for Windows (Berkeley Systems; 510-540-5535), Protalk for Windows (Biolink Computer Research and Development; 604-984-4099), and Screen Reader/2 (IBM; 800-426-4832).

Also last month, a reader wrote in to remind us that the Bible was available on several CD-ROM products. Here are some of them.

King James Electronic Bible (Compton's NewMedia; 619-929-2500); The Bible Library and The New Bible Library (Ellis Enterprises; 405-749-0273); CD WordLibrary (Logos Research Systems; 206-679-6575); Multi-Bible (Innotech; 416-492-3838); and Master Search Bible, Comparative Bible Research, and Master Search Bible, Concise Edition (Tristar Publishing; 800-292-4253).

THE EDITORS
GREENSBORO, NC

The Good Book

Thank you for your very complimentary review of PC Study Bible ("The Bit, the Byte, and the Word," April 1993). Even as your April issue arrived, Biblesoft began shipping version 3.1 of PC Study Bible, which directly responds to two of Mr. Moses' points.

A Bible window can now be divided into as many as six "panes." These panes can be linked to display different translations of a single Bible reference, or unlinked to display different references. You can add or remove panes from a Bible window at any time, using the keyboard or mouse.

Mouse support in version 3.1 has been greatly extended, including access to all keyboard shortcuts, a double-click function to copy material to PC Study Bible's built-in notepad, and much more.

Mr. Moses raised a critical issue in his conclusion when he stated, "Some might object to what they regard as reducing the Bible to a database from which you extract the bits of information you want without regard to a whole literary context; the basic unit of the Bible is not, after all, the verse, but the book."

Our desire to maintain a "whole literary context" is reflected in our newest add-on module—The Treasury of Scripture Knowledge. Treasury is a collection of nearly one million cross references relating each key phrase in a Bible verse to other passages that reflect the same thought or topic.

Finally, I would like to clarify our pricing structure. Biblesoft publishes six translations of the Bible, along with five classic references—all of which are available as independent modules. In addition, we offer four distinct starter

sets. The KJV and NIV versions of PC Study Bible (complete with a concordance, a notepad, and Nave's Topical Bible) are available for \$69.95. The Master Edition adds one translation and the Nelson's Bible Dictionary module, all for \$149.95. The Reference Library Edition adds the three modules that enable Greek-Hebrew word study: Strong's Dictionary, Vine's Expository Dictionary, and Englishman's Concordance, for a suggested retail price of \$239.95. The Treasury of Scripture Knowledge add-on module is available for \$49.95.

KIRT WILLIS
BIBLESOFT
SEATTLE, WA

Sounding Board

The sound card article in the June 1993 COMPUTE Test Lab covered a good selection of cards and described the features and attributes of each well. However, there were some technical problems with the test results.

The first problem was with the choice of a 10-kHz signal for the measurements made with a 22-kHz sample rate signal. For harmonic distortion, measurements are made of the energy in the harmonics of the side wave signal. The first harmonic of a 10-kHz fundamental is 20 kHz, yet the cutoff of the system at 22 kHz is below 11 kHz.

In fact, the signal itself was probably attenuated, and any harmonics were well past the bandpass of the system. Those measurements should have been made with a 1-kHz signal, which is the customary frequency, partially because it's near the peak sensitivity of the ear to distortion.

Second, since a large percentage of the cards were capable of 12- or 16-bit playback, couldn't you

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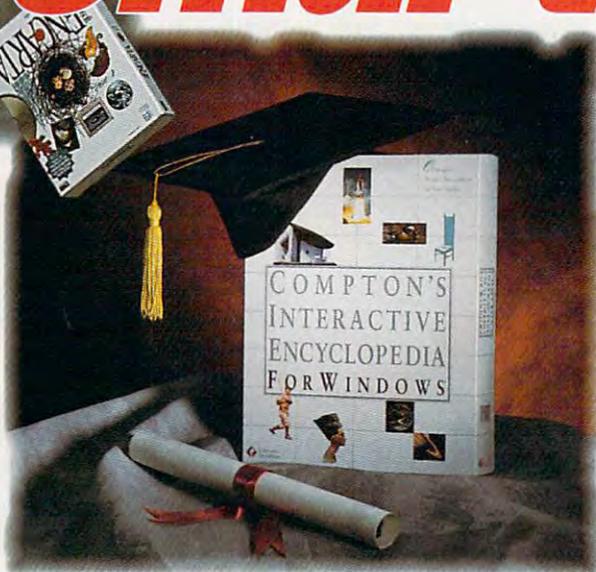


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FEEDBACK

have made measurements there, too?

DAVID STEIGERWALD
SILVER SPRING, MD

Tom Benford replies: Our objective in designing the tests for the Test Lab section is to provide performance data which simulates real-world conditions as closely as possible. Since the vast majority of sound effects, music, and other audio found in today's popular software titles is in the 10-kHz rather than the 1-kHz neighborhood, the 10-kHz signal was selected for our tests, and all of the cards were tested using it, thus providing a true performance profile for these products at that frequency. While it's true that several of the sound cards were capable of 12- or 16-bit playback, not all of them were. By using an 8-bit data format, all of the cards could be included in the tests. Eight-bit sound is the most common format in recreational products today.

Lingua Franca

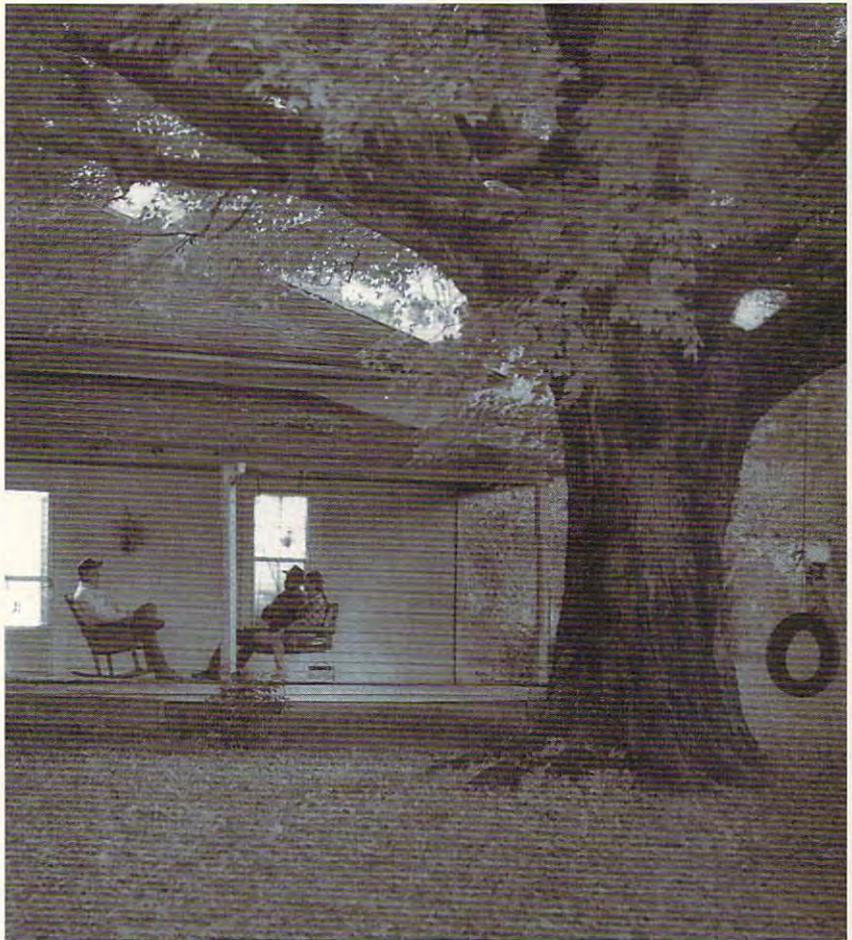
I'm impressed with the quality of the games that are being produced today. What specific compilers are software companies using to create IBM-compatible games?

RODNEY S. COCKRELL
GREAT FALLS, MT

If the games are compiled by a commercially available compiler, it's probably one of the major C languages. Odds are, however, that the software is being produced by home-grown compilers developed in-house at the development company. These compilers use libraries and techniques that are trade secrets and will probably never be available commercially. That accounts for the look and feel of games that let users instantly recognize, for example, a Sierra, Origin, or MicroProse game. As a sidelight, representatives from Access (makers of Links 386 Pro, related golf programs and course disks, and adventure games) recently visited our offices and pointed out that all Access games are developed in machine language because it results in faster code.

Look Before You LPT

About six months ago, I inherited a Commodore PC10-III XT-compatible with an internal hard drive and two floppies. I would be grateful if you could give me some advice with a problem I'm having. I can't get the Learn DOS



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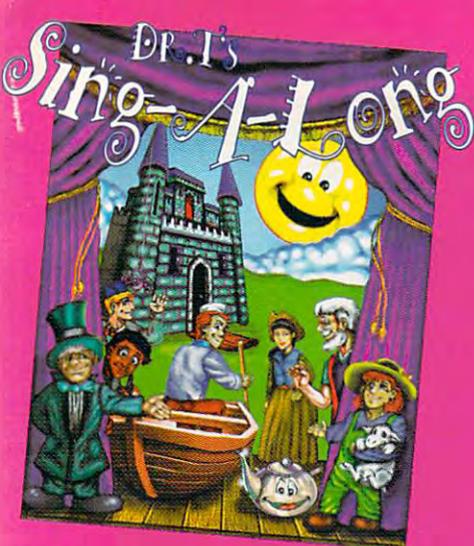
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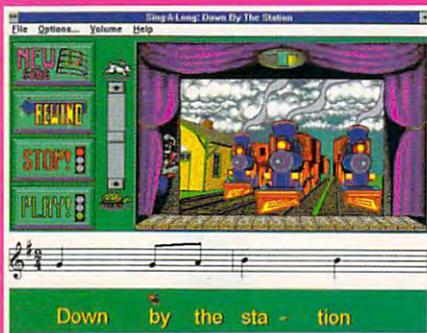
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FEEDBACK

program to print on my printer. I should be able to print by pressing Shift-Print Scrn, but all I get is the message *Unable to print on your printer: Check printer setup and try again.* All the application programs I have print beautifully on LPT2.

JAMES W. GOODMAN
OAKVILLE, ON

Your letter implies that the printer is connected to LPT2, not the more common LPT1. Shift-Print Scrn is hard-coded to send its output to LPT1. Here's a program that will fake DOS into thinking that the printer at LPT2 is also at LPT1. Type it in as a text file exactly as is, using either Edit (if you have DOS 5 or 6) or Edlin (if you have an earlier version of DOS). Name the file LPT2TO1.SCR. Leave in the blank line you see before the rcx line, and make sure you type the values in the db lines exactly as shown; one wrong letter or number and you'll have to reboot when you run the program.

```
a
db B8 00 00 8E D8 A1 0A 04
db A3 08 04 B0 00 B4 4C CD
db 21 C3
```

```
rcx
12
nlpt2to1.com
w
q
```

Then run Debug on it.

```
debug < lpt2to1.scr
```

This will create the program LPT2TO1.COM. From now on, just run that LPT2TO1.COM to redirect the output of LPT2 to LPT1.

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

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WINDOWS WORKSHOP

Clifton Karnes

BECOMING A HELP POWER USER

Nothing can transform you into a power user faster than the ability to get the right information about Windows and Windows applications when you need it. And no tool can deliver this crucial info faster than Windows Help.

In this column, I'm going to talk a little about Help and how to use it. Next issue, I'll talk about how you can create your own Help files.

Most of us have used Help at one time or another. Help is on the menu bar of almost every Windows application, pressing the F1 hot key summons Help for most apps, and many dialog boxes have a Help button you can press.

If you call Help in any one of these ways, the Help window will pop onto your screen. Now the fun starts. But before we dive into Help itself, let's back up and look at what Windows Help really is.

Windows Help is an application, WINHELP.EXE, that loads and displays Help file documents, which always have an HLP extension.

You can run WinHelp by choosing Run from Program Manager or File Manager and typing *winhelp.exe*. Windows Help will run without a Help document loaded. To view any Help file, choose File, Open from the menu bar. Try this now to get a feel for all the HLP files in your WINDOWS subdirectory.

You'll also note that WinHelp's menu bar has its own Help option. This calls Help on Help in a second Help window. Now, on to the details.

Help files usually consist of a Contents page and several Topic pages. When you choose Help Contents from the menu bar, you'll see the Contents page. As the name

implies, this is like a table of contents, giving a broad outline of what the file covers.

Click on any underlined green text (green is the default), and you can jump to that topic.

When you're reading a topic, green text that appears with a dotted underline has a pop-up definition. Click on these words, and a window with the definition pops up on your screen.

When you look at the Help window, you'll notice a row of buttons just below the menu bar. These are quick navigation buttons.

The Contents button takes you back to the Contents page, Search calls up a dialog box that lets you search for keywords, Back moves you to the previous topic, and History displays a dialog box of the topics you've viewed. In addition to these standard buttons, Help authors can add their own. You may, for example, see browse buttons, marked << and >>, that move you backward and forward through the available topics. You may also see a Glossary button that lists all the pop-up definitions throughout the Help file.

All that is pretty standard. Following, however, are some specialized features that are worth exploring.

First, if you look at the File menu, you'll see an option for Print Topic. As you'd expect, this prints the current topic. Very useful.

Under the Edit menu, you'll see Copy. If you select this, the entire topic is displayed in a text window, and you can

copy text from it to the Clipboard and from there to any Windows application.

Directly under the Copy option on the Edit menu is Annotate. This is one of Help's neatest features. Select this, and you'll be treated to a dialog box in which you can put any notes about the current topic. After you make an annotation, a small green paper clip appears by the topic title. You can click on the paper clip to bring up the annotation. These annotations are stored in your WINDOWS subdirectory with the Help file's name



Windows Help is an application, WINHELP.EXE, that loads and displays Help file documents.

plus the extension ANN.

Perhaps the neatest Help feature is Bookmark, which lets you place named bookmarks on any topic. The Bookmark names appear as Bookmark menu items. If you use a Help file often, this is a real timesaver. Bookmarks are stored in your WINDOWS subdirectory in a file named WINHELP.BMK.

The last feature of Help I want to discuss is Help, Always on Top. This will keep the Help window from being buried by other windows. I never use this one, but I can see how it could have its uses.

That's the quick tour. To get your feet wet with Help, make a practice of loading the Help files for your favorite applications and browsing them from time to time. □

Tony Roberts

RECOVERING DELETED FILES

One of DOS 6's best features is the expanded functionality of the Undelete command. The new Delete Sentry feature makes recovering deleted files as close to a sure thing as possible.

Before we discuss how to undelete files with Delete Sentry, it's helpful to know what actually happens when you issue the command to erase a file. First, the initial character of the filename in the File Allocation Table (FAT) is changed to a special character that signals DOS that the file has been deleted. Second, a series of pointers that describe the file's position on the disk are zeroed out. This tells DOS that the clusters occupied by the file are now available for other use.

Immediately after a file has been deleted, most of the filename, as well as all of the file's data, remains intact on the disk. Another data tidbit that isn't affected by the deletion is the FAT reference to the file's size and starting cluster number.

With these bits of information, you can recover a deleted file—as long as you haven't overwritten the disk clusters occupied by the file.

At its basic level, this is how Undelete works: It scans the FAT for a file that's been marked as deleted, it shows you the filename with the missing first letter and asks you to fill that in, and then it goes to the starting cluster and locates an amount of data that corresponds to the file's size. This works well if the undelete procedure occurs immediately after the deletion and if the deleted file wasn't scattered all over the disk.

A step up from basic undelete protection is Delete Tracker, a version of which

first became available in DOS 5. Every time Delete Tracker is activated (usually through a command in your AUTOEXEC.BAT file), the system makes a snapshot of your disk's FAT. This procedure makes deleting a file a little less risky. That picture of the FAT gives the Undelete command full information about the characteristics of your file as of the last boot-up. This information includes the first letter of the filename plus a list of every cluster that was occupied by the file. Even if the file was strewn all over the disk, Undelete can recover it if the clusters haven't since been occupied by another file.

The new feature in DOS 6—Delete Sentry—makes undeleting almost foolproof. Under this system, deleted files are not actually deleted but are moved to a hidden subdirectory on your disk where they remain fully intact. When you need to undelete a file, DOS simply moves it back to its original directory.

As effective as this protection is, it too is only transient. Deleted files don't stay in the hidden subdirectory forever, so it's always best to recover deleted files as soon as possible after the deletion. When you configure Delete Sentry, you decide how much disk space it can use, how soon to purge files from the hidden directory, and which files should be protected.

For example, on my 200MB hard disk, I allow Delete Sentry 5 percent, or 10MB, of space. Once I've deleted more than 10MB of files, Delete Sentry starts deleting the oldest files in its holding area to make room for the new deletions. Also, I set Delete Sentry to purge files that have been on hold over seven days. Finally, I've configured Delete Sentry not to save files with extensions such as TMP,

BAK, and the like.

There are a couple of ways that you can configure Delete Sentry. If you're running Windows, run Undelete and select Options, Configure Delete Protection, Delete Sentry. Enter your preferences into the resulting dialog box. Alternatively, you can edit the UNDELETE.INI file directly. This file is in the same directory as UNDELETE.EXE unless you've set the environment variable MSDOSDATA to point to a different subdirectory.

The entries in UNDELETE.INI are straightforward. For more information, type *help undelete* at the DOS prompt to get a full rundown on configuration options.

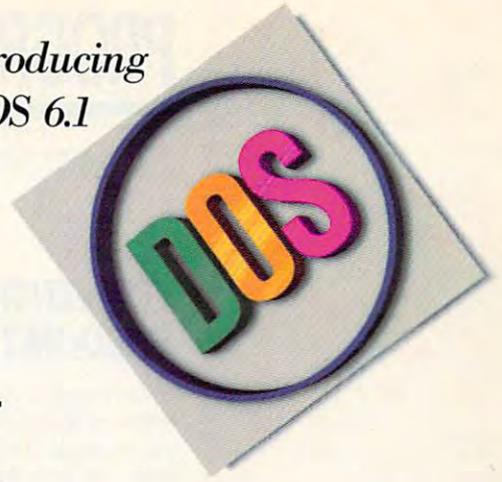
If you use Delete Sentry, be aware of how the program uses disk space. Although it can use up to several megabytes of disk real estate, Delete Sentry tells programs such as the DOS Dir command and File Manager that the space is available. You have to use Chkdsk to see the true amount of unused disk space.

Delete Sentry is programmed to give back the space it's using if this suddenly becomes necessary. If one of your other programs creates some huge data files that demand the space, Delete Sentry gives it up by physically deleting the files it's been holding, starting with the oldest. The freed clusters are then overwritten with the new data, making a recovery of the original file impossible.

Delete Sentry provides a terrific insurance policy against accidental deletion of important files, but be careful not to rely too heavily on this protection, especially if your system is chronically low on disk space. The best procedure to follow is to make regular backups of important files. That way, you can restore those files if Delete Sentry can't. □

Delete Sentry provides a terrific insurance policy against accidental deletion of important files.

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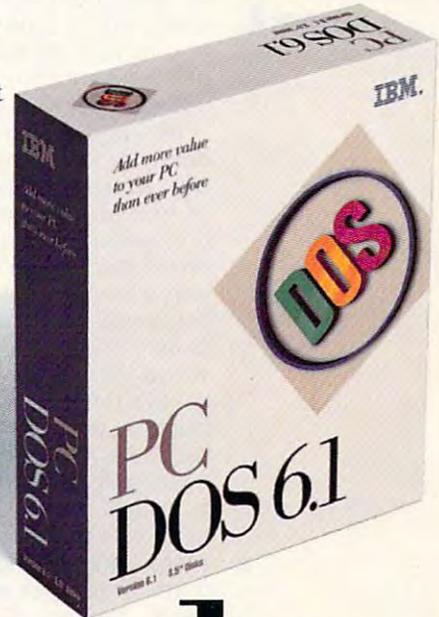
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	x	
Approximate number of viruses that can be detected	>1,400	800
Automated system configuration optimizer	x	
PCMCIA II support	x	
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PROGRAMMING POWER

Tom Campbell

CONVENTIONAL WISDOM?

This month, I decided to test some of the conventional wisdom about BASIC compilers and interpreters: that compilers are faster than interpreters, that floating-point computations are faster than integer, and that Windows slows everything down.

A compiler takes the input language (BASIC, in this case) and converts it to an equivalent machine code representation so that it can be run directly on the target processor (the 386, 286, or whatever CPU runs your machine). A compiler needs to run only once, because it creates an executable file. Unless the manufacturer says otherwise (and no major compiler company does), you're licensed to sell or give the executable to anyone you want essentially without restriction.

Interpreters, on the other hand, don't create executables. An interpreter consumes as much of the program as it can and runs that portion, then eats as much of the next part of the program as it can. You always need an interpreter as a host environment—as well as the operating system—to run an interpreted program. Normally, you're not allowed to distribute or sell your interpreted program unless the customer already owns the interpreter or you sell a copy of the interpreter along with your program. That's not always the case, though. Sometimes you're given licensing rights to a special version of the interpreter called a runtime version that can only, in accordance with its name, run programs. It can't let the user change them.

The advantages of a compiler seem obvious. So why bother with interpreters at all?

Compiler	Integer	Floating-Point
Visual Basic for Windows 2.0	2.03	41.58
PowerBASIC (compiled)	0.22	70.52
QBASIC	3.36	71.89
QuickBASIC 4.5 (interactive)	1.49	66.50
QuickBASIC 4.5 (compiled)	0.16	79.65

Because compilers normally make you wait awhile each time you run a program while it's compiled and linked, whereas interpreters usually omit those steps—just load and go. What if you wanted to write a compiler for both the Macintosh and the PC? One way to do this would be to "compile" to a chip that doesn't exist—an idealized hybrid between the Mac and the PC. Then write a tiny program that converts—interprets, actually—this mythical machine code to executable statements for the target processor. Now, what do you have—a compiler or an interpreter? Microsoft calls this a compiler. It's taken an approach very like the one I just described (called a p-code machine for historical reasons) on Visual Basic for Windows, Word Basic, Access Basic, and other dialects, starting with Quick-BASIC. As you might imagine, it's not intrinsically as efficient as direct compilation. But life isn't that simple. For example, floating-point code is notoriously inefficient on PCs without a math coprocessor—so inefficient that compiled floating-point code could be slower than well-written interpreted floating-point code, right? Well . . . Right. Sometimes.

The conventional wisdom has it, for example, that Visual Basic is slower than compiled BASIC, but that it's not terribly important except in the case of situations such as tight loops; the overhead of Windows is where most of the extra time is consumed. DOS

compilers are faster and create smaller code, or so it goes, but they don't offer all the advantages of Windows.

I ran a program similar to this one (it differed slightly for each dialect) in which an empty FOR loop using integer counters ran 500,000 times and then a similar loop using BASIC floating-point counters ran.

```
Dim iCount1, iCount2 As Integer
Dim dCount1, dCount2 As Double
t = Timer
For iCount1 = 1 To 1000
  For iCount2 = 1 To 500
    Next iCount2
  Next iCount1
PRINT "Integer Loop count to
500,000 in seconds: " +
Str$(Timer - t)
t = Timer
For dCount1 = 1 To 1000
  For dCount2 = 1 To 500
    Next dCount2
  Next dCount1
PRINT "Double loop count to
500,000 in seconds: " +
Str$(Timer - t)
```

See the table above. Results will vary, of course, because my machine configuration (25-MHz 486SX) is probably different from yours.

What's most interesting is that Visual Basic for Windows 2.0 has such outstanding results on floating-point computations. It's much faster than even my Microsoft C version under DOS. Likewise, Quick-BASIC 4.5's interactive version, which uses the p-code method, somehow races past both its own compiled version and PowerBASIC's estimable code generator. □

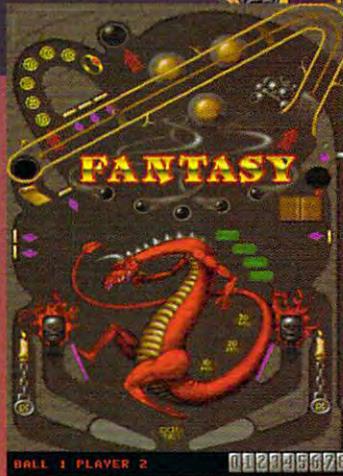
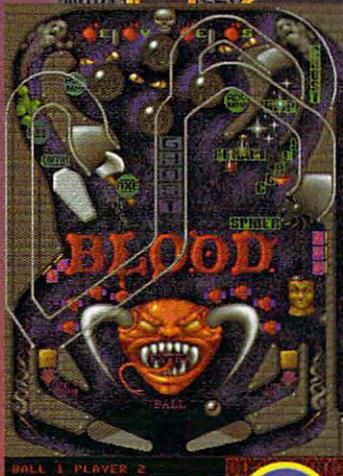
I found answers that defy conventional wisdom—and others that support it.

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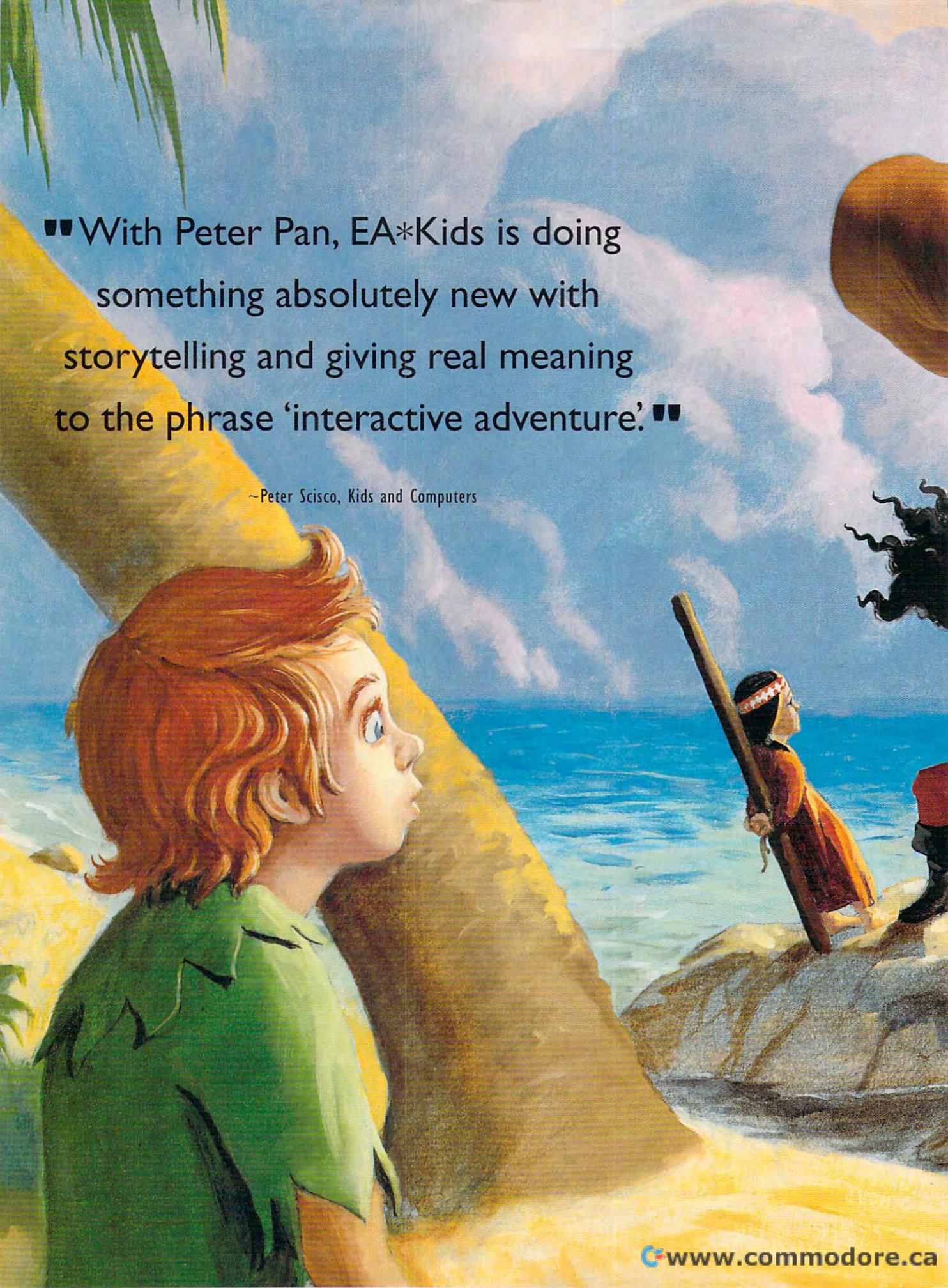
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An illustration of Peter Pan, a young boy with red hair and a green tunic, looking out over a tropical beach. In the background, a Native American woman in a red dress and headband stands on a rock, holding a long wooden staff. The scene is set against a backdrop of a blue sky with white clouds, a blue ocean, and a large palm tree trunk on the left. A large, brown, circular object is visible in the upper right corner.

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~Peter Scisco, Kids and Computers



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TIPS & TOOLS

Edited by Richard C. Leinecker

Specializing Notepad and making peace between PFS First Choice and Microsoft Works for Windows

Windows Editing

In a recent issue ("25 Top Windows Tips," April 1993) there is a Windows tip showing how to make a Recorder macro to load often-used text files. That's kind of complicated for me, so I found an easier way.

Start by selecting Notepad in the Program Manager. Pull down the File menu, select Copy, and make a copy of Notepad. Select the new Notepad in the Program Manager. Pull down the File menu and choose Properties.

Change the description to represent the file that's going to be edited. It might be something like AUTOEXEC or MY_TODO. Go to the Command Line box and add the path and filename that you want to load into Notepad.

Now you have an icon in the Program Manager that will automatically load a text file into Notepad.

RYAN WARNER
REVERE, MN

PFS Cleanup

I needed to transfer my PFS First Choice database files to Works, but even after I saved them as ASCII files, Works wouldn't load them in.

The problem is that PFS's ASCII files have quotation marks around fields and the fields are separated by commas. I wrote a simple BASIC program that removes the quotation marks and replaces commas with tabs. The program is called CLEANPFS.BAS. In the program replace the word *infile* with the name of the PFS First Choice file to be cleaned and the word *outfile* with the filename of the new file that will contain the cleaned text.

```
OPEN infile FOR INPUT AS #1
OPEN outfile FOR OUTPUT AS #2
DO WHILE NOT EOF(1)
  CHARS = INPUT$(1,#1)
  IF CHARS = CHR$(34) THEN
```

```
  CHARS = ""
  IF CHARS = CHR$(44) THEN
    CHARS = CHR$(9)
  PRINT #2,CHARS;
  LOOP
  PRINT#2,CHR$(9)
  CLOSE
```

Open the outfile in the Works word processor, select the whole document, and then copy it into the Clipboard. If you've set up your fields in the database form in the same order, just paste from the Clipboard. Every block of text separated by the tabs falls neatly into each field.

CLARK HARPER
WINSTON-SALEM, NC

Easier Forms

I'd like to share a trick with WordPerfect users who want to create forms with underlines extending to the right margin. At the beginning of the document, press Shift-F8 to access the Format menu. Select Other (option 4) and Underline Spaces/Tabs (option 7). Change Underline Tabs to Yes. (You can change the defaults if you do this often.)

When an underline is desired, place the cursor where you want it to begin and press F8. Now press Alt-F6 to flush right. This will draw an underline extending from the cursor to the right margin even if the right margin or font size is changed. And all the underlines drawn this way will line up at the right margin.

CAROLYN WESTON-RICE
MUNCIE, IN

Professional Batch Menus

With reference to easy DOS menus ("Tips & Tools," April 1993), Mr. Henry's technique becomes significantly more elegant with a minor modification. Rather than include the text of the menu in the menu batch file itself, create a separate text file and display it

via the batch file. Here's a batch file I created called MENU.BAT that displays a text file called MENU.TXT.

```
C:
CD \
CLS
TYPE MENU.TXT
```

I added the lines C: and CD \ so that the menu can be called from any drive or directory on the system.

MARSHALL G. EMM
AURORA, CO

We've Got Your Number

I get letters from readers asking why we require a Social Security number with the tips we receive. The answer is that the IRS likes to know who is receiving money from us.

RICHARD C. LEINECKER
REIDSVILLE, NC

Better Diskless Batch Files

In your September 1992 issue you printed a tip about how to create diskless batch files. You can make the tip a little safer to use by changing certain lines. Here is the original.

```
DOSKEY DA=ECHO Y | DEL A:*. *
DOSKEY DB=ECHO Y | DEL B:*. *
```

I changed it as follows.

```
DOSKEY DA=DEL A:*. *
DOSKEY DB=DEL B:*. *
```

With these changes in place, you'll be prompted for confirmation before the deletes take place.

LINHDIU H. DAO
SAN DIEGO, CA

Recording Computer Boots

Recently, I suspected that someone was using my work PC after I went home for the day, but I had no proof. To track the suspected intruder, I wrote BOOTTIME.BAT, which automatically records

Bally

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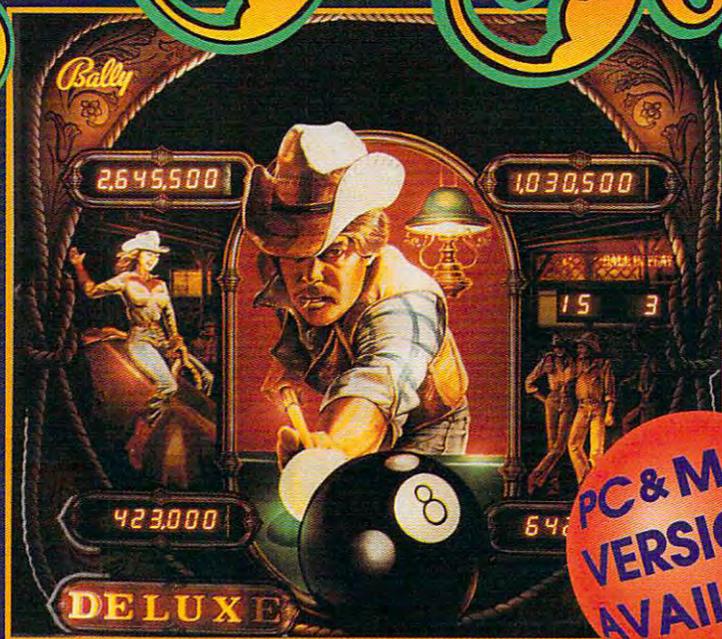
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Circle Reader Service Number 157

A better menu program and two hot computer security tips

the date and time of every boot sequence.

I call BOOTTIME.BAT from my AUTOEXEC.BAT file, but you could simply insert the lines into your AUTOEXEC.BAT file if you don't want to use a separate batch file. (This batch file will not work with 4DOS.)

```
@ECHO OFF
ECHO SET CURRDATE=%%3 %%4
> CURRENT.BAT
ECHO. |DATE > CURRENT2.BAT
CALL CURRENT2
ECHO SET CURRTIME=%%3 >
CURRENT.BAT
ECHO. |TIME > CURRENT2.BAT
CALL CURRENT2
IF EXIST LOGTRAIL.TXT ATTRIB
-h LOGTRAIL.TXT
ECHO %CURRDATE%
%CURRTIME%>>LOGTRAIL.TXT
REM ATTRIB +h LOGTRAIL.TXT
SET CURRDATE=
SET CURRTIME=
REM DEL CURRENT?.BAT
```

After writing and installing BOOTTIME.BAT on my system, I knew the time of intrusion to be about 6:30 p.m. every other weekday. By staying late at work for a couple of days, I managed to observe a coworker copying data files from my PC. He was speechless when I confronted him with the exact dates and times of his burglaries.

SCOTT SUMNER
CANTON, MI

Intruder Alerts

We have several employees in our office who come in after hours. They bring their children and let them play on the computers. I never minded until I came in one day and found my Windows icons completely reorganized.

Since then I've devised an intruder alert and called it from my AUTOEXEC.BAT file. It's written in BASIC and expects you to have QBASIC in your path. It should run just

fine with BASICA, too. When the intruder alert runs, it tells you to stand by for security clearance and beeps ten times. If you press the 1 key during this time, it exits, and you can get to work. Otherwise, it goes into an alarm sequence where a siren sounds through the speaker.

If you have QBASIC, run the program from your AUTOEXEC.BAT file with a line like this: QBASIC /RUN C:\DOS\ALARM.BAS.

```
100 FOR X = 1 TO 12: PRINT :
NEXT X
110 PRINT "STAND BY FOR
SECURITY CLEARANCE"
120 FOR X = 1 TO 12: PRINT :
NEXT X
130 PLAY "MN L8 03 T75"
140 FOR X = 1 TO 10
150 PLAY "C4"
160 A$ = INKEY$
170 IF A$ <> "1" GOTO 190
180 SYSTEM
190 NEXT X
200 SCREEN 1
210 COLOR 4, 15, 15
220 FOR X = 1 TO 11: PRINT :
NEXT X
230 PRINT "INTRUDER ALERT"
240 PRINT : PRINT
250 PRINT "Unauthorized Operator
Detected"
260 FOR X = 1 TO 11: PRINT :
NEXT X
270 FOR X = 440 TO 1000 STEP
10: SOUND X, .5: NEXT X: GOTO
270
```

This isn't a foolproof security system. But it's good enough for unwanted users who don't know much and are easily scared off. If you don't press the 1 key soon enough and the intruder alert is sounded, all you have to do to exit is press Ctrl-Break.

REBECCA LIBBY
FORT SMITH, AR

Don't Format

If you've ever caught yourself with the prompt WARNING, ALL DATA ON NON-REMOV-

ABLE DISK DRIVE C: WILL BE LOST!, you know how easy it is to type *format c:* by mistake instead of *format b:*. And if others use your computer and you're not sure of their skills, that compounds the danger of accidentally formatting your hard drive.

Here's a batch file that I created and put in my DOS directory. I named it FORMAT.BAT and renamed the FORMAT.COM program to FORMAT!.COM. It prevents anyone from formatting any drives other than A and B. If you ever really want to format your hard drive, all you have to do is use the command Format! at the command line instead of the usual Format command.

```
@ECHO OFF
IF "%1"==" " GOTO USAGE
IF "%1"=="?" GOTO USAGE
FOR %%A IN (A: a: B: b:) DO IF
"%%A"=="%1" GOTO
DOFORMAT
ECHO "
ECHO "
ECHO You may not format a fixed
disk!
ECHO "
ECHO "
:USAGE
FORMAT! /?
GOTO END
:DOFORMAT
FORMAT! %1 %2 %3 %4 %5 %6
%7 %8 %9
:END
```

JAMES KAO
COACHELLA, CA

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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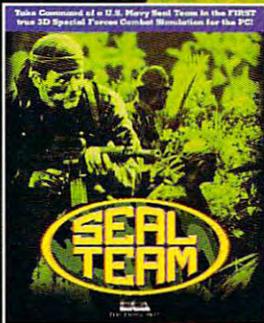


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HARDWARE CLINIC

Mark Minasi

DOS 6's MULTICONFIG, PART 4

This month, I'll conclude my discussion of MultiConfig's features. For the benefit of those just tuning in, MultiConfig is perhaps the best new feature of DOS 6. It lets you combine a number of CONFIG.SYS/AUTOEXEC.BAT pairs into a single CONFIG.SYS and AUTOEXEC.BAT. You can then choose which configuration you wish to boot with from a menu that's displayed at boot time. Check out the June, August, and September "Hardware Clinic" columns for more information.

This month, we'll look at MultiConfig's SUBMENU command, which can be especially helpful when you have more than one person using the same computer.

What's a Submenu?

We're used to working with menu systems under the DOS Shell, Windows programs, and OS/2 applications; those menu systems are typically two-level menu systems—select an option, and more suboptions appear.

For example, I'm looking right now at the menu on a Windows program, Ami Pro. The Ami Pro menu offers the options File, Edit, View, Text, Style, Page, Frame, Tools, Window, and Help. That's the top-level menu. However, if I click the mouse on, say, the Window menu item, then I get another menu below that, a kind of submenu that offers the options New window, Tile, and Cascade.

MultiConfig lets you add a second level of menus to your MS-DOS Startup Menu using the SUBMENU command. For instance, recall the Normal-versus-Interlnk example that I've

used during the previous months. Interlnk can be used in either server or client mode. You could put together a menu with three options on it: Normal, Interlnk-Server, and Interlnk-Client. Or you could have a top-level menu that offered just Normal and Interlnk options, and then if you chose Interlnk, you'd get a second-level menu that offered either Client or Server. Note that putting a submenu on Interlnk doesn't force you to put a submenu on the other menu options, such as Normal.

Using Submenus

The SUBMENU command in MultiConfig looks like this.

SUBMENU MENUBLOCK,MenuText

Here, MENUBLOCK is the name of a block—a section of CONFIG.SYS with that name at the top enclosed in square brackets. MenuText is the text that you want displayed on the Startup Menu. You then create a block called [MENUBLOCK] that contains menu commands, just like the original block called [MENU].

When we last looked at the Normal/Interlnk example, the CONFIG.SYS looked like this.

```
[MENU]
MENUITEM NORMAL,Standard
  setup
MENUITEM INTERLNK,Setup with
  Interlnk driver
MENUDEFAULT NORMAL,2
```

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

```
[NORMAL]
INCLUDE SHARED
```

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

To make the Interlnk option not a configuration, but a submenu, I'll change MENUITEM INTERLNK,Setup with Interlnk driver to SUBMENU INTERLNK,Setup with Interlnk driver.

Once I do that, however, MultiConfig will expect the [INTERLNK] block to contain menu commands, not CONFIG.SYS commands. So the new [INTERLNK] block should contain a menu for the Interlnk server and client commands. That menu will have new menu items, can contain menu defaults, can include new colors, and can even contain more submenus.

The new [INTERLNK] block will be fairly simple to build, as you see here.

```
[INTERLNK]
MENUITEM SERVER,Load Interlnk
  as server
MENUITEM CLIENT,Load Interlnk
  as client
```

Then I'll have to build two new blocks, the [SERVER] and [CLIENT] blocks. They'll actually contain the same text in the CONFIG.SYS, but they'll look different in the AUTOEXEC.BAT. These new blocks will look like this.

```
[CLIENT]
INCLUDE SHARED
DEVICE=C:\DOS\INTERLNK.EXE
```

```
[SERVER]
INCLUDE SHARED
DEVICE=C:\DOS\INTERLNK.EXE
```

The reason why I even bothered with two different configurations is that the commands in the AUTOEXEC.BAT have to be different in this situation. A piece of the AUTOEXEC.BAT might look like the following.

```
IF %CONFIG%==CLIENT GOTO
  CLIENT
```

**DOS 6's SUBMENU
command can
make it easier for
several people
to share the same
computer.**

```
IF %CONFIG%==SERVER GOTO
SERVER
```

```
:CLIENT
PROMPT $P$G
PATH C:\DOS
INTERLNK
GOTO END
:SERVER
C:\DOS\INTERSVR
GOTO END
:END
```

In the server configuration, there's no need to set PROMPT and PATH, as the server computer just sits there with an Interlnk status report on the screen; you can't get a DOS prompt or execute programs anyway. Put the whole CONFIG.SYS together, and it looks like this.

```
[MENU]
MENUITEM NORMAL,Standard
  setup
SUBMENU INTERLNK,Setup with
  Interlnk driver
MENUDEFAULT NORMAL,2
```

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

```
[NORMAL]
INCLUDE SHARED
```

```
[INTERLNK]
MENUITEM SERVER,Load Interlnk
  as server
MENUITEM CLIENT,Load Interlnk
  as client
```

```
[CLIENT]
INCLUDE SHARED
DEVICE=C:\DOS\INTERLNK.EXE
```

```
[SERVER]
INCLUDE SHARED
DEVICE=C:\DOS\INTERLNK.EXE
```

In case it hasn't been made clear yet, submenus don't change anything about the way that you write your AU-

TOEXEC.BAT. The only way that submenus (or the main menu, for that matter) can affect AUTOEXEC.BAT is through communicating the value of the %CONFIG% environment variable.

Where could you use submenus? A lot of COMPUTE readers own PCs that are shared by several people. For example, some companies have a pool of laptop computers that people borrow temporarily from the pool prior to going on a business trip. One of the biggest gripes that the people who use those computers make is that when they get the laptop back after someone else has used it, the configuration has been all messed up.

In many private homes, there's only one computer shared by Mom, Dad, and Junior, and they all want to be able to keep their own configurations separate and distinct. Public access computers, such as the ones that are starting to appear in public libraries, may need to serve as connecting points to databases of very different types, requiring different access methods.

MultiConfig can help to solve these three problems with its single-level menu. In the home example, Mom, Dad, and Junior could each have a menu item, but with submenus, it's possible for Mom to have 3 of her own configurations, Dad to have a couple, and Junior to keep separate the 14 different configurations he needs to run all his games.

And an arrangement like this actually provides a use for the MENUCOLOR command that I mentioned in August. One way to be sure that you haven't accidentally activated someone else's menu is to color each menu differently. This is more useful than it would seem at first glance. Imagine that Dad sits down to use the PC and he reboots and (out of

habit) presses 2, then 1, and then Enter, as that combination always gets him to the configuration he typically uses. Instead of ending up in Quicken, however, he quickly finds himself (or, rather, finds his cursor) being chased by the minions of the ravenous bug-blatting beast of Traal. What's happened to Dad, of course, is that he's accidentally gotten into Junior's menu. But if the screen had turned red when he got to Junior's submenu, he would've noticed it (Dad uses a menu with a sedate gray background) and rebooted straight off.

There's more to MultiConfig—Clean Boot, Interactive Boot, and Num Lock control, for example—but that stuff's easy to pick up from the manual. In this series, I've tried to get you started with the most important MultiConfig commands. Now you can go forth and create The CONFIG.SYS from Hell.

I try to answer all the calls and letters I get; sorry I've fallen a trifle behind recently. Let me make a request if you feel like contacting me this month. Virtually all of you have expressed happiness with this column and my books, but tell me more. I have a pile of things that I'm working on now, but I don't know if they're the kind of things that you want to read about. Tell me what you'd like to see in the column, and I'll do my best to respond.

Speak Up!

Do you have a tough hardware problem you'd like Mark to tackle? Let him know about it by calling (900) 884-8681, extension 7010202 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. □

Cyril Northcote Parkinson gave us a mantra for the modern day: "Work expands to fit the available time." That same principle holds equally true for the innards of our computers: Data will expand to fill every nook and cranny of a hard disk, no matter how many precautions you take.

Record a few seconds of 16-bit audio, update a customer database, or make an editable copy of a novel, and soon that expanse of free megabytes becomes a claustrophobic region to be protected at any cost. Data grows to fit the space, a truism just as certain as death and taxes.

Fortunately, since the infancy of computer technology and information science, mathematicians and computer scientists have been diligently battling this problem. In the late 1940s Claude Shannon began the study of data compression as he explored the entropy, or information richness, of a quantity of data. Mathematically speaking, the higher the entropy of a data file is, the more information will be in that file. Shannon explored ways in which to store data as efficiently as possible, to get the most information into a few bits.

Since that time, the abstract gyrations of compression schemes have found their way into nearly every aspect of daily computing. Load a new program

or game onto your hard disk, and you must run an installation program that decompresses the information held on the floppy disks. Download a utility or file from a BBS, and chances are that you must extract the file with PKUNZIP or some other decompression program. And now, in today's world of monster data files and multimedia information, data compression is even being factored into the most basic levels of file storage formats.

Gospel Truth

The most basic gospel of any data compression scheme is to get more into less space. To shrink data, a program must examine the data and then apply a compression algorithm to the most basic information—the bits and bytes that make up the data. This algorithm shrinks the size of a data file by combing out any redundancy in the information, thus making the output a more concise, information-rich piece of data.

Compression techniques can vary widely, and the details of the com-

pression algorithms vary from different mathematical approaches to entirely different schemes for wildly different data types. For example, a spreadsheet and a realtime video file will be best served by different compression techniques. While some techniques are specialized, there are generic compression algorithms that work at the most basic data level, oblivious to whether the data is a text file or a scanned image of Mona Lisa.

The simplest form of data compression is called run length encoding (RLE). The PCX data format employs RLE in its basic data format. RLE compresses data by eliminating redundancy. Imagine a single frame of Disney's *Snow White*, for example. The image is made up of large fields of simple colors—blue for her dress and red for the nose of Sneezzy, the dwarf. If we cut this picture up into horizontal strips, we can see that the picture consists of a series of color areas. Imagine these to be data bytes, and we can easily compress the image. If the strip showing Snow

White's dress is a field of blue, then the file storing the image can represent it as a series of bytes signifying blue. But for greater efficiency, we can replace the series of blue bytes with a pair of bytes, one indicating blue and the other indicating how many blue bytes are in the row. In this way, data can be much more efficiently stored.

RLE, however, is not the best method for compress-

DATA UNDER PRESSURE



**NO MATTER HOW MUCH
STORAGE SPACE YOU HAVE,
YOU NEED MORE.
COMPRESSION CAN HELP.**

BY PAUL C. SCHUYTEMA



ing a moving video file or a photorealistic image. The constant variations of hue and luminosity make RLE actually less efficient than storing this type of data normally. What is needed is another form of compression better suited for this type of visual data.

Generally, data compression comes in two flavors, "lossy" and "lossless." Lossy compression is a data compression scheme that represents a near match of the data, not the exact data. In a video image, for example, the human eye won't notice if a few pixels are removed or ten levels of blue are cut to eight. The JPEG (for still images) and MPEG (for video images) standards are two types of lossy data compression that are specifically designed to handle visual image files. Lossless compression is a data compression scheme that compresses and represents the data exactly. Information such as a spreadsheet or a haiku poem would become useless if any of the information was omitted or substituted. Lossless compression is the type of compression offered by DoubleSpace (which comes with DOS 6), Stacker, and SuperStor Pro.

As a hard disk fills to capacity, it's tempting to turn to one of these products for some much-needed disk real estate. But how do they work? Are they safe? Do they change the way we use our computers? These are some topics we will explore in order to arm ourselves with the information necessary to make an intelligent choice whether or not to compress.

Profit Without Loss

DoubleSpace, Stacker, and SuperStor Pro all use variations of the same generic lossless compression algorithm called Lempel-Ziv. The algorithm is named for its creators, Abraham Lempel and Jacob Ziv, who introduced the algorithm in a paper entitled "A Universal Algorithm for Sequential Data Compression" in 1977. While the three implementations of the

Compression Facts and Figures

Whole-Disk Compression Performance (170MB Hard Drive*)

Compression	Total Storage	Space Used	Free Space
None	166,276K	89,160K	77,540K
Stacker	317,656K	93,360K	224,296K
SuperStor Pro	315,588K	91,706K	224,882K
DoubleSpace	298,334K	88,102K	210,232K

* Disk is set up with a 5104K Windows permanent swap file.

Lempel-Ziv approach offer different interfaces and utilities, on the whole, the two most important factors, the compression ratio and the performance, are remarkably similar.

When one of these generic compression programs is installed on a hard drive, it will create two drives. One will operate the same as an uncompressed hard drive, but it will have approximately double the size of the original drive (I expanded a 170MB hard drive into approximately 310MB, not including a 5MB permanent swap file for Windows). The other drive will contain information important for the compression program, as well as a single file which physically contains all of the hard disk's files, in compressed form.

The compression program's device driver is loaded into memory during the boot-up process, and it intercepts the data going to or from the hard disk. As the data streams into a buffer,

the Lempel-Ziv algorithm scans the data in a "sliding window," sending off unique sections of data but looking for repeated patterns. When a redundant piece of data is encountered, an offset pointer is sent instead of the data proper. This pointer points to the first instance of that data. In this way, the Lempel-Ziv algorithm is a dictionary-based compression system, creating a table of repeating data patterns and substituting a pointer to the data's location in the dictionary, rather than the actual data. By trimming out the redundancy at the binary level, Lempel-Ziv can consistently offer about a 2 : 1 compression ratio.

However, the Lempel-Ziv algorithm used in today's generic compression programs is sophisticated enough to create an integrated dictionary—one that is contained within the compressed file. Because of this, the compression and decompression routines are executed faster, and there is no need for a separate dictionary file. The information in a Lempel-Ziv compressed file consists of a stream of actual data and pointers (set off by a code to let the decompression routine know that the information following is a pointer and not another instance of data), in which the pointers indicate an offset location in the file where the "real" instance of the data lives.

All of this data manipulation operates transparently to the user. It works directly with the read and write calls to the hard disk. On the surface, everything operates normally, with the exception that the capacity of the hard disk is doubled. If you were to examine the amount of compression taking place on a per-file basis, there would be much more variation. Executable files are the least compressible, while database files can easily see compression ratios as great as 7 : 1.

Ready to Commit

By committing to a program that compresses an entire drive, do users set themselves up for any unnatural risks? Possibly. But there are

Performance Comparison

Test A: copying a 1183K directory from an uncompressed floppy to a compressed hard disk (directory is a mixture of executable and data files)

Test B: copying a 1183K directory from a compressed hard disk to an uncompressed floppy (directory is a mixture of executable and data files)

Test C: opening a 70K Ami Pro 3.0 file from compressed hard disk (file is a mixture of text, tables, and simple graphics)

Time measured in seconds

Compression	Test A	Test B	Test C
None	95	69	8
Stacker	74	83	6
SuperStor Pro	106	98	8
DoubleSpace	101	98	11

two sides to the story (and considerable middle ground).

On the paranoid side, compressing a disk using Lempel-Ziv means putting your data at risk. Since Lempel-Ziv builds a dictionary on the fly from information contained in the compressed file, one wrong byte could create a cascade of disaster. Since the algorithm relies on the absolute accuracy of everything it has read to build the file, garbled information could lead to any number of mistakes, like data's being interpreted as a pointer or a pointer's pointing to a wrong instance of data, resulting in the retrieval of irrelevant data. Fortunately, when an entire disk is compressed, it's not *treated* as a single file, though, technically, it is a single file. The Lempel-Ziv algorithm looks at the disk file in sectors and builds a fresh dictionary for each unit of data read into the algorithm's buffer (generally 2048 bytes), which might contain only parts of a file or might contain several small files. If some data is misread, only

that sector's data will be lost.

On the other side of the coin, since data is compressed into much less physical space on the disk, the hard disk itself has to do less work to access a file, so the probability of an error's occurring is less than when accessing an uncompressed file.

The middle road, though, is truly the most sensible approach to take. Since the compression algorithm is performing an extra operation on your data, backing up regularly is essential (backup programs such as Central Point Backup work fine with compressed disks; in fact, Central Point's backup compression algorithm is licensed from Stac Electronics). With regular backups, it's safe to say that the inherent risks of whole-disk compression are minimized such that the benefits far outweigh any dangers.

The Turn of the Screw

So how do Stacker, SuperStor Pro, and DoubleSpace measure up? Compression-wise, it's a tossup (see accompanying table), with differences being

very minor indeed. They all perform at roughly the same level, slowing your computer down a bit (with the exception of Stacker), but hardly enough to complain about. Each supports Windows' permanent swap file (placing it in the uncompressed drive), and each boasts Windows interfaces, though each interface is passable at best. In short, the similarities far outweigh the differences, but there are a few points worth noting.

Stacker 3.0 and 3.1

Stacker 3.1 is essentially the same product as 3.0, but it's configured specially for DOS 6, replacing Microsoft's DoubleSpace and loading the needed drivers as part of the DOS operating system and not in the CONFIG.SYS file. Also, 3.1 allows a user who has already set up a DoubleSpace drive to easily convert it to a Stacker drive. Other than that, there are no real differences between versions 3.0 and 3.1.

Stacker is the easiest of the three to set up, yet the installation takes a

Hints

Here are some rules of thumb to help you live with disk compression.

- Be sure to back up your data before installing a hard disk compression product. Also, be sure to back up your data before you uninstall the compressed drive, since chances of errors are magnified as the program decompresses megabyte upon megabyte of data.
- If you're using DOS 6, either with DoubleSpace or with any other compression product, turn off SMARTDrive's lazy write feature. When DOS 6 is installed, SMARTDrive is set up so that it will not always write data to disk immediately, but will wait for an opportune moment. It's possible to lose data if you just switch off your computer.
- If you have additional drives on your system, such as a removable hard disk or a CD-ROM drive, don't expect the compression program to have the intelligence to figure it all out. You might have to go back and let your programs know the lay of the land. (My CD-ROM drive was changed from drive E to drive F during compression installation.)
- Be sure to have all of your manuals handy during installation. During each of my installations on two differ-

ent computers (a 386 and a 486), I had problems. They were minor problems—not fatal ones—but having the operating manuals handy let me track down some of the more esoteric conundrums (such as losing my 386 enhanced driver for Windows).

- Be aware that not all games will work in compressed form. If you're a serious game player, it might be a good idea to make a drive partition, creating an uncompressed logical drive for your games, and compress only your more standard applications and files.
- If you have a removable hard drive, compressing one of the cartridges makes for an extremely simple backup option. I used a 90MB removable compressed to nearly 180MB for easy whole-disk backups. In Windows, I created a macro that drags the C drive over to my removable and copies the entire thing in roughly 15 minutes.
- When you see an indication of how much free space is left on a disk, assume that it's an educated guess rather than the actual truth, since different files compress at different rates. In one instance, Windows' File Manager told me I had 229MB free, the compression program's utility informed me that I had 210MB free,

and DOS informed me that I actually had 234MB free.

- Don't use a standard disk optimizer on a compressed drive. Chances are that it won't hurt anything, but it will see the entire compressed drive as a single file. Use an optimizer designed for compressed disks.
- Copying a file (or moving a directory in Windows) within a compressed disk takes longer than copying that file to an uncompressed disk because the file must be decompressed and then recompressed.
- A hard disk compression utility is a perfect addition to a roving laptop computer. Consider a utility that will allow compressed floppies to be used on other systems for maximum efficiency.
- A compressed file can rarely be compressed further. Sometimes you can achieve an additional percentage or two of compression, but usually a compressed file actually becomes larger when compressed a second time. For this reason, one of the techniques for saving space on an uncompressed hard drive—using PKZIP to compress large files and directories—is useless on a drive compressed with Stacker or one of its competitors.

while to defragment and compress the disk (about 45 minutes to one hour for a 170MB hard drive). Once Stacker is in place, it works transparently.

Stacker offers a wide array of utilities, accessible at the command line or through Windows or DOS interfaces. In Windows, the user has the option of seeing a graphical dashboard—the "Stackometer"—showing the compression ratio, the amount of free space on the hard drive, and the amount of fragmentation. Stacker also features an optimized version of Norton's SpeedDisk to defragment the compressed files.

Stacker handles a Windows swap file very well, placing it in the uncompressed drive. If you want to change the size, though, it's slightly tricky. If you wish to make it smaller, you have to exit to DOS and change the size of the Stacker drive (an option which should be available in Windows). If you wish to make it larger, you have to exit to DOS and shrink the size of the Stacker drive before performing the operation in Windows.

Stacker allows a user to compress a floppy or removable hard disk with Stacker Anywhere, a transparent utility that will allow the disk to work on a

Compress and Back Up

One strategy for keeping your hard disk clear is to compress the files you rarely use and archive the files you never use. Chili Pepper Software has automated this process with Infinite Disk. It monitors your hard disk use and leaves often-used files uncompressed, compresses the files you only occasionally use, and prompts you to archive to a floppy the files that you haven't accessed during a specified period of time. You place a special sticker on the floppy to identify it. As far as your operating system is concerned, the archived file is still on your hard disk. The only difference is that when you access that file, Infinite Disk prompts you to insert the floppy containing its archive. It will be accessed as if it were still on your hard disk. There is no theoretical limit to the number of floppies you could use, so this method of hard disk management could yield an infinite hard disk, hence the name. The only practical limit would be your ability to maintain an orderly collection of floppies.

system that doesn't already have Stacker installed.

SuperStor Pro

Addstor's SuperStor Pro is similar to Stacker in many respects, although installing SuperStor Pro is much more demanding for the user (the newest versions of SuperStor Pro are bundled with 1.01 Enhancements, making installation a little easier). Once the system is installed, you have access to both DOS and Windows command interfaces. SuperStor Pro's Windows utility, while not as graphically pleasing as Stacker's, allows you to perform more operations, such as setting up a floppy or removable disk. The utilities allow the user to see the compression ratios and storage savings in a number of ways, even down to the statistics of an individual file.

SuperStor Pro features its own disk optimization program, as well as an additional program, JPEG Workshop, which allows users to compress color and black-and-white image files using the JPEG standard for lossy compression (achieving an average 20 : 1 compression ratio).

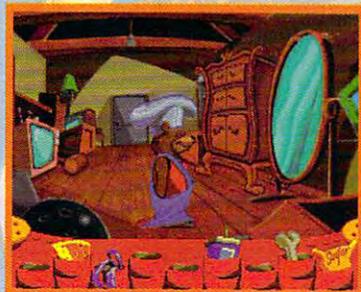
SuperStor Pro also allows removable media to be outfitted with AddStor's version of UDE (Universal



Fatty BEAR'S

Birthday Surprise

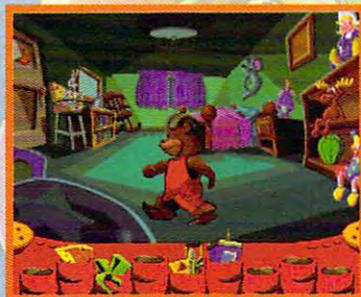
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Ages
3-7

IT
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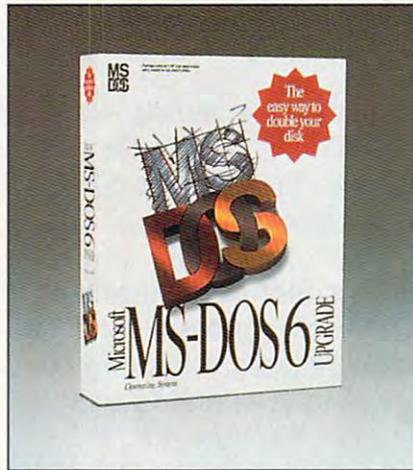
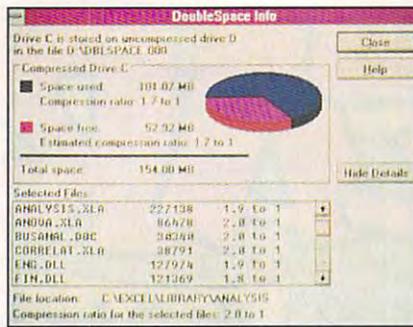
Data Exchange), which enables the disks to be fully functional on systems that don't have AddStor's product already installed.

Addstor also plans to offer DoubleTools, a compression program which, like Stacker 3.1, will supplant DoubleSpace.

DoubleSpace

DOS 6, when purchased as an upgrade, is the most cost-effective way to double a hard disk. DoubleSpace is a compression utility based on an algorithm licensed from Vertisoft (Stac Electronics is currently suing Microsoft for patent infringement; Microsoft first approached Stac to use its compression technology in DOS 6, but a deal could not be struck).

DoubleSpace is not automatically activated when you install DOS 6; it must be installed separately. When DoubleSpace compresses a drive, it creates a CVF (Compressed Volume File), which holds the compressed contents of the entire disk. DoubleSpace conforms to the Microsoft Realtime Compression Interface (MRCI), which is a standard that Microsoft hopes will be a common ground for all future software and hardware compression schemes (Stacker 3.1 and Addstor's Double-



The least expensive alternative: MS-DOS 6 Upgrade's DoubleSpace

Tools conform to the MRCI standard).

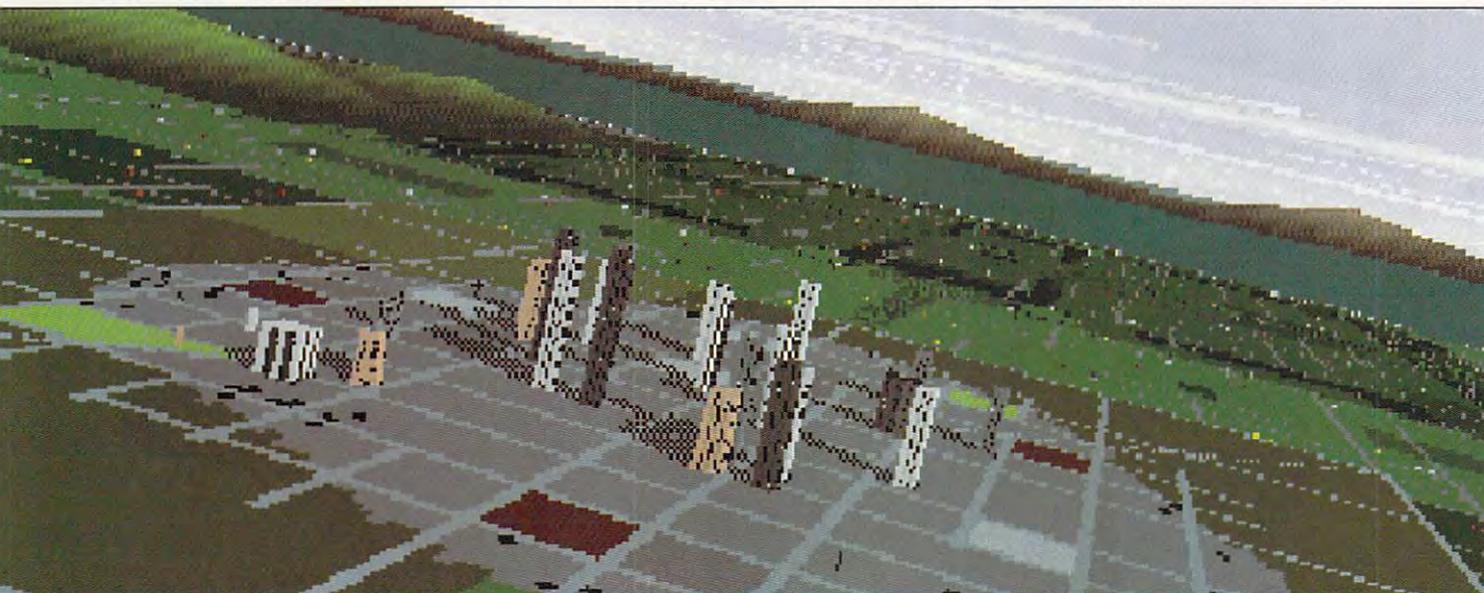
DoubleSpace offers performance similar to that of Stacker and SuperStor Pro, but it has the advantage of being a component of the operating system. A drive compressed with the other products must maintain two copies of the CONFIG.SYS file, while DoubleSpace works with a single instance of the file.

A disadvantage of DoubleSpace is that, at the time of this writing, the included optimization software was not configured to handle the compressed disk (the CVF), so it will not actually perform an optimization at all.

DoubleSpace suffers from the fact that it's the only one of the three products that doesn't offer an uninstall feature. To unDoubleSpace a drive, you must back up the entire drive, delete the compressed drive, and retrieve the information from the backup. Also, if you want to move from Stacker to DoubleSpace, you'll want to purchase a \$5 (plus \$5 for handling) utility from Microsoft called The MS-DOS 6 Stacker Conversion Kit.

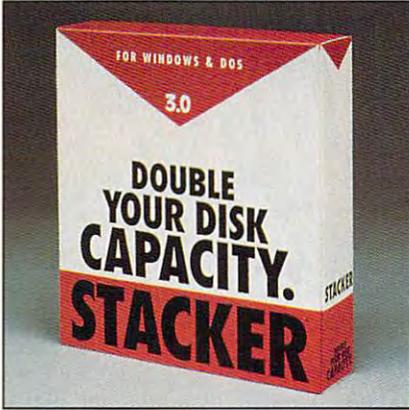
Conclusion

Hard disk compression utilities are a very exciting solution to a shrinking hard disk. The cost is far lower than that of a new hard drive, and the tech-



nology is advanced enough to install and forget. While some increased risk is incurred with disk compression, a prudent schedule of backups will protect important data.

Of the three programs mentioned above, any can be a wise and safe choice to double the capacity of a hard disk. Stacker offers the edge in ease of use, with effortless installation.



Fast and powerful: Stacker

SuperStor Pro provides the easiest access to removable media, in which the user can compress a floppy right from the Windows interface. DoubleSpace offers the cost edge, as well as

Products Under Pressure

Remember that these are list prices. Many of these products are available at significantly lower prices either through their manufacturers or through retailers.

SuperStor Pro
\$149.95
DoubleTools for DoubleSpace
\$99.00
ADDSTOR
1040 Marsh Rd., Ste. 100
Menlo Park, CA 94025
(800) 732-3133

DOS 6
\$129.95
The MS-DOS 6 Stacker
Conversion Kit
\$5.00
MICROSOFT
P.O. Box 3018
Bothell, WA 98041-3018
(800) 228-7007

PKZIP for DOS 2.04G
\$47.00
PKWARE
9025 N. Deerwood Dr.
Brown Deer, WI 53223-2437
(414) 354-8699

Stacker 3.0
\$149.00
Stacker 3.1
\$99.95
Stacker Special Edition
(only for DOS 6 users)
\$129.95
STAC ELECTRONICS
5993 Avenida Encinas
Carlsbad, CA 92008
(800) 522-7822

Infinite Disk
\$189.00
CHILI PEPPER SOFTWARE
1630 Pleasant Hill Rd., Ste. 180-200
Atlanta, GA 30136-7411
(404) 339-1812

the solidity of being an integral part of the operating system. Alternatives include Infinite Disk from Chili Pepper Software, which selectively compresses and archives files based on fre-

quency of access.

Any way you go, a compressed disk can give you that much-needed breathing room: a new allotment of megabytes to conquer. □

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PRODUCTIVITY CHOICE

Finally! A communications software package that runs under Windows, is easy to use, and has enough muscle to satisfy power users.

Tom Benford

CROSTALK FOR WINDOWS 2.0

One of the best communications packages available just got better. Crosstalk for Windows 2.0 is a new-generation product that even jaded power users will appreciate.

The product design team at Digital Communications Associates has added many useful features and implemented a true graphical interface in the program. These improvements make the new Crosstalk much more than an upgrade: It's a powerful new product.

For starters, DCA made the program intuitive and highly automated. It supports a true point-and-shoot interface that makes it easy for even novice telecommunicators to use.

Moreover, Crosstalk's ease of use begins right from the box. To install it, all that you have to do is name a target directory for the program's files; the excellent installation program takes care of the rest. The first time you run the program, you're greeted with a script configuration utility. This configuration session polls you for information about your system, including the desired COM port(s), the type of modem(s) you have installed, and other essential information. It uses the information you give it to tailor the program to your preferences and system configuration. You can even change the default directory settings for saving captured files, scripts, and more.

When you run the program, you're presented with a sessions file menu that contains icon-activated scripts for creating, invoking, or editing pre-

defined macro operating scripts. The default menu provides scripts for setting up Crosstalk in answer mode, as well as setups for AT&T Mail, CompuServe, DCA's BBS, Delphi, Dialog, Dow Jones News Retrieval, GENie, Lexis/Nexis, MCI Mail, NewsNet, and the Official Airline Guide. It also offers an easy setup for other hosts, as well as for PC-based BBSs.

DCA did a superb job with the documentation for the program. Two extremely helpful manuals are included with the package. The first is a user's guide that's well written and illustrated; it details all of the program's features and how to use them. The second manual is the CASL Programmer's Guide; it's an extensive resource for using the proprietary scripting language, CASL (Crosstalk Application Script Language; more on this later).

Crosstalk also features a comprehensive online help system that's only a mouse click away from any level of

the program. So, should you require some prompting or if you want some information about one of the software's many features, you don't have to refer to the printed documentation.

This new version of Crosstalk has support for 18 terminal emulations, so regardless of your specific requirements or terminal preferences, you're taken care of. It also covers 9 different file-transfer protocols, with variations of XMODEM and YMODEM that boost the total protocol selection to a hefty 15 choices.

Going well beyond merely configuring itself to your hardware, Crosstalk takes full advantage of the data- and resource-sharing features that Windows 3.1 provides while utilizing Windows' protected mode and memory management facilities. It also supports Windows' Dynamic Data Exchange (DDE); this means that you can link Crosstalk with other applications to ex-



change information.

If you're a telecommunications power user, you'll be pleased that Crosstalk also conforms to the Windows Multiple Document Interface (MDI) specification, a feature which permits you to have multiple communications sessions in progress. If you have the hardware to support COM ports 1-4, the program supports them for multiple sessions at the same time.

You'll also appreciate Crosstalk's inherent data-sharing capabilities, which allow you to easily cut and paste information from one session into another session. This helpful feature adds tremendously to the program's flexibility and functionality. And because each session sports its own toolbar, it is quite easy for you to access commonly used functions regardless of where you're currently located in the active sessions.

The CASL manual and the thick programmer's guide provide conceptual information about writing Crosstalk scripts. It's helpful for the inexperienced programmer and still provides ample detailed reference material to keep the sophisticated applications developer happy.

Remarkably similar in its power and command format to both C and Pascal, CASL can be used to create any type of script imaginable—from a simple log-on to online services such as MCI Mail or CompuServe, all the way up to extended scripts that are capable of running fully automated communications sessions unattended.

Crosstalk can also run most scripts that were created with Crosstalk Mark 4, DCA's popular advanced com-

munications program for DOS. This is good news for people who are migrating from the DOS environment and have a library of existing Mark 4 scripts. When they make the change, they won't have to manually duplicate their Mark 4 scripts' content in this program.

The program also features a learn mode that creates scripts by monitoring your interactions with a host and recording them in a script. You can then run the resulting script as is in subsequent sessions with the same host, or you can edit it to strip out unwanted sections and to add more functionality.

QuickBar icons are another useful feature that you'll appreciate. They let you quickly initiate tasks such as transferring files, capturing screens, and running CASL scripts. All of the items presented in the opening menus have QuickBar icons attached to them, so all you have to do to select and initiate an activity or function from one of those menus is to click on the appropriate QuickBar icon.

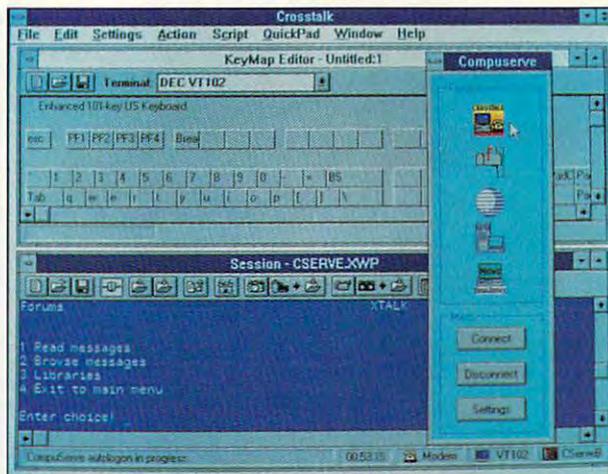
QuickPad is another powerful new feature. It lets you create customized onscreen keypads that include objects representing your most frequently used keys, key sequences, and scripts. To perform a specific function, all you have to do is click on the object that represents it on the QuickPad.

Crosstalk also features a built-in text editor. This is helpful when you are working with scripts and text files, as it expedites the tasks of creating, editing, and printing text files—within the program. The graphical keyboard editor in the program makes it easy to

customize your keyboard layout. With it, you simply click and drag keys wherever you want to assign them. You can also use the keyboard editor to assign scripts and key combinations to individual keys and scripts.

Network users will want to take advantage of Crosstalk's powerful modem-sharing capabilities. There are two popular LAN APIs (Local Area Net-

IBM 80386 or compatible, 400K RAM, Windows 3.1, hard disk with 4.5MB free—\$195; upgrade from previous versions or from competitors—\$49



work Application Programming Interfaces) compatible with most asynchronous communications servers that Crosstalk supports: INT4 and NetWare Asynchronous Services Interface (NASI).

Overall, Crosstalk for Windows 2.0 is a very impressive package. It's hard to imagine how DCA could have made this great program any simpler or friendlier to use. Yet despite making it easy to use, DCA managed to pump Crosstalk with plenty of power. Whatever your telecommunications requirements might be, you'll find that this telecommunications package not only meets but exceeds your telecommunicating needs. □

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PERSONAL PRODUCTIVITY

Daniel S. Janal

BREATHING ROOM

Five years ago, a 20MB hard disk was considered a huge warehouse for your data. Now, it isn't uncommon for some games and business applications to take up 25MB of hard disk space. If you use Windows or a graphics program, it's sure to take up a lot of hard disk real estate. And if you own a laptop, which generally has a smaller storage system than a desktop PC, you have an even more urgent need to use your limited hard disk space wisely.

The advantages of reducing the amount of space you use on your hard disk are that your programs will run faster, you'll be able to keep more vital information immediately available, and you'll have room for those little utilities and games that make owning a computer worthwhile even when there's no work to do.

Here's how to get the most out of your disk.

Prune regularly. Do you really need your invoices from 1983 on your disk? Or the game you haven't played since your son graduated from ABC's to UCLA? Maybe it's time to prune the dormant files from your disk forever, or at least copy them to a floppy where they can be stored for an IRS audit or for your grandchildren when they learn to read.

For commonly used programs, you might be able to delete files that are not essential to running the programs—now or ever. For instance, you might want to copy the README file to a floppy in case you ever need to use it. In the meantime, you free up valuable space. Check the manual to see if it lists the unnecessary files that can be erased with-

out damaging the program. For instance, if you use DOS in the United States, you probably won't ever use the keyboard program for Germany that sits in your DOS directory. Warning: Don't kill a file if you aren't 100 percent sure that it isn't needed. There are many files in your program directory that might seem cryptic but actually perform valuable functions. You'll find out when you're on deadline.

Windows users can find gold mines on their hard disks by eliminating never-used ac-

cessories, like Windows Write and Card. Go to the Main menu, choose Windows Setup, choose Options, and then choose Add/Remove Windows Components. You'll see check boxes for Readme Files, Accessories, Games, Screen Savers, and Wallpapers, Misc. Eliminating the accessories will save 1.5MB.

Many programs have tutorials. Once you've read them, kill them. Also, Word for Windows users can eliminate the import filters for never-used word processors and graphics file formats.

Some programs automatically create backups whenever you save a file. Delete the backups, or turn off the automatic backup command. Clip art and templates can also clutter your disk.

Archive. For files that absolutely, positively have to be accessible and can't be in a drawer of floppies, consider archiving. Archiving is a method of compressing a file or group of files into a single compressed file that occupies a fraction of the space. When you need to read or write to the file, you can select the file and expand it back to its original size so that it can be edited. Many free and shareware archive programs are available on bulletin boards.

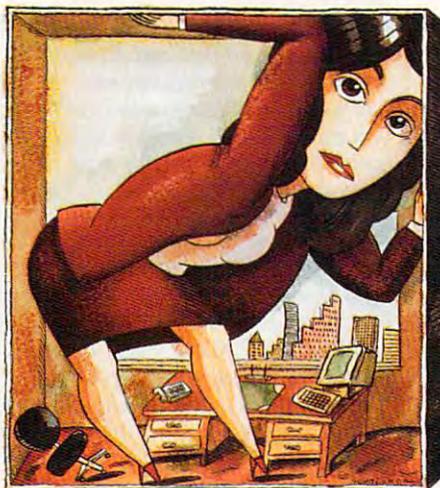
Compress. If you don't want to go through the trouble of individually archiving dozens of files in dozens of directories, consider compressing everything on the disk. Several software programs can do this. Stuff It, Stacker, Double Disk, and DOS 6 are widely available for less than \$100. These programs compress every file on your hard disk. You could easily double your disk space and turn a 60MB hard drive into a

120MB hard drive in minutes. Programs load almost as quickly as they do without the compression software.

Be sure to read the installation procedures, back up your data, install the compression program carefully, and run every application program you have on your disk to make sure it works.

Squeeze. Keep your eye open for duplicate files, duplicate directories, and directories and files that could be dumped to a floppy or printed out and filed in manila folders. Archive or use a disk compression program. Back up and delete files you rarely use. Your hard disk will repay you with better performance. □

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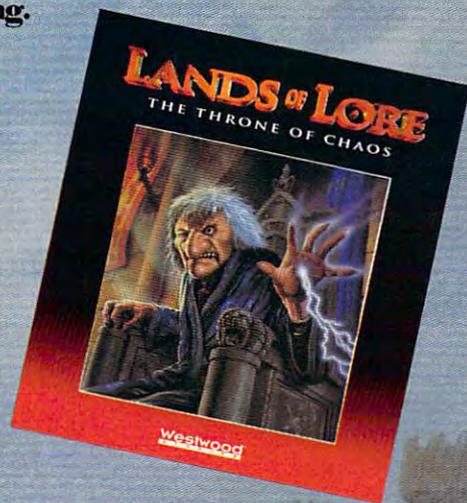
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ART WORKS

Robert Bixby

ROCK ON CD

For too long we've put up with monochrome backgrounds in printouts and presentations. Or, just as tiresome, the blue-to-black gradient fill. Sure, it makes the words easy to read, but a ho-hum background has to have a yawn-inducing effect on the information being presented.

That's why I was excited when I saw Marble & Granite (ArtBeats, P.O. Box 1287, Myrtle Creek, Oregon 97457; 505-863-4429; \$349), a two-CD-ROM collection of rock textures actually digitized from the rock face. They make anything set against them look as solid and respectable as old money. In the old days, before blond wood and ferns took over, bank lobbies used to be

Pixar One Twenty Eight gives you the textures you need to win attention for your publication or presentation.



lined with marble and granite in order to give the customers a sense that the bank had permanence and durability. The collection features dozens of different kinds of rock in special files for typesetting or laser printing.

But you might be looking for some textures that weren't quarried. In that case, Pixar has what you're looking for in a single-CD-ROM product called Pixar One Twenty Eight (Pixar, 101 West Cutting Boulevard,

Richmond, California 94804; 510-236-4000; \$299). True to its name, the Pixar product offers 128 photographic textures, including some granite and marble, but also including many woods, bricks, fabrics, shingles, and more. Each texture is in two formats: a high-resolution (512 x 512 x 24-bit) version and a low-resolution (128 x 128 x 8-bit) version. Although they don't have the TIF extension, you can load them as TIF images into any program that can work with that format. Special software is included to ease use of the product with PhotoShop and PhotoStyler. The textures can be tiled seamlessly to fill a screen.

A similar product, Atmospheres (TechPool, 1463 Warrensville Center Road, Cleveland, Ohio 44121; 216-382-1234; \$129) provides backgrounds in a vector format, along with a file conversion program that will translate the vectors into raster formats, if that is your preference. Atmospheres is available in separate packages with titles such as Geometric, Patterns, Cityscapes, Habitats, and (the package reviewed) Classics. Since the product comes in a vector format and at such a low price, Atmospheres ought to have a lot going for it. However, I found the images to be not very interesting. They have the look of vector clip art—the images are composed of simple areas of flat color. A ghosting program tones the colors down so they won't interfere with whatever is in the foreground.

If it's clip art you seek, you should look over the offerings of Masterclips. If your needs are specific, Masterclips has a series of 24 clip art collections with different themes (Masterclips, 5201 Ravenswood Road, Suite 111, Fort Lauderdale, Florida 33312;

305-983-7440; \$19.95 each) with titles like Humor, Business/Finance, Communications, and so forth. But if your clip art needs are general, Masterclips has a big, big collection of over 6000 clip art images on CD-ROM called, well, Masterclips, of course (\$299).

All of the images are CGM-format vector drawings in full color. Included is a color-to-monochrome utility and a browsing utility that makes it easier to find the perfect image for your needs.

I'm always looking for new and unusual ways to publish, and I think I've found one of the most unusual. Remember the tattoos you would occasionally find in a Cracker Jack box? The concept has come a long way since I was a kid. Nowadays, temporary tattoos let you have a realistic, colorful tattoo, even if you hate needles. They're hot among kids, and they make interesting conversation pieces.

What does this have to do with desktop publishing? J.B. Marketing (1017 Fifth Street, Coronado, California 92118; 619-435-2322) can turn your graphics into tattoos. You can put your logo or advertising message on biceps all over town.

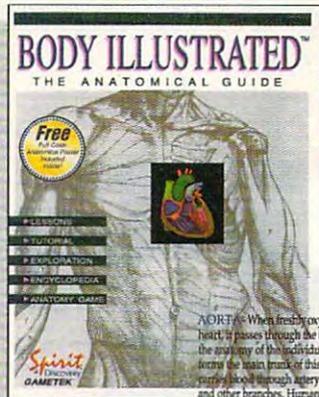
The washable, waterproof tattoos last 3-5 days and are easily removed with baby oil or rubbing alcohol.

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

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Designed to be fun and easy to use, BODY ILLUSTRATED is a visual and audio guide to exploring the human anatomy. BODY ILLUSTRATED examines hundreds of body parts from different views and is full of detailed illustrations with stunning realism. With just a click of the mouse, each part is explained in clear, non-technical language. A digitized voice provides the correct pronunciation of anatomical part names, "Instant Help" eliminates the need for referring to the manual.

BODY ILLUSTRATED teaches either by lesson method or through the use of the game mode. It is an ideal study guide for students. It's also a valuable reference tool for lawyers, doctors, nurses, clinics, or anyone who needs to know about the human anatomy. Instructors can easily use BODY ILLUSTRATED as an interactive anatomy teaching aid. Included in the box is a full-color anatomical parts poster and a written study guide.

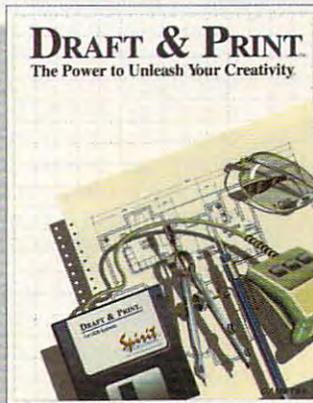
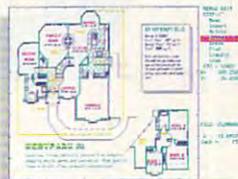
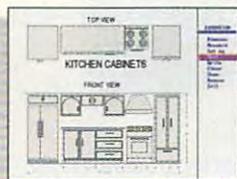
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PC Magazine

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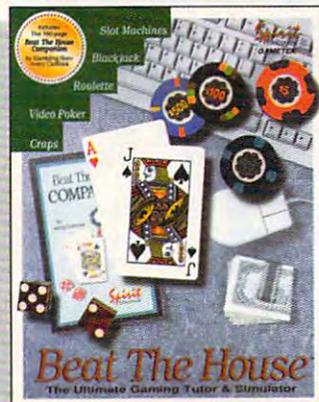
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DISCOVER

DISCOVERY CHOICE

Children learn physics as they race across the galaxy in this entertaining game.

David Sears

QUARKY AND QUAYSOO'S TURBO SCIENCE

Consider the popular misconception of science nuts: reserved and reclusive math-crazed social outcasts who concern themselves first with research and last with physical exertion. Adults know better, and everyone probably remembers at least one well-rounded athlete and scholar from high school or college, a person as at home in the laboratory as in the gym. Just try telling your children that they can have the best of both worlds, though. If they remember the cross-generational parade of nerds from movie and TV history, they'll stick with a good game of baseball or a day of bike riding rather than glance at a textbook.

But that was before Quarky and Quaysoo's Turbo Science, a delightful game in Sierra On-Line's Discovery series. More than being just an unusual title, Turbo Science manages to integrate scientific investigations, spirited competition, and some hilarious cartoon humor in a package designed to show kids that physics isn't for nerds only.

First off, the game's namesakes hail from New Delhi, India. Though tittering space elves, the blobbish little creatures show tremendous spunk and intelligence. Like members of so many other space-faring species in other stories, Quarky and Quaysoo found themselves bored silly without cerebral challenges, so they masterminded a competition called Turbo Science.

Perhaps more popular than the space elves intend-



ed, the science competition attracts contenders from across the galaxy and as far away as Australia. The reigning champ defends her title after players climb through the difficulty ranks and dominate both the churlish Das Liquidators and the smug Cool City Maulers. Besides being a humorous lot, these opponents show children that it takes all sorts of people to keep the world spinning.

The actual competition consists of conducting research and answering questions. Oh, no—it's a test! Well, not really. Turbo Science is actually more of a cross-country team effort to prove that you know more than your opponents—the sort of challenge that kids relish.

As each race begins, players appear on a map depicting the game environs, from mountainous retreats to urban sprawl and down to the beach. Each race winds through slightly different territory, so players won't encounter the same characters and locales too often.

At each location, kids have the opportunity to earn money

by answering questions about objects, people, and phenomena they see there.

For each spot on the map, Sierra's artists did a fine job of merging whimsy with an essential precision—young scientists-in-training will poke, prod, and investigate virtually everything that appears onscreen. To do this, children simply use the pointer to click on points of interest. The program makes more significant detective work possible with the researcher's toolbox, which is available on the icon bar at the bottom of the screen.

Clicking on the Eye icon and then clicking on onscreen objects invokes a pop-up window full of amusing bits of information—a description of the big-brained Dr. D. Vious, for one. With a click on the Tools icon, kids can summon a full box of tools that every serious explorer needs. Within the box is a voltage meter that reveals the shock value within thunderclouds, power lines, or electric sockets. A sound meter counts the decibels emanating from screaming children, noisy motor-

bikes, and ice cream trucks. Other tools include a tape measure for pinpointing distance, length, and height; a beaker that tells volumes; and a scale that weighs almost everyone and everything.

Players could perform their entire investigation before attempting to answer even a single question, but with so many objects onscreen at once, they'll certainly miss a few important tidbits of information. Still, if they choose this strategy, they'll improve their memories as they attempt to retain large amounts of data.

Turbo Science doesn't stress memorization extremes, however, and once the questions begin, all tools remain available for use. If a player can't quite remember which mountain climber has the least mass or which light source burns the brightest, it's easy to take a moment to find out. The competitors continue to struggle with their own questions, though, so the local Turbo Science team should keep its investigations brief.

Sometimes a question might prove too difficult for even veteran Turbo Science scientists. In those rare cases—say, when kids need to know about air pressure differences between elevations or the nature of electrical current—they can take time out by clicking on the Research icon and cracking the books. One book, actually: Turbo Science Research Guide, a 145-page feast for hungry minds.

Sierra crammed each page with the laws of physics, clear explanations, and humorous examples. Children will also encounter great moments in science history in the book, as well as inventors

and scientists (plus more amusing characters). Turbo Science refers players to the exact page they need to read for the question at hand, but the material found within the text is so well done that many kids will probably keep reading long after finding the necessary information. In fact, the research guide stands up fine on its own and makes perfect reading for a kid's spare time.

As the difficulty level increases, the race route passes through more locations on the game map. Kids may choose a variety of strategies to win. One strategy is to answer a few questions, earn enough money to BMX to the next checkpoint, and then answer more questions—whatever it takes to stay ahead of the competition.

An alternative method, though one that requires somewhat stronger nerves, has players answer questions and earn the maximum \$9,999 for a location, then buy the most expensive transport to zoom ahead of their opponents. Either strategy promises some entertaining interlude animation as Quarky and Quaysoo speed on their way.

Turbo Science works overtime to provide positive feedback. After each correct answer, Quarky or Quaysoo—depending on whom the player selected to run the race—teleports, flies, moonwalks, or explodes onto the screen, yelling support for his human teammates. At the finish line of each race, Paco Suave, a Turbonet newscaster, interviews either the winners or the losers, and while the dialogue runs on the silly side, it never insults a child's intelligence—a matter of serious

importance for an educational product.

The music for every screen serves well, but the gold stars for truly superior aural achievement go to the samples. A flurry of grunts, mild insults, and random chatter from the cartoonish space elves adds considerably to the fun.

Children will love Quarky and Quaysoo's Turbo Sci-

IBM PC or compatible (16-MHz 80386 or faster), 640K RAM, 256-color VGA, 3½-inch high-density floppy drive, hard drive with 3MB free, mouse;



ence just for the gameplay. And if your youngsters ever ask things like why steel ships don't sink or how airplanes fly, now they can find out for themselves.

Through the act of discovery, players are bound to uncover more than the simple kinds of answers we adults could give them in the often minimal amount of time we have to spare after work or before dinner. So give your children Turbo Science, and they'll uncover the answers they're seeking. But for real-world demonstrations, you'll still have to take the little knowledge hunters on expeditions to the Hoover Dam, the airport, or even the circus. □

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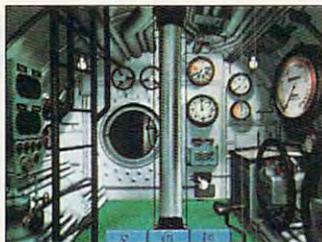
GAME INSIDER

Shay Addams

VIRTUAL UNREALITY

This is absolutely the last time I'll ever attend CES via its new virtual-reality option, created "exclusively for journalists unable to travel to Chicago for the Consumer Electronics Show." Due to a telecommunications glitch caused by one whopping big sunspot, I inadvertently entered the online virtual world of TSN (The Sierra Network)—and spent the next three days trying to find my

Killer barbecues, tunnelers, dwarves, U-boats, monsters and mazes, and a new Lowe in adventure make the Consumer Electronics Show set Chicago afire for computer gamers.



way out of Larryland! I managed to rip the virtual helmet off my head just in time to catch the last flight out of Tucson and see demos of all the new games previewed at CES—several of which should be on the shelves by the time you finish this sentence.

One I can't wait for is Bloodstone, an epic Dwarven tale that's "a role-playing game in the classic style," according

to Mindcraft's Ali Atabek, best known for his Magic Candle series. "No technological marvels, no startling new features," he continues. "It's the gameplay and intriguing story that make Bloodstone." What Bloodstone lacks in bells and whistles, it makes up for with curious characters, bizarre races, and unconventional monsters. The Killgrill, for instance, is a ferocious creature that looks exactly like a barbecue grill. Another uncommon aspect is Bloodstone's incorporation of alternative endings. As you progress through the quest, you must constantly make decisions regarding two Dwarven tribes, and the outcome hinges on which tribe you choose to help.

Siege: Walls of Rome is Mindcraft's follow-up to Siege. In addition to a different historical setting, it features a wholly rewritten engine whose artificial intelligence is less predictable than that employed in Siege, making the game more challenging. You wage similar battles: knocking down or defending city walls and fortifications with catapults, boiling oil, and infantry troops. Walls of Rome also introduces a heightened sense of authenticity. Mindcraft thoroughly researched ancient Rome to make the troops, weapons, and other aspects of the game as historically accurate as possible. The Carthaginians ride elephants into battle, and sappers (used to tunnel under walls and collapse them) form an important and realistic part of your arsenal in this tactical war game.

Mindcraft also has a futuristic strategy role-playing game called Strike Squad on the way, offering the latest in high-end graphics and animation.

Dynamix's first sub simulation, Graue Wölfe (Gray Wolf), is an all-new interpretation of submarine warfare designed

by Mike Jones, who did the classic Harpoon. It's built around a graphics and menu system similar to Dynamix's Great Warplanes series. In addition to individual missions as a German U-boat captain, you may also play out an entire career that spans World War II. A new implementation of Dynamix's 3-Space technology depicts ocean waves when you're surfaced or looking through the periscope as you've never seen them in a computer game.

Evil wizards, power crystals, mazes, crypts—all the trappings of the traditional monsters-and-mazes genre await the adventurer who sets foot in King's Ransom, a role-playing game from Canada's ReadySoft. Its most distinguishing aspect is graphics that scroll in any direction when you move. According to ReadySoft, the frame rate hits 60 frames per second, which accounts for the incredibly smooth scrolling.

Next month, look for Leisure Suit Larry VI, the latest in Al Lowe's series about Larry Laffer and his nonstop quest for girls, girls, girls. This time, you, as Larry, enter a TV dating game show. The grand prize is a two-week vacation at the La Costa Lotta resort, where Lowe promises Larry will meet "more girls than ever before!" as you quest your way to a world-class rendezvous in the penthouse suite (but not with Passionate Patti!). Sierra says there is no frontal nudity, but the game is rated PG-13. With Larry VI Sierra launches a new and unique look for each new adventure. This one will show hi-res graphics when running in Windows, as well as lo-res graphics under DOS. It also introduces a scrolling text window at the bottom of the screen, one you can scroll back to review recent dialogue and narration. □

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As a student at the TCSN Academy, you custom-design and fly unique combat, rescue, and search and retrieval missions from the CyberSchool's holographic simulator. In the *Wing Commander* tradition, the game features a dynamic musical score, improved rendered, bit-mapped graphics, and a dazzling array of customizing options. But *Wing Commander Academy* is not another cinematic extravaganza — it's an intense dogfighting marathon.

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- ◆ Climb into the cockpits of the new Confederation *Wraith* or Kilrathi *Jrathek* fighters for a new combat experience.
- ◆ Select a cybernet wingman — from a frightened cadet to a hotshot veteran.
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MULTIMEDIA PC

David English

WHAT'S NEW IN PC SOUND?

COMDEX is never dull. It allows companies to trot out their latest hardware and software for the rest of the industry to see. This year's Atlanta COMDEX showcased two impressive PC-based audio technologies.

The first involves a new chip from Yamaha. If you have a sound card in your PC, it most likely has a Yamaha OPL2 or OPL3 chip. It's the chip that gives you Ad Lib compatibility and allows you to add music

and sound effects to your PC games. These chips are actually simple synthesizers that can simulate (with varying accuracy) musical instruments and electronic sound effects. Most sound cards also have chips that let the card play back recorded sounds. These chips let you hear narration and real-sounding music and give you what most people refer to as Sound Blaster compatibility. This kind of sound is very realistic because the actual recorded sounds are stored on your disk or CD-ROM. On the downside, they take up huge amounts of disk space—as much as 10MB a minute when recorded at CD-audio quality.

A third kind of PC-based audio is called MIDI (Musical Instrument Digital Interface). MIDI is an electronic communications standard popularized by the synthesizer companies. An extension of the standard, called General MIDI, has become so popular on the PC that some sound cards now have General MIDI built in or offer it as an add-on. Most General MIDI systems use a wave-table technology where the sound of an instrument (such as an organ or trumpet) is stored in a ROM chip. The musical instruments sound very realistic because the actual patterns of the sound are used to re-create the sound. And because MIDI files basically store only note-on, note-off, pitch-change, and instrument-change information, General MIDI is extremely efficient—often 1/100 the size of a WAV-based audio recording.

Soon, every sound card, even the inexpensive ones, will be able to include General MIDI. At COMDEX, Yamaha announced its new OPL4 chip, which is essentially an OPL3 chip with a built-in 2MB General MIDI ROM chip. An optional chip, the YSS225 Effect Processor, will let you add high-quality sound effects, such as echo, reverberation, flange, distortion, panning, and surround. Why should you be interested in adding General MIDI to your sound card? If you play games, you'll hear dramatically better music (check out The 7th Guest and X-Wing, and you'll wonder where they're hiding the orchestra). If you're into music, you'll have the guts of a high-quality synthesizer on your sound card. Add an inexpensive MIDI keyboard, and you'll have a music workstation. And check out Musitek's new program, called MIDISCAN for Windows. Scan your sheet music with a hand-held or flatbed scanner, and MIDISCAN will

convert it to a standard MIDI file that you can play on your General MIDI sound card.

The other interesting development in audio technology at COMDEX was the growing number of sound cards that feature a DSP (Digital Signal Processor). A DSP is a separate processor that can run specialized programs independently of your computer's main processor. Creative Labs announced that it will support the three-dimensional QSound technology with the Sound Blaster 16 ASP's built-in DSP processor.

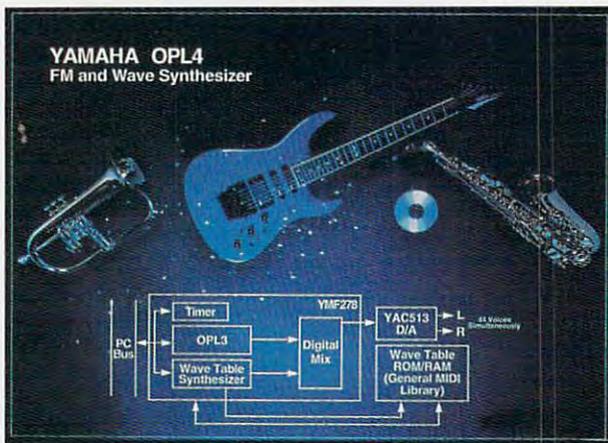
Centigram showed its TruVoice text-to-speech software that converts spoken English or Spanish into natural-sounding computer speech. Dragon Systems demonstrated DragonDictate, its advanced voice recognition system, which has a 30,000-word active vocabulary. Both programs will be available for sound boards that use Analog Devices' DSP chip.

Sierra Semiconductor also announced QSound and voice recognition for its DSP chip. Interplay will be shipping a special voice recognition version of STAR TREK: 25th Anniversary with many of the sound cards that use Sierra's DSP (also known as the Aria chip set).

As you can see, sound cards aren't just for game music anymore. We're about to see a revolution in the PC's ability to work with sound.

New Multimedia Section

Starting with our November issue, COMPUTE will have a monthly eight-page Multimedia PC section, and that's in addition to our usual multimedia reviews. Each issue will include this column (renamed "Fast Forward"), a four-page multimedia feature (with special emphasis on how-to and product-round-up articles), a one-page multimedia product spotlight, and two pages of the latest multimedia products. □



Because of Yamaha's new OPL4 chip, the next generation of sound cards will include General MIDI.

and sound effects to your PC games. These chips are actually simple synthesizers that can simulate (with varying accuracy) musical instruments and electronic sound effects.

Most sound cards also have chips that let the card play back recorded sounds. These chips let you hear narration and real-sounding music and give you what most people refer to as Sound Blaster compatibility. This kind of sound is very realistic because the actual recorded sounds are stored on your disk or CD-ROM. On the downside, they take up huge amounts of disk space—as much as 10MB a minute when recorded at CD-audio quality.

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ENTERTAINMENT CHOICE

Pamper astronauts, launch rockets, and risk lives as you race to be the first in this early-space simulation.

Scott A. May

BUZZ ALDRIN'S RACE INTO SPACE

Where were you when man first set foot on the moon? This question once defined a person's connection to one of the most pivotal events in human history. Twenty-four years later, in a world where space shuttles are almost commonplace, Apollo 11's epic flight seems to have lost much of its significance.

Now you can recapture the milestones, setbacks, triumphs, and tragedies of this remarkable era with Buzz Aldrin's Race into Space. Whether you're reliving faded memories or experiencing it for the first time, this is one voyage you won't want to miss.

The game represents a marvelous first effort by designer Fritz Bronner and is based upon his 1988 board game, *Lift-off*. Like many of today's so-called white-collar simulations—*SimCity* (Maxis), *Railroad Tycoon* (MicroProse), and *Utopia* (Konami)—*Race into Space* is essentially a game of top-level resource management.

As mission director for either the U.S. or the Soviet space program, you oversee production, planning, testing, and launching of unmanned and manned rockets. The first country to land a man on the moon and return him safely to earth wins the race. The game's distinctive twist is its historically accurate backdrop of Cold War tensions and politically motivated breakthroughs. It's an intense melding of ideals, strategy, spirit, and speculation into a viable game format.

The computer simulation sports one player per side,

with the usual combinations of human- and computer-controlled opponents. Multiple game types and difficulty levels help balance the odds between disparately skilled players or increase the challenge when you're matched against the computer.

The Historical Model ordains higher costs and better reliability for the U.S., while the Basic Model begins the game with the two sides on equal ground. Both models can have historical or customized astronaut and cosmonaut rosters. Three difficulty settings not only affect overall conditions and performance levels but also raise official expectations of your job. Fall too far behind, and you'll be fired. Three levels of difficulty raise or lower your management of this most precious cargo.

The race officially begins in the spring of 1957 and progresses in single turns, each equal to six months' time, for a maximum of 20 years. An attractive aerial view of each

country's spaceport—Cape Canaveral in the U.S. and Baikonur in the U.S.S.R.—doubles as a main navigational menu. As each side's programs evolve, many more buildings are added to the map. On the horizon loom such emblems of government influence as the Capitol (or Kremlin) and Pentagon (or KGB headquarters). Also within view are Arlington National Cemetery and the Kremlin Wall, which serve as grim reminders of the dangerous tasks that lie ahead.

The most important steps in creating a thriving space program are to set short- and long-term goals and then establish an itinerary. The race is composed of a series of mission milestones, like rungs on a technological ladder, each taking you a step closer to the moon.

Historical milestones include everything from orbital satellites to manned lunar landings. Each phase contains



many test missions for equipment safety, duration limits, and astronaut training, for a total of more than 300 mission variations. Your job is to secure sufficient funding, purchase necessary equipment, budget research and development, design missions, and schedule launches.

Follow the historical guidelines with no major mishaps, and you'll be rewarded with prestige points, which mean higher ratings and increased funding. You must complete many programs to successfully complete a milestone, but you can skip others or cut them short. The elaborate strategic considerations and decisions you face add both stress and risk management to your already weighty list of responsibilities.

Other fascinating aspects of play include astronaut recruitment, training, and what amounts to psychological coddling. Choose to play from the historical roster, assembled from 106 simplified profiles (per side) of real-life flyboys, or create your own customized characters.

Astronauts are rated on five skills: capsule handling, lunar module piloting, spacewalking, docking, and endurance. After you've assembled primary and backup flight crews, you assign each to the appropriate training facilities to bolster their ratings. You must also monitor your flight crews' emotional well-being: Astronauts are a highly competitive breed and respond negatively to inaction. Some simply don't get along; pairing incompatible recruits provokes bad feelings that could jeopardize your mission.

Despite the administrative nature of your duties and the

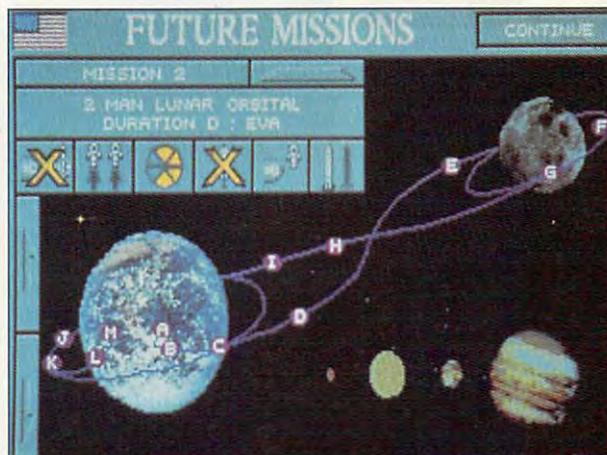
lack of time limits imposed on players' turns, the game instills momentum with its subtle sense of urgency. As your programs grow through various stages of rocket and class of spacecraft, the stakes are raised and tension mounts. Your job entails far more than pencil pushing; you must judiciously and firmly push the envelope on space exploration. Should you skimp on research and development costs or fudge the recommended safety factor? Is it worth bumping up a launch date—risking time, money, and lives—in the name of Cold War posturing? These are just a few of the questions you must contend with in a high-tech whirlwind of politically charged cause and effect. Although you have no direct control of a mission once a rocket launches, it's tremendously exciting to watch each stage unfold, with the promise of success and the threat of failure.

The graphics are extremely well designed, including bitmapped, digitized, and ray-traced artwork spread among nearly 30 information-packed screens. The program boasts CD-quality multimedia effects with more than 1000 historical photos and stop-motion animations. Although a far cry from realtime video, these make-shift animations add substantial flavor to what otherwise could've been a dry simulation. The bland musical score is best turned off, but keep the digitized samples of rumbling launch effects and mission control chatter. One complaint: The game consists almost entirely of static screens, but the designers didn't double the graphic resolution or offer an SVGA op-

tion. Games with such technical information desire a slick, hi-res veneer.

Included are Bronner's excellent product manual and supplementary 132-page historical guide, *The Conquest of Space*, cowritten by Robert Reeves. Both documents are generously illustrated—the first with itemized screen shots and charts galore, the latter with NASA photos and chronologies of historical events. To feed the interest these books stimu-

IBM PC or compatible (12-MHz 80286 or faster, 80386 recommended); 550K RAM; MCGA or VGA; hard drive with 16MB free; mouse recommended; supports Sound Blaster, Sound Blaster Pro, Ad Lib,



late, Bronner also has written *Buzz Aldrin's Race into Space Companion* (Osborne/McGraw Hill). A terrific 400-page collection of designer notes, insider tips, strategies, and history, it includes Bronner's interview with Edwin ("Buzz") Aldrin.

Buzz Aldrin's *Race into Space* is the first computer game to fully capture the complexity, intrigue, and exhilaration of this volatile period in history. The integration of these elements into a dynamic strategy contest, with profound educational merit, is nothing less than extraordinary. □

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GAMEPLAY

Paul C. Schuytema

BURNING RUBBER

On a weekend drive down an unfamiliar, winding road, I long for an old MG-TD to tame the banking blacktop. Of course, a manual transmission is essential; I glide through the gears to the reassuring "snick" of the tight clutch. I turn the wooden steering wheel tight into the corner, finding that perfect line where the car seems to ride on rails as it accelerates into the straightaway. Crowds cheer, and I choose not to pit. Instead, I try to put one more lap between me and the pack.

Let one of these simulations drive you to exhilarating exhaustion as you control the most powerful machines on the road.



Shaking my head, I realize that it's the middle of the week and I'm not out on a twisting road or burning up the Grand Prix at Hockenheim. I'm safe in my Midwestern study, dripping sweat all the same as I eat up the asphalt on my PC, steering wheel in one hand, joystick in the other.

When I loaded *Car and Driver* from Electronic Arts, I trembled at its possibilities. Set up as an electronic issue of *Car and Driver* magazine, the game features in-depth articles that focus on ten cars, from the Lamborghini Countach to the Shelby Cobra.

There are also articles on ten different driving areas, from the Mahomet drag strip to California's Route 1. You choose a car and a place to drive, slide on the fingerless leather gloves, pop the clutch—and you're off.

I've found that two of the nearly limitless scenarios really feed my driving machismo.

The first involves taking a 1957 Ferrari Testarossa on Highway 97 in New York.

This classic car zooms over the hilly roads, narrowly missing the stream below the road on one side and the oncoming cars in the other lane. The drive is set up as a timed point-to-point race, and I'm constantly racing against a recording of my last best race.

My other pulse-pounding favorite scenario lets me take a Mercedes C11 IMSA to the banked, oval Super Speedway. Slamming down the accelerator, I keep one eye on the rpm as I shift up through the five speeds to well over 200 mph before I hit the first bend, just ahead of my three competitors. The feeling of speed is so real that I can barely breathe as I try to keep the screaming Mercedes on track (any harsh moves and the wind will whip under the car and lift it like a feather).

After any race, successful or not, I can watch the replay in a hi-res simulation of a television broadcast with different cameras panning to follow my car.

For my more cerebral driving fantasies, I turn to *World Circuit* from MicroProse. A *Formula One* simulation, *World Circuit* gives me the chance to battle for points in a panglobal series of Grand Prix races.

World Circuit somehow replicates the real feeling of competing in a championship international race. All the variables add up to a true knot in my stomach as I wait for the green light.

World Circuit's hypnotic representation of the Zen of driving is not an effect to which I alone am enslaved. My wife, who seems at times to be a professional computer skeptic and who certainly is the hardest sell for a computer game that I've ever met, sat mesmerized as she battled a three-

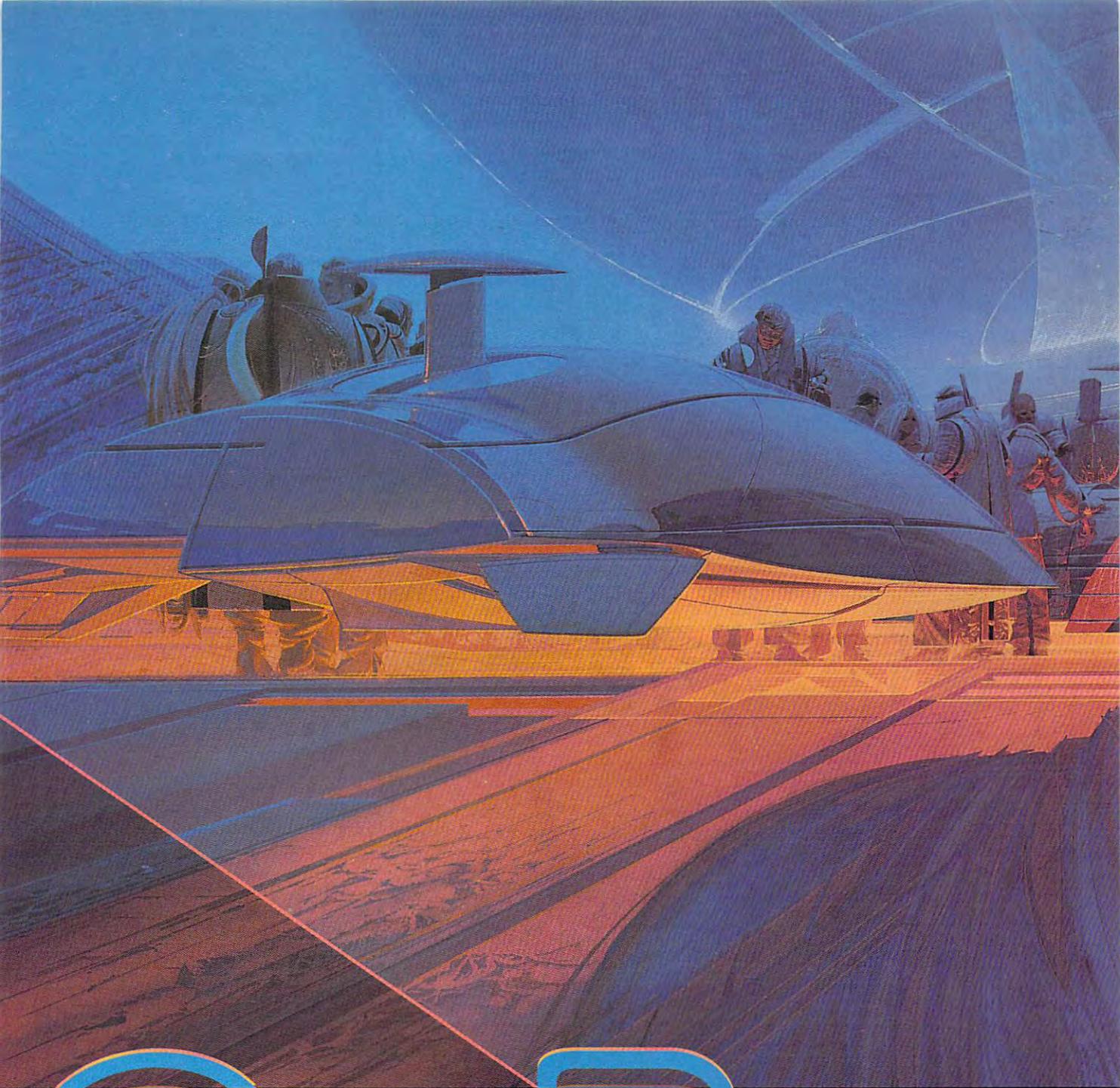


lapper at Monza. I watched her eyes, glassy and manic, as she leaned into the turns to the sound of her squealing tires; she had worked her way to sixth place when I paused the game to show her a replay of her latest pass. She nearly killed me for breaking her concentration. She was hooked.

World Circuit is an effort to play because there's so much going on and the variables—like setting the car's racing trim and gearing, navigating the pit stops, timing the braking to cut inside that fellow from France who dogs you the whole race—are exhaustive.

The game even lets me tweak the frame rate and check my on-the-fly processor performance, allowing me to create a completely realtime experience. At Hockenheim, when I'm hot, the competition doesn't stand a chance because on the second chicane, I've found a line that's fast—very fast. The only problem is that with the slightest miscalculation, I ram my *Formula One* into a concrete wall, and I'm out of the race. Just one of the risks I have to take.

To make driving a little more realistic, I swap my desk chair for a canvas sling garden chair (it looks dumb, but feels right) and clamp Colorado Spectrum's Mouse Wheel to my desk. The Mouse Wheel is a steering wheel that controls my mouse, allowing me to steer in a more realistic fashion. The product is great, but with every game I have to tweak it some to make the mouse feel right (*Car and Driver* lets me change the sensitivity right in the game). But when it's right, I'm out there, on the open road. □



CYBER RACE™

CYBERDREAMS™

ENTERTAINMENT SOFTWARE

Circle Reader Service Number 144

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Joyful anticipation turns sour in a tale almost every dedicated computer game player has shared: After enduring months of splashy advertisements and media hype, you finally bring home that long-awaited software masterpiece. Expecting to be dazzled by state-of-the-art graphics and sound, you're instead greeted by an ambiguous error message—or worse, total system lockup. Several reinstalls and a half-dozen aborted attempts later, you contemplate a new hobby.

There are as many different variations to this scenario as there are games and IBM PC-compatible systems. Sometimes a program installs correctly and then fails in the middle of a play session—usually at the worst possible time. In most cases, these problems can be fixed with a simple change in your system settings or by creating a plain-vanilla floppy boot disk. More serious problems usually mean that there's a software bug or that your hardware is incompatible.

Less threatening, but equally frustrating, are games that run flawlessly but just don't measure up to your expectations. Some prove too difficult, while others aren't challenging enough. Features often touted in advance publicity aren't implemented properly, or worse, are dropped completely from the final design. For one reason or another, you're not a happy gamer.

Fixing a Hole

Game publishers respond to program failures, hardware incompatibility, and design suggestions with an almost revolutionary new form of customer service: software patches. Software patches afford consumers the unique opportunity to repair or enhance their purchases with minimal effort and cost. Like a digital bandage for ailing software, patch files are designed to swat bugs, tweak playability, and restore confidence in a company's product line. Patches are often innocuous, changing minor elements of a game to fix isolated problems. Sometimes, however, they constitute a major upgrade, turning a good game into a great one.

Entertainment software has grown to proportions unthinkable only a few years ago. Fueled by quantum leaps in technology and steadily plummeting prices, the once-stodgy PC compatible now finds itself the platform of choice for today's high-end computer games. Hundreds of third-party peripherals have rushed onto the scene: sound cards, game ports, video cards, memory managers, and disk compression utilities. Game publishers, used to the plug-and-play days of Commodore and Atari, suddenly find themselves confronted by almost unlimited variations in hardware configurations. Creating cutting-edge software that runs smoothly on every possible system has become a

nightmare, while the persistent lack of industry standards in the computer game world assures that the problem just won't go away. Thus, software patches are born.

Upgrades and Bug Swats

Most software companies employ a full-time staff of in-house beta testers, whose job is to look under every rock in a fantasy realm and to log hundreds of flight hours, tracking the elusive bug. Given the sheer size of games and the number of game variables, attempting to eliminate all bugs is a daunting task but one most companies feel obligated to undertake. "Our beta testers catch most bugs," says Bill Linn, director of public relations for Sierra On-Line, "but it's like proofreading a novel: Everyone misses the occasional comma or quotation mark." Dan Riddle, customer service manager for Mindcraft, considers fantasy role-playing games to be the worst to debug because everyone plays them differently. "We've had people who say, 'I have a problem doing



G GREAT GA

Article by Scott A. May

this.' Your initial reaction is, *Why did you do that?*" Riddle says. But, he acknowledges, ideally, games should be able to handle whatever a player wants to do.

In addition to answering to those hapless gamers who stumble into obscure programming traps, companies must also be ready for complaints from "grogards"—excessive aficionados in a particular field who love to grumble about technical inaccuracies. These are the players who can recite, from memory, the exact turning radius of the F4U-1A Corsair and the time it takes, with flaps down, to execute a 180-degree bank, as well as how much air speed you should lose during the turn. While this obsession with detail prompts some in the industry to mutter "Get a life," others welcome such nitpicking. Jerry Luttrell, director of public relations for Dynamix, admits to employing eight or nine grognards as beta testers for Aces over Europe. "We figured that if we can make these guys happy, then we know we've done our job," Luttrell says.

King of the Hill

If you were to select the king in the field of game patches, MicroProse Software would likely wear the crown. It's a title, however, the company is proud to bear. "We owe it to our customers to do our best," says Steve Albinak, manager of customer services at MicroProse. "Sometimes it may take a revision or two to make software that runs as tight as possible on as many platforms as possible." At the top of the company's all-time patch list is its massive medieval fantasy, Darklands. This software problem child received six separate patches before the company finally combined them all into a complete reissue of the game, officially known as Darklands 7.0.

Among patches that dramatically enhance their original programs, Dynamix's Aces of the Pacific 1.2 improves aircraft performance, enemy pilot artificial intelligence, graphic detail, animation frame rate, sound effects, and weapons performance. "Nearly half of the changes that we made in

Bugs, patches, hackers, and you: why computer entertainment is a sometimes frustrating but usually exciting experience

Aces of the Pacific," Luttrell says, "were from customer requests—things they didn't like or wanted to be done differently." Dynamix's patch for version 1.02 of Front Page Sports: Football makes a great game even better, increasing playability with vast improvements to the AI, the play-calling interface, the sound card support, the league options, and the statistical displays.

The advent of low-cost, high-speed modems has spurred increased interest in games offering null or remote modem play. Products not originally equipped with a modem option are often refitted through patch files or expansion disks. MicroProse did just that with the version 1.5 modem update to its best-selling racing game, World Circuit. Not only does the update provide a slew of major enhancements affecting graphics detail, frame rate, and control options, but two players can now tear up the tarmac, connected by remote or null modem link. Though initially available only through the patch, these improvements will eventually be included in the Master Players edition. Other games that have added modem options or fixed problems with existing remote play include Siege: Dogs of War (Mindcraft), The Perfect General (QQP), Tom Landry Football (Merit Software), and Falcon 3.1 (Spectrum HoloByte).

Games with minor problems are often updated with add-on disks, since most supplements require ownership of the original program. Spectrum HoloByte used Operation: Fighting Tiger not only to add new scenarios but also to automatically upgrade Falcon 3.0 to version 3.01. Other notable examples of this bundled approach include Gunship 2000 Mission Builder (MicroProse), Red Baron Mission Builder (Dynamix), Siege: Dogs of War, Megafortress: Operation Skymaster (Three-Sixty Pacific), and Great Naval Battles Scenario Builder (SSI).

Extending Life After Retail

Many games ward off planned obsolescence with integrated construction kits, allowing you to create your own diabolical levels, articulated missions, and custom characters. Such features not only draw players deeper into the game but also help sustain a product's long-term market appeal. One of the best is surely Stunt Island (Disney Software), in which you can design, fly, film, and edit original stunts, then share your fabulous footage with friends. Another new breed of construction kit can be found in El Fish (Maxis), an electronic aquarium simulation that allows you to spawn exotic new species of fish, then share your mutations with other aquarium owners. Of course, the classic success story is Accolade's lucrative line of golf simulations, each containing full-featured course designers. You can't swing a nine iron around most major online services without hitting dozens of 18-hole courses for Mean 18, Jack Nicklaus

ME A DD-INS

Unlimited Golf, or the latest in the collection, Signature Edition.

Companies often rekindle interest in previously released products with stand-alone construction kits. Red Baron Mission Builder brings a whole new dimension to this best-selling air combat simulator. Likewise, the Gunship 2000 Mission Builder renewed excitement in a product whose shelf life had otherwise peaked. An unusual case is Mallard Software, whose Aircraft & Scenery Designer and Aircraft & Adventure Factory benefit users of another company's product: Microsoft's Flight Simulator 4. CompuServe's Flight Simulation Forum bursts with hundreds of unique aircraft and scenery packages created with Mallard's programs.

Taking Matters into Their Own Hands

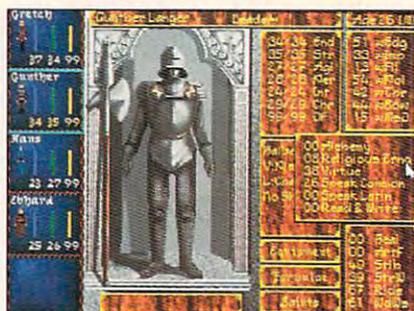
By far the most fascinating and controversial area of game patches is that of user-created hacks and enhancements to commercial products. Unlike illegal hacks used to break copy protection, these playful modifications seek to extend legitimate interest in popular games. Typical hacks merely instruct players how to hex-edit specific data files to generate supercharged aircraft or the ultimate role-playing heroes. Some actually change or add features to a game, while others are sophisticated, self-contained editors, designers, and managers.



Enjoy modem options when you play *The Perfect General* from Quantum Quality Products.

Officially, software publishers neither condemn nor condone this practice, yet they privately express wonderment at players' dedication to their products. "Most designers are excited that people get so involved with their games," says Khris Brown, product support manager at LucasArts. "We can't deny the fact that these user modifications can sometimes increase the shelf life of a product." Brown cautions, however, that experimenting with hacks can be like putting leaded gasoline in a car clearly marked for unleaded gas. Once a player ventures into this gray area, the manufacturer can't be responsible for the consequences, good or bad.

LucasArts happens to be the target of some of the most prolific and unusual game hacks. A current favorite is the X-Wing Mission Design



Use player-created character editors to dig behind the scenes of MicroProse's *Darklands*.



Create new species of fish and share them with friends in *El Fish* from Maxis.

Kit by Henry Chang. This menu-driven program allows you to construct X-Wing missions—a feature not included in the original game—with complete control of all ships, space objects, and mission objectives. Another LucasArts title to spur enormous hacker activity is the company's best-selling combat flight simulation, *Secret Weapons of the Luftwaffe*. The

Beyond Fun and Games: Educating Players

Where do you fit in this tangled web of bugs, patches, and hacks? The recent boom of low-cost, high-end PCs has put killer game machines on the desktops of a record number of first-time computer users. Thanks to the number of disparate system configurations, game publishers have recently found themselves in the awkward position of not only selling their products but also educating customers about computer hardware. As a result, entire chapters of game manuals must address the basics of hardware and software configuration, potential problems, and possible solutions. For companies to admit that it's a hassle, however, would be like biting the hand that feeds them.

Let's face it: It's a jungle of hardware peripherals out there. If you're a computer novice and want to play games, you'll need to know about sound cards, game ports, modems, video cards, drivers, disk compression

utilities, memory managers, disk-caching tools, and operating systems. Confused? Now, try installing a hardware-hungry game like Origin's *Strike Commander*. It's no wonder that good customer support is a game publisher's most valuable asset.

While companies struggle to make games that run perfectly on every possible system, what can you do to help?

Get to know your hardware. It may sound condescending, but the solutions to most problems are within your grasp. Get an updated beginner's guide to DOS, memory management, and hardware configuration. Learn which gaming peripherals—usually sound cards and joystick ports—are most likely to cause conflicts with other hardware or software settings.

Read the troubleshooting section of your software manual. If you're still stumped, hit the phone before hitting the roof. In addition to

checking with the software company's technical support line, try calling your local dealer or a PC-knowledgeable friend.

If you have a modem, query other game players. There may be a local BBS in your area, or you can check out the game sections of national services like CompuServe, GENie, and America Online. Besides finding hundreds of fellow gamers online, you can often direct questions to actual company representatives. If your software needs a patch, you'll most likely find it here.

When in doubt, stick with popular, proven accessories. Many gamers have been burned by cut-rate peripherals promising 100-percent compatibility with better-known products. Stick with the top-of-the-line accessories if you want to be safe.

If you follow these guidelines, you'll soon be enjoying the thrills the best computer games offer. And in no time at all, you'll be winning.

P O S I T R O N I C

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Artificial Intelligence Based

Artificial Intelligence now a reality!

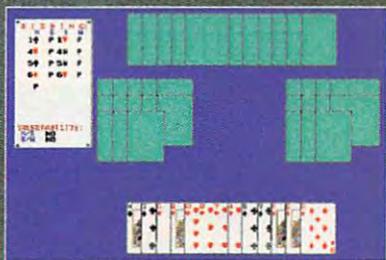
The challenge of computer bridge will never be the same with the introduction of Positronic Bridge, the first artificial intelligence based bridge game. Whether you are a beginner or expert, Positronic Bridge with its cutting-edge computing technology automatically improves its skill level as you improve yours, so the game always remains a challenge.

Included free with the program is the best-selling book "The Basics of Winning Bridge" that will have you playing bridge in just one hour. You can then improve your bridge skills using the practice mode and help keys.

Other features include: "No Cheat" gameplay (the computer doesn't look at your cards to make decisions), rubber or duplicate bridge, standard bidding, simple signaling, random deals or preset input, show/hide opponents cards.



Play Screen



Bidding Screen

Endorsed By Bridge Experts

"You can't outgrow Positronic Bridge. Two thumbs up!"
Mike Lawrence, Berkeley, CA, USA

"Positronic Bridge will give you the battle of your life."
Eric Kokish, Montreal, Canada

"The game you can teach to be as good as you are"
Tony Forrester, London, England

 **Positronic**



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most plentiful hacks are user-modified aircraft, commonly called hexed planes, that range from subtle corrections of erroneous flight models to outrageous fantasy designs. Samples of this last category include a 700-mph Messerschmitt Bf109G-6 (which flies at nearly twice the actual aircraft's top speed) and a jet-powered B-17 bomber equipped with oversized guns and rockets. Among the most ambitious hacks is Anthony Shimizu's SWOTL Manager 2.1, a TSR program that adds new menu options, such as reviving dead pilots and viewing up to 100 modified aircraft. Similar character editors and game managers also exist for Red Baron and Aces of the Pacific, Planet's Edge (New World Computing), Civilization (MicroProse), Their Finest Hour (LucasArts), and Pacific War (SSI).

The high-end flight simulator Falcon 3.1 has also inspired an overwhelming number of exciting and inventive user enhancements. There are so many, in fact, that one enterprising player created a menu-driven shell to consolidate the plethora of TSRs, hacks, and editors. In the sports world, there are team and league editors for FPS: Football and Tom Landry Football, as well as ter-

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rain editors for Stunts (Brøderbund) and pit stop managers for Mario Andretti's Racing Challenge (Electronic Arts). Fantasy role players can also dig behind the scenes with character editors for Darklands, Eye of the Beholder III (SSI), and Might and Magic III (New World Computing).

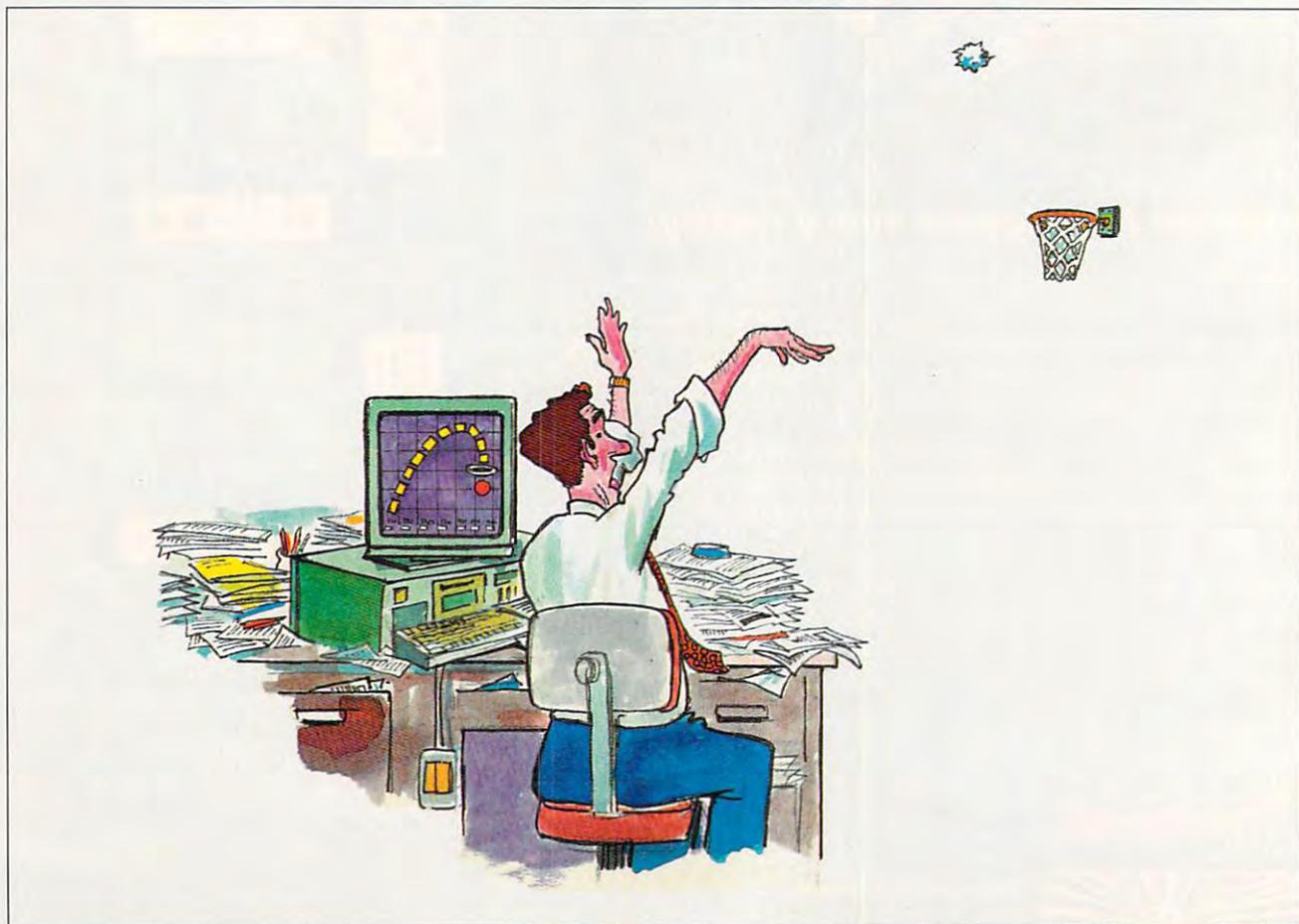
Where to Go for Help

There are almost as many sources for game patches, revisions, and user enhancements as there are materials

to choose from. Some software publishers automatically mail free upgrade disks to registered game owners (another good reason to fill out those pesky registration cards). Others report that they will gladly mail free upgrades in response to requests made either by mail or by phone. Modem users have a much wider choice when searching for help, add-ons, and enhancements. Subscribers to national electronic information services such as CompuServe (GAMERS, GAMEPUB, and FSFORUM), GENie (Scorpio's Games Roundtable), and America Online will discover a gold mine of patches and game supplements. In addition, most publishers maintain customer-service bulletin boards that are stocked with upgrades, custom levels, hints, and tips. Check your software manual for BBS telephone numbers.

Only the Beginning

The items mentioned here represent only a small portion of a much larger (and still growing) overall picture. As long as software publishers care about the quality of their products, and customers enjoy using them, computer games will continue to enjoy a healthy life after retail. □



64/128 VIEW

So why does a professor of electronic engineering still use a 64 in his office?

Tom Netsel

Phil Hoff is a professor of electronic engineering at California State University in Chico. He wrote me recently to say that although the school provides him with a 33-MHz 486 PC, he still uses a 64 in his office. This fact has been a source of some puzzlement to his students.

Hoff also serves as the faculty adviser to Eta Kappa Nu, the national honorary society for electrical engineers. On fliers urging society members to attend a campus meeting, someone added the following teaser: "Maybe we can find out why Hoff still uses a Commodore 64."

Hoff saw the flier and went to the meeting prepared. Here's his reply that he wrote and gave to the students. It's been edited slightly for space requirements.

"First things first. I don't use just the 64. I use a PC for all the things that the 64 can't do and for some things that a PC just does better. But the 64 still sees plenty of use.

"Speed. My PC takes 37 seconds to boot (without virus checking, which will soon be added and will lengthen boot time). My 64 takes two seconds. I often have little programs to write that might take five lines of BASIC. On the 64, they're up and running before the PC finishes booting.

"Viruses. The problem is nonexistent on the 64. Can you say the same for your computer?

"Editing. Loading an editor to edit a file or program is absurd. Give me a cursor on a 64, and I can edit. Its editor is powerful and intuitive.

"DOSlessness. I put DOS, UNIX, and C in one bag. Granted, they are in demand in industry, but anybody who says he loves them should be a computer engineer. The only way I can navigate in DOS is to keep a book of what jokingly is called its syntax at my computer desk. No such problems with the 64.

"Continuity. I have lots of programs that I've written for the 64 to perform things I commonly need. There's no way I'm going to take the time to convert them to some PC BASIC (although I do admire QuickBASIC).

"Hardware cost. The system I have now is a 128 and a dual mode color monitor. This system was bought used for \$200. Commodore still sells about a million a year. That's more than 10 million in all. Total sales of PCs and clones are just over 20 million. Macs? Eat your heart out—maybe 2 million.

"Software cost. I consider pirating of software immoral. I will not do it. I also consider paying \$200.00 for a word processor to be immoral and stupid. I will not do it. My word processor cost me \$10.95 and is quite satisfactory. I've never paid more than \$25.00 for a piece of 64 software. PC software is outrageously priced and outdated before you learn to use it. Any good software for the PC is usually shareware. I believe in the shareware concept. If I use a program consistently, I pay for it. But for the 64, lots of good software is PD and therefore is free."

Thanks for writing, Professor. I hope your students practice what you preach. □

GAZETTE

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One of the most confusing subjects for beginning users and for some intermediate users is Commodore's disk structure and format. This article will attempt to shed some light on disk organization down to the most basic level. I'm not going to discuss disk commands, but rather DOS, track and sector layout, block composition, and group code recording (GCR) fundamentals.

We'll concern ourselves with the three current Commodore disk drives: 1541, 1571, and 1581. For all practical purposes, each drive organizes its disks in a similar way with the exception of the number of sectors and location of the directory track (more on these differences later).

Before we get into looking at the disks themselves, let's take a look at some of the developments in computers that led us to where we are today. We'll begin with the disk operating system, known more commonly and simply as DOS. Everything regarding a disk's structure is determined by this operating system that's located in a ROM chip inside the disk drive. Since DOS is so vital, you might wonder how it came about.

It all started more than ten years ago with Commodore's introduction of the 4040 dual drive for the PET 4016 computer. This drive was an upgraded version of the 2040 and 3040 drives that had been used in earlier PET models.

Single Drives

Then, in 1981, along came the 1540 drive for the newly released VIC-20. Commodore assumed most users would prefer an inexpensive tape drive to store data and programs, so it didn't want to invest a lot of research and development funds in a new operating system for home users. In an effort to keep costs down, Commodore adapted the 4040's DOS to this single drive. While the 4040 was equipped with a parallel IEEE-488 bus that sped information along eight bits (one byte) at a time, the 1540 got a serial bus that restricted data to a snail's pace of one bit at a time. Now we can see why Commodore disk drives aren't exactly speed demons unless we employ an external fast-loader. The exception is a 1571 or 1581 attached to a 128.

Two years later, Commodore released the 1541 for its new Commodore 64 computer. This drive was a slightly modified 1540. When Commodore developed the 1571 for the 128 and then the 1581, it continued with the tradition of modifying and adapting its existing DOS.

In addition to a faster parallel bus, the old 4040 had two processors, one for disk management and the other for drive control. Its DOS was intended for this dual-processor scheme, but Commodore modified it for a single processor in future drives.

As a result, the current DOS spends a lot of time reminding itself that it's working with only one processor. Since upgrades were merely new code tacked on to old, DOS has become bloated and inefficient. The 0 used with many disk commands (NO: DISK NAME, ID, for example) is a holdover from the dual drive 4040 days when one drive was designated drive 0 and the other was drive 1. The 0 is optional with a 1541, but its use does ensure the most reliable operation. See table 1 for more information about DOS versions used in different Commodore drives.

All isn't as bad as it seems. Commodore did learn a few lessons with the 1581. Its DOS was greatly optimized as

shown by the tremendous amount of unused space in its ROM chip. Thus the 1581 is more efficient than either the 1541 or 1571. In addition, various fastloading devices can speed things up considerably by using their own disk management and loading routines instead of relying on those used in the drive that were supplied by Commodore.

Disk Basics

Before going into specifics, let's take a look at disks and drives in general. A floppy disk is a thin, circular piece of plastic material encased in a protective jacket. Generally, this plastic is covered with a magnetic film of nickel alloy. Initially, the magnetic particles in this film are arranged in a random fashion, but formatting the disk organizes or polarizes them in a way that the drive can understand.

Data is read from and written to a disk by the drive's read/write head, which is moved back and forth across the disk by a motor. If you look at a floppy, you'll notice an oval slot approximately one inch long. This opening is where the

AS THE DISK SPINS

BY HENNING VAHLENKAMP