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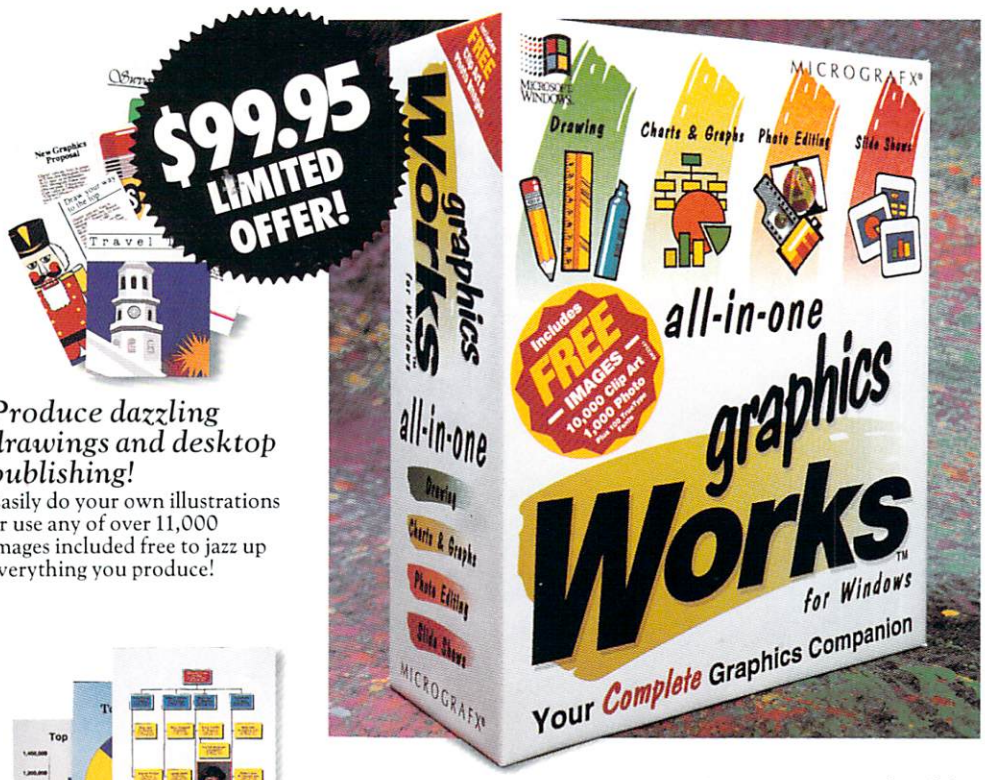

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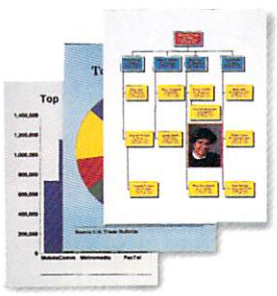

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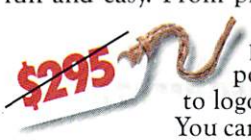

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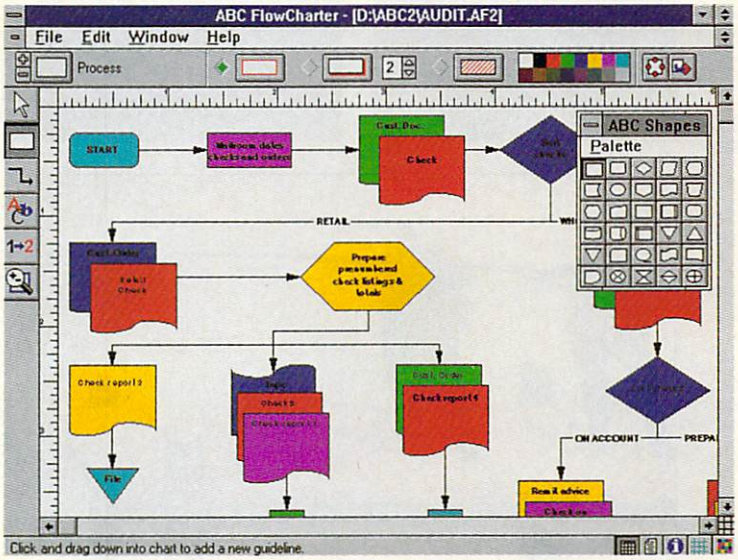

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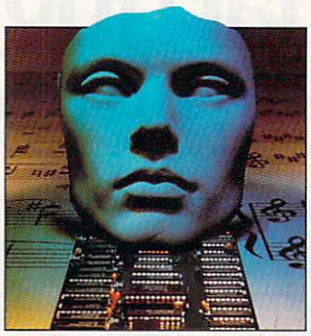

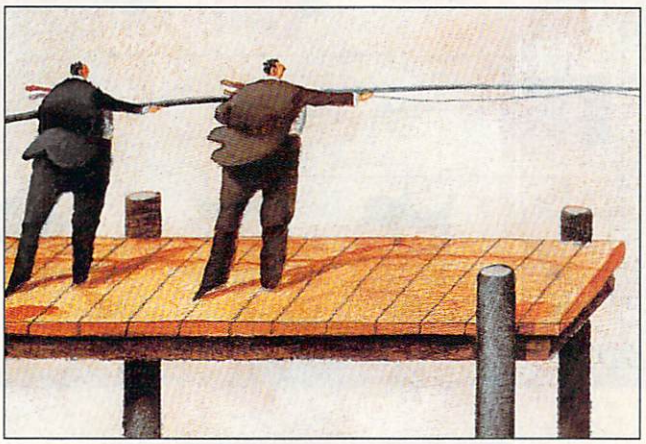

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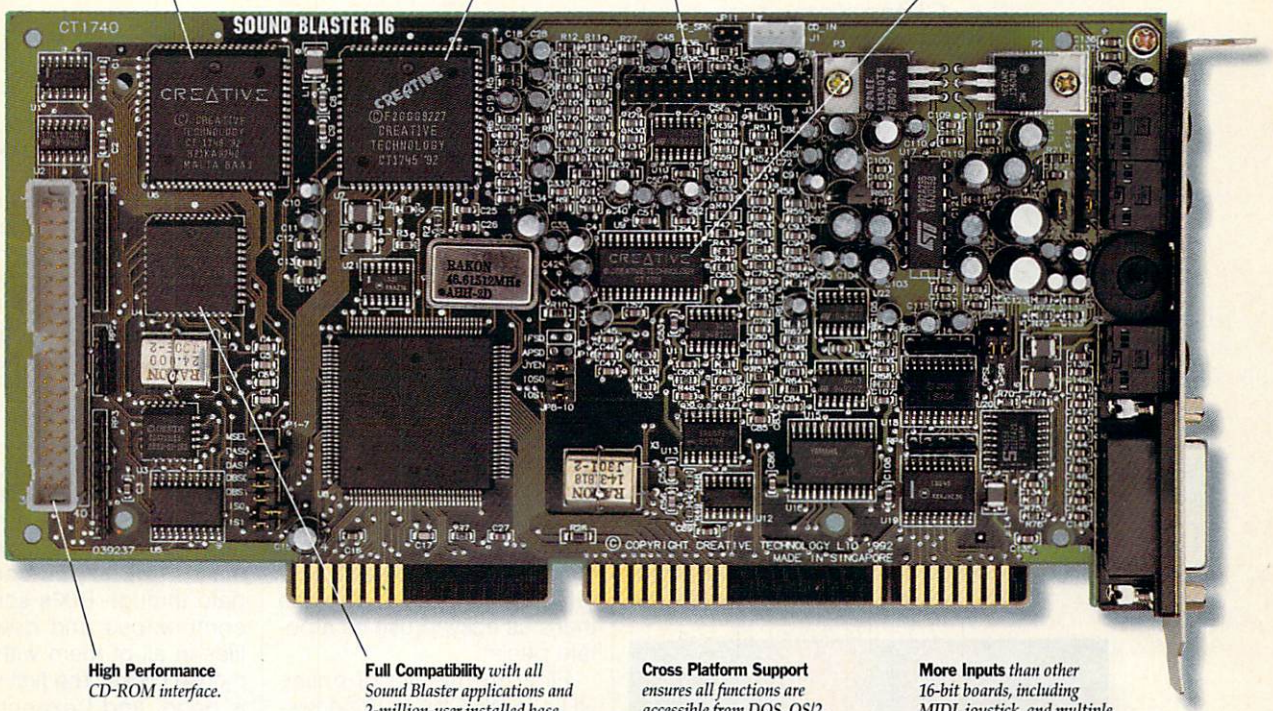

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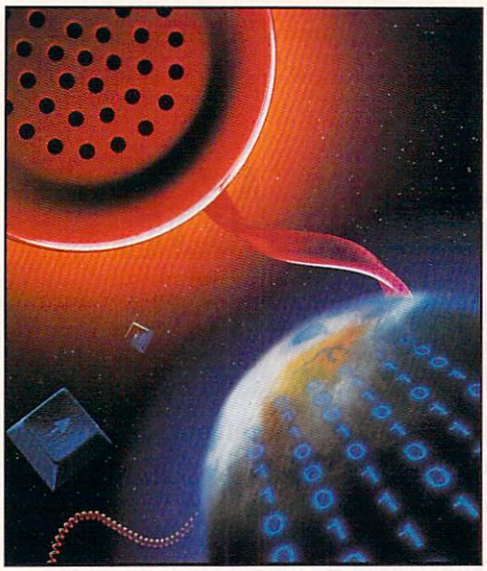
Clifton Karnes

Face it: If you're not wired into a network like CompuServe, GEnie, MCI Mail, America Online, BIX, DELPHI, or COMPUTE's own under-development COMPUTE/NET, you're working too hard, and you're only tapping a fraction of your computer's power. I know that telecommunications is a challenge and it can be expensive, but it's also the most exciting arena in computing today.

Online information flows at the speed of light.

What makes telecommunications so great? First of all, information flows over your phone lines at the speed of



light, so news and data travel *fast*. You can get files from an online service days, weeks, or sometimes even months before they're available elsewhere.

Speed is one thing, and it's great, but the sheer quantity of information and pooled resources available online is an even better reason to get connected. All of the networks mentioned above have tons of data—everything from the latest shareware to the latest product information to hot pictures to encyclopedias, and all of it is ready to be downloaded into your machine at home or work. And the services' members are an ever-growing source of information when you have questions on almost any available topic.

If telecommunications is so great, why isn't everyone doing it? Well, before long, everyone will be. And the reason is a new breed of online software. If you tried telecommunicating a few years ago, you should try it again, because things have changed. Now there's a good chance your favorite online service offers a Windows interface that's as easy to use as a potato peeler.

First on this list of online GUIs is WinCIM, a Windows-based front end to CompuServe. With WinCIM, you can do everything you can do while communicating with CompuServe in character mode, but you can do it faster and easier. Browsing through files, searching databases, and sending mail are all indecently easy with this beautifully designed program. If you're a fan of the CompuServe Information Manager for DOS, try the new Windows entry—it's even better.

If you've used MCI Mail, you know that the interface is about as friendly as a damaged boot sector. But even with this Spartan interface, MCI is very powerful and probably connects more businesspeople than any other network. Great news for MCI users comes from Swfte, heretofore famous as an electronic type foundry. The company's new offering is called The Wire, and it's a Windows-based front end for MCI Mail that makes sending and receiving mail a snap. The Wire gives you all of MCI Mail's power, including multiple attachments and group routing, but in an easy-to-use, point-and-click environment. If you use MCI Mail and Windows, The Wire's a must.

Next is BIX, a sanctuary for programmers and technical users. For programming information, especially multiple-platform information, BIX has always been hard to beat. But its menu system has never really had that come-hither look. Enter BIXnav, a Windows interface for BIX. BIXnav isn't as full featured as WinCIM—as its name suggests, it's primarily a navigator—but what a difference it makes to BIX! You can navigate through BIX's scores of conferences and download files in all of them with a few mouse clicks. The first version is good, and I expect future versions of BIXnav to be even better.

These are just three of the excellent new online interfaces available. They all make using online services much easier, but there's still a problem with them. The problem is that you can't use WinCIM with BIX and you can't use The Wire with CompuServe. All of these programs are dedicated, proprietary communications tools.

For each online service you access, you'll have to use either a boring terminal program or, if you're luckier, a dedicated front end, like the ones just discussed. But if you telecommunicate much, you'll find yourself using half a dozen communications programs a day.

This is the problem the online industry needs to solve. Online services are, at their heart, databases, and the problem of universal access is a problem of protocols. With a standardized protocol system for all telecommunications, one Windows-based interface would work with any online service. When that happens, we'll have crossed the final online frontier. ❐

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TEST LAB

Edited by Mike Hudnall

It's that time of year again when throughout America people stay up late, wrestle with piles of bank statements and old receipts, and begin to mutter to themselves as they attempt the 1040 two-step. It's tax time.

Although nothing can really ease the pain of paying taxes, your PC can convert your annual tax-preparation session from a befuddling ordeal to an efficient, almost pleasant exercise. Or, if you use a paid preparer, this might be the year to take your fiscal fate back into your own hands with the capable assistance of your faithful PC.

In Test Lab this month, we focus on ten tax-preparation programs. Tax software is getting to be so good that you can rely on it to guide you successfully through the often confusing maze of forms with their arcane instructions—as long as you don't have truly unusual transactions.

These tax-preparation programs range from lean, form-filling speed demons to multimegabyte masters that gently interview you and handle all the forms and schedules. The amount of instruction and help these programs offer ranges from little or nothing to extensive handholding every step of the way (including IRS instructions, plain-English explanations, and lists of tax-saving tips).

Most of the programs contain the basic feature set, which includes IRS instructions, at least 35 forms and 10 schedules, the ability to print IRS replica forms for at least the 1040 itself on laser or dot-matrix printers, an electronic filing option, and available add-on software for state returns. You can assume that these features are there unless we tell you otherwise. The features grid also lays out the nitty-gritty details for you.

New this year is the exciting Form 1040PC, not offered by all the programs. The 1040PC bypasses printing IRS replica and substitute forms, which, after all, are mostly composed of lines with no dollar entries. The 1040PC prints only lines which contain data. Returns eligible for the 1040PC—the vast majority—print on a single page. The IRS believes it can process the 1040PC significantly faster and more accurately than traditional paper returns.

The realities of publishing schedules mean that we have tested "early bird" or "head start" editions of the software. Developers traditionally release a preliminary version in the late fall. When the IRS and Congress finally approve the forms and finalize the rules in January, developers ship the final version. Although developers rarely make significant changes in their software between the early bird and final editions, it does happen.

The timing also means we can't test software that doesn't ship an early bird edition. In sidebars, we cover two fine programs that weren't available to test. Another sidebar shows off an intriguing product designed to turn your PC into an electronic tax-filing business.

Using these programs doesn't mean that you must dump your tax adviser and go it alone. If you have nonstandard transactions, you may still be able to prepare your own return by simply calling your tax adviser for advice on the hard parts. Your adviser will still bill you, but less than it would cost to prepare the entire return. Other preparers may be able to use your disk as a starting point and merely review and finish the return that you took as far as you could.

How should you choose a tax program? Decide how much handholding you need and look for a program that fits your style. Some of us like to work directly with the tax forms; others would be delighted never to see the actual forms till it's time to sign them. There are programs for both styles. If you use another financial program, take a look at our features grid to see if you can plug your program's data into the tax package of your choice. Check the hardware requirements to be sure your PC will run the program. Compare the forms in your last year's return to the software's list of forms to ensure that it handles all the forms you'll need.

Then, buy the program that best fits your needs and let it simplify your life.

RICHARD O. MANN

AM-TAX PERSONAL-2 1040

AM-Tax Personal-2 1040
IBM PC or compatible; 512K RAM; two 5¼-inch floppy drives, one 3½-inch floppy drive, or a hard drive—$65 ($45 renewal) for Personal-2; $40 ($25 renewal) for Personal-1

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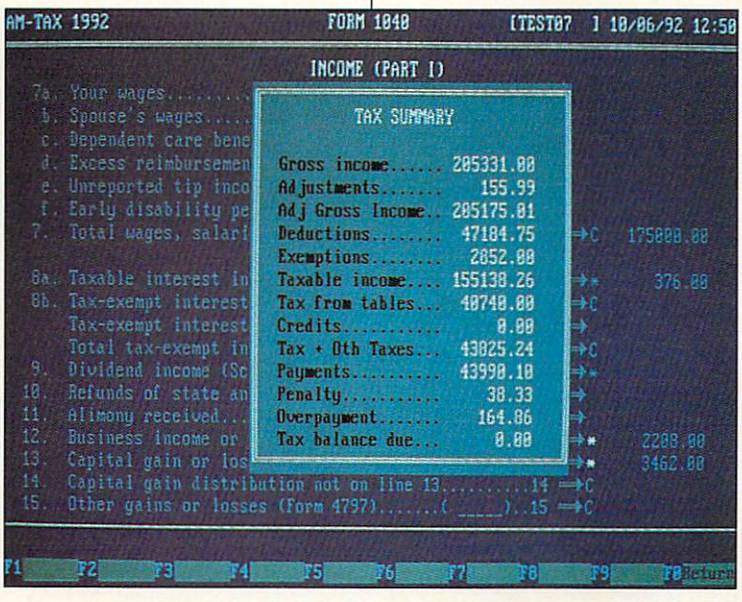
AM-Tax Personal-2 1040's barebones approach to tax preparation works well for those who know their way around tax returns and want their computers merely to accumulate the information on the forms, do the necessary math and table lookups, and print the returns. The program is also a godsend for users who must work without a hard drive or with limited memory.

AM-Tax Personal-2 runs from two 5¼-inch floppy drives or one 3½-inch drive, a rarity in today's world of multimegabyte programs. It needs only 512K of RAM. Its companion product, AM-Tax Personal-1, is less expensive, prepares fewer forms, and runs from a single 5¼-inch disk in only 400K of RAM. Both are excellent choices for users with limited hardware.

The reason AM-Tax Personal-2 can work within these Spartan disk space and memory requirements is that it offers no help, no interviews, no checklists, no audits—in fact, no frills at all. (I can just imagine my crusty old tax professor saying, "Whatya want all those sissified gewgaws for, anyway? Real men go right to the tax forms.")

If you can get the right data on the right lines of the right forms, however, the program does everything else masterfully. If you have self-employment income, for example, you put the raw data into Schedule C. AM-Tax Personal-2 totals it, posts the total to the 1040, and completely fills out your Schedule SE. You don't have to remember to fill it out and may not even know the program has filled it out until you print the return.

AM-Tax Personal-2 takes a logical approach to the forms. It starts at the top of the 1040 and works you down the form. As you come to lines that present totals from other forms, a quick strike of the F6 key whisks you to the appropriate form or schedule. Fill that out, and AM-Tax returns you to the next line on the master form. This process can sometimes have you two or three forms deep, but AM-Tax manages to keep everything straight for you. As long as you aren't trying to learn how to prepare tax returns as you go, AM-Tax is easy to learn and use.



AM-Tax Personal-2's form and schedule count is respectable, and it offers enough copies of multiple forms to handle any remotely normal return. AM-Tax Personal-1 handles only 19 fewer forms and schedules. Of the forms left out, only the Form 1040A would be useful for simple returns. Most taxpayers would use the other forms infrequently.

AM-Tax Personal-2 prints graphic replica forms (see forms sidebar) for only the 1040 itself, with approved substitutes for all other forms.

Unfortunately, AM-Tax Personal-2 doesn't support the new Form 1040PC or electronic filing—these are available only with the professional version.

At $65, AM-Tax Personal-2 1040 isn't a particularly good buy, compared to the feature-rich competitive products in the same price neighborhood—unless you need it for its miserly use of hardware resources and its lightning speed.

RICHARD O. MANN

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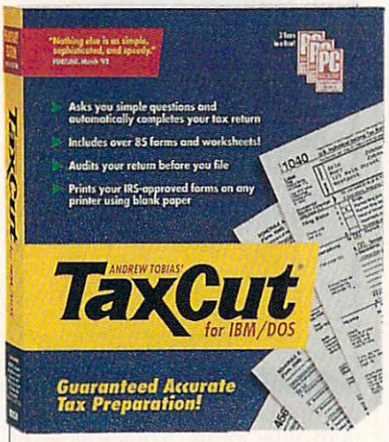

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Andrew Tobias' TaxCut for DOS and its sibling Windows product (reviewed separately below) hold your hand from the minute they take control of your screen.

The opening screen has a dialog box asking if you want to go directly to the interview. If you choose not to use the interview, the opening screen displays the message *Start Here!* and warns you not to go to the top of the 1040 to start. (The personal-background screens gather the information needed for the top of the 1040 and other forms at the same time.)

While you can go directly to forms and worksheets to enter your tax information, TaxCut provides the ultimate in handholding. This year's interview walks you through the entire process, from importing data from last year's tax program and this year's checkbook program all the way through printing or electronic filing.

And what an interview it is! TaxCut asks you the questions in the top of the screen and uses the bottom of the screen to explain the question and your options in answering it. Its explanations and advice are in chatty, easy-to-understand English, using examples liberally when they'll help make a point. If you know the answers to the questions, you can whip right through the interview, because the help is not in your way. If you need the help, it's right there where it can be the most useful. And even when you think you know what you're doing, having the explanations and cautions in view as you go may help you notice certain errors you've been making.

The interview uses artificial intelligence techniques to ask only questions that matter to you. The program helps you with your answers, telling you that most people answer a question no, for instance, then listing common exceptions.

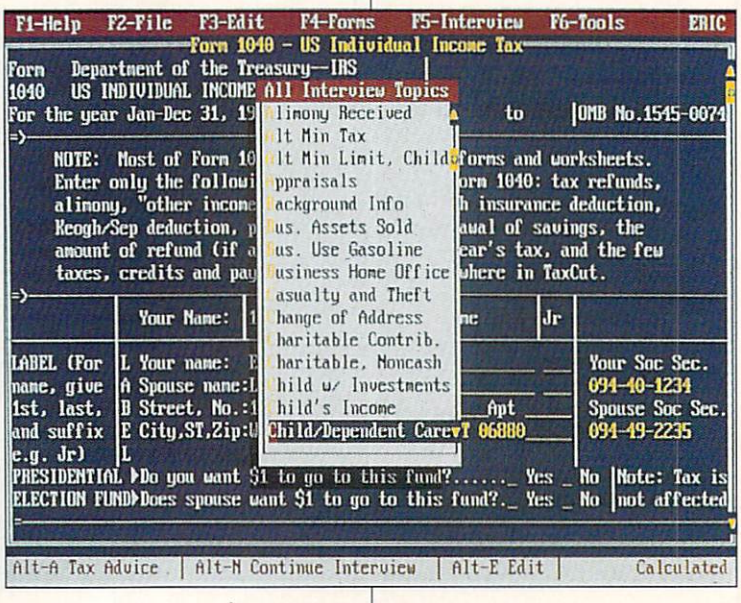
The interview is especially helpful if you plan to file your return electronically. It tells you about the special formatting requirements for electronic filing as you enter the data so that you can enter things in the right format from the start.

The interview provides an extremely thorough first line of help. IRS instructions are available on-screen, as are explanations of the purpose of each form. These explanations include the details of how the program performs certain calculations. You can also get help from a long, alphabetical topic list, and you can print any help topic for later reference.

The advice and help throughout the program are down-to-earth and clearly explained. At one point, the program warns you against cooking up some "clever dodge. The IRS has been around a long time, and they've seen it all." The program feels like your kindly uncle (with a Harvard law degree) at your side helping you.

TaxCut explains this year's changes in the law, allows you to mark fields as estimated until you can find the exact answer, provides a detailed flow chart showing the information flow between forms, and has an extremely thorough audit function. As you work through the auditor's findings, you can jump to the questioned location in the forms, fix the problem, and jump back to the next audit question.

TaxCut prints the new Form



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Questions? Call toll free 1-800-223-6925.

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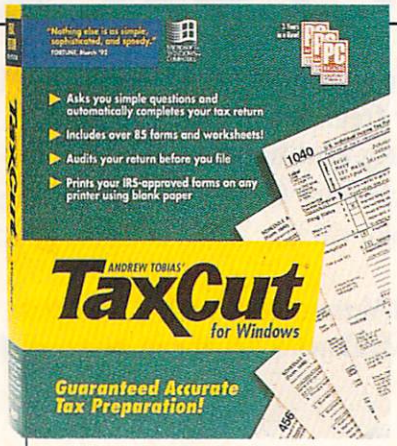

1040PC. It checks your return in detail to see if it fits the stringent 1040PC requirements and helps you make necessary changes.

A clever new feature is designed for people who have access to a laser printer only at work. You can prepare the return at home and print a file onto a disk. Take the disk to work and run TCPRINT from it to print your return on the laser printer (this feature is available in the DOS version only).

You can also find the right tax form from an alphabetical list of tax topics or use the shoebox function. In shoebox mode, you work from a list of possible sources of tax information. If you pick a source such as your employer, it then lists the possible kinds of documents that come from employers. Pick the one you need, and it takes you to the right form to enter the item.

In general, I believe that Andrew Tobias' TaxCut for DOS and its Windows version are the best tax programs you can buy. Novices get the maximum amount of handholding help, while experienced tax preparers can whiz through a return with the assurance that the program won't let them forget anything important. I test all the tax programs every year and always end up using TaxCut for my own return. (For a variation on this program, however, see the sidebar on Kiplinger's TaxCut, which also comes in both DOS and Windows versions.)

RICHARD O. MANN

Circle Reader Service Number 372

Andrew Tobias' TaxCut for Windows
IBM PC or compatible (80286 compatible), 2MB RAM, EGA or VGA, Windows 3.1, hard drive—$79.95 ($29.95 renewal)

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ANDREW TOBIAS' TAXCUT FOR WINDOWS

Andrew Tobias' TaxCut for Windows takes the basic TaxCut for DOS program and presents it in a classy Windows format. By moving to Windows, you lose a little and gain a lot, but the basic tax program with its friendly yet sophisticated interview remains the same.

TaxCut for Windows will not print on your office laser printer from a disk file as the DOS version does, and you have to exit Windows and run a small, separate program to electronically file your return with the clearinghouse. The DOS version can hook up to the clearinghouse from within its menu structure.

The gains come with the graphical nature of Windows. TaxCut for Windows prints all the forms and schedules in IRS-identical replicas, but takes a lot longer to do it. It uses TrueType to accomplish this miracle, allowing you to scale down the font size and thus scale down the WYSIWYG images of the forms to suit your fancy.

TaxCut for Windows has a useful toolbar across the top of the screen, providing quick, one-button access to a dozen functions, including the interview, the graph, the forms list, and the calculator, among others.

You can have several forms open on the screen simultaneously and click back and forth among them. A colorful tax-summary graph presents a pie chart showing the distressingly large wedge of your pie that goes out in taxes each year.

In short, Andrew Tobias' TaxCut for Windows is the same topflight program as its DOS version, with the added advantages of WYSIWYG forms and the easier-to-use Windows interface.

RICHARD O. MANN

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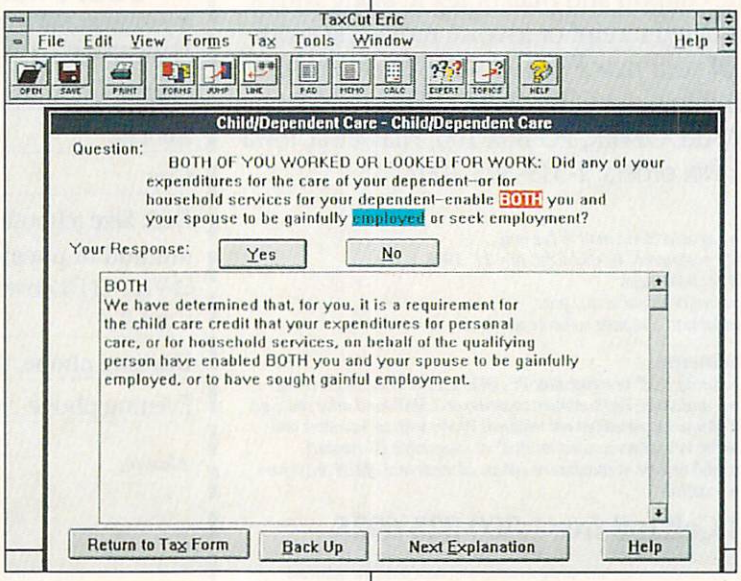

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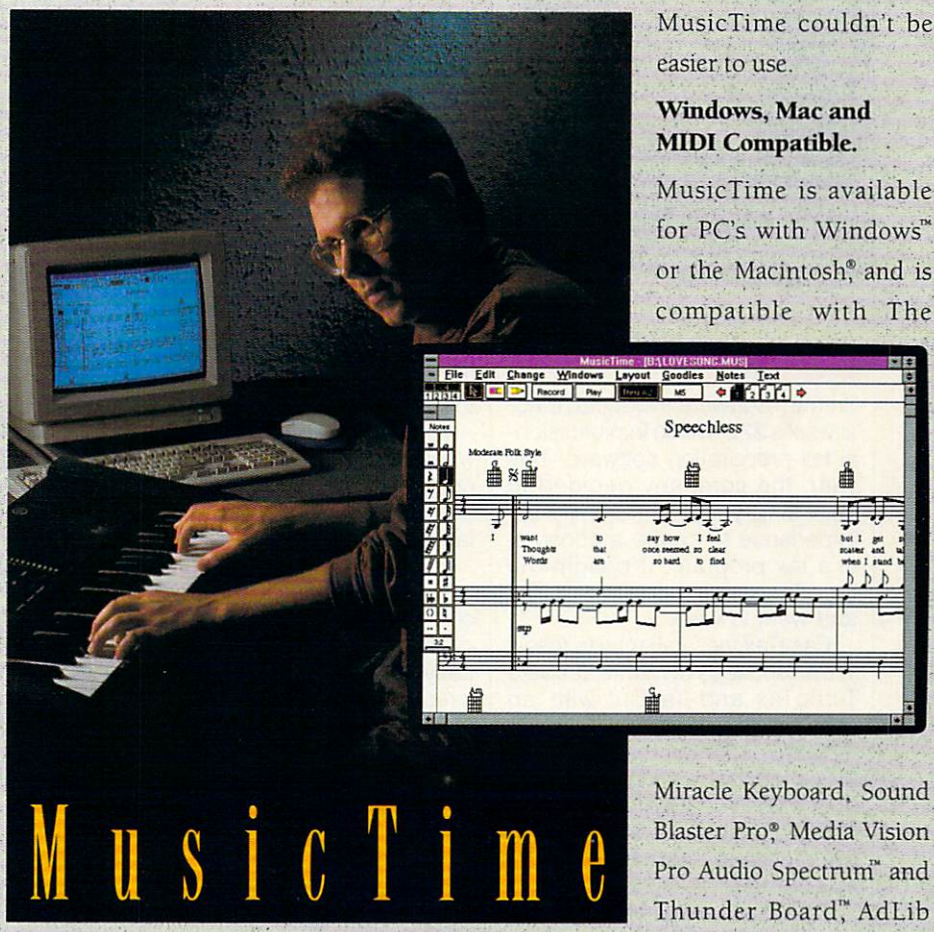

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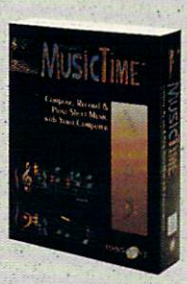

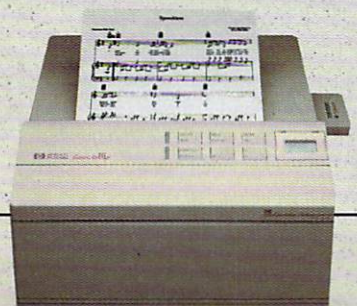

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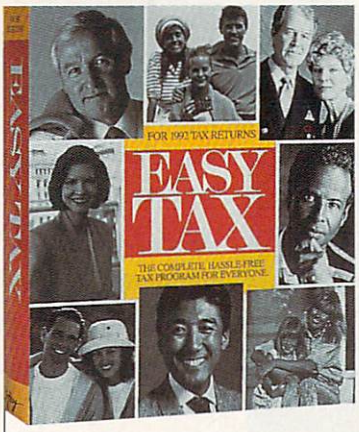

EasyTax
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EASYTAX

SoftKey Software Products annually sells $22 million in professional tax-preparation software. This year, the company decided to tap its 12 years of tax-software experience to create a consumer's tax program. It bought the EasyTax name from Timeworks and went to work.

EasyTax tries valiantly to follow in the footsteps of market leaders TurboTax and TaxCut with an easy-to-use program full of helpful features for tax novices, but it falls short of the polish and power of those two programs. It feels like the TurboTax or TaxCut of two years ago—not a bad achievement for a first-time effort.

Take the taxpayer interview, for example. EasyTax has a thorough interview that will successfully guide you to the right places for your tax information, but it isn't as slick and effortless as it could be. You answer yes-or-no questions, for instance, by hitting the space bar to cycle between yes, no, and question marks (which denote a question you haven't answered yet). Why can't you just type a *Y* or an *N* as you do in hundreds of other programs?

The interview misses opportunities to use simple artificial intelligence to streamline. It asks, for example, if you sold any depreciable business assets during the year. If you answer no, it should then skip the next few questions, which elicit details of such sales. Instead, you have to answer those questions as well.

Also, I found an instance where the program should have compared two figures and carried the lesser to the next line but failed to do so.

But aside from its minor failings, which are primarily inefficiencies that won't affect the accuracy of the tax returns it produces, EasyTax has many laudable features. It prints all 41 of its forms and schedules in IRS replica form on most dot-matrix and laser printers without any additional software. It supports the new Form 1040PC and provides for electronic filing of your return through a central clearinghouse for a $19.95 fee.

EasyTax opens with a checklist that shows you in what order you should attack the pile of forms. The shoebox entry system lets you enter individual transactions in any order; identify the type of transaction, and the program takes you to the right line on the right form to enter it. Its context-sensitive help has hypertext links to any term that's explained elsewhere.

EasyTax estimates your 1993 taxes and supports four what-if scenarios for analyzing the current year's return. It offers an online set of 60 tax-saving tips and a few screens of year-end tax strategies that can be helpful. It checks the integrity of the data when you're finished, highlighting odd relationships between piec-

KIPLINGER TAXCUT

Test Lab evaluates only software that is actually shipping to retail customers. Unfortunately, this worthwhile tax program was available only in a beta (prerelease) version. We thought you'd be interested in it (and J.K. Lasser's Your Income Tax, treated in a separate sidebar), even if we couldn't tell you exactly what it will be like when it is finalized.

Undoubtedly the best buy this year is this variant on the Andrew Tobias' TaxCut programs. Kiplinger, the highly respected publisher of personal finance books and *Kiplinger's Personal Finance Magazine*, purchased the rights to use MECA's best-selling Andrew Tobias' TaxCut software. Kiplinger adds its own advice files full of tax-saving tips to the already excellent TaxCut and packages the program with a copy of the popular book *Kiplinger's Sure Ways to Cut Your Taxes*. To sweeten the deal, the company adds Kiplinger Tax Estimator software, which Kiplinger says helps you analyze your tax situation and make planning decisions. (We did not see a beta version of the Estimator.)

But the big news is that Kiplinger sells it for $39.95 (plus $7.50 for shipping and handling)—a special introductory price for the program's first year. You get the TaxCut software with the extra Kiplinger helps, the Estimator, and the book ($12.95 in bookstores) for about half the list price of Andrew Tobias' TaxCut. This is a true bargain. (Kiplinger's full price in future years will be $89.95, but registered users will get a discounted update price.)

Kiplinger TaxCut software is available in both DOS and Windows versions. This software is not available in stores. To get it, call Kiplinger's toll-free number, (800) 365-1546.

—RICHARD O. MANN

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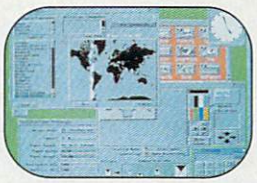

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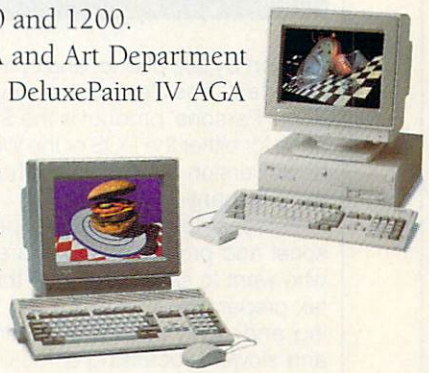

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es of information,as well as other suspicious items.

EasyTax's developers certainly have the expertise to back their venture into the consumer tax program market. Within a year or two, they should be challenging the best in the business, but the product doesn't quite measure up to the best this year.

RICHARD O. MANN

Circle Reader Service Number 374

PERSONAL TAX EDGE

Personal Tax Edge
IBM PC or compatible; 640K RAM (520K free) for DOS version, 1MB RAM for Windows version; hard drive (4MB free for DOS version, 6MB free for Windows version); supports mouse in both versions—$49.00 for DOS version ($24.50 renewal), $59.00 for Windows version ($24.50 renewal)

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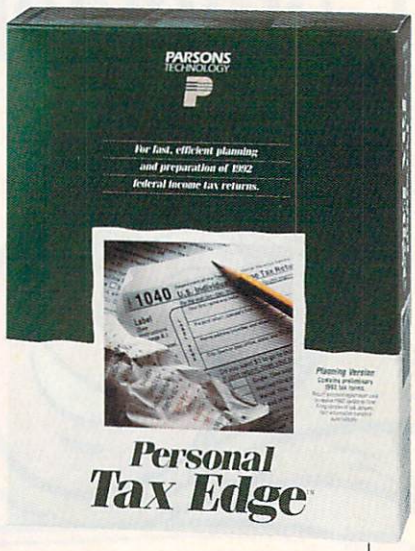
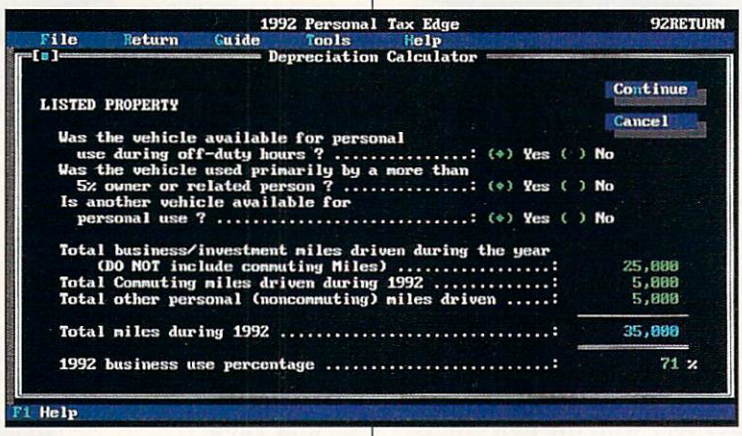


Personal Tax Edge is the price leader, with the lowest advertised price, and still has many of the features of higher-priced competitors. These features include audit warnings, a what-if estimator, tax tips, plain-English explanations of IRS publications and instructions, an estimate flag, notes, a tally of entries, tax-planning suggestions, and unlimited free technical support by fax, phone, and online services. The real price news about Parsons' product is the $19 price for either the DOS or the Windows version by mail, direct from the company.



Personal Tax Edge targets personal and professional preparers who want to save money on their tax preparation and electronic filing and don't mind the printing and slower processing of facsimile forms. Industry analysts I've consulted rank Personal Tax Edge third among personal tax-preparation programs in user popularity.

You can enter information by using forms, interviews, and the new organizer, which resembles MECA's shoebox. Personal Tax Edge supports six more forms this year, but there's still no 1040X support. The what-if estimator, with 1992 and 1993 rates, calculates both 1040ES and W-4 to give wage earners control over their withholding. Comparisons of 1992 data to national averages and last year's taxpayer data help to identify inconsistencies. Analyses flag missing data, wrong values, tax-saving suggestions that apply to your data, and the legal filing status that gives the best benefit.

The interface is a windowing environment that allows three to four windows to be open at one time in the DOS version and multiple windows limited only by available memory in the Windows version. Pull-down menus that you can use simultaneously with your mouse and keyboard facilitate your use of the program.

At no extra cost, Personal Tax Edge provides electronic filing software, which is integrated into the program with low-cost ($10 per return) transmission charges. All forms supported may be printed in IRS-approved facsimile format on a wide variety of printers. The graphics-output format approved by the IRS finds support on all signature forms. While the appearance of laser-generated graphic IRS format is important on mailed paper returns, the paper appearance of electronically filed returns is inconsequential.

The program automatically saves return files after you exit all forms. Personal Tax Edge has been criticized in the past for being slow and for having poor, white-on-black graphics. A Parsons representative claims that the program is faster this year than last and that the graphics have been improved. Parsons has a sophisticated pop-up financial calculator which rivals those hand-held calculators made by Hewlett Packard and Texas Instruments.

Personal Tax Edge has a wide variety of forms, features, and

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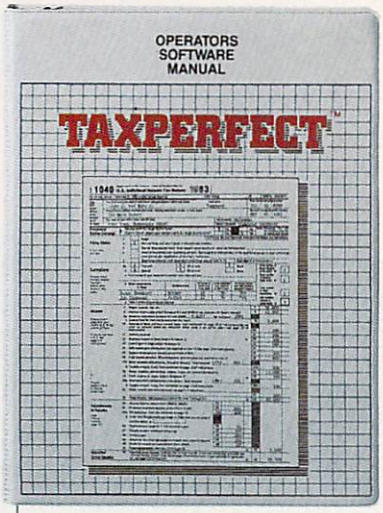

help for a low price and should be a worthy challenger for the industry leaders. The Windows version, released in January, is a new and exciting advance which demonstrates Parsons' commitment not to be left behind in the features race.

ALFRED C. GIOVETTI

Circle Reader Service Number 375

TAXPERFECT-PC

TAXPERFECT-PC is a no-frills tax-preparation package that has been on the market for ten years. Even though it produces no state returns or supporting worksheets, TAXPERFECT-PC produces as many federal forms as required for any situation, limited only by available hard disk storage.

This program actively targets as customers both professional and personal preparers, with separate versions specifically designed for each group. Each version allows you to prepare both individual and small business taxes. A related product line helps you prepare the 1120 corporate tax form for both the C-type and S-type corporations.

TAXPERFECT-PC has only one (form-based) style of data entry. However, it allows you to print a customizable interview sheet or organizer, similar to the organizers used by high-priced professional tax-preparation packages, of up to 100 pages. The printed organizer can be used as an input sheet that helps you organize information logically in preparation for entering it into the computer. The paper organizer provides a permanent paper record of the source and computation of all information put into the return, should the IRS ask for explanations after you file the return.

TAXPERFECT-PC
IBM PC or compatible, 640K RAM, EGA or VGA, one floppy drive (720K or 1.2MB) and one hard drive with 1.5MB free—$99.00 ($49.50 renewal) for personal version, $199.00 ($99.50 renewal) for professional version

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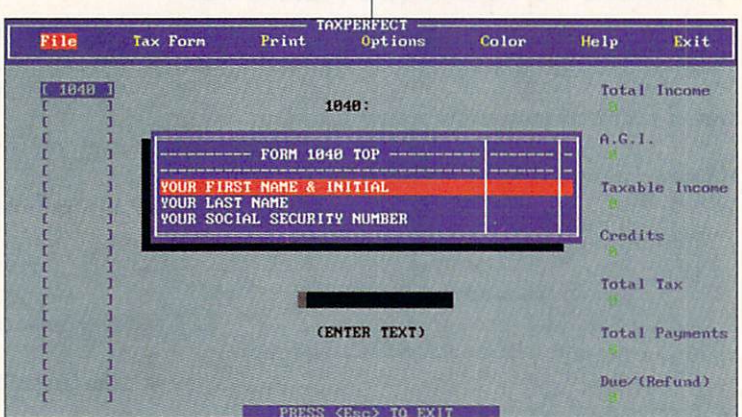
The program has an inviting and encouraging feel, with keyboard-activated pull-down menus and screen-prompted input, but no mouse support. A forms tree helps you select and keep track of the forms-preparation process. A view mode allows you to view forms exactly as they'll look when printed. The program supports a full range of dot-matrix and laser printers to print IRS facsimiles, but it requires a font cartridge and expensive laser software to print IRS-approved graphic forms.



For detailed information about how to use the software, you'll consult the 125-page user manual, which contains short, one-paragraph explanations of the uses of the forms supported by the software. The online, context-sensitive Data Integrity Check feature looks for inconsistencies, omissions, and errors, and it prompts you to correct them. An override feature lets you override any calculated field. Active only at the forms-tree area of the program, the help function provides a short explanation of the form, its application, and its use similar to that found in the manual. The manual references IRS publications that should be reviewed if you need further information.

TAXPERFECT-PC supports no state tax form preparation and has no online audit-trail features as do the other packages. There are no user-selectable notes, supporting schedules, or item tallies that you can save to disk. The pop-up, full-function calculator, which imports results to numerical-input data fields, prints a paper tape from the computer printer but doesn't allow the user to label the numbers printed to the tape. The program has no standard or IRS worksheets to support or assist in the calculation of data that goes on the official IRS forms.

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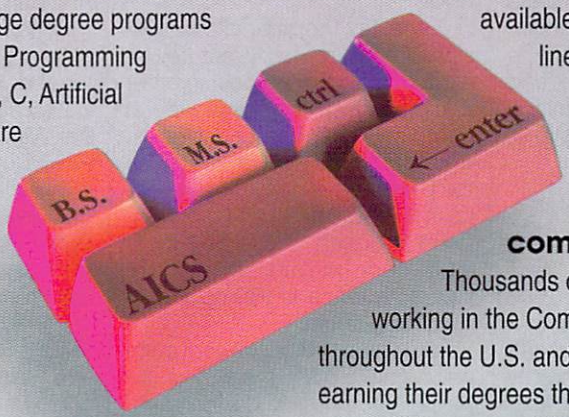

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anticipation loans are available through Financial Services Marketing Corporation (FSMC) and Nelco (an electronic filing company) at an additional software price of $200 and a transmission cost of $5.95 per return. You can file returns by modem, by fax, or the old-fashioned way—on paper via the mail. The program has a built-in what-if planner with 1992 and 1993 tax rates. Where alternative tax treatments or methods can be legally used, the software automatically selects the most advantageous method. The software recalculates the whole return in under two seconds.

TAXPERFECT-PC is recommended for professional preparers who are willing to pay extra for laser printing and electronic filing and don't require support of state tax return preparation. The personal preparer will find the pricing on laser printing, electronic filing, and refund-anticipation loans prohibitive even though the personal program costs are affordable.

ALFRED C. GIOVETTI

Circle Reader Service Number 376

TAX PREPARER

HowardSoft's Tax Preparer is a speedy tax program with excellent documentation and highly responsive telephone support. This program has professional features and supports unlimited numbers of depreciable assets, rental properties, stocks, bonds, and accounts, although Schedules C and F are limited to five forms each. State-tax preparation is available for only one state, California, with an extra-cost add-on.

Tax Preparer allows three separate styles of entry: interview-based (called Road Map), batch (not recommended for nonprofessional preparers), and a hybrid of the form-based and interview methods. There's only one version of Tax Preparer: the professional one. Personal preparers can use this inexpensive professional program to prepare their own returns and those of family members.

Tax Preparer
IBM PC or compatible, 256K RAM (512K recommended), hard drive with 2MB free—$295 ($99 renewal)

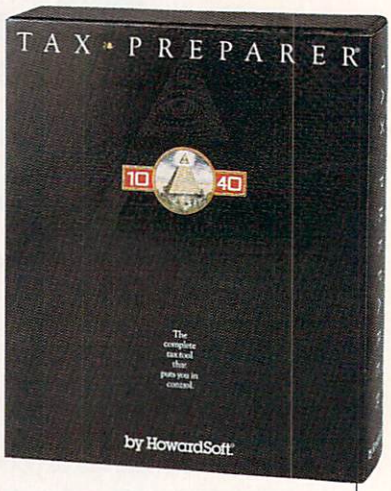
HOWARDSOFT
1224 Prospect St., Ste. 150
La Jolla, CA 92037
(800) 822-4829
(619) 454-0121

If you have a less-than-muscular computer system, take note: Because of its small size, Tax Preparer is one of the few remaining programs that will process forms on a single-floppy-drive computer system, such as an IBM PC Junior, without a hard drive.

Since Tax Preparer is a professional program, many features included at little or no cost in other packages must be purchased at relatively expensive prices, which put them out of reach for the personal preparer. These prices include $295 for the electronic filing option and a $50 minimum cost for laser printing of signature forms in IRS-approved graphic output.

While many other software companies have gone the way of sophisticated on-disk, context-sensitive help routines, tax tips, and IRS instructions, Tax Preparer has maintained manual-based support of these services; and it easily has the best manual of those programs compared in this Test Lab. The popular 600-page manual has over 100 pages of IRS instructions and publications, with plain English explanations and tax tips.

Another area where HowardSoft shines is telephone support. The company actually has its own expediter assigned to make sure that customers don't wait more than a minute before getting to talk to a real human being when they call in. Not only does the staff place a high priority on service, but an alarm alerts HowardSoft's personnel to any caller who has been waiting for more than a minute. HowardSoft's staff is trained to provide callers with IRS publication numbers and pages that relate to their tax questions and provides support that is just short of the legal definition of tax advice.



You can install the program under Windows, using the Windows PIF Editor utility. Once the program is installed under Windows, you can use the Clipboard utility of Windows to import and export data from any Windows application. Tax Preparer should be used only in Windows' enhanced mode with 4MB of RAM and with 10–15MB of free hard disk space.

HowardSoft has redesigned Tax Preparer's printing to work with a full range of dot-matrix and laser printers, which will print your information on the form, eliminating the need for extra supporting statements. However, laser printing requires a tax-font cartridge to print with standard IRS-form spacing. IRS-approved graphic forms can be printed from a variety of printers. Form 1040PC is supported by the package.

HowardSoft's user base, according to the company's spokesperson, is composed of 17,000 mostly part-time professional preparers who have another job and prepare between 50 and 400 returns per tax filing season, as well as about 7000 personal us-

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ers who have fairly complex returns with passive losses or numerous K-1s. Most sales are reported in Texas, Florida, California, Oregon, and Massachusetts. Tax Preparer should continue to appeal to its user base, as it has shown unusually high acceptance by professional tax preparers since 1979.

ALFRED C. GIOVETTI

Circle Reader Service Number 377

TAX SOLVER

Tax Solver
IBM PC or compatible; 117K RAM (in addition to your spreadsheet's requirements); CGA, EGA, or VGA; hard drive; Lotus 1-2-3 2.0 or higher, Lotus 1-2-3 for Windows, Excel 4.0, or Symphony 3.0; supports mouse—$79.95 for individual version, $129.00 for business version, $495.00 for professional version

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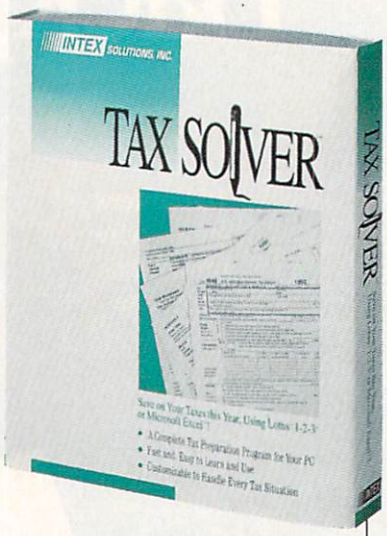


Tax Solver, new this year, turns your high-powered spreadsheet program into an impressive tax-preparation tool. If you're fairly competent with any release of Lotus 1-2-3 above 2.3, including the 3.*x* series and the Windows version, Symphony 3.0, or Excel 4.0, there's a version of Tax Solver for you.

Tax Solver is intricate, complex, and powerful, yet it's really nothing more than a series of linked spreadsheet template files, one for each form or schedule of the tax return. The complex formulas, combinations of data, comparisons, and links between forms are all built into the worksheets. You enter your data on the right lines of the right forms—which appear onscreen in exact replicas of the IRS forms—and the computer calculates, posts to other forms, and does the table-lookup work.

Tax Solver isn't a program (it's just templates), so it cannot offer anything you can't do with a spreadsheet. Thus, you don't get most of the consumer features offered by stand-alone programs. There's no help, no online tax advice, no handholding at all. It does, however, compare your deductions with national averages in a series of attractive graphs (because you can do that in a spreadsheet).

Because it's spreadsheet-based, it has some unusual abilities. Its laser-printed forms are magnificent: crisp, sharp, and actually of better quality than the IRS's printed versions. And all 104 of its forms and schedules are replicas of the IRS forms—you don't need extra-cost laser software.

Spreadsheets also give Tax Solver a special power: what-if analysis. Spreadsheet jockeys know that they can set up a series of values to plug into a spreadsheet cell and list the results from each possible value in a table. You could, for instance, set up a spreadsheet with an amortization table for proposed mortgages and have the what-if function print out the net tax liability that would result from each possible mortgage interest rate. Any input to the tax return could be similarly analyzed.

Other limitations include the difficulty of setting up additional forms. If you need separate copies of Form 4562 to feed into Schedule C and Schedule E, for instance, you have to copy the Form 4562 file, rename it, and manually link its total to the right form. This is not child's play.

Tax Solver can tax your hardware's abilities. If your return involves too many individual forms

J. K. LASSER'S YOUR INCOME TAX

For over 55 years, J. K. Lasser's book of the same title, with its familiar large format and yellow cover, has been a bestseller during tax season. Its publisher, Simon & Schuster, developed a fairly good software package to go with it a few years ago and sold them together. During the 1992 off-season, ChipSoft, the developers of TurboTax, bought the rights to the name and the software but not the book. ChipSoft will sell the software without the book this year, although a discount coupon for the book will accompany the software. There will also be a reduced-price coupon for the software in each of the millions of copies of the book.

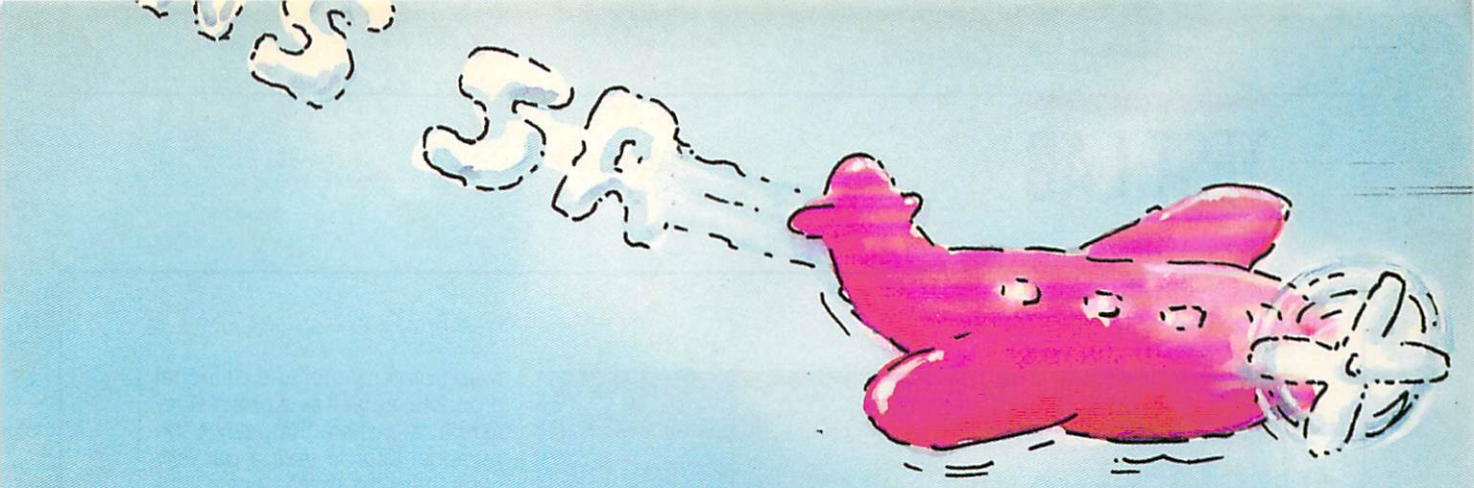
This year's J. K. Lasser's Your Income Tax software sells for $29.95 to new users. You can purchase it with the coupon from the book, but it will not be sold in stores.

I was not able to see a shipping version, but ChipSoft says the software will be similar to last year's version, featuring a form-based approach. A yes-no interview checklist helps you determine which forms to fill out. There are a number of helpful worksheets to assist you in accumulating the necessary information before putting it on the forms. Adequate help, including the text of the IRS instructions, is available.

Buy the Lasser book and order the software with the coupon, or contact ChipSoft (800-964-1040) for purchasing details.

—RICHARD O. MANN

Circle Reader Service Number 382



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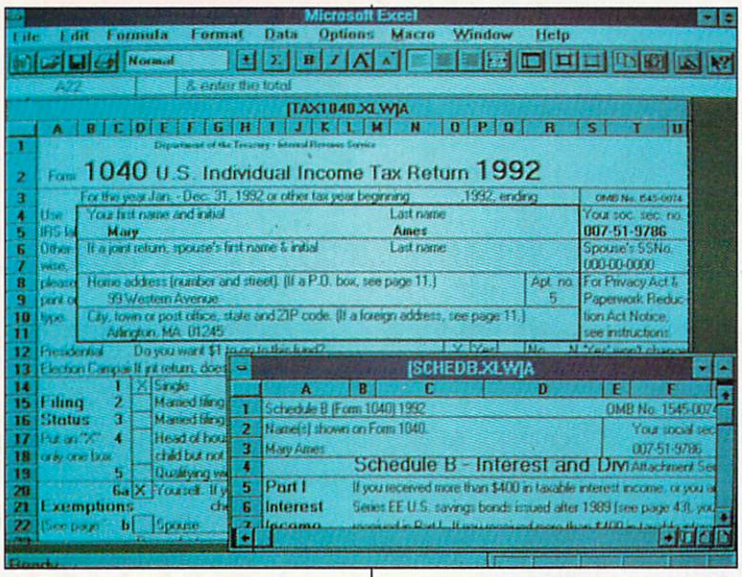

and schedules, you'll run out of memory as you try to open them all. The manual warns that you must have all the forms open at once or amounts may not transfer between forms correctly and advises manually checking the numbers on the printed return. In my opinion, that's not an acceptable solution.

Tax Solver offers more forms than any other tax-preparation software, all laser perfect; gives you a superb what-if analysis capability; and lets spreadsheet masters customize things at will. Spreadsheet masters who also understand tax forms will love it; ordinary taxpayers may be in over their heads.

RICHARD O. MANN

Circle Reader Service Number 378

TURBOTAX FOR DOS

TurboTax for DOS has all the desired features of any full-featured personal tax program at a moderate price: accurate, guaranteed computations; voluminous online, text-sensitive documentation and help; multiple interactive data-input modes; and a winning track record.

ChipSoft—the producer of TurboTax for DOS, TurboTax for Windows (the old SoftView MacinTax for Windows), and MacinTax products—dominates the tax-preparation software field and has just acquired J.K. Lasser's Your Income Tax (covered elsewhere in Test Lab) and SPEED>S, an electronic filing company which services Nelco and three other professional tax-preparation software companies, including PencilPushers and Tax Byte.

The 574,000 users of the ChipSoft and TurboTax family of products range from the personal home computer owner to the professional who prepares individual and small business income tax returns. Every effort has been made to make TurboTax useful to a wide range of tax preparers. It provides cross compatibility between professional and personal products, as well as a professional referral system that allows the personal user to take a partially completed return to a local ChipSoft professional preparer, who can complete or review the preparation of the forms.

New for this year is a bright, aqua-colored series of pop-up mouse- or keyboard-controlled menus in the DOS version of TurboTax. This new EasyStep interface, which is a hybrid of the interview and checklist forms of input, overlays the old, popular, white-on-black facsimile forms approach, adding an income tax return walk-through to the program. TurboTax for DOS also contains five new forms, including the 1040PC, 17 new or improved worksheets, and a heroic attempt to translate IRS language used in instructions and publications into plain English. Electronic filing software comes with the package at no additional charge, other than the transmission and processing fee of $19.95 per return.

TurboTax for DOS has a new filing cabinet feature, similar to the shoebox feature of MECA's TaxCut, which lets you enter data in any order. When additional information is found or comes in late, the filing cabinet will allow you to add it to already proc-

TurboTax for DOS
IBM PC or compatible, 640K RAM (512K free), hard drive with 2.5MB free; supports mouse—$79.95 ($39.95 renewal)

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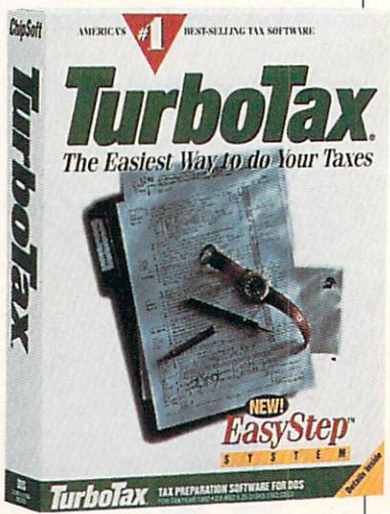
(619) 453-8722



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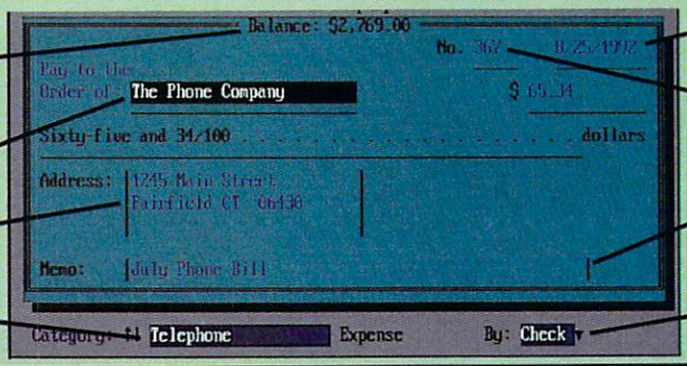

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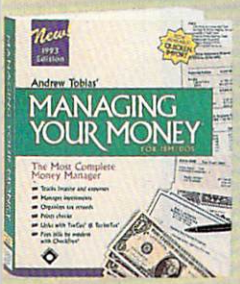

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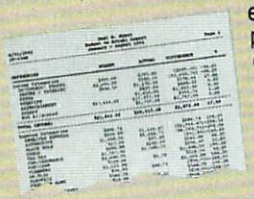

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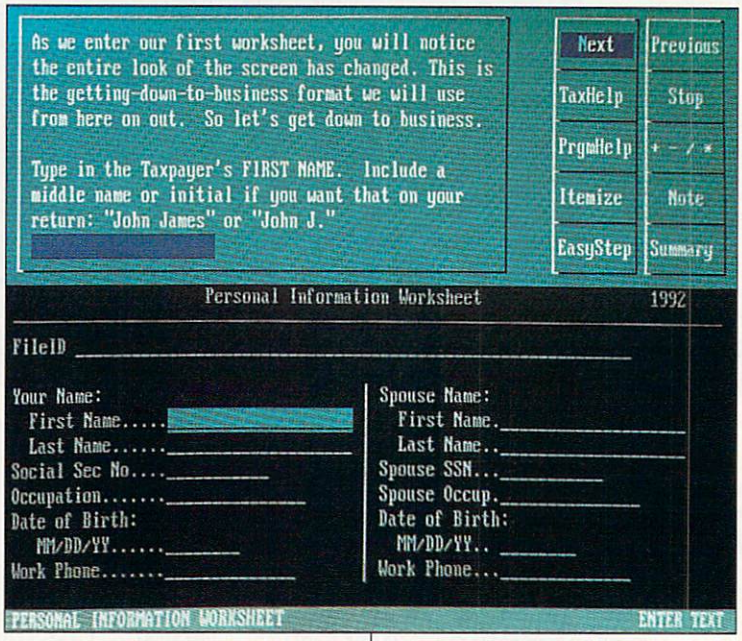
essed information. The program's alphabetical listing of expenses and income categories allows you to jump to the appropriate form or schedule where the receipt belongs.

The routine for the preparation of the 1040X (amended return) allows you to prepare any year by simply inputting the figures calculated by hand or spreadsheet into the generic form, or for the current year by inputting the information from the 1040. People who find errors or omissions in returns for prior years will appreciate the ability to print a 1040X for those years.

A sophisticated what-if tax planner with 1992 and 1993 tax rates built in will allow you to explore the tax consequences of different financial situations and to prepare accurately the 1040ES, estimated tax vouchers, to avoid underpayment penalties for 1993.

ChipSoft is offering new tax-planning software for the preparation of 1040ES and W-4 documents as a $49.95 add-on to the 1040 program. Where taxpayers are wage earners who may have income that does not have adequate withholding, the choice to increase the withholding instead



of filing estimated taxes may be more advantageous. The TurboTax tax-planning add-on allows accurate preparation of the W-4 based upon needed withholding and not on the less accurate method of equating dependents with withholding allowances.

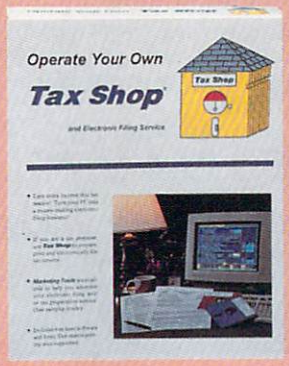
TurboTax for DOS has an audit feature that reviews the return for inconsistencies and also compares the deductions to the national average and the taxpayer's prior-year deductions in the same categories. Variation from the national average or last year's figures may lead to a greater chance for audit; it may also alert

OPERATE YOUR OWN TAX SHOP

The people at TenKey Publishing are betting that any PC owner with the desire to run a home-based business can make money running a business filing tax returns electronically. With TenKey's new $69 software package, Operate Your Own Tax Shop, you can be the electronic conduit from the taxpayer to the IRS.

To run this software, you'll need an IBM PC or compatible, 640K RAM, a hard disk, DOS 3.0 or higher, and a Hayes-compatible modem (1200 or 2400 bps).

It takes no special tax knowledge to enter information from a tax return that the taxpayer has prepared at home into your computer. Tax Shop software checks the return for accuracy, then files it by modem. You can charge $25 to $30 for this service. With a little experience, you can enter and transmit two to three returns per hour.



Electronic filing can speed up the taxpayers' refunds by four to six weeks, so even those who prepare their own tax returns—including the brief 1040EZ and 1040A returns—will gladly pay for electronic filing services.

Tax Shop comes with a marketing guide to help you find customers and order forms for a variety of advertising materials. Be aware, however, that you must register with the Internal Revenue Service before offering this service; registration takes 30 to 60 days.

Do you have the urge to make money at home? This might be a good opportunity. There's a ready-made market, and the startup costs are next to nothing. To order the program, call TenKey Publishing at (800) 448-1415, or write the company at 7650 Municipal Drive, Orlando, FL 32819.

—RICHARD O. MANN

Circle Reader Service Number 383

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The Static-Free Phonejack™ Telephone Extension System, designed like a miniature computer, comes complete with an advanced highly featured telecommunications transmitter and a receiver/extension device that may be moved from room to room. Supports up to 20 extension locations at one time.

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* Some wiring systems may cause a variance in performance. Recommended for single phone lines.

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Circle Reader Service Number 211

TAX PACKAGE FEATURES

	AM-Tax Personal-2 1040	Andrew Tobias' TaxCut for DOS	Andrew Tobias' TaxCut for Windows	EasyTax	Personal Tax Edge
State editions	(22)[1]: AZ, CA, CT, DC, GA, IL, IN, KS, KY, MA, MD, MI, MN, MO, NC, NJ, NY, OH, PA, SC, VA, WI—$30.00 each, $20.00 for updates	(23): AZ, CA, CO, CT, DC, FL, GA, IL, IN, MA, MD, MI, MN, MO, NC, NJ, NY, OH, OR, PA, TN, VA, WI—$24.95 each	(23): AZ, CA, CO, CT, DC, FL, GA, IL, IN, MA, MD, MI, MN, MO, NC, NJ, NY, OH, OR, PA, TN, VA, WI—$24.95 each	(24): AL, AZ, CA, GA, IA, IL, IN, KS, KY, LA, MA, MD, MI, MN, MO, NC, NJ, NY, OH, OK, PA, SC, VA, and WI—$29.95 each	All states requiring returns except Hawaii—$49.00 each
Federal forms	(32): 1040, 1040A, 1040ES, 1099R (5), 1116, 2106 (2), 2119, 2210, 2441, 3800, 3903, 4136, 4137 (2), 4255, 4562 (23), 4684, 4797, 4835, 4868, 4952, 4972 (2), 5329 (2), 6251, 6252 (10), 8283 (3), 8453, 8582, 8606 (2), 8615, 8814 (5), W-2 (25), W-2G (5)	(41): 1040, 1040A, 1040ES, 1040EZ, 1040X, 1116, 2106, 2119, 2210, 2441, 2688, 3468, 3800, 3903, 4136, 4137, 4255, 4562, 4684, 4797, 4835, 4868, 4952, 4972, 5329, 6198, 6251, 6252, 8271, 8283, 8453, 8582, 8606, 8615, 8801, 8803, 8814, 8815, 8822, 8824, 8829	(41): 1040, 1040A, 1040ES, 1040EZ, 1040X, 1116, 2106, 2119, 2210, 2441, 2688, 3468, 3800, 3903, 4136, 4137, 4255, 4562, 4684, 4797, 4835, 4868, 4952, 4972, 5329, 6198, 6251, 6252, 8271, 8283, 8453, 8582, 8606, 8615, 8801, 8803, 8814, 8815, 8822, 8824, 8829	(35): 1040, 1040A, 1040ES (2), 1040EZ, 1040PC, 1099MISC (4), 1099R (4), 2106 (2), 2119, 2210, 2441, 2688, 3800, 3903, 4137, 4255, 4562 (40 assets), 4684, 4797, 4868, 4952, 4972, 5329 (2), 6251, 6252 (4), 8283, 8453, 8582, 8606 (2), 8615, 8814, 8822, 8829 (5), W-2 (8), W-2G (4)	(27): 1040, 1040A, 1040ES, 1116, 2106 (8), 2119, 2210, 2441, 2555, 3903, 4562 (49), 4684, 4797, 4835, 4868, 4952, 5329 (2), 6251, 6252 (6), 8283, 8453, 8582, 8606 (2), 8615, 8814 (5), 8829 (10), 9282
1040 schedules[2]	(15): 1, 2, 3, A, B, C (5), D, D-1, E-1 (5), E-2, EIC, F, K-1 (23), R, SE	(15): 1, 2, 3, A, B, C, C-EZ, D, D-1 (short term), D-1 (long term), E, EIC, F, R, SE	(15): 1, 2, 3, A, B, C, C-EZ, D, D-1 (short term), D-1 (long term), E, EIC, F, R, SE	(13): A, B, C (5), C-EZ (5), D-1 , D-2, E-1, E-2, EIC, F (5), K-1 (15), R, SE (2)	(12): A, B, C (10), D-1 (3), D-2, E-1 (8), E-2, EIC, F (3), K-1 (10), R, SE (2)
Data import/export	Imports from prior year's AM-Tax Personal-1 or -2 only	Imports from prior year's TaxCut (DOS and Windows) and TurboTax (DOS and Windows), as well as from Quicken for DOS 5.0 and 6.0, Quicken for Windows 2.0, Managing Your Money 8.0 and 9.0, Microsoft Money 1.0 and 2.0, CheckFree 3.0, Fidelity On-Line X-press 2.0, and any other program that outputs in Tax Exchange Format (files with TXF extension)	Imports from prior year's TaxCut (DOS and Windows) and TurboTax (DOS and Windows), as well as from Quicken for DOS 5.0 and 6.0, Quicken for Windows 2.0, Managing Your Money 8.0 and 9.0, Microsoft Money 1.0 and 2.0, CheckFree 3.0, Fidelity On-Line X-press 2.0, and any other program that outputs in Tax Exchange Format (TXF)	Imports from Managing Your Money, Quicken for DOS 5.0 and 6.0, and ASCII files; imports 1991 information into 1992 package; multiple-returns capability, limited only by hard disk space	Imports from software that supports MoneyCounts, Managing Your Money, Quicken (DOS and Windows), Microsoft Money, and ASCII format; imports 1991 information into 1992 package
Technical support	Free support via toll call; fax-back service with 24-hour turnaround (toll call)	Free support via toll call; February 1 through April 15, 9:00 a.m. to midnight (EST) Monday through Friday, 10:00 a.m. to 4:00 p.m. weekends; 9:00 a.m. to 6:00 p.m. Monday through Friday the rest of the year; 24-hour fax support via toll call; CompuServe forum	Free support via toll call; February 1 through April 15, 9:00 a.m. to midnight (EST) Monday through Friday, 10:00 a.m. to 4:00 p.m. weekends; 9:00 a.m. to 6:00 p.m. Monday through Friday the rest of the year; 24-hour fax support via toll call; CompuServe forum	Free support via toll call, toll call to fax	Free support via toll call, toll call to fax, smart fax, CompuServe, or GEnie
Audit trail	Supporting worksheets available for any line, up to a total of 50	Miniworksheets provided for items needing off-form calculations; scratch pads available for any field	Miniworksheets provided for items needing off-form calculations; scratch pads available for any field	Unlimited schedules and notes for all numeric-input fields	Unlimited schedules, notes, minispreadsheets for all numeric-input fields
Electronic filing	Not available with personal versions[3]	No additional software required to file with clearinghouse by modem or mailed disk at $14.95 per return	No additional software required to file with clearinghouse by modem or mailed disk at $14.95 per return	Nelco electronic filing via mail, or direct to Nelco via modem with transmission within two days for $19.95 per transmission; no external software purchase needed	$10.00 for single return, $75.00 for each group of ten returns; no additional software purchase required; electronic filing software included in the price of the program; mail paper signature forms to Parsons and transmit via modem or mail data disk and Form 8453

[1]Here and throughout this grid, the numbers in parentheses show the number of forms available.

[2]Most manufacturers also offer supporting schedules for short forms of 1040.

[3]Electronic filing is available for the professional version of the product. The software, which includes the professional version, costs $395.00. The filing fee is $6.00 per return.

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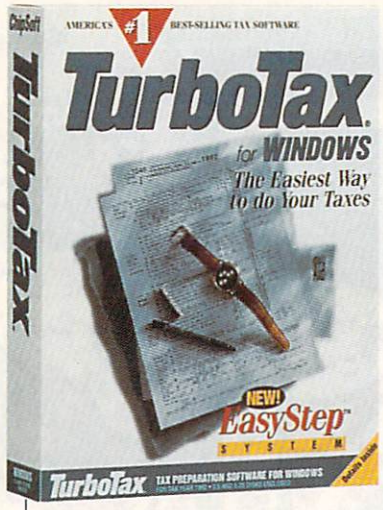
Circle Reader Service Number 161



TurboTax for Windows
IBM PC or compatible, 2MB RAM (1MB free), Windows 3.0 or higher, hard drive with 4MB free, mouse—$79.95 ($39.95 renewal)

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the taxpayer to possible inaccuracies in his information.

TurboTax for DOS is a highly rated, best-selling program, the industry leader in personal and professional tax preparation. More than 550,000 people use this program. This number represents over 60 percent of the software units sold in this market. TurboTax for DOS ranks high on the list of recommended software.

ALFRED C. GIOVETTI

Circle Reader Service Number 379

TURBOTAX FOR WINDOWS

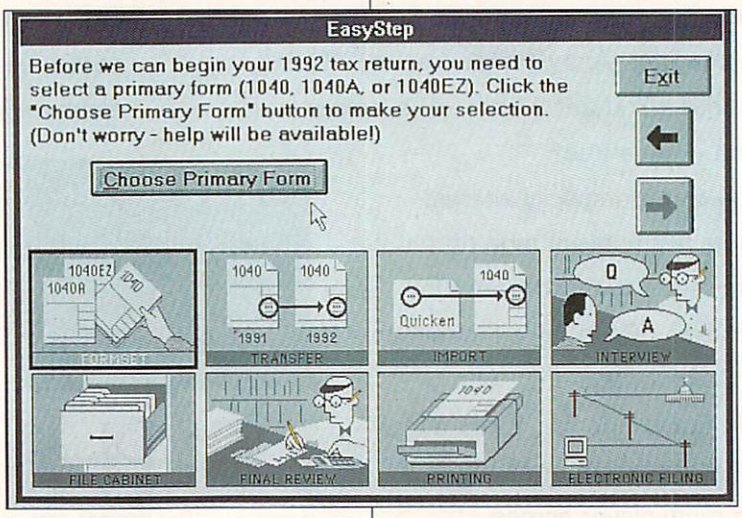
TurboTax for Windows combines all the advantages of the Windows interface with the most advanced personal tax-preparation software features, such as multiple data-input modes, advanced printing options, electronic filing, and online context-sensitive help—all at a moderate price.

TurboTax for Windows does a great job of implementing Windows' onscreen and printing font features. Onscreen forms and their printouts are identical to the IRS forms found in the post office. The program supports a wide range of laser printers and 9- and 24-pin dot-matrix printers, without any special fonts or memory requirements.

This Windows version of TurboTax has both the classical forms-based input and the new hybrid of interview and checklist that ChipSoft refers to as the EasyStep system (discussed in my review of the DOS version). In this version you'll find many of the same features of the DOS version and more—specifically, the file cabinet, planning mode, W-4 and 1040ES tax planner add-on module, data import with Tax Exchange Format and Dynamic Data Interchange technology, compatibility with the professional version, audit flags, and tax-saving suggestions.

The big difference between the DOS and Windows versions of TurboTax is the true windowing environment and presentation of onscreen forms that look just like the forms you can get from the post office. TurboTax for Windows supports only 15 states, while the DOS version supports all 43 states that have income tax and even prepares the Florida personal property tax return. The Windows version supports basically the same federal forms and schedules as the DOS version but has 10 more worksheets than the DOS version for a total of 100 forms, schedules, and worksheets.

Not only does TurboTax for Windows compare your deductions and income amounts to the nation-



THIS MONTH'S REVIEWERS

Richard O. Mann, C.P.A., C.I.A. (Certified Internal Auditor), of Roy, Utah, is an internal auditor with a large international religious organization in Salt Lake City. He has over twenty years of accounting experience as a C.P.A. in public practice and as a corporate controller and financial vice president. Rich has written nearly 200 articles over the past four years.

Alfred C. Giovetti, C.P.A., Ph.M., of Catonsville, Maryland, is, among other things, a professor of accounting at Catonsville Community College, a partner and senior accountant with Giovetti and Giovetti Accountants, and a lecturer in continuing education for accountants. In addition to being a contributing and associate editor for *Free State Accounting Journal* and other publications, Al has written well over 100 articles published over the last year.

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- New resolution-independent transitions
- Streamed-in animations and sound files mean faster loading and reduced memory usage
- Word and character recognition allow hypertext browsing in text windows
- Enhanced object editor now has control panel functions
- Additional database functions

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Circle Reader Service Number 235

TAX PACKAGE FEATURES

	TAXPERFECT-PC	Tax Preparer	Tax Solver	TurboTax for DOS	TurboTax for Windows
State editions	(0)[1]	(1): CA—$125.00	(3): CA, MA, NY—$39.95 each	(44): AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NJ, NM, NY, OH, OK, OR, PA, RI, SC, TN, UT, VA, VT, WI, WV—$49.95 each	(15): CA, CT, DC, IL, MA, MD, MI, MN, NC, NJ, NY, OH, OR, PA, VA—$49.95 each
Federal forms	(40): 1040, 1040A, 1040X, 1041, 1116 (U), 2106 (U), 2119, 2210, 2439, 2441, 2555 (U), 3468, 3800, 3903, 4136, 4137 (U), 4255, 4562 (U), 4684, 4797, 4835, 4868, 4952, 4972, 5329 (U), 5884, 6198, 6251, 6252 (U), 8283, 8396, 8582, 8586, 8606 (U), 8615, 8803, 8814 (U), 8815, 8828, 8829	(19): 1040, 1040ES, 1040PC, 2106 (5), 2119, 2210, 2441, 3468, 3800, 3903 (3), 4562 (15), 4797, 5329 (2), 6251, 6252 (5), 8582, 8606 (2), 8615, 8829 (5)	(92): 1040, 1040A, 1040ES, 1040X, 1045, 1116, 1128, 1310, 2106, 2210F, 2119, 2120, 2210, 2350, 2439, 2441, 2555, 2688, 2848, 3115, 3468, 3800, 3903, 3903F, 4029, 4136, 4137, 4255, 4361, 4506, 4562, 4571, 4684, 4782, 4797, 4835, 4852, 4868, 4952, 4970, 4972, 5329, 5472, 5735, 5754, 5884, 6198, 6251, 6252, 6478, 6765, 6781, 8027, 8027-T, 8082, 8264, 8271, 8275, 8283, 8300, 8332, 8379, 8396, 8453, 8582, 8582CR, 8586, 8594, 8606, 8609, 8611, 8615, 8801, 8803, 8809, 8814, 8815, 8817, 8818, 8819, 8821, 8822, 8824, 8826, 8828, 8829, 8830, 911, SS-4, TDF 90, W-2, W-4	(38): 1040, 1040A, 1040ES, 1040EZ, 1040PC, 1116 (2), 2106 (2), 2119, 2210, 2441, 2555 (2), 2688, 3800, 3903, 3903F, 4137 (2), 4255, 4562 (6), 4684, 4797, 4868, 4952, 4972, 5329 (2), 6198, 6251, 6252 (4), 8283, 8453, 8582, 8606 (2), 8615, 8814 (4), 8815, 8822, 8824, 8829, W-4	(41): 1040, 1040A, 1040ES, 1040EZ, 1040PC, 1116 (2), 2106 (2), 2119, 2210, 2441, 2555 (2), 2688, 3800, 3903, 3903F, 4137 (2), 4255, 4562 (6), 4684, 4797, 4835, 4868, 4952, 4972, 5329 (2), 6198, 6251, 6252 (4), 8283, 8332, 8453, 8582, 8606 (2), 8615, 8801, 8814 (4), 8815, 8822, 8824, 8829, W-4
1040 schedules[2]	(11): A, B, C (U), D-1 (U), D-2, E-1 (U), E-2 (U), EIC, F (U), R, SE (U)	(11): A, B, C (5), D-1, D-2, E-1 (U), E-2 , EIC, F (5), R, SE (2)	(10): A, B, C, D, D-1, E, EIC, F, R, SE	(13): A, B, C (4), C-EZ, D, D-1 (2), D-2, E-1 (2), E-2 (2), EIC, F (2), R, SE (2)	(14): A, B, C (4), C-EZ, D, D-1 (2), D-2, E, E-1 (2), E-2 (2), EIC, F (2), R, SE (2)
Data import/export	Files from personal-version returns are compatible with those from professional version; imports 1991 information into 1992 package	Imports 1991 information into 1992 package; Windows Clipboard can be used to import information from any Windows-capable application	Feeds this year's Tax Solver–prepared returns into next year's Tax Solver package	Imports from Quicken for DOS 5.0 and 6.0 and software that supports Tax Exchange Format; no adjustment of information permitted after import; imports 1991 TurboTax information into 1992 package	Imports from Quicken for DOS 5.0 and 6.0 and software that supports Tax Exchange Format; imports 1991 TurboTax information into 1992 package; designed for Windows environment from the ground up; fully uses all Windows features including GUI and Windows fonts to print returns.
Technical support	Free support via toll call	Free support via toll call, toll-call fax, or (800) fax	Free support via toll call; 11 hours per day, 7 days per week from January 2 through April 15; regular business hours the rest of the year	Free support via toll call, (800) fax, bulletin board, CompuServe, or GEnie	Free via toll call, (800) fax, bulletin board, CompuServe, or GEnie
Audit trail	No custom schedules, notes, minispreadsheets supported for any field; pop-up calculator produces an output resembling calculator tape	Unlimited schedules, notes, and minispreadsheets (which can add, subtract, divide, and multiply) for all fields	Can be created by the user; you can create custom spreadsheets and link the totals into the forms; cells can also carry brief comments after the data	Unlimited notes, tally sheet, and supporting schedules for each numeric field	Unlimited notes, tally sheet, and supporting schedules for each numeric field
Electronic filing	Nelco electronic filing via modem, fax, or mail-in paper forms; $5.95 per return; $200.00 for electronic filing software	Software priced at $295.00 is available for electronic filing through third party and at $1100.00 for electronic filing direct to IRS	None	Electronic filing built into the program—$19.95 per return with Nelco by modem or mailed paper forms; no longer any support for mailing of computer disks	Electronic filing built into the program—$19.95 per return with Nelco by modem or mailed paper forms; no longer any support for mailing of computer disks

[1]Here and throughout this grid, the numbers in parentheses show the number of forms available. The letter *U* in parentheses designates an unlimited number of forms.

[2]Most manufacturers also offer supporting schedules for short forms of 1040.

al averages, as in the DOS version, but inconsistencies and conflicting answers are pointed out to you by pop-up warning windows. You can mark your data with codes to prevent confusion, such as *E* for estimate or a question mark for questionable information or data that needs verification. A warning about and identification of questionable items allows you to correct the data prior to printing the complete return. The notations for estimates and questionable data make the tax preparation easier and less prone to error.

Electronic filing is available for the $19.95 transmission price and does not include the professional TurboTax refund-anticipation loan (RAL) capability. ChipSoft includes the electronic filing software at no additional charge and integrates it with the software. I found the help feature of TurboTax for Windows more comprehensive than the same feature in the DOS version, offering IRS instructions, plain-English explanations, and tax-saving suggestions for every field in the return. If the Windows version supports your state tax preparation, and if you prefer using Windows over DOS, the award-winning, highly recommended TurboTax for Windows may be the product for you.

ALFRED C. GIOVETTI

Circle Reader Service Number 380

NEXT MONTH
Tape Drives

ELECTRONIC FILING

Pros

- Faster refunds
- Acknowledgment by IRS that your return was received and accepted within 48 hours of receipt
- Increased accuracy (error rate of only 2 percent last year)
- Option of direct deposit of refund
- Great way to impress friends

Cons

- Bank rules sometimes in conflict with direct deposit of refund
- Delays, sometimes of months, because of incorrect or incomplete information
- Balance-due returns and refund-anticipation loans (RALs) not yet supported in personal tax software (must go through a professional preparer)

—ALFRED C. GIOVETTI

FORMS AVAILABILITY AND COMPATIBILITY

One of your criteria for selecting a tax package may well be how a particular package allows you to output your information.

If you aren't using IRS-supplied forms, tax packages offer a variety of output options. Some packages allow laser output, others use preprinted pin-feed forms for dot-matrix output, and there are other options. You'll want to consider what kinds of forms you need, whether your printer is supported, and what extra expense, if any, is involved.

Signature forms are simply the forms that contain your signature; the IRS requires that your printer output of these forms look just like the pages mailed to you from the IRS. **Graphic replica forms,** also called **IRS replica forms,** contain not only the necessary IRS information but fonts and graphics that make them virtually identical to IRS forms, so they can be used as signature forms. **IRS facsimiles,** on the other hand, contain the information, but lack the fonts and graphics, in the IRS forms.

AM-Tax Personal-2 1040
Laser forms for all forms available for $100 (federal) and $75 (state); compatible with Nelco printed forms and overlays

Andrew Tobias' TaxCut for DOS
Prints 16 basic forms in IRS replica format (requires 100-percent HP LaserJet compatibility); all others printed with MECA's LaserLink FullPak ($99)

Andrew Tobias' TaxCut for Windows
Prints all forms in IRS replica format; accesses Windows 3.1 TrueType font technology

EasyTax
Compatible with Nelco forms; prints IRS replica forms on dot-matrix printers and HP LaserJet Plus family (or compatible) laser printers

Personal Tax Edge
Graphic output for signature forms with IRS-approved forms for other supported forms; laser-printed graphic output not available for non–signature forms

TAXPERFECT-PC
Supports friction-feed printing directly to IRS forms available at post office; uses overlays, transparencies, IRS-approved facsimiles, continuous pin-feed forms; supports a wide range of dot-matrix printers (anything that will print); Nelco laser-print–option graphic output of all supported forms requires software priced at $225

Tax Preparer
Pin-feed preprinted forms and laser software available—$35 for some graphic replica forms and facsimile forms, $150 for graphic replica printouts of all forms; compatible tax font required

Tax Solver
All forms supplied in laser-ready form

TurboTax for DOS
Preprinted pin-feed forms, graphic-output signature forms, and facsimile forms; works with lasers, HP DeskJet, and dot-matrix printers

TurboTax for Windows
Preprinted pin-feed forms, overlays, facsimiles, HP-compatible laser graphic forms for all supported forms through Windows GUI

NEWS & NOTES

Jill Champion

Superspeed chips for Super VGA, a helping hand for the disabled, and a lesson in deficit spending

The ULTRA Chip

Looking to light a fire under those graphics? Then look to accelerator boards that carry Avance Logic's GUI ULTRA graphics coprocessor chip. GUI ULTRA accelerates graphical user interface (GUI) software such as Windows, OS/2, and X-windows up to 10 times the speed of Super VGA (SVGA) on ISA-bus systems and up to 15 times the speed of SVGA on local-bus systems.

The ULTRA provides similar acceleration for computer-aided design (CAD), desktop publishing, and multimedia/video Windows and DOS applications.

In local-bus design, the ULTRA chip will operate at the speed of the host microprocessor (25 MHz to 50 MHz and up), which is especially important for video applications that require high-speed graphics processing. The ULTRA also speeds up SVGA functionality on the chip, resulting in an increase in performance of both Windows and non-Windows programs. It accelerates common functions used in GUIs, including Bit-Blt, area fill, and line draw. Bit-Blts are bit-block transfers of pixels that are used in GUIs for dragging application windows. Line draw increases performance in CAD and other drawing programs.

The Avance GUI ULTRA is fully compatible with all IBM and Hercules graphics display standards. Since the ULTRA's architecture is compatible with Avance Logic's earlier graphics coprocessor, the GUIEngine, Avance customers can easily adapt GUIEngine software to upgrade to the ULTRA. For more information, contact Avance Logic, 46750 Fremont Boulevard, Suite 105, Fremont, California 94538; (510) 226-9555, (510) 226-8039 (fax).

For the Physically Challenged

Numerous computer-related devices are designed specifically for aiding physically challenged persons in all aspects of their communication, work, entertainment, and environmental control.

The question is, where can you find these devices, and once you've made a purchase, who will be there to offer operating and technical support for the newly purchased equipment?

Look no further: Key Technologies offers a catalog filled with pioneering products for assisting disabled persons *and* technical support for every purchase.

Products include symbols and display material; signaling devices; silent-scanning, digital-recording, and text-to-speech devices; writing aids; computer-access products for IBM and compatible, Macintosh, and Apple IIe and IIGS computers; alternate keyboards; software; page turners; telephone-dialing systems; and environmental controllers, including power controllers, switches, and mounting systems.

Key Technologies founders Kenneth P. Whitley, a speech and language pathologist active in the field of assistive technology for 16 years, and Karen S. Whitley, an early childhood educator for more than 17 years, are "dedicated to providing the very best in assistive technology to disabled persons."

They also offer, through their company, workshops on the operation and application of all products, comprehensive services in selecting appropriate products, and complete product support. For more information, contact Key Technologies, P.O. Box 1997, Morganton, North Carolina 28680-1997; (704) 433-5302, (704) 433-6298 (fax).

Cut the Budget

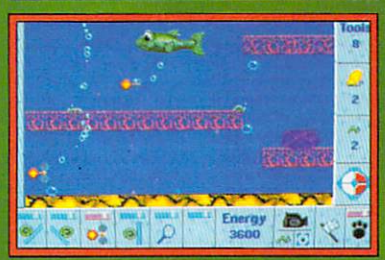
So you think you have the answer to the national deficit crisis? Now you can test your budgeting theories with free software from Banner Blue. Uncle Sam's Budget Balancer lets anyone with an IBM PC or compatible computer balance the U.S. federal budget.

The program allows you to modify the president's fiscal-year 1993 budget with more than 300 options that have been researched and documented by the Congressional Budget Office. Options for spending and revenue changes are described, including the pros and cons of implementing each one. You can also make budget changes of your own design; with each change you select, the deficit is immediately updated. Uncle Sam's Budget Balancer also contains educational information on the budget process. You can even explore the history of the U.S. budget and the federal deficit.

Banner Blue created the program as a public service and hopes it will help heighten American taxpayers' awareness of the seriousness of the budget crisis. In fact, you're encouraged to make copies of the program for friends and colleagues and to print out your own budget solutions and mail them to Congress.

Uncle Sam's Budget Balancer is available through CompuServe and America Online. CompuServe subscribers can download the program SAM.ZIP from the Political Issues library in the Issues Forum (GO ISSUES) or from the Economy library of the Campaign '92 Forum (GO VOTEFORUM). To download from America Online, choose Keyword from the Go To menu (or press Ctrl-K) and type *Quickfind;* then, in the file-search dialog, type *SAM.ZIP,* and select List Matching Files.

Creepers™



The Creepers are on the move. It's the annual trek to the Butterfly Bowls. But, with over 70 levels of factories, caverns, and forests to cross and with the worst sense of direction in the entire animal kingdom, getting them all there is going to take some doing!

Creepers Features:

- Over 70 puzzle levels.
- 256 colors (PC).
- Crazy Creeper animations.
- Difficulty rating from easy to brutal.
- Full soundcard support with 16 funky soundtracks.
- The Creeper-cam with multiple playfield views.

The mean green creeping machine

Look for Creepers crawling in your favorite software store, or call: (800) 438-7794

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(617) 731-3553

Circle Reader Service Number 165

For a $10 shipping-and-handling fee, you can order the software directly from Banner Blue. For more information, contact Banner Blue Software, 39500 Stevenson Place, Suite 204, Fremont, California 94539; (510) 794-6850, (510) 794-9152 (fax).

All the News That's Fit to Digitize

Welcome to the world's first digital television network, NBC Desktop News, brought to you on your PC by NBC, NuMedia, and IBM. It looks and feels like television, but it's digital and comes to you personalized via your PC. The network draws on the extensive news-gathering and -processing capabilities of NBC, its affiliates, CNBC, and other news organizations worldwide. Both video and print content are digitally converted into electronic news stories and then delivered to you via satellite through cables or phone lines. Since the information is stored, you can watch it on your monitor whenever you wish. You can even decide the order in which you want to view the stories.

The service integrates text, graphics, video, and sound in an easy-to-use, concise format with a look much like that of television news. It's designed for corporate users who need the latest news and information on demand but who don't have hours to comb through the diverse range of news and information sources available to businesses today. NBC Desktop News, which is currently in the pilot stage, will automatically review incoming video, text, and other databases and, based upon each subscriber's profile, create a customized mix of news and information. Typical of the general business and market news that will be available to users will be segments of no longer than two minutes, which are continuously updated throughout each day. Corporations can also subscribe to industry-specific news segments in areas such as pharmaceuticals, computers, and finance. In addition to the base business news service and industry-specific news, subscribers will be able to incorporate their own corporate news and training information into NBC Desktop News.

For more information, contact NuMedia, 201 North Union Street, Suite 400, Alexandria, Virginia 22314; (703) 684-9000, (703) 684-9393 (fax).

Metrics by Metrix

Forget pounds and ounces; it's metric time. And thanks to Financial Systems Associates, you don't have to struggle with troubling metric conversions if you don't happen to remember them all. Metrix, for IBM PCs and compatibles, offers quick access to the most common metric-to-U.S. and U.S.-to-metric conversions. The program also allows you to search a user-modifiable refer-

There's Sound...

"vroom, vroom"

SoundMan™ 16. Get Real.

SoundMan16 delivers sound so real, 85% of the time, people can't tell the difference from live sound. That's because it's packed with the absolute latest in sound board technology: up to 16-bit/44KHz record/playback, Yamaha OPL-3 stereo synthesis 20-voice chip, 100%

ence table that contains more than 1200 conversion reference items. Online help and a pop-up calculator that accepts input from conversion-screen results or manual entry are also included. Metrix is available in both DOS and Windows versions. The DOS version runs as either a stand-alone or a TSR program. The suggested retail price is $39.95. For more information, contact Financial Systems Associates, 148 North Washington Street, Delaware, Ohio 43015-1725; (614) 363-2289.

Down-Home Software

There's no good reason to spend a fortune to get your work done—or to have some fun.

If you're not a high-tech computer user—and never intend to be—Lifestyle Software Group of St. Augustine, Florida, offers a number of entertaining and eminently practical "home leisure software" titles for those looking for visually appealing, easy-to-install, easy-to-use, and reasonably priced programs—ones you'll actually use—for your home computer. Most of the software is priced well below $100, even while utilizing advanced graphics and sound capabilities.

LSG's offerings include Photo Family Tree, a genealogy-tracking system that, among other capabilities, lets you scan in family and ancestral photos for full-color pictorials of your entire family tree; Visions, an astrology program that generates complete astrological data, including your daily horoscopes and behavioral patterns; Hooked on Lottery, a program for lottery players that uses data from past winners to apply the principles of probability to your number-choosing tactics; and Micro Bridge Companion, a collection of simulations and tools, including more than 2 billion card deals, that help bridge lovers sharpen their strategies and playing skills. One of LSG's newest titles is Micro Kitchen Companion System. "Designed by cooks, for cooks," it is "the ultimate library management and menu-planning tool." It also computes nutritional analysis for complete meals and is compatible with LSG's new electronic series of Betty Crocker cookbooks.

If you would like to get additional information, contact Lifestyle Software Group, 63 Orange Street, St. Augustine, Florida 32084; (800) 289-1157, (904) 825-0223 (fax).

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

FEEDBACK

Unfinished business, leaving no trace, selling from the pocket, getting busted, printouts you can live with, running by the calendar, and batches within batches

Missing

Something seems to be missing from the bottom of pages 100 and 102 in the January 1993 issue of COMPUTE.

STEVE SLOAN
PASADENA, TX

Right you are. The material was lost as a result of a problem we had transferring our files to our typesetter. We regret the deletion and appreciate your bringing it to our attention. Here is the material missing from the bottom of page 100.

One example is Apple, which is using a superset of the PCMCIA standard in its upcoming Newton. That means you'll be able to buy, for example, any PCMCIA modem card for the Newton, yet Apple will have the choice of offering a higher-speed communications link for AppleTalk connection.

And here is the material missing from the bottom of page 102.

VL-Bus architecture is ready for 64-bit processors when they arrive on the desktop, but Apple is also working on a superfast bus called QuickRing, which provides data speeds that leave even the 64-bit VL-Bus in the dust.

Clean Slate

I understand that when you delete things from your hard disk, the files remain on the disk, legible to anyone who knows how to look at the individual sectors on the disk. How can I keep my deleted files secret?

NAME WITHHELD
CINCINNATI, OH

PC Tools' optimizer, Compress, has the option of clearing a disk—that is, overwriting every unused sector on the disk. Also, in our September 1992 issue, we listed a program in "Tips & Tools" that will delete a file and wipe its bytes out as well. Here's a BASIC program, called Filler, that writes nonsense to all unoccupied sectors of your hard disk, leaving little behind for snoops to find.

```
DEFLNG A-Z
RANDOMIZE TIMER
FOR i = 0 TO 12
filename$ = filename$ +
 CHR$(255)
NEXT
MID$(filename$, 9, 1) = "."
ls = 29: ls$ = "bytes in each
 allocation unit"
GOSUB getemptyspace
d = a
GOSUB create
homedirectory$ = filename$
SHELL "cd \"
SHELL "md " + homedirectory$
SHELL "cd " + homedirectory$
filler$ = "This sentence is
 approximately sixty-four
 characters in length"
ls = 23: ls$ = "bytes available
 on disk"
GOSUB getemptyspace
b = INT(a / 262144)
c = a - b * 262144
CLS
PRINT " This program will
 create"
IF b THEN PRINT b; "files of
 262144 bytes and"
PRINT " 1 file of about"; c + d;
 "bytes"
PRINT " to fill your disk."
IF b THEN
GOSUB create
originalfile$ = filename$
OPEN originalfile$ FOR
 OUTPUT AS #1
FOR i = 0 TO 4095
PRINT #1, filler$
NEXT
CLOSE 1
FOR i = 2 TO b
GOSUB create
LOCATE 6, 1: PRINT i,
 filename$
SHELL "copy " + originalfile$ +
 " " + filename$
NEXT
END IF
CLOSE
ls = 23: ls$ = "bytes available
 on disk"
GOSUB getemptyspace
c = a
GOSUB create
OPEN filename$ FOR OUTPUT
 AS #1
FOR i = 1 TO c + d
PRINT #1, "a";
NEXT
CLOSE
SHELL "cd \"
SHELL "del " + homedirectory$
 + "\" + chr$(255) + "*.*"
SHELL "rd " + homedirectory$
END
create:
letter = 12
create1:
letterval =
 ASC(MID$(filename$,
 letter,1))
IF letterval = 255 THEN
letterval = 65
ELSE
letterval = letterval + 1
END IF
MID$(filename$, letter, 1) =
 CHR$(letterval)
IF letterval > 90 THEN
letterval = 65
MID$(filename$, letter, 1) =
 CHR$(letterval)
letter = letter - 1 + (letter = 9)
IF letter = 0 THEN END
GOTO create1
END IF
RETURN
getemptyspace:
GOSUB create
SHELL "chkdsk >" + filename$
OPEN filename$ FOR INPUT
 AS #1
WHILE RIGHT$(a$, ls) <>ls$
LINE INPUT #1, a$
WEND
CLOSE
a = VAL(a$): a$ = ""
SHELL "del " + filename$
RETURN
```

Of course, Filler may miss a few bytes here and there, so don't count on complete protection. For example, one of the first things it does is create a subdirectory. If the subdirectory isn't very large,

You get so much out of it because we put so much into it.

Falcon 3.0 Awards of Distinction

Computer Gaming World
Simulation of the Year 1992

PC Games
Best Flight Simulation of '92

PC Magazine
"A Best Product" of 1992

MultiMedia World
Readers Choice Award 1992

Consumer Electronics Show Innovations Award 1992

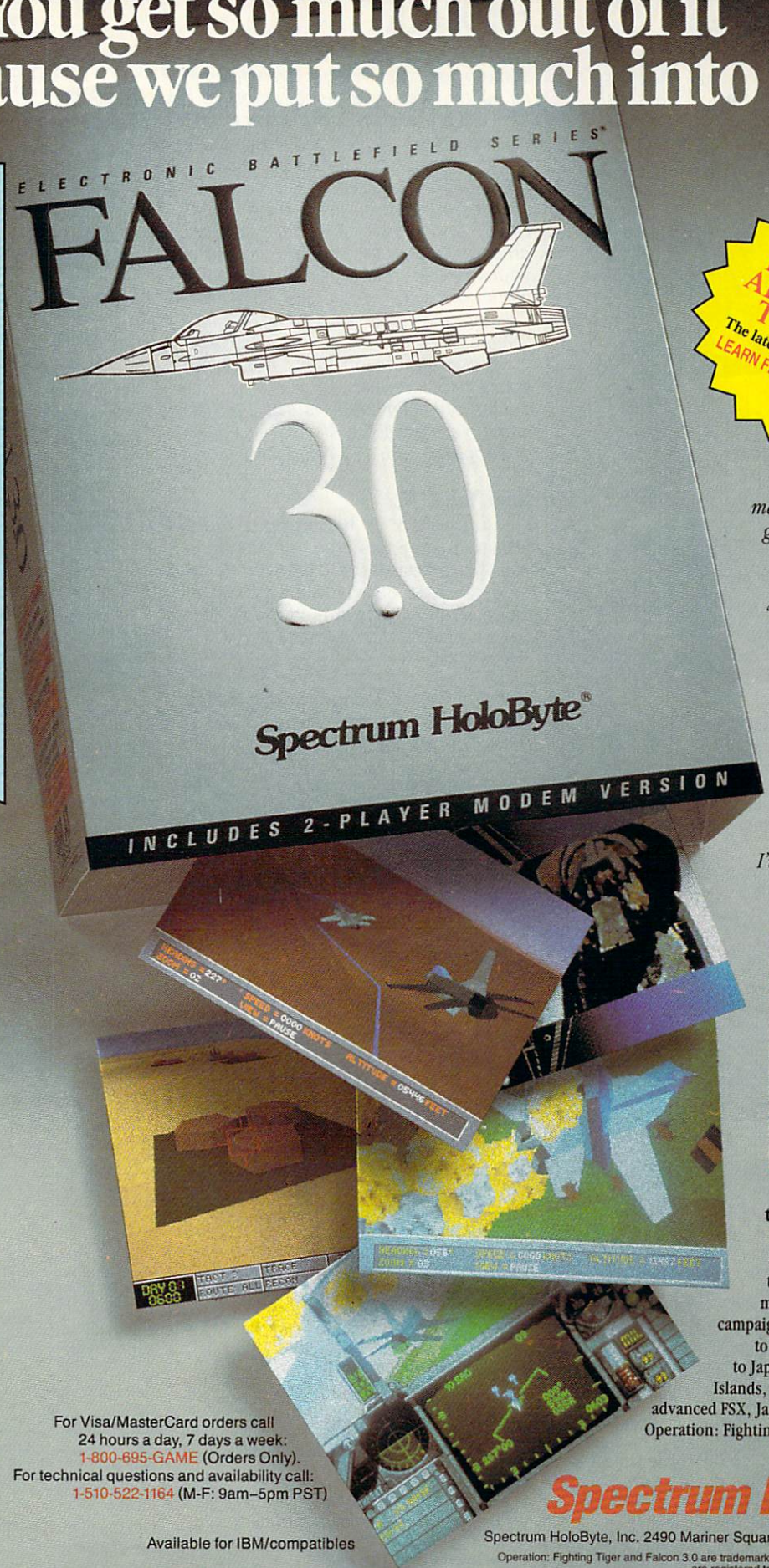
7 CompuServe Wilbur Awards

e could tell you about
e superb graphics we put
to Falcon® 3.0. And the
credibly real F-16 feel.
nd the sensational scope
at delivers everything
om Instant Action arcade
citement to plotting your
vn Red Flag training missions
engaging in a different
mpaign every time you play.
ut we couldn't say it half as
ell as the critics have said
Look at the high marks
ey've given Falcon 3.0.

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

f you aren't in the armed rvices–and maybe even you are–this is as close you can come to flying e Falcon."
TER OLAFSON, COMPUTE

The graphics are stunning, e sound is incredible and e game play is a rush."
VID ETHEL, VIDEO GAMES & MPUTER ENTERTAINMENT



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LEARN FROM REAL PILOTS

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

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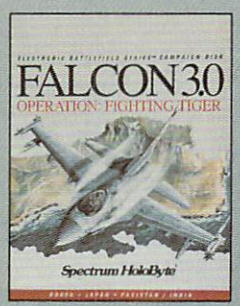
RICHARD SHEFFIELD, COMPUTE

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



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

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For technical questions and availability call:
1-510-522-1164 (M-F: 9am–5pm PST)

Available for IBM/compatibles

Spectrum HoloByte

Spectrum HoloByte, Inc. 2490 Mariner Square Loop, Alameda, CA 94501

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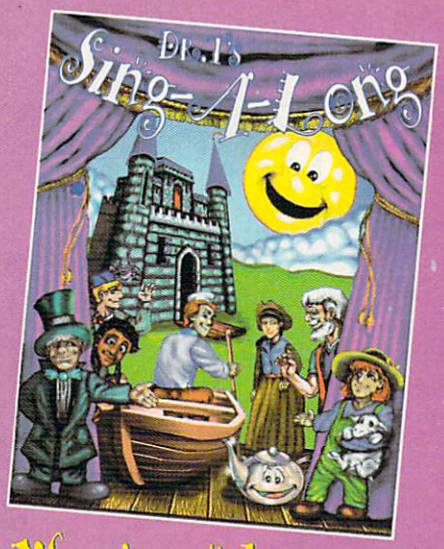
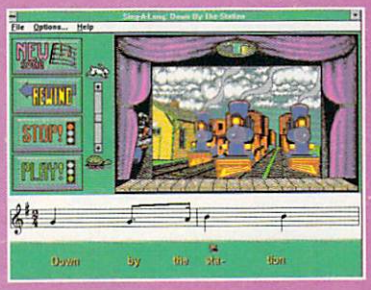


Music and animations make singing along a treat for children and parents!



Dr. T's Sing-A-Long™
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Ages 4 to 10
(Pre K to Grade 4)

Dr. T's
MUSIC SOFTWARE

For more information, call 1-800-989-6434.

FEEDBACK

some bytes might not get overwritten in its sector. Also, many sectors on your disk will be partially full, leaving traces of earlier files unchanged. Filler does nothing about those unused portions of partially filled sectors.

Filler was debugged only under DOS 5.0, and several routines depend on specific wording on certain lines in your Chkdsk report. To be sure it will work with your version of DOS, run Chkdsk and make sure the exact text "bytes in each allocation unit" and "bytes available on disk" appear in your Chkdsk report.

One other limitation is that the file-naming system limits Filler to hard disks of under 917,586,121,746,944MB.

Now You C M

I'm interested in finding out more about Pocket Salesforce, mentioned in your November issue ("Palmtop Strategies," page 83). How can I get in touch with CM Software, its publisher?

LANCE RISSER
ADDRESS UNKNOWN

CM Software is located in the United Kingdom. Its address is Business Unit 1, 33 Sandford Road, Littlemore, Oxford, England OX4 4XT. To call direct from the United States, dial 011 44 865 748 875. Pocket Salesforce, a contact manager for the Hewlett-Packard 95LX palmtop computer, costs $99.95 in U.S. currency, plus seven pounds' postage. If you call, remember that the time in the United Kingdom is five hours ahead of Eastern Time. When it's 8:00 a.m. in New York, it's 1:00 p.m. in Littlemore.

Caught by the Police

The number you gave for NewQuest in your June issue is wrong.

DETECTIVE WARREN
L.A.P.D.
LOS ANGELES, CA

We confess! We gave the wrong number. If you want to contact NewQuest, makers of Ascend, the address is 2550 South Decker Lake Boulevard, Salt Lake City, Utah 84119, and the telephone number is (800) 877-1814 or (801) 975-9992.

For the Ages

Most options for storing computer graphics are extremely time limited: Paper yellows; ink fades; computer disks lose their magnetism. One of the things preventing serious artists from using computers is the fact that you can't generate archive-quality

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graphics with a computer.

LLOYD BORG
NEW ORLEANS, LA

Kodak sent us a press release stating that Joni Carter—a very serious computer artist—uses a Kodak printer. That suggested to us that Kodak must have a printer capable of producing archive-quality printouts, so we called the company. A Kodak spokesperson confirmed that the Kodak XL 7700 printer provides archive-quality printouts. The XL 7700 is used by some hospitals to preserve archived medical records. The printer uses 8½- × 11-inch or 11- × 11-inch paper that's similar to photographic paper, so its printout is about as permanent as a photograph. The cost? You'll have to sell a few of your etchings to earn the $18,000 list price. But check with your dealer; you might be able to get it for less. If you have any questions about the XL 7700 (or the smaller-format SV6500), call Kodak at (800) 445-6235 or (716) 726-6749.

Once in the Morning

I have a lot of programs in my AUTOEXEC.BAT that I want to run only once a day, not every time I boot up my computer. Is there a way to run them the first time I start up and not again until the next day?

BARRY BROWN
CINCINNATI, OH

Sure. Here's a BASIC program you can run. It's called 1DAY.BAS, and it's written in GW-BASIC. To run it from your AUTOEXEC.BAT, use the following line.

```
gwbasic 1day.bas
```

Take the list of programs you want to run only once a day and place it in a file called 1DAY.BAT. Each time you boot up, the BASIC program will check a file called TIMER.FIL to see what the date was the last time 1DAY.BAT was run. If the date is the same as today's date, the program won't run. If it's different, indicating that the file hasn't run today (or if there's no TIMER.FIL, indicating that this is the first time 1DAY.BAS has been run), 1DAY.BAT will run, and TIMER.FIL will be updated.

```
10 ON ERROR GOTO 90
20 OPEN "timer.fil" FOR INPUT
  AS #1
30 LINE INPUT #1, A$
40 CLOSE
50 IF A$ = DATE$ THEN SYSTEM
60 GOSUB 120
70 SHELL "1day.bat"
80 SYSTEM
90 CLOSE
100 GOSUB 130
110 RESUME 70
120 SHELL "del timer.fil"
130 OPEN "timer.fil" FOR OUTPUT
  AS #1
140 PRINT #1, DATE$
150 CLOSE
160 RETURN
```

Batch Shell

If a batch file is executed from within a batch file, the commands after calling the batch file aren't executed. Is there a way around that problem?

STEPHEN LAI
LONDON, ON

Yes. If you're using a version of DOS lower than version 3.3, simply precede the batch file call with Command /c. If you're using version 3.3 or higher, use Call. Here's a simple example. Say that in the middle of a batch file, you want to call another batch file which we will call ANOTHER.BAT. In DOS 3.3 or higher, use this structure:

```
echo This is a batch file
echo for DOS 3.3 or higher.
call another
echo The batch file will proceed
echo to these lines when another
echo has completed operation.
```

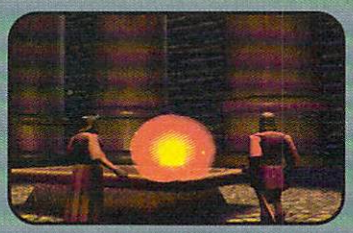
In DOS versions lower than 3.3 use this structure:

```
echo This is a batch file
echo for versions of DOS lower
echo than 3.3.
command /c another
echo The batch file will proceed
echo to these lines when another
echo has completed operation.
```

The Call and Command /c commands start up another instance of the command interpreter, using 40K–50K of available RAM (depending on your DOS version), so you shouldn't nest your batch files too deeply. When the called batch file ends, the command interpreter running it is removed from memory.

Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Write to COMPUTE's Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that we cannot provide personal replies to technical questions. Letters submitted to "Feedback" become the property of General Media International. ❐

When the world is out of balance, someone has to tip the scales!



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Circle Reader Service Number 192

Anyone who's worked for more than ten minutes with Windows or Windows applications knows that there's always more than one way to complete any task. What's easiest may not always be best. What's most intuitive may not be the fastest.

Windows, Excel for Windows, and Word for Windows are all well-documented products, but it's no easy task ferreting out the high-octane power nuggets in those hundreds of pages of dense text. And each program includes many undocumented features.

To give you a quick start into the Windows fast lane, we've asked our experts for their best tips for Windows itself and also for two popular Windows applications, Excel and Word.

So, go directly to your computer, fire up Windows, and take these tips for a test drive.

WINDOWS TIPS

1. Bypass Task Manager and zoom between Windows and DOS programs

You can use the Task Manager or press Alt-Esc to move between Windows and DOS applications, but both methods can be slow.

Use Alt-Tab and Alt-Shift-Tab.

1. Run any DOS application. (If you don't have one handy, run DOS Prompt from the Main group.)
2. With the DOS application full screen, press Alt-Tab to cycle forward through all the applications on your desktop. You'll see the name of the application on a band at the top of your screen.
3. Press Alt-Shift-Tab to cycle backward through your applications.

2. Replace Program Manager with another shell

Program Manager is Windows' default shell, but you might prefer to use a different shell, one that takes less memory, for example.

Change the shell= line in SYSTEM.INI.

1. Run SysEdit and select your SYSTEM.INI file.
2. Find the line that says shell=progman.exe.
3. Change the line to shell=winfile.exe.
4. Experiment with other programs. The MS-DOS Executive (MSDOS.EXE), for example, makes an excellent shell.

3. Load programs rather than run them

When you double-click on an icon or filename or run a program with Program Manager's or File Manager's File, Run command, the application runs full screen, which is often an inconvenience.

Load programs you want to run minimized.

- Shift-double-click on any icon in Program Manager or any filename in File Manager or MS-DOS Executive that you want to run minimized.

4. Create a macro to view or edit nonassociated text files

With File Manager, there are two ways you can view files easily: You can associate the file's extension with Notepad (or another text-editing program) and double-click on the file, or you can drag the file to a Notepad icon (in Windows 3.1). The first method only works if the file is associated, and the second method requires that Notepad be minimized on your desktop.

Use a Recorder macro to load the file at the cursor in File Manager (or MS-

DOS Executive) into Notepad.

1. In File Manager or MS-DOS Executive, select a file to load into Notepad.
2. Open Recorder, configure the program to ignore mouse movement, choose a name for your macro, and start recording.
3. In File Manager, press Alt-F, P, and Ctrl-Insert to copy the selected filename to the Clipboard. Press Tab, Tab, Enter to exit the dialog box.
4. Press Alt-F, R, and type NOTEPAD.EXE in the text box followed by a space.
5. Press Shift-Insert to paste the name of the file into the text box.
6. Press Enter.
7. Stop Recording the macro, and assign the macro a keypress such as Ctrl-Alt-N.

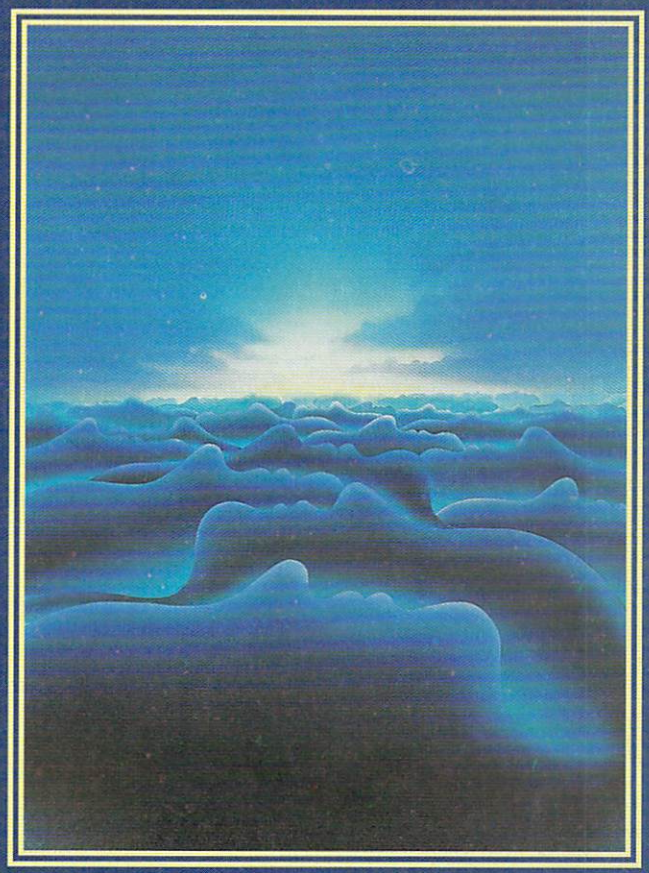
5. View Recorder macro keystrokes

After you create a Recorder macro, it's often essential to review its keystrokes to see if it does what you want it to. Use Recorder's secret viewer feature.

1. Run Recorder and select the macro you want to view.
2. Hold down the Shift key and select Macro, Properties (either with a mouse or the keyboard).
3. Your macro's keypresses will appear in a list box.

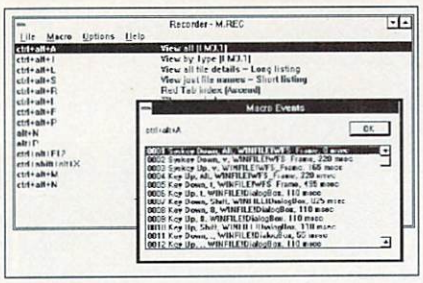
Reading this keystroke list can be tricky. You'll see two entries for each keypress—one for when the key was pressed and one for when the key was released. For example, if you press the A key, you'll see Key Down, a and Key Up, a. Shift, Alt, and Ctrl keys also have up and down states, so a key combination with one of these will have four entries in the list. For example, Shift-A will look like this:

Key Down, Shift



25 TOP WINDOWS TIPS

ARTICLE BY
CLIFTON KARNES,
JAN ALTMAN,
AND HERB TYSON



Key Down, a
Key Up, a
Key Up, Shift

Note that shifted characters don't appear in the listing as we see them onscreen. For example, the asterisk (*), which is the shifted state of the 8 key, is listed like this:

Key Down, Shift
Key Down, 8
Key Up, 8
Key Up, Shift

6. Open two drive windows in File Manager

Copying files from one drive to another in File Manager is difficult unless you open two drive windows simultaneously.

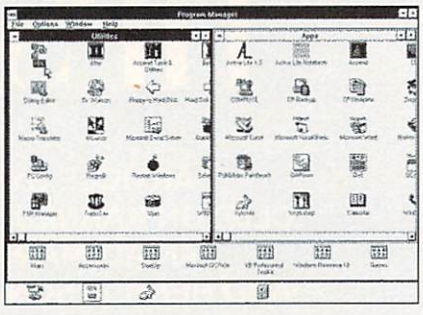
With one drive window already open, Shift-double-click on any other drive icon.

1. Open the first drive window by clicking (or Shift-clicking) on the drive icon.
2. Open the second drive window by Shift-double-clicking on the drive icon.
3. Choose Window, Tile, or press Shift-F4 to arrange the windows.

7. Move and copy icons from one group to another

Copying and moving icons from one Program Manager group to another is often a necessity, but you don't always get the results you expect.

Move icons by dragging and dropping them, and copy icons by pressing the Ctrl key while dragging and dropping.



1. To move an icon from one group to another, first make sure both source and destination groups are visible (the destination group can be either restored or minimized).
2. Click on the icon you want to move and hold down the mouse button (this is normally the left mouse button, unless you've changed the primary button with Control Panel).
3. While holding down the mouse button, drag the icon to its destination and release the button.
4. To copy an icon, repeat steps 1 through 3 above, but press the Ctrl key while you drag and drop.

Note that in Windows a minimized group can't be an icon on another group.

8. Start each Windows DOS session with a special prompt

If you run programs from Windows and from DOS, it's sometimes difficult to remember whether you're at the DOS prompt itself or at a DOS prompt in Windows.

When you run the DOS Prompt from Windows, set the PROMPT environmental variable so the session is identified as a DOS session in Windows.

1. Run Notepad and start a new file called DOS.BAT.
2. Type in the following lines, substituting anything you'd like for [WIN]:
PROMPT [WIN] PG
COMMAND
3. Use this batch file as your DOS prompt from Windows, and it will look like this: [WIN] C:\>.

9. Skip the Microsoft brag screen at startup

Microsoft's startup screen can become boring (as can one you've created yourself).

Skip the startup screen.

- Instead of typing WIN or WIN/s, where s is a switch, type WIN : or WIN/s : to bypass the startup screen.

This works with the original WIN.COM or a new WIN.COM you create yourself.

10. Reinstall any Windows program without running Setup

Often you need to reinstall just one program, file, or group of files from the Windows distribution disk. Usually you can't do this without reinstalling all of Windows.

Learn to decompress the files on the Windows distribution disks.

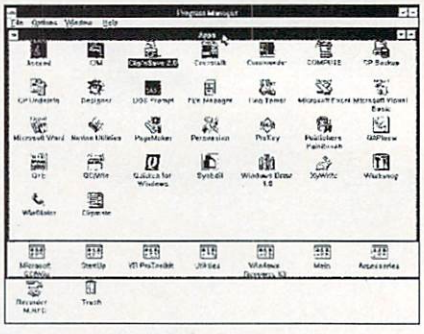
1. Find the EXPAND.EXE program on the Windows distribution disks. (It will probably be on disk 1 or 2.)
2. Copy this file to your WINDOWS subdirectory.
3. You'll notice that most of the other files on the disk have extensions that end with an underscore (_)—for example, WINHELP.EX_, MOUSE.DR_, and so on. These are compressed files. (Note that in early versions of Windows, the compressed files end in EXE, but they are not executable.)
4. To uncompress one of these files, for example WINHELP.EX_, type
EXPAND A:WINHELP.EX_ C:\WINDOWS\WINHELP.EXE.

C:\WINDOWS\WINHELP.EXE is the executable file you're creating.

(Your source and destination drives may be different from A and C used above.)

11. Change the default icon title font

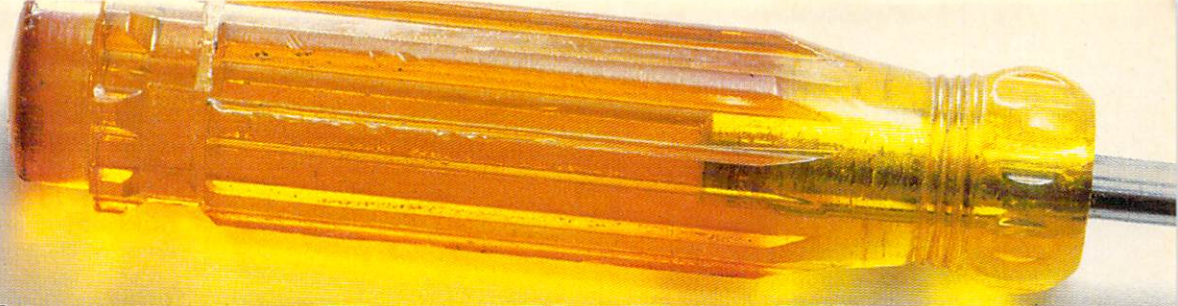
Windows' default font for icon titles can be hard to read.



If you have Windows 3.1, you can substitute a different font for the default.

1. Run SysEdit and select WIN.INI.
2. Find the [Desktop] section, and insert the lines
IconTitleFaceName=Fontname
IconTitleSize=Fontsize
where Fontname is the name of a font on your system and Fontsize is the size, in points, you want to use.

A good choice for an alternative to the default 8-point MS Sans Serif is the System font (which is only available in 10 point). To make System the title font, your lines would look like this:
IconTitleFaceName=System



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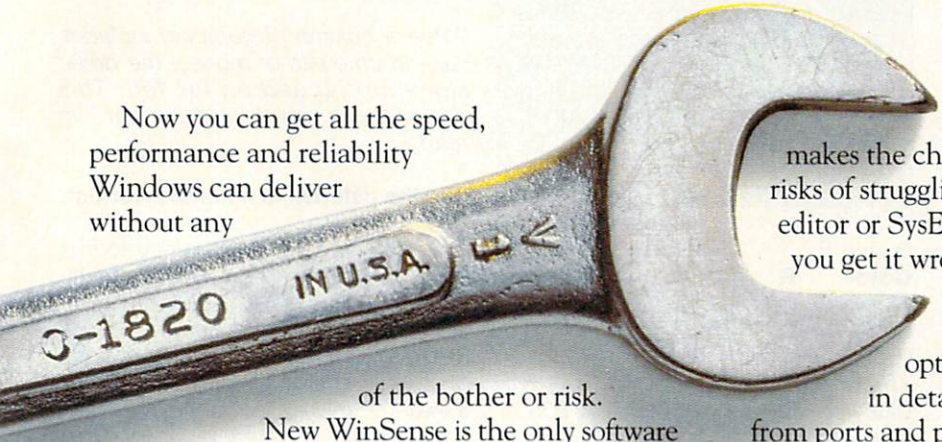

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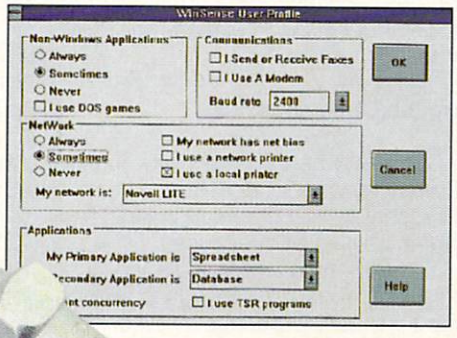

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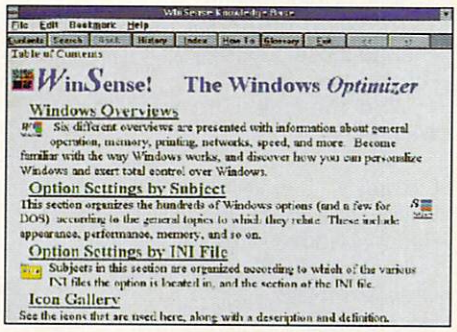

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IconTitleSize=10

12. Make changes in WIN.INI effective immediately

When you make changes to your WIN.INI file, you've probably noticed that you have to reboot Windows to see the changes take effect.

Use Control Panel to reload your WIN.INI without rebooting.

1. Make some changes to your WIN.INI file. For example, you might want to add an extension to the [Extensions] section.
2. To make the change current without rerunning Windows, run Control Panel, double-click on Desktop, and click on OK. This will reread your WIN.INI file and make most of your changes current.

You can use almost any Control Panel icon to update your changes. This technique doesn't work with all WIN.INI parameters, however. Color is the most important exception.

13. Change the colors of buttons, highlight, and Help

The default colors for buttons, highlight, and Help may not be the best choices for you.

Change these colors with Control Panel and WIN.INI.

For Windows 3.1
1. Run Control Panel (on the Main group), and double-click on Color.
2. Select Color Palette.
3. Click on highlight or button to change those colors.

For Windows 3.0
1. Add the following lines to your WIN.INI file:

```
[colors]
ButtonFace=RGB
ButtonShadow=RGB
ButtonText=RGB
GrayText=RGB
Hilight=RGB
HilightText=RGB
```

where R,G, and B are color values standing for red, green, and blue.
2. Rerun Windows.

For Windows 3.0 and 3.1
1. Add the following lines to the [Windows Help] section of your WIN.INI file:

```
Jumpcolor=RGB
Popupcolor=RGB
```

2. Rerun Windows.

Here are some useful values for R, G, and B.

Color	R	G	B
Black	0	0	0
Red	255	0	0
Green	0	255	0
Yellow	255	255	0
Blue	0	0	255
Magenta	255	0	255
Cyan	0	255	55
White	255	255	255

About the Tips and the Tipsters

The Windows tips in this article were excerpted from three books by Windows experts Clifton Karnes, Jan Altman, and Herbert Tyson. Karnes is editor of COMPUTE magazine, Altman is a trainer and consultant on Windows applications, and Tyson is the author of numerous books on word-processing software.

These authors ferreted out and compiled hundreds of fascinating and timesaving tidbits in researching their books *101 Essential Windows Tips*, *101 Essential Excel for Windows Tips*, and *101 Essential Word for Windows Tips*, all published by COMPUTE Books. These handy desktop guides are available for $9.95 each from COMPUTE Books, c/o CCC, 2500 McClellan Avenue, Pennsauken, New Jersey 08109. Add $1.00 per book for shipping and handling.

EXCEL TIPS

14. Select a block of cells in one step

You need to select the current filled-in block of cells, but it extends far in all directions.

Use the Ctrl-* shortcut.

1. Click anywhere inside of the block of cells you want to select.
2. Press Ctrl-*. The selection includes filled-in cells in all directions.

The Ctrl-* shortcut selects the current block of data. It extends in all four directions until it reaches a row or column of blank cells.

Excel 4 includes a tool that performs the same action. It's found in the Utility category within the Options Toolbars Customize box and can be added to any toolbar (it shows a small black box with arrows going out in four directions). I suggest adding it to your standard toolbar.

14. Search or replace backward from the cursor

Neither Formula Find nor Formula Replace gives you the option of searching up from the cursor.

Hold down Shift when pressing Enter or clicking OK.

1. Choose Formula Find or Formula Replace.
2. Fill in the necessary information.
3. Hold down Shift while pressing Enter or clicking OK. Excel searches backward from the active cell.

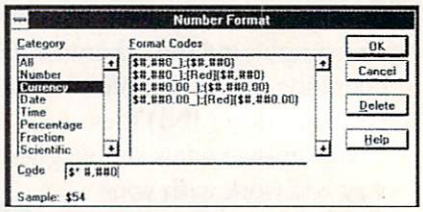
This tip also works when using Data Find.

16. Left-align dollar signs in columns of currency format

When a column of numbers includes varying amounts of money, the dollar signs are jagged on the left. This doesn't look good, and it's hard to read.

Use the asterisk in a number format.

1. Select the cells in currency format that you'd like to align. Make a multiple selection, if necessary.
2. Choose Format Number.
3. Drag over the field at the bottom, and type the following format: $* #,##0.



An asterisk in a number format means "fill the middle of the cell with the next character." The next character is a space. This format places a dollar sign on the left, fills the middle with spaces, and places the number (in comma format) on the right.
4. Press Enter or click OK. The dollar signs in each cell are pushed to the left.

This customized format is saved with the current worksheet and can be found at the end of the list in the Format Number box.

17. Mix fonts in a title or heading

You'd like to italicize one word in the title at the top of your worksheet. But since the title resides in a single cell, you're forced to italicize it all.

Place the text in a text box.

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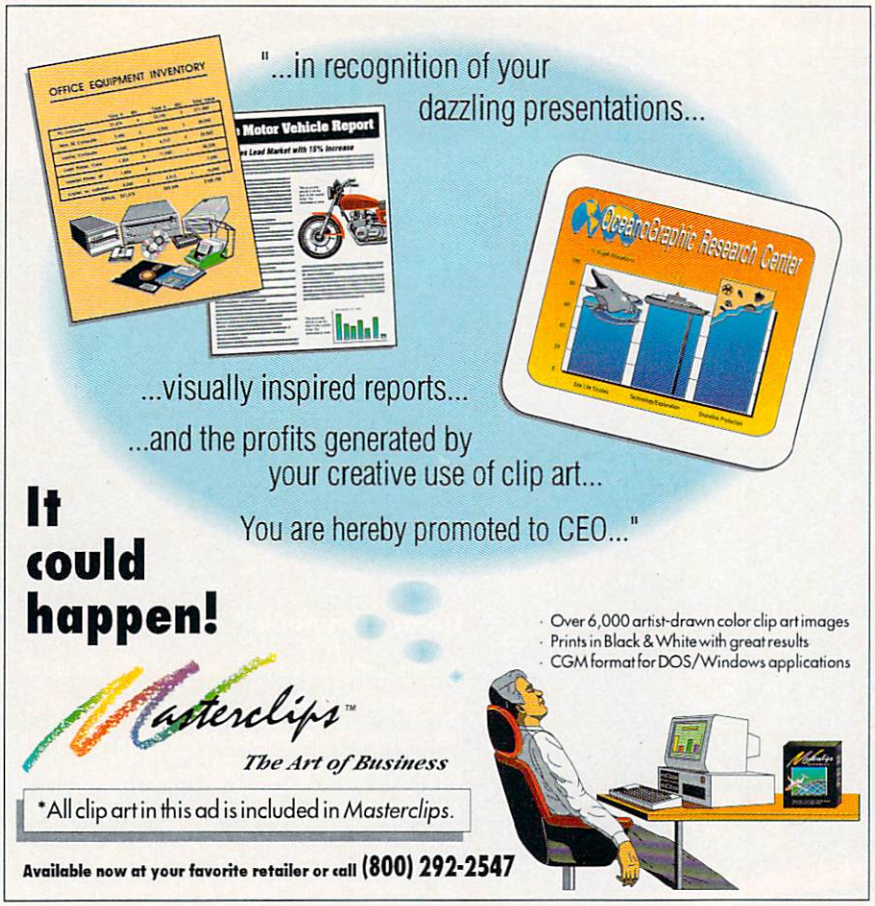

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1. On the toolbar (use the drawing toolbar in Excel 4), click the text box tool (shows a small page with lines of text).
2. Drag on the worksheet to position the box.
3. Type the text of your title in the box. Drag the handles to adjust the box to the size of the text.
4. Select the word or words you'd like to format, and choose Format Font.
5. Select the formats you like, and press Enter or click OK.

To create several text boxes at the same time, either hold down Ctrl when you click the tool (Excel 3), or double-click the tool (Excel 4).

18. Set default formatting for worksheets and charts

You've developed your own special style for worksheet and chart layout. From now on, you want all your documents to look the same.

Save the worksheet template SHEET.XLT in the XLSTART directory.

1. Open a new worksheet window.
2. Make whatever changes you'd like to save as defaults.
3. Choose File Save.
4. Under File Name, enter SHEET.
5. Under Save File as Type, choose Template.
6. Under Directory, choose the XLSTART directory (under Excel's main directory).
7. Press Enter or click OK.

From now on, each new worksheet created is based on this template.

Examples of things you might save in a worksheet template are: cell styles, margins, headers and footers, page size and orientation, print area, calculation, defined names, toolbar layouts, etc.

Save the chart template CHART-.XLT in the XLSTART directory.

1. Create a chart based on some existing worksheet data.
2. Add whatever formatting you'd like to save as defaults.
3. Choose File Save.
4. Under File Name, enter CHART.
5. Under Save File as Type, choose Template.
6. Under Directory, choose the XLSTART directory (under Excel's main directory).
7. Press Enter or click OK.

From now on, each new worksheet created is based on this template.

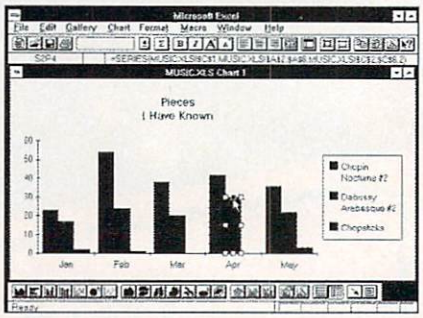
The worksheet data used to plot the template in step 1 is not saved. When you open a new chart window, the formatting specified in step 2 is used to format the current selection.

Examples of things you might save in a chart template are: chart type, formatting of chart elements, legends, arrows, text boxes, titles, etc.

19. Adjust chart data with the mouse

Assigning new values to data points can be tedious if you have to return to the worksheet, enter new numbers, and replot the chart.

Select a data point with Ctrl-click, and drag the black handle.



When you click on an object in a Windows application, handles appear to show it's been selected.

1. Click on any data point. The entire data series is selected. (The white handles show it's not changeable.)
2. Hold down Ctrl while clicking a data point. That single data point is selected. (A black handle shows that the data point is now changeable.)
3. Drag the black handle to adjust the value of the data point. The formula bar displays values as you drag.

Want to see something really cool? Arrange both the worksheet and the chart on the screen while adjusting a data point. The worksheet changes instantaneously.

WORD FOR WINDOWS TIPS

20. Insert text in front of a table even when a table is at the top of a document

If a Word document begins with a table, you cannot insert ordinary text in front of the table. Instead, when you press Ctrl-Home and start typing, text is inserted in the first cell.

Press the column break keys.

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1. Press Ctrl-Home to go to the top of the document.
2. Press Ctrl-Shift-Enter to insert a column break. This forces a carriage return ahead of the table, allowing you to insert text.

A single press of Ctrl-Shift-Enter under these circumstances will not actually insert a column break—it will insert just a paragraph marker (carriage return). If you press Ctrl-Shift-Enter a second time, however, a column break will be inserted.

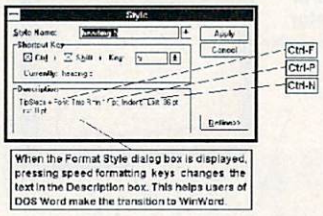


Figure: 22

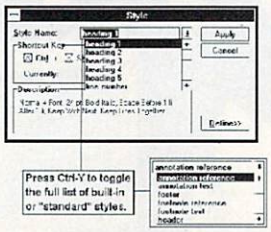


Figure: 23

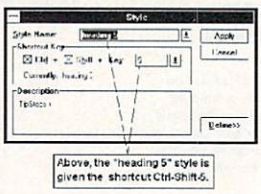


Figure: 24

21. Return to the last editing spot when you reedit a file

If you repeatedly work on the same file—such as a book or a long report—you usually want to pick up where you left off.

Use GoBack.

1. Select File Open to open a document.
2. Press Shift-F5 (GoBack).

Shift-F5 (the GoBack key) toggles among the current cursor location and the last three locations where any editing occurred. The GoBack information is saved each time you close a file. Advanced users can make this procedure automatic by including the GoBack command as part of an AutoOpen macro.

22. Make quick changes to a style using shortcut keys

Selecting Format Styles Define, and then having to select each of its different aspects, is time-consuming.

Use shortcut formatting keys in the Format Styles dialog box.

1. Position the cursor in the paragraph you want to affect.
2. Press Ctrl-S, twice.
3. Select the style you want to edit.
4. Use formatting keys to display or turn off formatting in the Description area.

Keys used to change format:

Style Description
Ctrl-O Add line spacing before paragraph
Ctrl-A All capital letters
Ctrl-B Bold
Ctrl-E Centered paragraph
Ctrl-0 Delete line spacing before paragraph
Ctrl-D Double underline
Ctrl-2 Double-spaced lines
Ctrl-F Font
Ctrl-T Hanging indent
Ctrl-H Hidden text
Ctrl-P Increase point size
Ctrl-N Indent paragraph
Ctrl-I Italic
Ctrl-J Justified paragraph
Ctrl-L Left-aligned paragraph
Ctrl-5 One-and-one-half-spaced lines
Ctrl-G Reduce hanging indent
Ctrl-M Reduce left indent
Ctrl-Space Remove all variant character formatting (except font)
Ctrl-Q Remove all variant paragraph formatting
Ctrl-R Right-aligned paragraph
Ctrl-1 Single-spaced lines
Ctrl-K Small capital letters
Ctrl-= Subscript (3 points)
Ctrl-Shift-= Superscript (3 points)
Ctrl-U Underline
Ctrl-W Word underline

23. Show all built-in or standard styles

WinWord has 34 standard or built-in styles, but they only appear when you use a related feature.

Press Ctrl-Y in the Format Styles dialog box.

1. Select Format Styles (shortcut: press Ctrl-S twice).
2. Press Alt-Down (this expands the list box to show a list of styles).
3. Press Ctrl-Y to toggle the list of standard styles on and off. Once displayed, these styles may be selected and applied normally.

The Standard Styles:
annotation reference
annotation text
footer
footnote reference
footnote text
header
heading 1
heading 2
heading 3
heading 4
heading 5
heading 6
heading 7
heading 8
heading 9
index 1
index 2
index 3
index 4
index 5
index 6
index 7
index heading
line number
Normal
Normal Indent
toc 1
toc 2
toc 3
toc 4
toc 5
toc 6
toc 7
toc 8

24. Create shortcut style keys

Normal format has a built-in shortcut. For other styles, however, you have to press Ctrl-S and either type or cursor down to the style you want.

Use the Format Style dialog box.

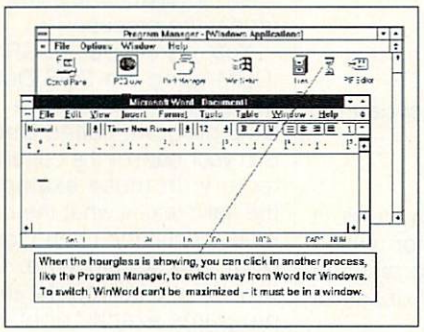
1. Press Ctrl-S, twice.
2. If you want to make more than one assignment, Press Alt-D (Define).
3. If you want to add the style shortcuts to the underlying template, press Alt-E to turn on Add to Template. Otherwise, the style shortcuts you create will exist only in the current document.
4. Select the style for which you want to create a shortcut (Alt-S).
5. Select the key you want to use (Alt-Y).
6. Select Change (Alt-A).
7. Repeat steps 4 through 6 until you

have assigned as many styles as you want.
8. Select Close.
9. When you exit from WinWord, say Yes to the prompt *save global glossary and command changes* or to the prompt *save changes to TEMPLATE.DOT* (where TEMPLATE is the actual template name). Alternatively, you can select File Save All (Alt-F, E) now and answer Yes to the appropriate Save prompts.

25. Escape from WinWord's hourglass

During field updates in a large document and when printing, WinWord can display its hourglass for what seems like hours.

Restore before running.



1. If WinWord is maximized, click on the Restore button before starting the time-consuming procedure.
2. Start the procedure—Print, Update Fields, Sort, and Mail Merge.
3. Move the hourglass so that it is over the Program Manager (in the background window) and click. The focus shifts away from WinWord, and the task runs in the background.

Even though the cursor is an hourglass shape, which usually means "wait," you can switch to another application—if another application is visible on your desktop. If WinWord is maximized, however, you must wait for the hourglass to disappear before you can switch away.

This tip allows you to switch away from a WinWord print job and continue working on a non-WinWord task. If you want to continue working on a WinWord task, you can run a second copy of Word for Windows in another window. To do that, however, you must run SHARE before starting Windows, and you must have sufficient memory installed. SHARE.EXE is a DOS utility that, among other things, prevents files from being written to simultaneously by multiple programs. See your DOS manual for more. ❑

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Circle Reader Service Number 261

TIPS & TOOLS

Edited by Richard C. Leinecker

Getting a helping hand with your DOS programs and encrypting files

Helping Hand

You can't get too much help with DOS commands. Even your applications, batch files, and homegrown programs need to provide help after time has gone by and you've forgotten their syntax. Here are two ways to add easily accessible help from the DOS command line.

The easiest way to provide help for your DOS files is to create a set of batch files with the help you think you'll need. They can be separate batch files or one big one. If you're worried about disk space, I'd suggest one large batch file. One large file takes up less space on your hard drive than many small files.

Here's my solution to the help shortage. It's a batch file called HP.BAT. To use it, type *hp* followed by the subject you want help with.

```
ECHO OFF
IF "%1"=="" GOTO NOPARAMS
IF "%1"=="WP51" GOTO
 WORDPERFECT
IF "%1"=="wp51" GOTO
 WORDPERFECT
IF "%1"=="KILLDIR" GOTO
 KILLDIR
IF "%1"=="killdir" GOTO
 KILLDIR
IF "%1"=="NEWDISK" GOTO
 NEWDISK
IF "%1"=="newdisk" GOTO
 NEWDISK

GOTO NONEOFABOVE

:WORDPERFECT
ECHO This is where you
ECHO should put your
ECHO WordPerfect help.
GOTO END

:KILLDIR
ECHO KILLDIR will delete an
ECHO entire subdirectory including
ECHO embedded subdirectories.
ECHO.
ECHO Usage: KILLDIR
 directory_name
GOTO END
:NEWDISK
ECHO NEWDISK will erase all
ECHO information
ECHO on a floppy drive.
ECHO.
ECHO Usage: NEWDISK a
 or NEWDISK b
GOTO END

:NONEOFABOVE
ECHO No help available
ECHO for %1
GOTO END

:NOPARAMS
ECHO Usage: HP help_subject
GOTO END
:END
```

There's a slicker way to do it if the programs for which you're creating help respond to a command line option of /? to provide help.

Any program that provides help when given a command line argument of /? is a candidate for the help utility built into DOS.

Here's all you do. Go to your DOS directory and find the file with the name DOSHELP.HLP. I'd suggest backing up the file before altering it. Once you have a backup made, load it into a text editor or word processor in ASCII mode.

You'll note that all of the commands are in alphabetical order. Each one begins in the left margin, and additional help lines after the first one begin with spaces.

To add an entry, find its place. Make sure it'll be in alphabetical order once it's inserted. Add the command with its help, and save the file. Now type *help* and watch for your newly added help. You can also type *help subject,* and the actual program will produce the same help as if you ran the program with a /? command line.

CLINT AKIRA KAWASAKI
PENSACOLA, FL

File Security

There's a level of security you can add to your files that'll be hard for prying eyes to break. It scrambles any file on disk so that it's not readable until unscrambled with the same program.

It works by going through a given file and altering the entire file, byte by byte. To use it, just type *crypt filename.* Then, to unscramble the file, repeat the process.

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

```
DEBUG CRYPT.COM
File not found
-e 100 be 80 00 ac 0a c0 74 56
-e 108 ac 3c 0d 74 51 3c 20 74
-e 110 f7 8b d6 4a ac 3c 0d 74
-e 118 04 3c 20 75 f7 c6 44 ff
-e 120 00 be 62 01 b8 02 3d cd
-e 128 21 72 33 8b f8 8b df b9
-e 130 01 00 b4 3f 8b d6 cd 21
-e 138 0b c0 74 1c 2b c9 49 8b
-e 140 d1 8b df b8 01 42 cd 21
-e 148 80 34 ff 8b df b9 01 00
-e 150 b4 40 8b d6 cd 21 eb d5
-e 158 8b df b4 3e cd 21 b4 4c
-e 160 cd 21
-RCX
CX 0000
:62
-W
Writing 0062 bytes
-Q
```

If you run the program Checksum ("Tips & Tools," July 1992) on CRYPT.COM, you

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should see the number 062 displayed on your screen.

You can call the Crypt program from a batch file so that you'll have help that's available and also so that you can take advantage of wildcards and multiple arguments. Here's a batch file I named CRYPTER.BAT.

```
ECHO OFF
IF "%1"=="" GOTO NOPARAMS
IF "%1"=="/?" GOTO HELP
:BEGIN
FOR %%f IN (%1) DO CALL
 CRYPT %%f
SHIFT
IF "%1"=="" GOTO END
GOTO BEGIN
:HELP
ECHO This program encrypts files
ECHO so that they are unreadable
ECHO until the Crypt program
ECHO unscrambles them.
ECHO.
ECHO Usage: CRYPTER filemask0
 filemask1 . . .
GOTO END
:NOPARAMS
ECHO Error -- no command line
ECHO arguments given.
ECHO.
ECHO Usage: CRYPTER filemask0
 filemask1 . . .
:END
```

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DOS menus and prompts to dazzle the eye

Easy DOS Menus

You can create easy menus for DOS. First, run your text editor or word processor in ASCII mode and create the menu text. Here's the file I created for my menu. I named it MENU.BAT.

```
@ECHO OFF
ECHO.
ECHO HARD DISK MENU
ECHO.
ECHO 1. GEOS Professional
ECHO.
ECHO 2. Professional Write WP
ECHO.
ECHO 3. Utility Applications
ECHO.
ECHO Type the number of your
ECHO choice and press Enter.
ECHO.
```

Next, I created three batch files and named them 1.BAT, 2.BAT, and 3.BAT respectively. Each one ran the selected software. Here is 1.BAT.

```
ECHO OFF
CD \GEOWORKS
PCGEOS
CD \
MENU
```

Here is 2.BAT.

```
CD \WP
WP
CD \
MENU
```

Here is 3.BAT.

```
CD \UTILITIES
UTILITY
CD \
MENU
```

You can add as many batch files as you want and expand your menu batch file, too.

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KERRVILLE, TX

Jazzier Prompts

In the October 1992 issue there was a tip that told how to make your prompt display the time. I'd like to show you how to jazz up your prompt and give it color. Besides the prompt commands listed in the October issue, here are some others.

$n shows the current drive.
$p shows the current drive and path.
$g shows a > character.
$l shows a < character.
$b shows a | character.
$t shows the current time.
$d shows the current date.
$_ moves the cursor to the next line.

To change the colors, type *$e[;??m*, where ?? is the number of the color you want. Here's a list of the colors.

0 = black
1 = blue
2 = green
3 = cyan
4 = red
5 = magenta
6 = orange
7 = gray
8 = dark gray
9 = bright blue
10 = bright green
11 = bright cyan
12 = bright red
13 = bright magenta
14 = yellow
15 = white

To calculate the color you want, multiply the desired background color by 16 and add the desired foreground color. If the background color is greater than 7, it will blink.

If you want to display C:\hi> in blue, use this prompt command.

```
PROMPT $e[;34m$p$g
```

You can mix colors within the prompt, too. Here's one that makes the drive and path yellow, the > character red, and the text cyan.

```
PROMPT $e[;33m$p
 $e[;31m$g$e[;36m
```

ERIC FONG
LAFAYETTE, CA

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WINDOWS WORKSHOP

Clifton Karnes

WINDOWS SCREEN FONTS

In this and the next two columns, I'm going to talk about one of the least understood aspects of Windows: fonts. In this column I'll talk about screen and plotter fonts, and next month, I'll discuss TrueType and how to get the most out of it. For the last installment, I'll discuss some utilities that let you translate PostScript fonts into TrueType, as well as ones that let you manipulate TrueType fonts in some exciting ways.

The most important screen font is System. You'll see this font in menu and dialog boxes and almost everywhere else in Windows.

Windows 3.1 comes with three types of fonts. The first type is screen fonts, also called raster fonts. The second type is plotter fonts, also called vector fonts. And the third kind is TrueType fonts.

Screen fonts are bitmaps, which means that each character in the alphabet is constructed from a collection of dots. It also means that each size of the font must be represented with a different set of bitmaps.

Windows installs many screen fonts, including MS Serif (Tms Rmn in Windows 3.0), MS Sans Serif (Helv in Windows 3.0), Courier, System, Fixedsys, Terminal, Symbol, and Small Fonts.

These fonts are distributed in a limited number of sizes. For MS Serif, MS Sans Serif, and Symbol, the sizes available are 8, 10, 12, 14, 18, and 24 points. You may notice in this group that the sizes are even numbers from 8 to 24 with 16, 20, and 22 left out. This may seem strange, but it makes sense when you understand that these fonts can also be used effectively in multiples of the available sizes. So a 16-point MS Serif can be obtained by doubling the 8-point font, and so on. Courier is available in 10-, 12-, and 15-point sizes, and Small Fonts, which is used mostly for previewing text, comes in 4, 5, 6, and 7 points. As with the other screen fonts, multiples of these sizes are also available. The sizes of System, Fixedsys, and Terminal are determined by your display.

All screen fonts are in a sense display dependent, which we'll discuss in a minute. But first, I'd like to talk a little about each font and how it's used.

The most important screen font is System. You'll see this font in menu and dialog boxes and almost everywhere else in Windows. System is very easy to read onscreen, and all things considered, it's my favorite screen font. In programs that give me a choice of which screen font to use (such as File Manager), I almost always choose System.

System, like most of the fonts used in Windows, is a proportional font, which means that the horizontal space occupied by each character is determined by the character's width. By contrast, in a fixed or monospaced font (such as Courier, which impersonates a typewriter), each character, no matter how wide it is, occupies the same amount of space. In a fixed font, a lowercase *i* takes as much space as an uppercase *W*.

In versions of Windows prior to 3.0, the System font was a fixed font, and for compatibility, this font is included with 3.1. As you may have guessed, it's the Fixedsys font mentioned above. Although some people say that this font is all but useless, it's often the best choice for text editors. Notepad, in fact, uses this font.

After System, the most important screen font is MS Sans Serif. Serifs are the finishing strokes in fonts, and a font that doesn't use these is called a sans-serif face. MS Sans Serif is almost identical to Windows 3.0's Helv, and it's used for icon captions in Program Manager and minimized icons on your desktop.

Of the remaining screen fonts, Terminal, also called the OEM font, is important because it's the one you see in a typical DOS box.

You'll find all these screen fonts in your SYSTEM subdirectory with the extension FON. The exact form of the name will vary according to your display type. You'll probably see the following names with the *x* replaced by either an E (for VGA displays) or an F (for 8514 displays): COUR*x*.FON (Courier), SERIF*x*.FON (MS Serif), SSERIF*x*.FON (MS Sans Serif), SMALL*x*.FON (Small Fonts), and SYMBOL*x*.FON (Symbol).

The screen fonts that are available in a single point size (which is determined by your display) are *x*SYS.FON (System), *x*FIX.FON (Fixedsys), and *x*OEM.FON (OEM or Terminal), where *x* is probably either VGA or 8514.

You can have some fun with your system font and your icon caption font by making substitutions. Find the [Desktop] section in WIN.INI that says IconTitleFaceName and substitute System (or any other installed font) for MS Sans Serif. If the line isn't there already, add it.

The plotter fonts (Modern, Roman, and Script) are scalable, which means they're available in any point size. With TrueType, these plotter fonts are unnecessary, but they're provided for compatibility with previous Windows versions. You'll probably never need them.

That's it for screen fonts, also called raster or bitmapped fonts. Next month, I'll talk about TrueType—how it works and why you should use it. ❐

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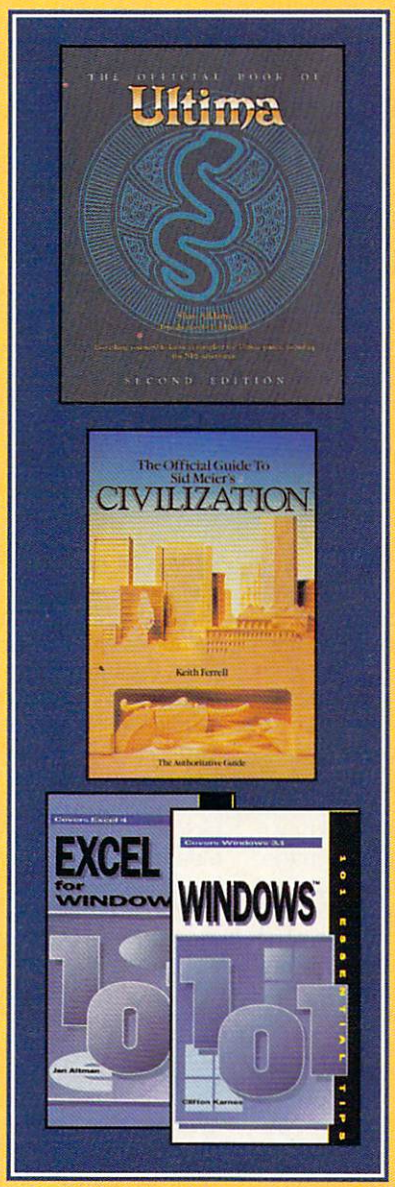

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Now you can afford to choose which of the Big Three databases is right for you.

This is a good time to get into database programming. Microsoft and Borland have triggered a price war in the guise of competitive upgrades, making it hard to resist picking one of the Big Three databases: FoxPro 2.5, dBASE IV 1.5, and Paradox 4.0. We'll look at all three so that you may learn which is best for you.

Each of the Big Three has a manual composed of hundreds of pages. Of course, you're expected to read it before firing up the application generators—and with good reason. You have to know a fair amount about database theory before developing programs people will pay for. Expect to spend a month or three before you have the background to blast out turnkey apps in two days. And you really need a working knowledge of the script language, as it's the only way to get out of a bind when the application generator hits a wall. The appgens are good, and they can indeed produce the expected results—but not before you pay your dues.

You must also realize that unlike with Microsoft C 7.0 or Borland C++ 3.1, you can't distribute your applications to people who don't have the database program—unless you pay for an add-on product, usually called a runtime. A runtime acts like a stripped-down version of the database manager without the programmability.

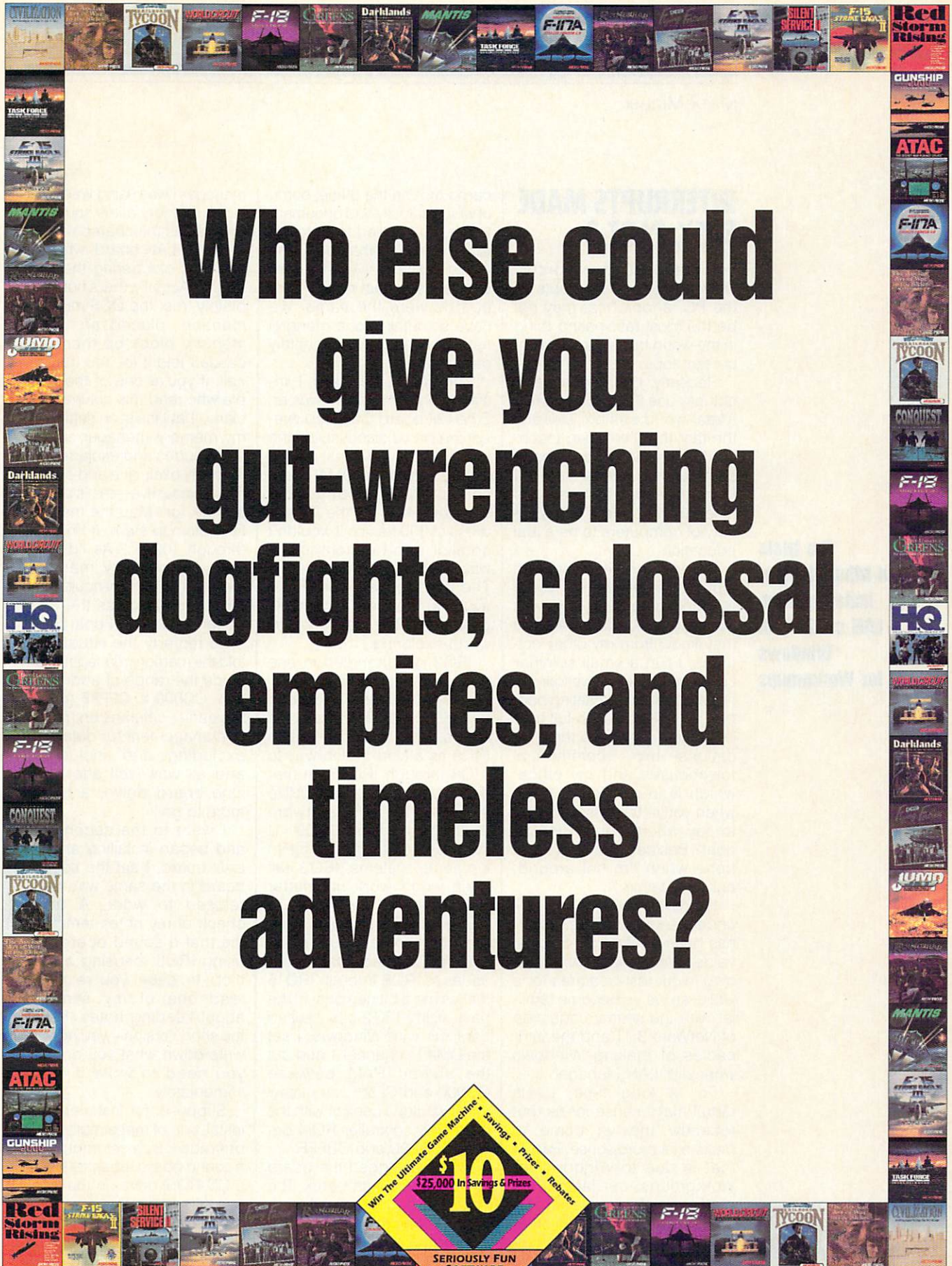
Finally, you'll want to become familiar with programming under the constraints of a network environment. You don't want the lawyer whose office you automated to call you up and ask where her cases went when two people tried to edit them at once. When she threatens to sue, she means it.

Borland's Paradox 4.0 (800-331-0877, $795) has the most up-to-date language and my favorite appgen among the bunch. Application Workshop, a sort of turbo shell over Paradox, lets you put together multifile applications and test them interactively. It let me turn out good work fast, with a minimum of coding knowledge. That PAL is not compatible with the dBASE language cuts both ways: You can get more done in fewer lines of code, but you must settle for a much smaller market of books and code libraries. But the PAL programmer's guide is the best introduction to a language I've seen with any product. My favorite chapter is a complete sample application with massive commenting. None of the other products have anything similar. The Paradox online help would've been great five years ago but is shockingly bad now. The integrated environment is meant to be familiar to users of earlier versions of Paradox, not other Borland languages, so I found the keystrokes somewhat unfamiliar.

Microsoft's FoxPro (800-426-9400, $495) is your best bet if you want a dBASE language but don't require 100-percent dBASE IV compatibility. You're expected to know dBASE when you buy FoxPro—there's little in the way of tutorial material for non-dBASE programmers—but the development environment is what dBASE should have been years ago. I find the appgens easier to use than those in dBASE and much less cohesive than Paradox's. Its Menu Builder and Screen Builder are good for large applications, but they don't hold together as well as Paradox's. However, FoxApp, which lets you build a single-file application without programming, is a toy. FoxPro tried hard for dBASE IV language compatibility, plus compatibility with earlier Fox languages, so its dBASE dialect is somewhat unwieldy but extremely powerful. If I were moving up from dBASE III Plus, I'd go to FoxPro, not dBASE IV. The online help is also the best among the three.

Borland's dBASE IV (800-331-0877, $795) needs no introduction. It's showing its age, however, and I see the ideal dBASE IV user as someone different from the typical reader of this column. The program's prodigious automated program generation tools outdo those of either of the other products; however, they're the toughest to learn. Since I seem to hit the programming wall where code generators fall down on any project I do, I prefer Paradox or FoxPro because it's much easier to learn to use their tools. The dBASE language lacks support for push buttons, list boxes, and other artifacts of the GUI world that FoxPro and Paradox now take to be part of the programming habitat. But dBASE IV is irreplaceable in its support of the SQL commands Commit and Rollback. These seemingly arcane features are absolutely necessary in the corporate world, and of the Big Three, only dBASE supports them. Commit lets you save the state of the database; Rollback lets you restore it. In case of a power failure, virus, or network breakdown, this guarantee of database integrity is priceless.

Whose name goes on the trophy? I have to cop out because each has tremendous strengths. Paradox is the top choice for the user with a clean slate; FoxPro, for the dBASE programmer with no particular need for dBASE IV; and dBASE IV, for those with corporate clients, the patience to learn its appgens, and no burning desire to make their programs GUI. ❐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HARDWARE CLINIC

Mark Minasi

INTERRUPTS MADE EASY, PART 3

The trials and tribulations of installing nine LAN cards with Windows for Workgroups

For the past two months, we've looked into interrupts on the PC, a topic that may not be the most fascinating thing in the world but is surely an important topic.

Recently, I got a chance to actually use this information in a real-world setting. Despite the fact that I've been teaching PC installation and repair seminars for seven years, I found the simple installation of nine Ethernet cards into a variety of computers to be a real education.

Before I provide you with the details, let me give you a little background on why I was installing the boards. As you may know from my other columns, I run a small seminar company that employs four administrative and marketing people, as well as seven full-time instructors. We have three locations—two commercial townhouses and my office, which is in my home. (Hey, when you're the boss, you get to say where your office is, right? Besides, they get more done when I'm not around, and vice versa.)

I'm telling you this so you'll understand that for us, a LAN has been an item of marginal value. We've had LANs running in our test-bed area for a while, so we've become familiar with the seamy underside of NetWare 3.11 and the intricacies of making Windows work with LAN Manager.

For a long time, LANs didn't make sense for us, but recently, they've come to make a lot more sense. Part of that is due to Windows for Workgroups, our latest LAN platform. It's annoying in some ways and great in other ways—but then, isn't that always the case with LANs? We had a bunch of Ethernet cards around the office, some of which actually had documentation. So I sallied forth to set up a network. What made the whole process even more interesting was that no two LAN boards were the same. We have something of a mongrel network that we affectionately call MuttNet.

The first LAN card I installed on our network was an Ethernet board that used everything we've discussed in the two previous columns: an I/O address range, a DMA channel, an IRQ level, and some shared RAM. I left the I/O address at 300 hex so it wouldn't conflict with the computer I was installing the board into. The IRQ I chose was IRQ5, avoiding the more commonly used IRQ2. The reason why is worth exploring.

IRQ2 gets handled in one of three ways by PC systems. On some systems, you can use IRQ2 with no trouble. On others, IRQ2 is connected to IRQ9 as a kind of doorway to IRQ8 through IRQ15. In that event, you may have to utilize IRQ2 but tell your software that you're using IRQ9. (I know it sounds odd, but try it.) On some systems, IRQ2 just plain won't work no matter what you do.

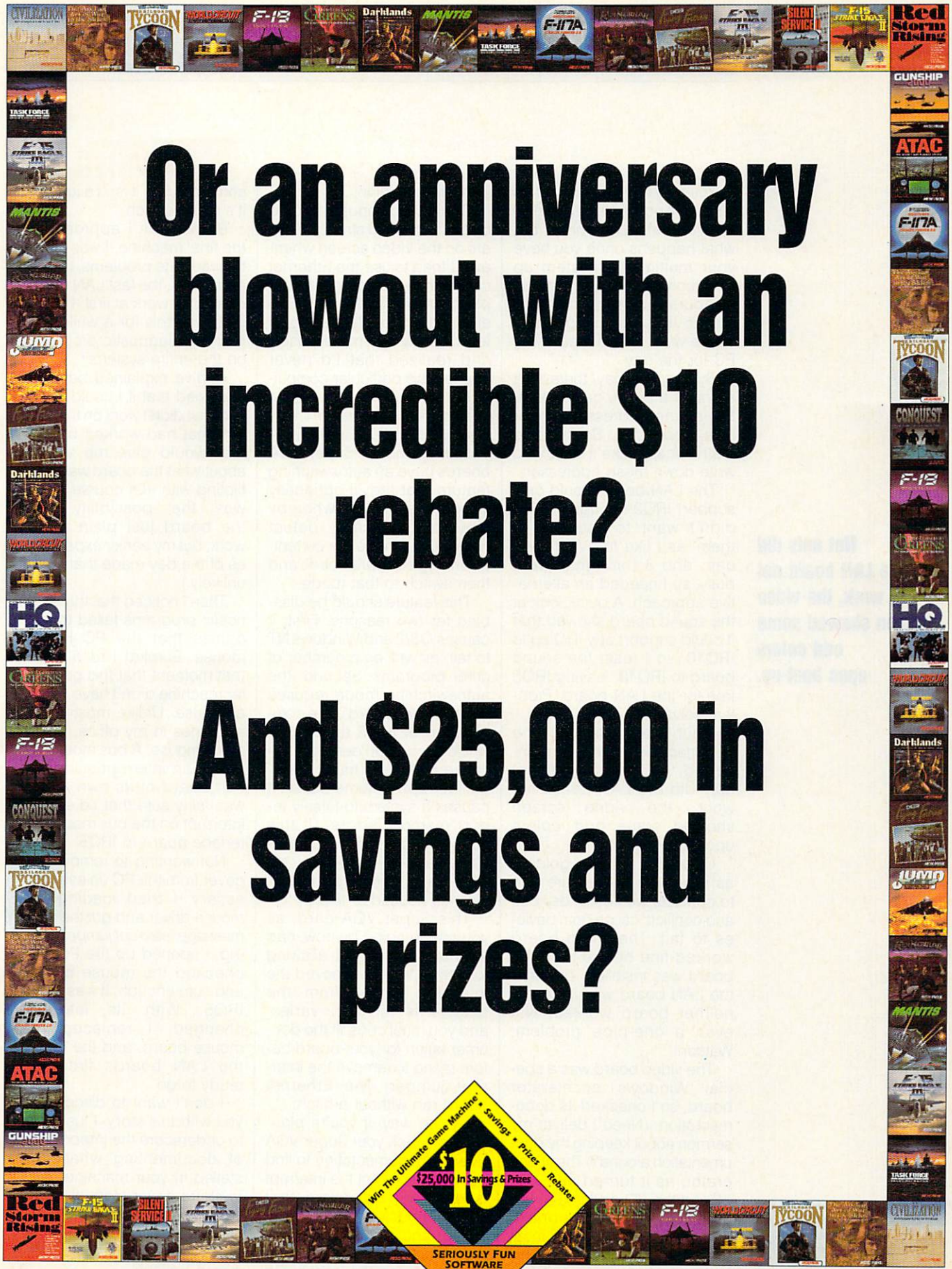
I avoid IRQ2 because even though it can be used in some systems, the fact that it cascades to IRQ8 through IRQ15 makes me a bit nervous; in the past, using IRQ2 has caused conflicts with Windows. I set the DMA to channel 1 and put the shared RAM between CC000 and CFFFF, as I knew that it wouldn't conflict with the hard disk controller ROM between C8000 and CBFFF.

When I plugged the board in, however, it didn't work. The next board I tried didn't work either. It was the same for the next board and the next. A little fiddling around made me realize that the DOS memory manager I was using was placing its memory at the same addresses as the shared memory on my LAN board, which in turn was clobbering the LAN board. (Actually, that's not completely true; the DOS memory manager placed an upper memory block up there because I told it to. You may recall, if you're one of the people who read this column regularly, that I insist on setting up my memory manager so that my includes and excludes are mutually exclusive and collectively exhaustive—that's professor talk for "Map the memory from stem to stern, from 640K through 1024K." As I'd done that, my memory manager took it on faith that it could plaster memory across the RAM buffer on the LAN board.)

To remedy the situation, I told the memory manager to exclude the range of addresses from CC000 to CFFFF (check the earlier columns on memory management for details on excluding and including), and all was well after that. One board down, a bunch more to go.

I went to the second PC and began installing another LAN board. I set the second board in the same way, but it refused to work. A quick check of my notes reminded me that a sound board was using IRQ5, causing a conflict. In case you've never read one of my sermons about keeping notes, here's the short version—you need to write down what you do, and you need to write it down immediately.

Suppose, for instance, you install one of these multimedia upgrade kits, a set containing a sound board, speakers, and a CD-ROM drive. In the process of setting this up, you'll have to choose several DMA channels, IRQ levels, I/O addresses, and, perhaps, ROM addresses.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You may have the best of intentions about writing down all this information soon, but what happens once you have your multimedia system up and running? You play with it, of course! And by the time you've finished trying it out, you're worn out and leave the PC for the day.

By the next day, there isn't a prayer that you can remember all the addresses, channels, and levels. So become methodical; make it a habit to write down those addresses.

Not only did the LAN board not work, the video screen showed some odd colors upon boot-up.

The LAN board would only support IRQ2 through IRQ7. I didn't want to use any of them, as I like to avoid 2 if I can, and 3 through 7 were busy, so I needed an alternative approach. A quick look at the sound board showed that it could support any IRQ up to IRQ10, so I reset the sound board to IRQ10, leaving IRQ5 free for the LAN board. Problem solved.

Trouble appeared on the next machine as well. After I inserted the LAN board, not only did the LAN board not work, the video screen showed some odd colors upon boot-up.

Clues like this are golden, as most IRQ failures are due to conflicts with other devices and conflicts cause both devices to fail. The video board worked fine before the LAN board was installed, but after the LAN board was installed, neither board worked. Not even a one-pipe problem, Watson!

The video board was a special Windows accelerator board, so I checked its documentation. (Need I deliver my sermon about keeping the documentation around?) The accelerator, as it turned out, employed the I/O address range 300–30F, causing a conflict with the Ethernet card. I reset the I/O address on the Ethernet card, and all was well with *that* machine.

The next computer booted up OK, but it had strange flickers on the video screen whenever I tried to use the Ethernet card with the test program supplied with the board. The Ethernet card was also failing its tests, so I looked more closely and realized that I'd never opened this particular computer before.

This computer was equipped with a Super VGA board. Almost all Super VGA boards have an autoswitching feature that they'll optionally support, a feature whereby they automatically detect which video mode the currently running software needs and then switch to that mode.

This feature should be disabled for two reasons. First, it causes OS/2 and Windows NT to fail, as well as a number of other programs. Second, the autoswitching mode requires that the video board use a combination of IRQ2 and IRQ9, which is less than desirable because it steals a much-needed interrupt; in some cases, it causes a system to falsely report memory errors. (If this sounds odd, it isn't. The hardware that detects memory errors—also called parity errors—is hooked to IRQ2.)

This Super VGA card, as you can imagine by now, had the interrupt enabled, allowing for Super VGA. I removed the interrupt jumper from the board—its location varies, and you must consult the documentation for your board before trying to remove the interrupt jumper. The Ethernet board ran without a hitch.

By the way, if you're planning to check your Super VGA board's documentation to find out whether or not the interrupt is enabled, be aware that some manuals refer to the interrupt and some refer to autoswitching. If you can't find one, look for the other. On some boards, it isn't a jumper, it's a DIP switch.

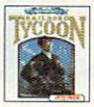
By now, as I approached the final machine, I was trying to anticipate problems. Like its comrades, the last LAN board refused to work at first. I struggled with this for a while, idly running diagnostic programs on the entire system.

As I've explained before, I reasoned that if I could figure out what didn't work on this system that had worked before, that would give me a clue about what the board was conflicting with. (Of course, there was the possibility that the board just plain didn't work, but my earlier experiences of the day made that seem unlikely.)

Then I noticed that the diagnostic programs failed to recognize that the PC had a mouse. Eureka! I recalled at that moment that this particular machine didn't have a serial mouse. Unlike most of the machines in my office, it had a bus mouse. A bus mouse requires an interrupt-using circuit board of its own, and I was fairly sure that I'd set the interrupt on the bus mouse interface board to IRQ5.

Not wanting to remove the cover from the PC unless necessary, I tried loading the mouse driver and got the error message *interrupt jumper missing*. I opened up the PC and checked the mouse board, and sure enough, it was using IRQ5. With its interrupt changed, I replaced the mouse board, and the last of the LAN boards fired up, ready to go.

I don't want to discourage you with this story. I just want to underscore the importance of documenting what's installed in your machines and to share a war story with you that may give you an idea or two the next time you're having trouble making a new board behave. ❐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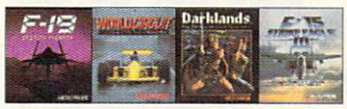
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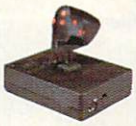

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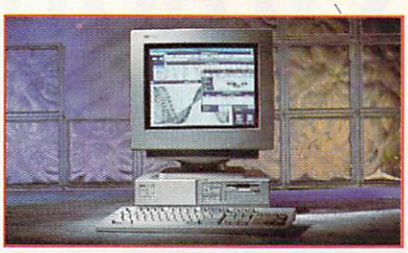

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INTRODOS

Tony Roberts

TIME FOR A SYSTEM TUNEUP

Don't be afraid to adjust your startup files. They sometimes need a little fine-tuning.

Startup-file phobia is a condition every computer user should try to outgrow. Your system is defined by the CONFIG.SYS and AUTOEXEC.BAT files, so you can't ignore these files and hope to run a well-tuned operation. The more you learn about your startup files, the better computer user you'll be.

Most of today's software installation programs are able to modify your startup files to include the necessary instructions for the software to run, but these automatic modifications aren't always the most efficient. Even if you let software modify your startup files, it's a good idea to review the changes carefully and tidy things up when necessary.

Let's look at what's involved: CONFIG.SYS contains instructions that define your system at boot-up. After you turn on your computer, it performs its system and memory check, loads the hidden DOS files and COMMAND.COM to get its basic operating instructions, and turns to CONFIG.SYS to see how you want things set up.

The instructions in CONFIG.SYS define how your computer will operate until it's rebooted. Memory allocation and the computer's relationship with various devices—the screen, scanners, network cards—are defined here.

Once CONFIG.SYS puts everything in place, AUTOEXEC.BAT takes over. It fine-tunes DOS the way you like it and runs your regular programs. Unlike the commands issued in CONFIG.SYS, most of the instructions in AUTOEXEC.BAT can be changed during a computing session without rebooting.

To examine or edit your startup files, you need a text editor. The Edit command, which is part of DOS 5.0, will do just fine. To allay any fears that you might do something that will upset the balance of your system, make printouts and/or backup copies of CONFIG.SYS and AUTOEXEC.BAT before you begin.

Now, take a look at CONFIG.SYS and focus on the lines that begin device= or devicehigh. These lines install drivers that control your hardware. Each of these drivers takes up memory that could be used for other purposes, so there's no sense installing drivers you don't need. You might check for drivers that control devices, such as a scanner and fax board, that you're no longer using.

If you're not sure whether you can safely remove a line from CONFIG.SYS, you can insert the keyword Rem, just ahead of the command, as in rem device=c:\dos\cdr.sys.

This is known as commenting out the line. Rem is used to insert remarks or comments in a program. These comments don't execute when the program runs. By commenting out a line, you prevent the line from being executed. If you find that your system won't run properly without that particular line, you can reinstate it quickly by deleting the Rem.

While you're perusing CONFIG.SYS, make note of the Buffers and Files commands. These commands set aside areas of memory that are used to speed up data transfer and to keep track of open files. Some software installation programs set these to very high levels, probably on the better-safe-than-sorry theory. Unfortunately, each buffer and file allocated consumes memory that can't be used elsewhere.

Depending on how you use your computer, you may be able to lower the number of files and buffers allocated. My system—which I'd classify as an active one with plenty of Windows multitasking and network activity—allocates 40 files and 40 buffers.

On the AUTOEXEC.BAT side, make sure you have a Prompt statement and a Path statement. A good basic Prompt statement is prompt pg. This gives you a system prompt that includes the current disk drive and subdirectory. It's possible to get more elaborate with the prompt, but pg is a good start.

The Path statement tells the system where to look when it's trying to find executable files. Every time a Path statement is executed, the current path is replaced with the new path. If you have two Path statements in your AUTOEXEC.BAT, the second one overwrites the first one, so there's no point in having two. A few software installation routines, in their attempt to modify your Path statement, actually create a second Path statement.

If you were to type *xxxyyyzz* at the DOS prompt, your system would check every directory listed on the path before returning with the *Bad command or filename* message. Out-of-date subdirectory references in the path don't hurt anything; they just waste time.

The Path statement can be only 127 characters long, but you can usually keep it to less than that. A bare minimum Path statement includes the root directory, the directory where you keep your DOS programs, and the directory where you keep your batch files. By using batch files to switch to the subdirectory where a program resides, you can skirt the need to have that subdirectory on the path.

So why not shed your fear of startup files and give your system a tuneup? ❐

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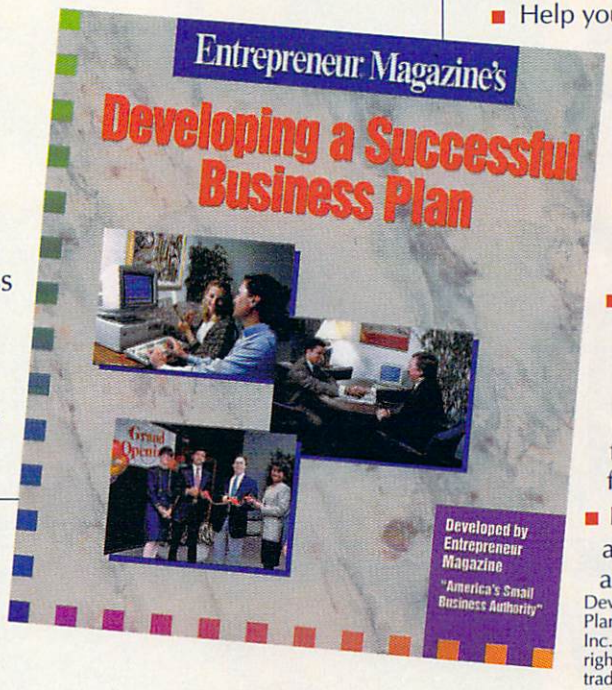

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The Bit, the Byte, and the Word

The picture is jarring: Moses descending from Sinai, cradling in his arms not two tablets of stone but a pair of laptops. Or St. Paul the apostle, green in the glow of a monitor as he taps at a file named corinth2.txt.

Jarring, perhaps, but in the history of the Bible, computerization is the next logical step. The Bible, in its various stages of development, has passed through nearly every sort of information-retrieval system known to history, beginning with oral tradition and progressing to stone tablets and then to scrolls; early in Christian history, the clumsier scroll was replaced by the codex, the forerunner of the common bound book, and in the fifteenth century, the advent of the printing press made it possible

Article by Anthony Moses
Painting by Joel Peter Johnson

to buy a bound Bible for something less than the price of a good war horse. It only makes sense that when personal computers became available at (comparatively) reasonable prices, PC versions of the Bible weren't far behind. What some may not understand is the need for them.

The Bible is, frankly, a difficult book. Its sheer size can be daunting: The Protestant canon of the Bible is a small library composed of sixty-six separate works of varying lengths. If printed in normal-size typeface on standard-size pages (rather than the usual cramped double columns on India paper), the books of the Bible would easily fill a shelf. Small wonder that after buying a Bible, your next purchase is usually a concordance (or word index), just so you can find your way around.

The Eternal Quest

But there are problems other than size. Coming as it does out of vanished cultures, originally written in two ancient languages, and most commonly available to readers of English in a translation that is pushing four centuries in age, the Bible can at times be simply incomprehensible. A serious student of the Bible will probably end up investing in at least a Bible dictionary and will probably want to purchase one other translation, as well as a topical index, a Greek-Hebrew lexicon, and any other study aid he or she can afford. There then follows the less-than-edifying game of text juggling—shifting between Bible and study aids while trying to follow the development of a particular Biblical theme, keeping bookmarks (or fingers) lodged between the pages of reference works and using one's free hand to jot down study or sermon notes. Whatever gains you make in spiritual or linguistic insight are pretty much balanced out by a loss of patience.

That's where a PC Bible comes in handy. While it's true that nothing less than a Cray could contain and process all the available information on the Bible, your personal computer can at least handle the most frequently performed Bible-study tasks if you can get the right software.

Considering the matter ideally, a PC Bible program should be able to do several basic but important things. At the very least, it should be able to perform as a concordance—that is, to list and display occurrences of words in the text of the Bible, preferably through Boolean and wildcard searches and with an option to limit the search area. It should also come with a topical index, which allows you to search the Bible not only by word occurrences but by themes and concepts. These two functions by themselves would greatly reduce much of the investigative drudgery of Bible study, but we can always wish for more. For example, it would also be helpful if the computerized Bible-study aid could display more than one translation at a time, to compare English renderings of the original languages—and, for that matter, it would be nice to have a peek at the original Hebrew and Greek words themselves, along with their definitions and shades of meaning. And finally, though not an absolute requirement, it would be an advantage to have a Bible dictionary online, to define obscure words and proper names.

Two pieces of commercial Bible-study software that perform all of these functions are THE WORD Processor 5.0 (from Bible Research Systems) and PC Study Bible 3.0 (from BibleSoft). THE WORD Processor is available in several popular translations, though you'll need to get the King James Version (KJV) or the New International Version (NIV) as your basic translation if you wish to use any of the *Strong's*-based study aids. THE WORD Processor's Verse Search employs the now-standard pull-down menus to navigate you through the Bible.

THE WORD Processor

THE WORD Processor used to consist of what are now two separate programs: Verse Search and Librarian. However, since *THE WORD Processor* is the more commonly used name, I will use it to refer to these two packages collectively. Bible Research Systems also provides a number of other tools at additional cost.

You begin using THE WORD Processor by opening a Bible window; from the Search menu you can choose the book, chapter, and verse of the Bible translation you want to display. THE WORD Processor allows you to display multiple Bible windows and to size them for maximum readability or to autosize them side by side. The translations can be synchronized—that is, when you change verse references in one translation window and then switch to another window, the new translation window will jump to the same reference. The Search menu also acts as a concordance; you can either choose the pop-up box containing particular words in the Bible and view Bible verses containing the word you've chosen—or (even better) switch to the Find screen and enter multiple search values to determine the search range (the whole Bible or particular books). This last method will produce a list of relevant Bible verses and display the texts for you.

In addition to the basic Verse Search package, THE WORD Processor offers several online helps through its StudyAids menu. The most valuable of these for serious Bible students are probably the Greek and Hebrew Transliterators, available at additional cost, which are based on *Strong's Concordance of the Bible* and will give those who haven't had the chance to learn the Biblical languages a glimpse into the original words underlying the English translations. Through the transliterators, you can call up the Strong's numbers for the words in a particular verse and locate other verses with corresponding word numbers. Or you can switch to the Greek-Hebrew Dictionary screen, which will display the English verse and the Strong's numbers in one box, while an accompanying box will provide a transliteration of the original Greek or Hebrew word and translate its various senses.

THE WORD Processor provides other helpful Bible-study tools through the StudyAids menu. One of these is an online chain reference in the form of a screen that will display your current Bible verse along with a list of related verses, which may themselves be displayed in turn—or you can go to any related verse and make it the basis for a new reference chain.

The Chronological Bible screen is a historical outline of Biblical events and their approximate dates, with an option to view the relevant Bible verses. The Librarian option on the StudyAids menu will give you access to a list of Biblical topics and people, which can generate another verse list and let you read Bible verses dealing with the subject area you've selected; you can also create your own specialized topic lists.

THE WORD Processor also offers the well-known *Smith's Bible Dictionary* as an online guide to names and words as they're used in the Bible. Once you've done your research, you can access the Lesson Editor, a large pop-up window that is, in essence, an internal word processor allowing you to compose sermon or study notes, copy Bible verses directly into your own text, and then print out the file. (If you prefer working in your own word processor, you can

utilize Verse Typist, a TSR program that lets you into THE WORD Processor so that you can copy pertinent verses from the Bible.) Or if you're the kind of person who prefers writing in the margins of your Bible, you can do the PC equivalent with the Personal Commentary command, which lets you append notes to verses and then marks the noted verse with an asterisk.

THE WORD Processor's many attractive features have made it a solid study Bible for a number of years, but some users may have a few problems with it. Though it does support a mouse for some functions like sizing and switching between windows, scrolling the Bible text, and clicking on command boxes and pull-down menus, interaction with THE WORD Processor is chiefly through the keyboard. While this may delight the mouseless user, others who are used to mousing around a program may wish that THE WORD Processor's mouse support were stronger. Some might also wish that you didn't have to leave the Bible window to perform some of the Search or StudyAid functions; easily confused users (like me) may sometimes find it a little hard to get back to the original text.

Word from Biblical Research Systems has it that a Windows version is in the works.

PC Study Bible

People who like more mouse support may prefer using PC Study Bible 3.0, which has many of the features of THE WORD Processor (including a number of the more popular translations) but adds an impressive array of Bible-study aids. As with THE WORD Processor, you can open one or several Bible windows in various translations and move or size them as you like. Unlike THE WORD Processor, PC Study Bible doesn't have the option of synchronizing translation windows; however, as you can switch between translations inside a window with only a mouse click, this is not a major problem. PC Study Bible provides a concordance search through single words or phrases or a Boolean search; it then pops up a list of Bible verses and allows you to view them.

PC Study Bible includes the *Strong's Greek-Hebrew Dictionary; Vine's Expository Dictionary,* a more detailed consideration of the meanings of all the words in *Strong's;* and *Nave's Topical Bible,* probably the best known of the topical indexes. *Englishman's Concordance,* another *Strong's*-related study aid, indexes English words in the Bible according to Strong's reference numbers. Another welcome addition is *Nelson's Bible Dictionary,* which functions almost as a miniature Bible encyclopedia, with nicely detailed definitions.

Access to the study aids is somewhat easier than in THE WORD Processor: Just position the pointer beside a verse and then click on the CrossRefs menu, and you're given the choice of accessing the Nave's Topics, Nelson's Dictionary, or Vine's Articles, all of them already keyed into the selected verse. Or, if you want to access any of these independently of the Bible text, you can go to the Open menu and choose any of the above aids, plus the Englishman's Concordance and Strong's Dictionary sections. Selecting the Strong's section from this menu moves you to a screen with a list of the words (and their Strong's numbers) in your selected Bible verse; the KJV version of the passage is also displayed, along with any other translation you have online. From this screen you can find in the Strong's section the definition of any highlighted word, read from the Vine's section an article about the word (when available), or perform a search through the Englishman's Concordance for the word by its number.

In fact, one of the strengths of PC Study Bible is the interdependence of its study-aid screens. If you're working in the Englishman's Concordance screen or the Vine's screen and want a definition for a Strong's number mentioned in the text, you can highlight the number and instantly call up a definition without leaving the screen. The Nelson's Dictionary screen will let you look up any Bible verses in its articles from within the dictionary itself. The result is that you save a lot of the time and frustration involved in repeatedly opening and closing study aids—and whatever screen you're in, the text of the Bible is always instantly available to you. Bible students with a liberal theological leaning, however, may be annoyed by the slant occasionally evident in the Nelson's Dictionary section, which is pretty clearly leaning toward the conservative end of the theological spectrum.

To ease the process of study or ser-

Product Information

THE WORD Processor
Verse Search (with translation)—$99.95
Additional translation—$79.95
Hebrew Transliterator—$99.95
Greek Transliterator—$99.95
Librarian—$99.95
Chronological Bible—$49.95
Chain Reference—$49.95
Personal Commentary—$49.95
Verse Typist—$49.95
People—$49.95
Topics—$49.95
Smith's Bible Dictionary—$49.95
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(512) 251-4401 (fax)

PC Study Bible—$239.95
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(206) 824-1828 (fax)

The Alim—$115.00
ISL SOFTWARE
P.O. Box 90005
Houston, TX 77290-0005
(800) 443-3636
(713) 893-0805
(713) 893-0558 (fax)

Word Search Computer Bible (KJV)—$59.00
Word Search Computer Bible (LB)—$59.00
Word Search Computer Bible (NIV)—$79.00
Word Search Computer Bible (NKJV)—$79.00
Word Search Computer Bible (NRSV)—$79.00
Word Search Computer Bible (NAB)—$89.00
NAVPRESS SOFTWARE
P.O. Box 35002
Colorado Springs, CO 80935
(800) 366-7788
(719) 548-9222
(719) 598-0749 (fax)

QuickVerse for Windows 2.0 (KJV)—$59.00
QuickVerse for Windows 2.0 (NIV)—$69.00
QuickVerse 2.0 (KJV)—$49.00
QuickVerse 2.0 (NIV)—$59.00
QuickVerse Hebrew and Greek Transliterated Bible—$29.00
Nave's Topical Bible—$29.00
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(319) 395-7314 (technical support)
(319) 395-0217 (fax)

mon preparation, PC Study Bible provides an online notepad for sketching out your exegesis and onto which you can copy Bible verses or any information from any of the study aids. The text file can be printed out from within the program or stored as an ASCII file and then accessed from within your own word processor. However, one (perhaps minor) drawback of PC Study Bible is that it doesn't allow you to footnote individual verses with personal commentary.

QuickVerse

A third popular Bible-study package, QuickVerse 2.0 for Windows (from Parsons Technology), may at first seem to offer less than the other two packages. As with PC Study Bible and THE WORD Processor, QuickVerse has several translations available and allows you to open as many translation windows as you like; it, too, provides (at additional cost) a topical index (*Nave's Topical Bible*), an English concordance, and a Hebrew and Greek transliterated Bible based on *Strong's Concordance* and using the standard Strong's reference numbers. You may be initially disappointed to discover that QuickVerse contains no Bible dictionary (apart from the scanty definitions in the Nave's section) or internal word processor, as do THE WORD Processor and PC Study Bible. But this disappointment will evaporate when you actually begin to use QuickVerse.

Mouse-addicted users will be happy to note that QuickVerse, though it hasn't actually eliminated the need for a keyboard, has less need for one than the other two programs. In addition to mouse-accessible pull-down menus, it has an icon bar that duplicates many of the menu functions and speeds them up. Even selecting which Bible text to view can be performed by calling up a pop-up list of all the books of the Bible and then clicking on the book, chapter, and verse you want to see.

But QuickVerse's strongest feature, and the one that most sharply distinguishes it from its competitors, is its display of translation and study-aid windows. Like THE WORD Processor and PC Study Bible, QuickVerse allows you to size the windows according to taste and to arrange them as you like—but perhaps the best way to use it is through its tile display. This autosizes the windows displayed and arranges them symmetrically, with translation windows occupying the upper two-thirds of the screen and ancillary windows (textual notes and the Strong's Dictionary screen) occupying the lower one-third of the screen.

QuickVerse also provides superior synchronization of windows, so that if you switch to a different verse in one of the translation windows, all other windows switch with it instantly. Once this setup is achieved, all of the available information on the verses in question can be simultaneously displayed, without having to leave the Biblical text to read it on another screen. Highlighting a word in the KJV text will correspondingly highlight the Greek or Hebrew equivalent in the Transliterated Bible window, and the Strong's number and definitions of the word instantly appear in the definition window below.

The only time you need to leave the Bible text is when you're performing a search for a new word or phrase. The Search function can scan the Bible using the concordance (which allows wildcard and Boolean searches) or the Nave's Topical Bible section, and the search parameters (through particular books and either or both testaments) can be readily defined.

The QuickVerse menu also allows a search of the Strong's Dictionary screen by either the English equivalent or its Strong's number. But if you want to search for other occurrences of a word in one of the Bible windows without leaving the Bible text, you can use the Quick Search function if you don't mind using the QuickVerse default options. Either method will display a pop-up Search List of verses and allow you to view the verses or copy them to a file or the Windows Clipboard. When you're finished with your QuickVerse session, you have the option of saving the desktop, and when you return to it later, you'll be just where you left off last time.

QuickVerse allows you to create your own footnotes for Bible verses and even to copy information from the Strong's screen into your notes. However, those who regularly prepare sermons may lament the absence of an online notepad (present in the other two packages) that lets you make notes for a Bible study or sermon and copy verses or other study-aid information onto it. QuickVerse has worked around this lack to some degree by allowing you to open a file to which you can copy Bible verses or definitions from the Strong's screen and then access them (in ASCII format) via your own word processor. If your word processor is a Windows application or supports Dynamic Data Exchange, you can use it to import Bible text from QuickVerse. If you're still using a DOS-based word processor, however, you'll have to open it under Windows and take the circuitous route of copying the highlighted verses from QuickVerse to the Windows Clipboard and thence to your word processor. Sometimes, a pen and paper still work best.

Seeking Perfection

The Christian Bible is the most heavily computerized sacred text, but students of the Koran will be pleased to know that it is also available on disk in the form of The Alim from ISL Software.

If the point of a PC Bible is to reduce the more tedious and time-consuming aspects of Bible study, which of these Bible-study packages does the job best? Well, if you're a Bible student, you already know that answers don't come easily. Each has certain strengths and weaknesses. THE WORD Processor 5.0 is a worthy application offering a number of impressive study aids and fast and easy access to the Bible text, but it may seem a bit cumbersome compared to its fellows. PC Study Bible 3.0 has the advantage of better mouse support and a larger number of study aids that allow extensive cross reference between themselves and the Bible text, though users other than those with a conservative theological viewpoint may find its study aids inappropriate for them. In terms of Bible text and study-aid display, as well as mouse support, QuickVerse 2.0 for Windows is clearly the winner, though there are some users who might well wish for more study aids (such as an online Bible dictionary) and a notepad—or at least better support for DOS-based word processors. But all three packages do the job and do it well.

And that leads to the larger question of whether a PC Bible should be doing what it does so well. 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. It's a valid enough objection, and one that applies not only to the Bible but to all the other books that (sooner or later) are going to wind up on disk.

The computerized Bible may be a test case that will begin to show us not only how people will be performing Bible study in the near future but perhaps how they will be reading and studying other works as well. ❑

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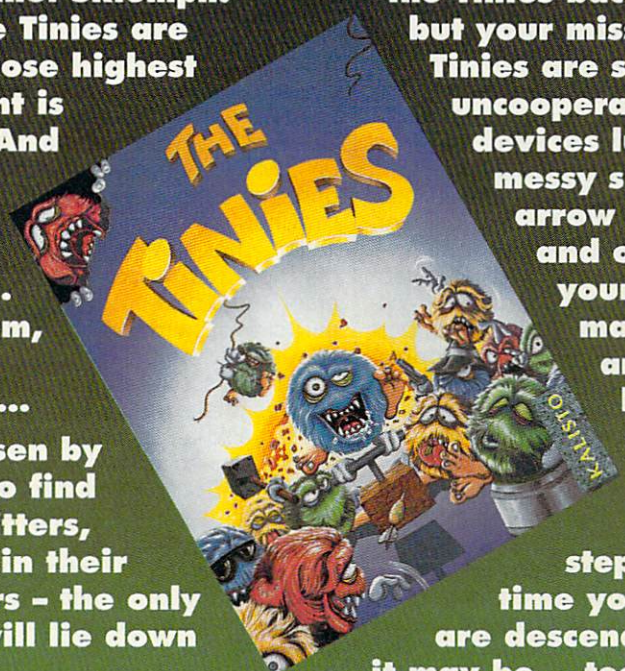

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Circle Reader Service Number 258

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This graphics package offers all the features small and home business owners need without the complexity of dedicated professional packages.

William Harrel

GRAPHICS WORKS

Graphics Works from Micrografx is a great introductory integrated package that lets users assess their graphics needs and upgrade to the more full-featured Micrografx applications. Simply put, it's a graphics-creation-and-editing extravaganza.

The package includes five applications, giving you a taste of the power found in full-fledged programs used by professionals. Each application's interface resembles the others, so after you've learned the basics in one, mastering the others is simple. A Run command on the File menu in each application lets you move among the applications with a mouse click. Object linking and embedding (OLE) is also supported, so it's easy to keep drawings and presentations current.

Graphics Works is built around Micrografx's popular, economical Windows Draw—a relatively sophisticated vector draw program. Since Windows Draw does not support color separations, trapping, and other commercial prepress options, it won't meet the needs of professional graphic artists. But it's a great application for most small business and home office settings, as everything else you need to create sophisticated vector drawings is included. In fact, Windows Draw is a scaled-down version of Micrografx's popular drawing and illustration package, Designer, which has long been a favorite among professionals. With Windows Draw, you can rotate, skew, fill, and manipulate Type 1 or TrueType fonts in every way imaginable. And Graphics Works ships with several high-quality Bitstream Type 1 typefaces. Dazzling radial and gradient fills make creating impressive backgrounds and 3-D effects child's play.

The other applications in Graphics Works include: PhotoMagic, a bitmap photograph editor; Windows OrgChart, for creating organization charts; WinChart, a charting and graphing program; and SlideShow, the standard slide-show module included with Micrografx's high-end draw and presentation packages, Designer and Charisma. There's also a clip art indexing and viewing utility for managing the 10,000 clip art images that come in the package, as well as a photo index and view utility for the 1000 photographs. However, to access the bulk of the clip art and photographs, you'll need a CD-ROM drive.

PhotoMagic is a remarkably friendly bitmap editor. For example, as you change tools, the application window changes to accommodate you by providing drop-down lists and icons that allow easy adjustments to pen and brush widths and the other feature-rich tools. Zoom controls, memory information, special effects, and other handy features are a mouse click away, rather than being mired in a complicated menu structure. You'll have to go to the menus only for seldom-used features, such as resizing or rotating images. An annoying aspect of the program, however, is its use of uncommon terms, such as *SmartSizing* for resampling (reconstructing) bitmaps. And to convert images from one format to another, such as from color to gray scale, you have to go into the Effects dialog box. I couldn't find this feature without calling technical support. Because converting images from one format to another is a common function, it should be easy to find.

Of all the applications in Graphics Works, Windows OrgChart is most impressive. Never has creating organizational charts been so simple, yet still powerful. You can create links between chart boxes and other information—such as salary, phone number, or home address—and access

them by double-clicking on the box. About the only thing I don't like about OrgChart is that you must enter text into boxes and other objects through dialog boxes rather than onscreen, which means you cannot just enter an insertion point on the screen and start typing or editing. This does, however, prevent you from making inadvertent changes to text.

While statisticians and scientists might need a lot of charting prowess, most people will never need more than WinChart provides. The program offers an array of chart styles and several variations, including overlays for 3-D effects and comparing data. Almost all popular spreadsheets—and even some databases—are supported. Creating charts is as easy as selecting the data to include and clicking on an icon; changing chart types is just as easy. You can create gradient color washes and other exciting backgrounds, and you can do just about everything else supported by full-featured presentation packages. But you cannot embed sound and animation files to play back during onscreen slide shows as you can in most of the top charting and presentation applications.

SlideShow, Micrografx's standard screen-show utility, is beginning to look a little long in the tooth. It still contains only a few transition effects and doesn't let you embed multimedia files or jump around from slide to slide. However, it's straightforward and simple. You'll have your first slide show up and running before you know it.

The 10,000 clip art images included on the CD-ROM disc are some of the best available. (Actually, the clip art and photographs are worth the product's purchase price.) You'll probably never have to look any further for a suitable image. The options are nearly limitless. There are well-drawn maps, complete with cities and other geographic information; terrific anatomy shots; and a collection of business scenes and symbols to suit almost every imaginable situation. When your document or presentation calls for a photograph, surely one of the 1000 24-bit images will work. They are expertly scanned, color corrected, and ready to be placed into your work. And if you need gray-scale pictures, PhotoMagic is quite adept at converting them.

When you buy Graphics Works, you get a great support program, which includes 24-hour service during the week and limited hours on weekends. Not once in my several years as a software reviewer and desktop publisher have I called Micrografx technical support lines without getting immediate, accurate answers to all my questions. The technicians are very well trained and courteous.

Micrografx also offers several upgrade policies. If you already own Windows Draw, you can upgrade to Graphics Works for $99.95. Once you've had a chance to try out the various apps in Graphics Works, if you'd like to upgrade to a more powerful Micrografx app and the suggested retail price of the Micrografx application you'd like to upgrade to is $499.95 or $299.95, you can buy that application for $199.95 or $99.95, respectively. Those who want one of the more powerful, $699.95 applications may purchase it for $299.95.

Again, none of the programs in Graphics Works are full-featured enough to be adequate for professional desktop publishers and graphics designers. But the average small and home-based business can't miss with Graphics Works. In fact, this may be the only graphics package that you'll ever need. Graphics Works is, at $295, certainly a tremendous value. For the small or home-based business owner who wants quality graphics editing and creation without getting bogged down in the seemingly limitless, complicated features of dedicated professional packages, Graphics Works is certainly a good choice. ❐

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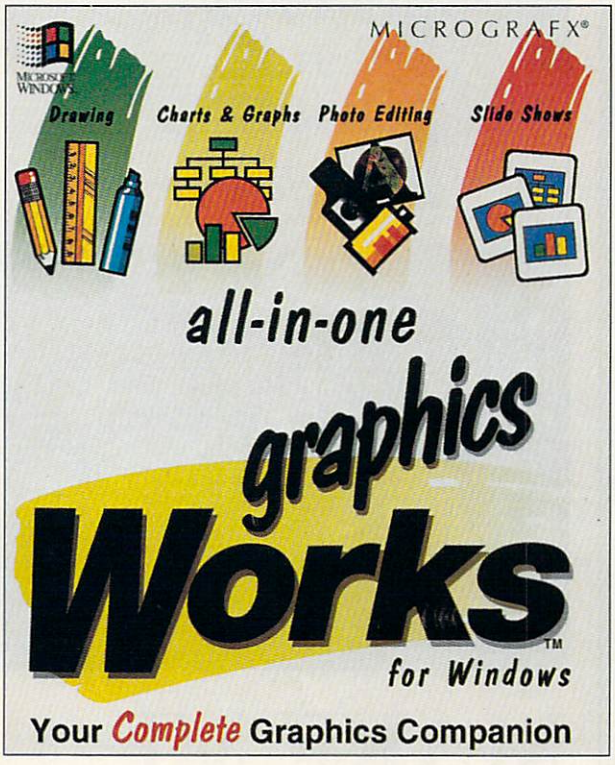

IBM PC or compatible (80386 or faster), 4MB RAM (8MB recommended), DOS 5.0, VGA (Super VGA with at least 256 colors recommended), Windows 3.1 or higher, high-density floppy drive, 80MB hard drive (120MB drive recommended), mouse; CD-ROM drive required to access full library of images and clip art—$295

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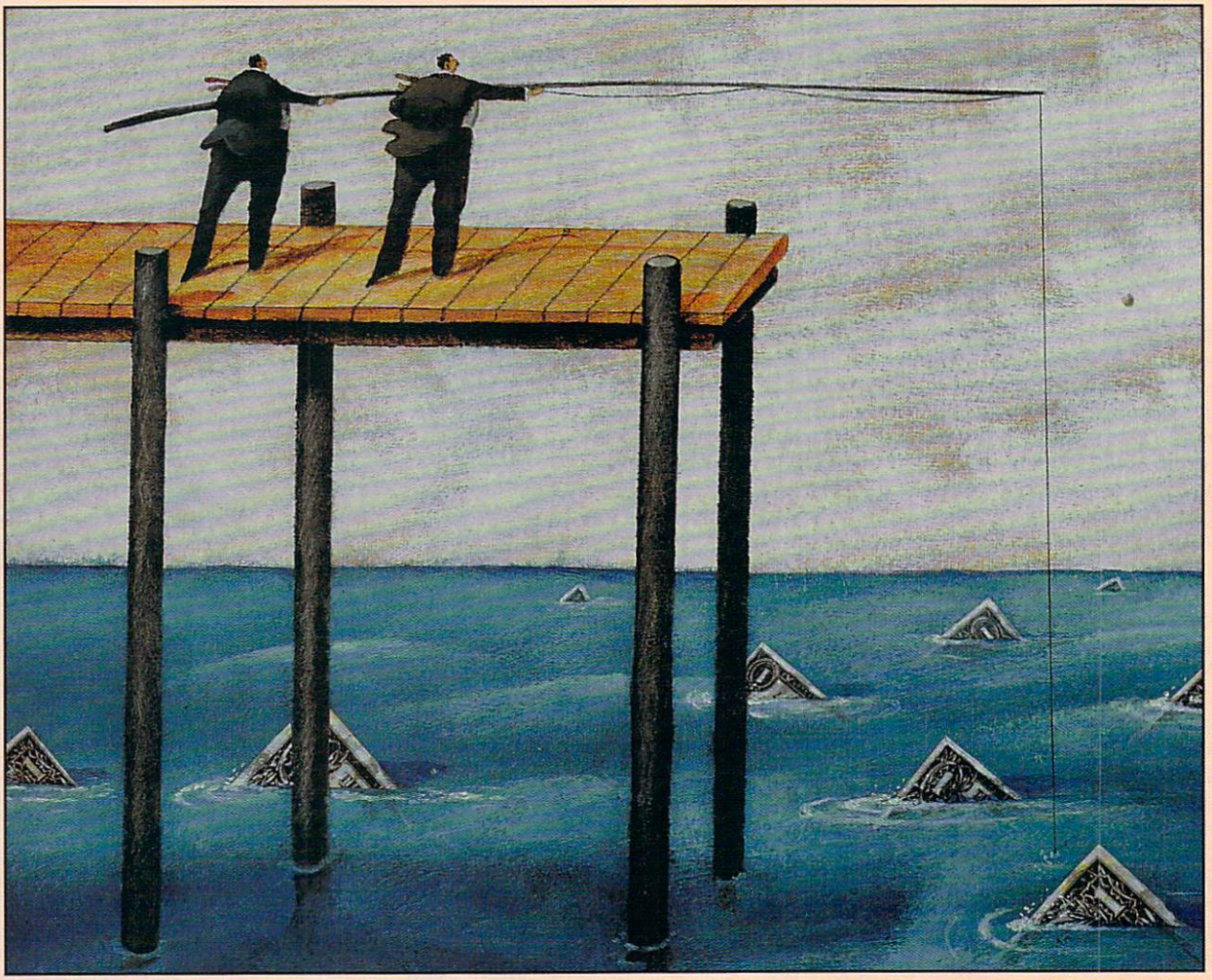

MAKE ME AN OFFER

POWER COMPUTING, THE SECOND TIME AROUND

BY TOM CAMPBELL

It's not unusual for a software company to charge $150 for an upgrade to a product that lists for $495. For that $150, you get a raft of new features, a highly "improved" user interface, extensive online help, and numerous example files. You probably also need to set aside at least 10MB of extra disk space and no doubt expect slower operation while the snazzy new menu-driven page preview feature labors to produce that almost-perfect print preview that practically shows you almost exactly what's going to print, with just a few barely noticeable details not showing quite right.

But after a few months you realize that you need a faster machine, because you get so frustrated waiting for your old computer to labor through the same job it performed in a heartbeat running the previous version. It's time to buy a new machine, or perhaps, in the downsizing nineties, a *better* machine will be good enough. Maybe it's time to consider a used computer.

The Time to Buy

Indeed, there has never been a better time to buy used computers or software. The industry is maturing, and demand no longer outstrips supply the way it did in the late seventies and early eighties. If the $1,500 price tag on a new 386 system with 4MB of RAM, a Super VGA monitor, and a 120MB hard disk doesn't float your boat, then maybe the same configuration in a used machine for less than a grand will.

It's not unusual to find last year's barn burner on sale for as much as one-third off. In 1992 the standard machine was a 386 running at 33 or perhaps 40 MHz. This year, it's a 25- or 33-MHz 486. With the luster now gone from a 33-MHz 386, you're apt to find some great deals. Mac buyers will find particularly good deals on last year's low end, the LC and original Classic series, because Apple has been extremely aggressive in its pricing structures of late.

Here are some tips to help you buy or sell a used machine:

- If you're selling, don't be surprised at a low consignment price. Face it—even though you paid $5,000 for your state-of-the-art 20-MHz 386 system in 1987, you'll be lucky to sell it for $750 today. Hardware prices drop fast. Really fast. It may be worth more to you than to a prospective buyer. Remember, you can pass it along to your kids or run a BBS or voice-mail answering machine with your used computer.
- Check for a BIOS you know. I recently bought a new motherboard that has a slightly old BIOS by a second-tier chip maker. Surprise! Because of problems with the BIOS, Windows sometimes hangs when it quits. Compaq, Phoenix, and AMI make high-quality BIOS chips.
- Kick the tires. Turn the machine on as soon as you come in to look it over; then leave it on while you chat. Some problems only crop up when the machine is warm. Run Chkdsk /f a couple of times on each logical volume. Try running Windows or some other program that creates big swap files. Test *all* the keys on the keyboard to ensure they don't stick. (If the keys don't click, that means you're looking at a membrane keyboard, which has about one-third the life of a clicking keyboard. You might have to factor in the cost of a new keyboard replacement soon.) Ask the owner to open up the box and look for obvious defects, such as melted or broken components. Don't worry about dust.
- If the system comes with a printer, insist on printing at least two full pages of both graphics and text.

Ripped Off!

The dark side of some computer bargains that look too good to be true is that they *are* too good to be true. The computer might be hotter than its microprocessor. Selling stolen computers is becoming a major racket. Here's an anecdote that shows how savvy the thieves and the police can be when it comes to computer theft.

Recently, I loaned my spare 386 to a friend in Costa Mesa, California. About six months later, her office, along with every other office in the building, was broken into, and every high-tech gizmo of value was stolen. What surprised me most was the sophistication of the burglars. The people who broke in knew enough to take the 386 and my prized NEC Multisync but to leave the seven-year-old XT clone next to it.

The story gets even more interesting, however. While assembling the paperwork for a police report, I discovered to my dismay that the stolen computer never had a serial number! The original invoice listed every component separately, from the power cable to the serial card to the motherboard, but no serial number. When I called the no-name local clone vendor that sold me the machine, the people there confirmed that at the time I purchased it, they didn't serialize the machines they assembled. So I didn't even bother to file the report. My friend's insurance company refused to cover the loss because it wasn't her property. Even if it had been, it would have been covered only for its depreciated value, not its replacement value.

A few months later, the police called my friend to tell her they'd just recovered a large number of computers from the same people who ripped off her office and asked if she'd like to come down to see if the machine was there. When we got there, I sheepishly told the property officer that I hadn't filed a report because there was no serial number. He said that was fine, as long as I could provide a description of the computer and the contents of its hard disk. This makes complete sense to me, but I had no idea the police were getting so hip to the computer world. It was also ideal for me because I wrote most of the software my friend used that machine for, so an intact hard disk would have provided ironclad evidence that the machine was mine.

It turned out that my computer hadn't been recovered, but I learned a few things for next time:

- Copy down the serial number of your machine—if it has one!
- Engrave your driver's license number in a couple of places on the machine, preferably somewhere inside the chassis.
- Take snapshots or shoot some videotape of your home system, recording serial numbers as you do so. This will be invaluable for identification or insurance purposes.
- Make sure your insurance covers your PC equipment. Check to see whether it covers for replacement value or just depreciated value. If it doesn't cover for replacement, upgrade the coverage. As this article points out, value can drop awfully fast, and you could be left with what amounts to a deductible of thousands of dollars.
- Back up frequently and keep a fairly current backup off-site. The thieves might well take your disks or tapes.
- Find out if your police, like the Costa Mesa police, are familiar enough with computers to accept a description of the hard disk contents for at least a partial identification. If not, suggest that they should reconsider their policy.
- You can also register your loss with the Stolen Computer Registry, P.O. Box 1490, Madison Square Station, New York, New York 10159. Either fax (212-777-1290) or mail in a request for a report form. The registry will list your computer on a national exchange and notify you if your serial number shows up on a computer that is recovered or put up for sale. All you have to do is supply the make, model, and serial number. The service is free. The voice number is (212) 777-1291.

- If the machine has, say, two serial ports and two parallel ports advertised, check each of the ports.
- If the system doesn't come with a monitor and video card, bring your own. It simply isn't good enough to be told the machine works.
- Most older motherboards and serial-port cards have tiny jumper switches. Make absolutely sure that you have all the documentation for those jumpers, or you might well fry the motherboard the next time you upgrade the video or add a fax card.
- Make sure the accompanying software has transferable licenses. If the seller advertised bundled software, take down the name of each package and call the software publisher to find out about licensing terms. Make sure the owner transfers the licenses to you according to those terms.

Brokers

A whole industry has sprung up around the used-computer market. (See the sidebar "Used-Computer Brokers" for addresses and telephone numbers.) A broker can help you buy a used computer or sell your old one. Some of them take a commission, some list computers for sale, and some do both. But they're all designed to match buyers with sellers.

To see how one of these companies operates, I called the National Computer Exchange (NACOMEX). Rather than keeping a stock of used machines awaiting sale, NACOMEX maintains a database of companies and individuals with used computers that they're interested in selling. To buy a computer through the service, call NACOMEX and describe the computer you want and the price range you can afford. Your NACOMEX broker will try to locate a seller who is willing to sell the equipment for the price you can pay.

In addition to providing a pipeline for used equipment from sellers to buyers, NACOMEX publishes a newsletter on used computer equipment. The newsletter costs $99 per year and includes charts showing the supply and demand of various popular systems, a price index, the price of the 100 kinds of computer equipment most active in the exchange (primarily computers and laser printers), significant trades, and volume of sales by segment.

NACOMEX doesn't inspect the equipment it sells, but it gives you 48 hours from the time of receipt to check the equipment and make sure that it's fully operational and that it matches the description given. If it fails to operate or isn't the machine you agreed to buy, you can return the machine within the 48-hour period and get your money back.

Software for Sale

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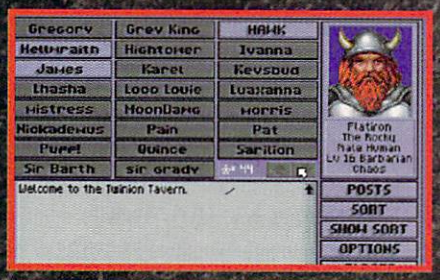

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your word processor? Can you afford the 20MB or more of disk space your next Windows word processor will chew up? If the answer to any of these questions is no, read on.

Used software may fill the bill at a fraction of the street price of new, and older versions of software often fill the needs of most users. Even if you answered yes to all of the above, you might still appreciate saving a few bucks on the latest version, which is sometimes available used as well.

Recently, I bought CorelDRAW! 3.0—the current version at press time—for $160. My source? The classifieds in a local freebie newspaper. The asking price was $200, but I explained to the seller that you could get a competitive upgrade for about $180 through Corel directly. He readily agreed, and I saved $300 off the lowest street price I could find for what is—even at its $600 retail—one of the best bargains on the graphics market. I had, of course, done my homework; I'd called Corel first and asked if the license was transferable. I was told that all I needed was a letter signed by the previous owner transferring ownership of the product bearing that serial number. (Ditto for Microsoft and a few other companies I checked with.)

It turned out that he hadn't even registered his copy, though, so I got the equivalent of the full retail product at one-third the store's price. More often, though, you'll see ads for slightly outdated software—typically one version back—for very low prices. As long as you can transfer the license, you're probably just as well off with the older version. I must confess, for example, that I've never needed the charting package, equation editor, and line numbering that come with Word for Windows 2.0 and that 1.0's feature set would've been just fine for me. However, I bought 2.0 because it's much faster.

The chief dangers in buying used software are that each company has a different license transfer policy and that many users will try to sell you pirated software or earlier versions from which they upgraded without transferring the licenses to you. In fact, I had found CorelDRAW! 3.0 at an astounding $95 in another ad, but in that case, the person was only willing to sell me the program disks. He wanted to keep the manuals and CD-ROM (CorelDRAW! 3.0 comes standard with both CD-ROM and floppies). Worse, he wouldn't transfer the license—a blatant attempt at a ripoff.

Here's your checklist for buying used software:

- Call the company that manufactures the product and find out whether it's possible to transfer the license and, if so, exactly how to do it. If you don't transfer the license, you're essentially buying pirated software.
- Ask around to see if there are known problems with that version. For example, PC Tools 7.0 isn't much of a bargain because it was, shall we say, released a little too early. But 7.1 is pretty solid. On the other hand, a friend of mine has PC Tools 5.0, and it works great; she doesn't need anything more powerful.
- Call the company and find out how many distribution disks are in each version. Windows products are so huge that a disk could be lost and you might never notice—until the installation program asks for it.

Previously Owned

There's a world of high-powered hardware sitting idle in the storerooms of companies that have recently upgraded equipment, and in the closets of people who tried computing and just didn't like it. None of this equipment can be sold as new, so it's a buyer's market in the used-computer world. Identify your needs, work out a reasonable price, and start looking. If you're like many used-computer hunters, you'll probably find more than you bargained for selling for less than you expected. ❑

Used-Computer Brokers

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Atlanta, GA 30328
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BOSTON COMPUTER EXCHANGE
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(617) 542-4414

NATIONAL COMPUTER EXCHANGE (NACOMEX)
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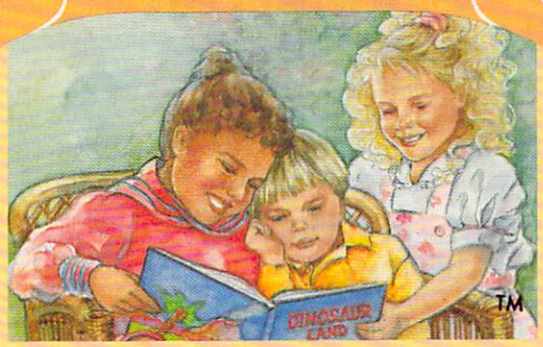

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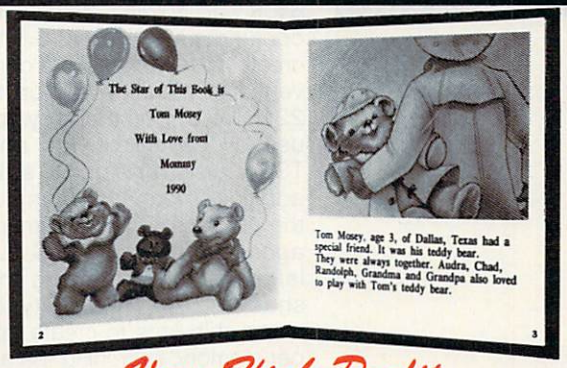

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SHAREPAK

Steve Draper

PRODUCTIVE TOOLS

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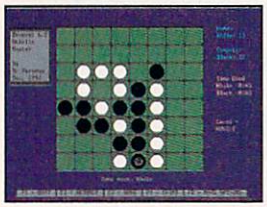

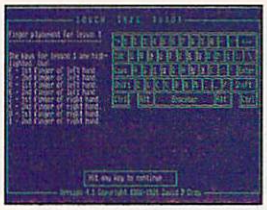

Memory Management Kit

Biologic's Memory Management Kit is the complete memory manager for your PC. It provides three useful memory enhancement tools that are not included with DOS. With these programs (HRAM, VRAM, and MIN-MEM), you can get more out of your computer than ever before.

HRAM is a powerful memory management program for PCs that enhances the use of upper memory (between 640K and 1024K). It works in conjunction with DOS 5.0 to create up to 96K of extra conventional memory and up to 224K of upper memory for use by device drivers and TSRs, even on older XTs. In addition, it provides many of the necessary memory management features DOS 5.0 left out, including using the shadow RAM capability of many chip sets to create upper memory, searching the area above 640K and converting the unused regions to upper memory, and optimizing upper memory by automatically determining the order in which your drivers and TSRs should be loaded.

HRAM requires DOS 5.0 or higher. Shadow RAM or expanded memory is required for 8088 and 80286 PCs.

VRAM breaks the 640K memory barrier by creating up to 32MB of expanded memory by using disk space or extended memory to simulate expanded memory. VRAM gives applications the illusion that they have more memory than actually exists in your computer by storing portions of programs in a temporary file on your hard disk or in extended memory and copying them to conventional memory as needed. Except for an occasional disk read/write, applications will operate just as if an expanded memory board were present.

VRAM requires extended memory or free disk space equal to the amount of additional expanded memory you wish to create.

MIN-MEM manages your TSRs and frees up memory for large programs by swapping memory-resident programs to your disk, giving you instant access to up to 24 pop-up programs while using only 15K of memory. MIN-MEM loads each of your TSRs and writes a memory image of the TSR to your disk. The memory used by the TSR is then released to the operating system. When you want to run one of your TSRs, just pop up MIN-MEM and highlight the program you want to run from a list of your TSRs and press Enter. A section of your memory is saved to disk, and the selected TSR is loaded in its place. When you exit the TSR, the section of memory that was saved to your disk is restored, and you'll return to your original program.

MIN-MEM requires expanded or extended memory, and disk space. The registration price for the kit is $45.

Reversi 6.2

Othello is an easy game to learn, but its many intricate strategies make it a difficult and challenging game to master. Now, you have one of the best players in the world to play against. If you're a beginner, the easier skill levels offer good practice to get you started. And if you think you're already a great Othello player, try this program on the master level—it can be a humbling experience. As an example of how good this program is, check out these credentials. In USOA-sanctioned tournaments, Reversi placed first in the 1991 U.S. Open, the 1992 Canadian Championship, and the 1992 Man vs. Machine Open. In addition, Reversi features three skill levels, along with save, restore, time limits, and game transcript and analysis options.

The registration price is $35.

Touch Type Tutor

Touch Type Tutor is an all-in-one typing teacher. It features three different modes to cover all your needs in one easy-to-use program. The tutorial mode consists of eight different graduated lessons that automatically adjust to your typing skill level. Whether you've never tried to touch-type or you're already proficient, the program will choose the right skill level for your needs.

The speed mode is specially designed for measuring typing speeds by using different styles of text in a number of categories. The categories vary from basic text to various technical styles. Practice lines can also be given before the actual test begins.

The game mode, like the tutorial mode, adjusts itself to the user's typing skill and prompts the user to type faster by becoming familiar with the location of the keys. Winning this game requires the player to type consistently faster through the five skill levels.

Touch Type Tutor requires an IBM PC or compatible. The registration price is $20. ❐

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PERSONAL PRODUCTIVITY

Daniel S. Janal

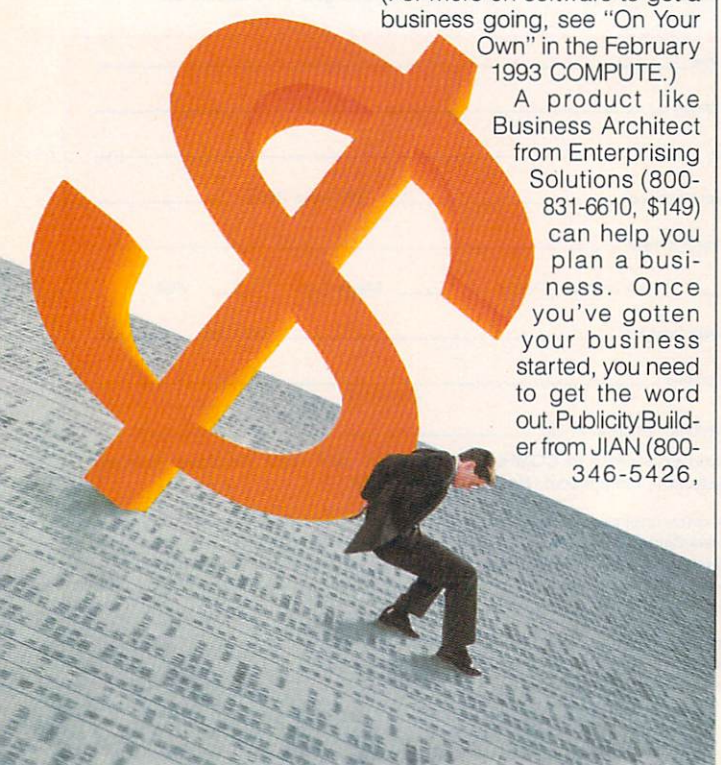
POLICY POLICE

When entrepreneurs start businesses, they might be experts in their fields, but that isn't enough to run a successful business. They need to know how to keep the cash flowing, hire and manage employees, avoid theft, and deal with legal technicalities.

A new breed of software programs can give entrepreneurs the tools to start, run, and expand businesses effectively.

These programs include a comprehensive, instructive printed text that explains the entire situation as well as any textbook could. Written by experts in their fields, these volumes can save business owners and managers a great deal of time and money by providing advice from authorities who have first-hand experience.

You don't have to be up against it. Business software can give you a helping hand in all facets of business.



The field is booming. No matter what stage your business is in, there is a program to help you solve your problems. Here is a representative list of helpful software that has crossed my desk recently. (For more on software to get a business going, see "On Your Own" in the February 1993 COMPUTE.)

A product like Business Architect from Enterprising Solutions (800-831-6610, $149) can help you plan a business. Once you've gotten your business started, you need to get the word out. Publicity Builder from JIAN (800-346-5426, $129) teaches you how to deal with the press and then helps you write better press releases with the help of more than 15 model templates on disk.

As your business grows, you need to hire employees. JIAN's Employee Manual Maker ($139.00) provides a complete manual on disk from which you can cut, paste, and tailor your company's individual needs. Policies Write Now by KnowledgePoint (707-762-0333, $295.00) asks you questions and helps create a manual based on your answers. Employee Handbook Toolkit from Palo Alto Software (800-229-7526, $129.95) provides a customizable template and includes the Model Safety Program mandated by the State of California.

If you're about to hire employees, Descriptions Write Now from KnowledgePoint ($149) or Job Sketch from JIAN ($99) will help employees understand the scope and limitations of their jobs.

To make sure your employees aren't robbing you blind, use JIAN's Business Guard Dog ($159). The manual provides insight into so many scams that the author warns employers not to let employees see the book. It might give them ideas.

As decisions get tougher, Expert Choice from Expert Choice (412-682-3844, $495) provides MBA-level direction and tools for analysis. It also includes lengthy discussions of situations to show you how to approach and apply tools for making decisions.

When the money comes rolling in, you'll need to manage your finances. To make sure you get paid, use JIAN's CashCollector ($139.00), which tracks past-due accounts and provides collection letters ranging all the way from friendly to threatening. Other programs that provide professional correspondence and documents are BLOC Publishing's Personal Law Firm (305-445-0903, $29.95) and Parsons Technology's It's Legal 3.0 (800-223-6925, $69.00).

To keep track of the money, use Quicken, a check-writing, budgeting, and accounting program from Intuit (415-322-0573, $29.95). You don't have to study accounting to keep good books.

To handle the legal situations you encounter, It's Legal from Parsons Technology (see above) and AgreeMentor from JIAN ($99) provide agreements for consulting, confidentiality, equipment lease, employment offer and acceptance letters, and others. It's best to check with an attorney, but these tools can help prepare you and save time in drafting documents.

When it comes time to expand your business, you might consider taking on partners. Partnership Maker from Nolo Press (510-549-1976, $129) can help prepare a partnership agreement for doing business in any state. The form can be customized to fit your needs and avoid legal fees (but I'd still suggest letting your lawyer review the documents). If you'd like to launch or expand your business by selling stock to private investors, try JIAN's P.P. Memo ($195, *P.P.* stands for *Private Placement*).

For assistance in writing, check out Instant Answers, a specialized style reference (not a style checker) for business writing from Reference Software International (800-872-9933, $99).

To keep your business running, you could study at one of the 350 colleges that offer classes in entrepreneurial skills, or you could use the software developed by entrepreneurs themselves and learn those skills in an instant. ❐

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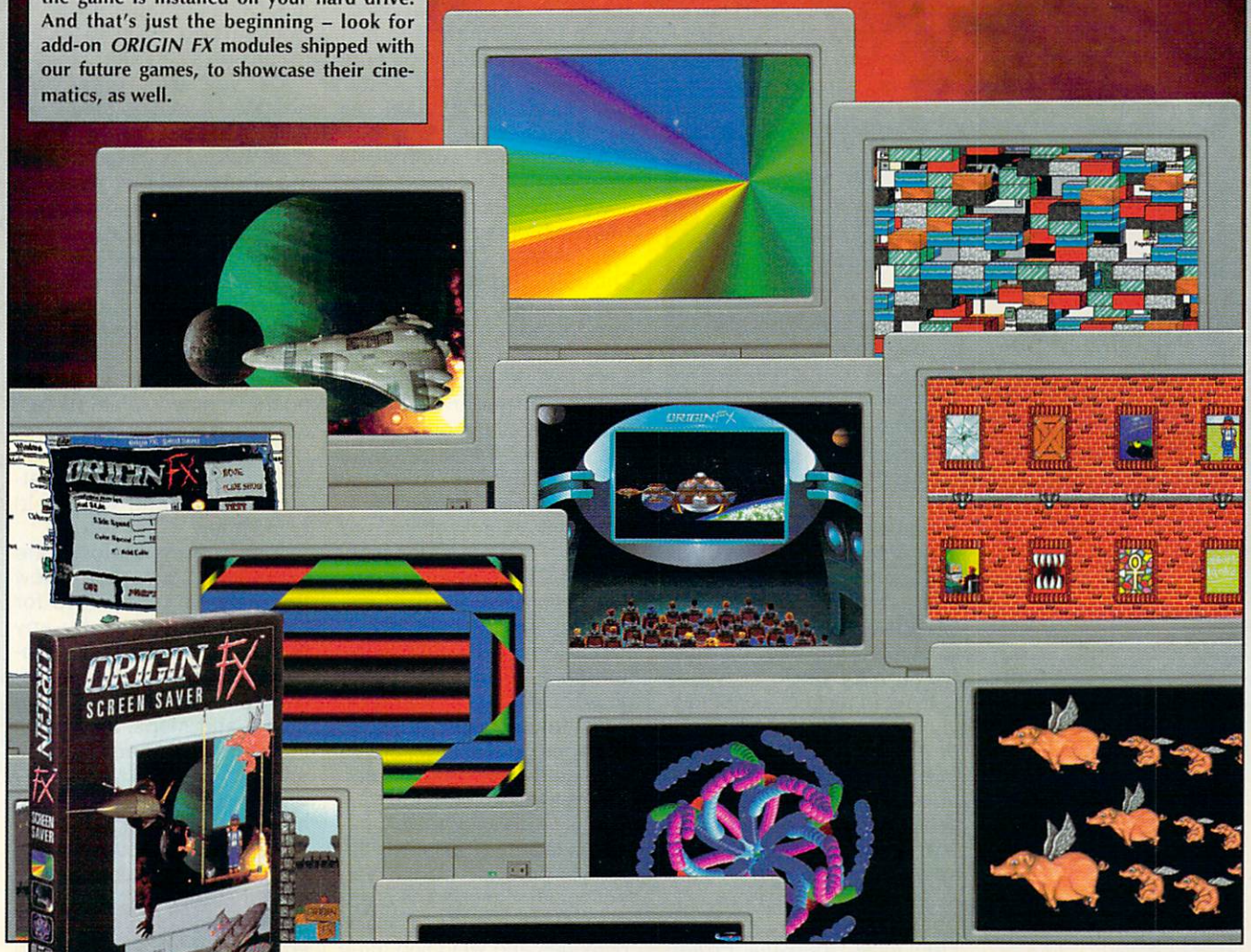

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Circle Reader Service Number 262

ART WORKS

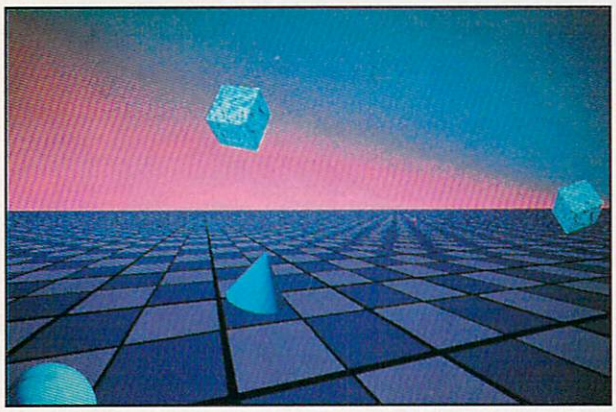
Robert Bixby

PRESENTATION POWER

Do you think that multimedia is getting too much attention? About four years ago, multimedia began to be hyped in the industry. If you're like me, your response was probably, "Sure, it's great for games, but what kind of serious work can you do with it?"

If you don't visit any dungeons or fly any stealth fighters, what relevance does multimedia have for you?

I have a CD-ROM drive in my PC at home, which I use as a dedicated CorelDRAW! server (I leave my CorelDRAW! CD-ROM in there to save hard



disk space), and I have a nice sound card sitting on a shelf, still in shrink wrap. If you don't visit any dungeons or fly any stealth fighters on your PC, what relevance does multimedia have for you?

It could have plenty of relevance, if you're a salesperson or a teacher. One of the answers is that multimedia can add life to presentations. A presentation is generally either a computerized sales spiel or a lecture.

The list of presentation packages is long and growing. Freelance, Charisma, PowerPoint, and Harvard Graphics are dedicated presentation packages, and CorelDRAW! and Micrografx Designer are among a handful of programs that were designed for other purposes but are capable of mounting presentations.

But last summer at PC Expo, Gold Disk demonstrated something a little different: its presentation program, AddImpact, now available for sale. AddImpact quickly and easily adds sound and animation to the most mundane presentation of data. For example, you might create a graph using data in an Excel spreadsheet. Using AddImpact, you could animate a hot-air balloon ascending to the heights of recent sales while a recording of the song "Up, Up, and Away" plays in the background—all within Excel itself.

AddImpact effectively turns any OLE-capable Windows application into a presentation program. Gold Disk is the creator of COMPUTE Choice Award winner Professional Draw, and it has brought the same kind of intuitiveness and intelligence to this product. You can create your own animation or use one of the animations provided. It has a runtime module, so you don't even have to install AddImpact on a machine to play back its animations and sounds. For more information, contact Gold Disk at P.O. Box 789 Streetsville, Mississauga, Ontario, Canada L5M 2C2.

NISCA recently announced an interesting 400-dpi, 8-bit gray-scale, full-page scanner. It's battery powered (it'll scan 20 pages on a charge, or you can use the AC adapter) and requires no expansion bus card (it feeds its graphic information to the computer via the parallel port), so it's the perfect scanner to use with a laptop. Measuring 2½ × 2¾ × 12 inches and weighing three pounds, it'll fit in your briefcase alongside your computer, portable printer, and pocket fax modem.

NISCAN Page is shipped with OCR, fax, and image-editing software, and it costs $799. It can operate as a sheet-fed scanner, or if you have something that can't fit through the sheet feeder, you can take the bottom plate off the scanner, and it will "crawl" across a page. NISCA will also offer a sheet feeder that will allow you to feed a batch of up to five pages through the scanner (for long faxes). The scanner should be available by the time you read this. Contact NISCA, 1919 Old Denton Road, Suite 104, Carrollton, Texas 75006.

Do you ever draw flow charts? Have you ever tried making all the pieces fit, complete with connecting lines, using a conventional graphic package? Sheer madness. Visio, the new drawing package from Shapeware (not shareware), is specially designed to assist in the creation of flow charts. Who uses flow charts? Network administrators, project and program managers, engineers, MIS professionals, facilities planners, plant managers, human resources specialists, marketers, trainers, and writers, to name a few.

Visio's drawing tools are generalized enough to allow the program to be used for most drawing tasks by any graphic artist, yet it has special features that are of particular use in creating flow charts and maps. It includes libraries of standard boxes and symbols that you simply drag and drop on the drawing area. It has a collection of arrows (which can contain text) and intelligent connecting lines that maintain their connections as you move the elements around on the page to allow for new elements in the process you are illustrating. If you would like more information, contact Shapeware, 1601 Fifth Avenue, Suite 800, Seattle, Washington 98101. ❐

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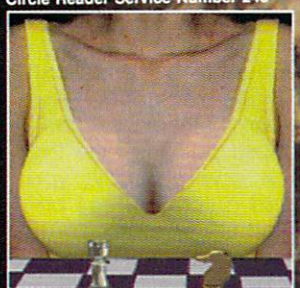
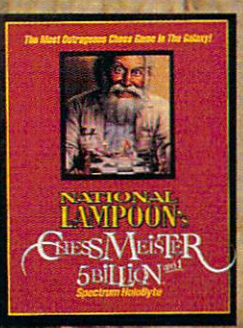


Not an actual VGA screen shot. You wish.



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* HEY, IT WORKED ONCE! *This photo was a Lampoon cover in 1973. We're happy to report the dog died of natural causes.*

DISCOVERY CHOICE

Kids have so much fun in this adventure that they don't realize they're learning complex concepts years ahead of schedule.

David Sears

THE ISLAND OF DR. BRAIN

When kids work for Dr. Brain, they can't help but learn. The Island of Dr. Brain is a puzzle-packed adventure that will have them solving problems from the major schools of knowledge: science, art, language, and math. Even music and literature are entwined in this fun game of mysteries.

One of the first puzzles involves polyominoes. Like most other island teasers, this obstacle is far less intimidating than it sounds. A brief consultation with the ever-handy EncycloAlmanacTionaryOgraphy (a weighty name for the included multipurpose tome) reveals that the challenge of the polyominoes is, essentially, to fit them together to form different shapes. Don't think your 12-year-old wants to read the explanation? Don't worry; the game is highly intuitive, making trips to the manual infrequent and unintimidating. Even if kids rarely approach it, they'll get Dr. Brain's tidbits, whether they're geometric, electronic, linguistic, or artistic. Kids will soon discover that the world makes sense from a number of different perspectives.

Players learn through a series of interactive brain teasers. Even the copy protection offers a chance for a new discovery: cartography. Designers of lessons-on-the-go adventures obviously know that the best way to teach actively involves students in problem solving, whatever the discipline. The best of these lessons also impart plenty of interesting data while sharpening problem-solving skills.

Making fine use of Sierra's now-standard point-and-click interface, The Island of Dr. Brain puts kids immediately in the thick of things—most kids won't even need the instruction manual to get started. By the time they reach more difficult entanglements, they'll understand the menu options.

At one point, kids encounter magic squares, those fiendish little number grids whose rows, columns, and diagonals add up to the same number. While players might readily place the appropriate digits in the blanks, thereby completing the square, they can also consult the EncycloAlmanacTionaryOgraphy for helpful hints on how to build their own squares and for a taste of magic square history.

Should they use the manual, even the youngest players will wrest principles from what they read, a process not in the least passive. Besides finding jazzy dateline tidbits—the first magic square surfaced in 2200 B.C.—kids will discover the Fibonacci sequence and more number-series insider knowledge. Who expects such a holistic tutorial in the midst of a magic squares discussion?

Or how about the article concerning the Tower of Hanoi, that devilish disks-and-towers puzzle? The version in The Island of Dr. Brain involves only four disks and relatively few moves, but the supplied Brahmanic wisdom equates a more complex version of the puzzle with the nature of the universe. Anyone who reads that a 64-disk puzzle requires as many as 18,446,744,073,710,000,000 moves to complete (requiring a time investment about 30 times greater than the age of the universe) will earn a healthy respect for numbers.

Of course, the game has challenges that encompass more than mathematical gambits. Word puzzles take the form of cryptography; you add and delete spaces between letters or swap words to render garbled text into familiar quotations. And there are particularly dense word finds. When's the last time you sought out *noch einmal* among a dizzying grid of let-

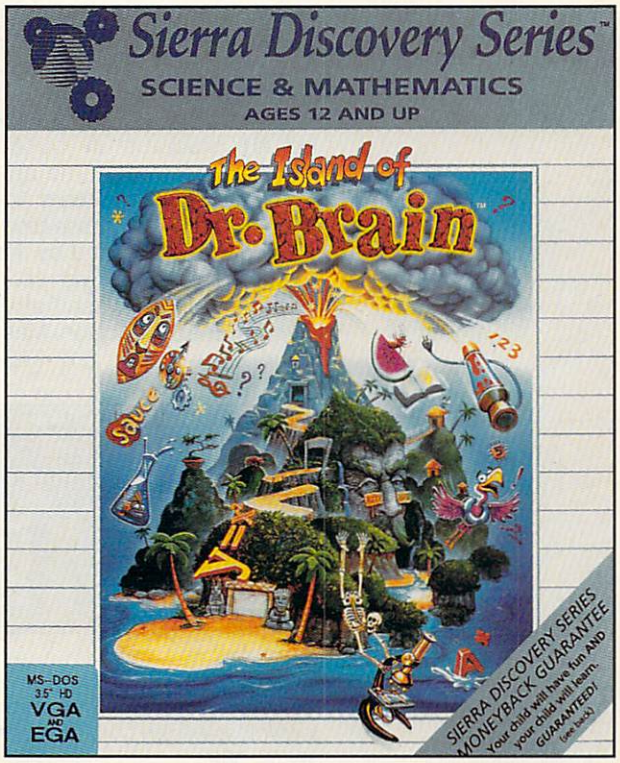
ters? Players might find themselves searching for not only German vocabulary words but French and Spanish ones besides. Other language challenges involve antonyms, synonyms, and homonyms; kids choose from word lists to fill in the blanks in Shakespeare's sonnets or a piece from Steinbeck, for example.

The art gallery in The Island of Dr. Brain lets kids view representative works from van Gogh, O'Keeffe, Kandinsky, Pollock, Picasso, and Dali. Players try to match paintings with the animated busts of the artists and hear brief biographies on each master. Correct matches win praise from the artists. Dali commends the successful student with "You, like me, have the mind of a paranoiac-critical genius! I say this in all sincerity." Kids might not know what he means, but it seems funny at least. Moreover, this brief exposure to great art could put ideas of museum visits in many young minds. And students fortunate enough to get a field trip to an art museum will be more comfortable and open to learning, having "met" many of the great artists already.

Physical science challenges abound on Dr. Brain's island. To gain access to the island's control room, kids must provide a counterweight for a troublesome elevator by mixing water, mercury, and alcohol together for the necessary poundage. In order to do this, they'll need to familiarize themselves with standard measures and the specific weight of a cup of each liquid. The process seems confusing at first, and it may be an opportune moment to utilize the online hint watch. Depending on the nature of the problem at hand and the number of available hints, the hint watch can provide clues or complete solutions to facets of the puzzle. However, players earn extra hints by solving puzzles without assistance.

Once the counterweight is in place, kids find themselves toe to toe with torque. Gears, teeth, and math—they're all much easier to comprehend when Dr. Brain is the teacher. Kids just follow the simple equations in the manual and choose the appropriate gears. Completely unaware that they're doing so, they learn rudimentary algebra and physics—years ahead of schedule. Later in the game, they'll design and test their own computer chips, complete with logic gates, and they'll even program a robot to round up essential electronic components.

The Island of Dr. Brain invites interaction. Even the mouse-shy will soon click on every piece of vivid scenery; most of it moves, if only to grin or roll its eyes. With any major sound board, the soundtrack will delight most knowledge seekers; the more expensive sound cards promise stereo sound for the most discriminating. Players may chart their progress on the Achievement Board, a full-screen bulletin board for hanging plaques—bronze, silver, or gold, depending on the gameplay difficulty setting. More competitive players might value their scores more highly than their overall success; these kids can solve puzzles up to four times to work toward a maximum score of 1000 points and a supersecret message from Dr. Brain himself. These entertaining and colorful mind expanders play well enough without any additional goals, however, and no puzzle plays the same way twice. All this adds up to an exceedingly replayable game.



An almost-perfect initial exposure to the world of science, art, language, and, in a lesser way, literature and music, The Island of Dr. Brain teaches kids the importance of cross-disciplinary study. After spending halcyon days with Dr. Brain, kids will begin to look for solutions to everyday mysteries rather than passively accepting them as a part of life. Perhaps a lucky few will go on to find the connections between these mysteries for themselves—and lead lives of wonderful contemplation as systems analysts, CIA agents, or maybe even game designers. ❐

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PATHWAYS

Steven Anzovin

THE CUTTING EDGE

If you took high-school biology, you probably remember pithing a frog and seeing for yourself the number of chambers in the heart of a fetal pig. Hundreds of thousands of frogs and pigs are still dissected by students in public schools every year. The animals cost millions of dollars. According to *Beyond Dissection,* a handbook published by the New England Anti-Vivisection Society (333 Washington Street, Suite 850, Boston, Massachusetts 02108; 617-523-6020), three years of preserved bullfrogs for three biology classes can cost as much as $1,069.

Operation Frog simulates an American bullfrog for dissection by junior-high biology classes.

PCs can provide a cheaper, cleaner, and more pleasant alternative to dissection. Clever computer software is being used in more and more biology classrooms to simulate the experience of vivisecting or dissecting laboratory animals. Using a color-capable computer and a mouse (the computer kind, that is), students can uncover layer by layer the anatomies of earthworms, bullfrogs, and even human beings without having to kill and cut a real animal—an experience that turns many students away from further study in biology. Dissection programs also provide detailed information on each anatomical feature, and many include animations, quizzes, games, or other learning aids.

To take one example, a program called Operation Frog (Scholastic Software, P.O. Box 7502, 2931 East McCarty Street, Jefferson City, Missouri 65102; 800-541-5513) simulates an American bullfrog for junior-high biology classes. It offers step-by-step dissection of a simplified frog—just one set of muscles and no bones—but plenty of interesting related activities, including animations and digitized photos. The program costs $79.95 for the Apple II version and $89.95 for the DOS version and can be used over and over again. Operation Frog allows students to go at their own pace, rather than having to keep pace with the class. And after students have taken the frog apart, they can put it back together, something that the best biology teacher in the world can't do with a real frog.

There are some other advantages, too. Using simulations instead of real animals reduces exposure to nasty chemicals like formaldehyde. Maybe best of all, students can't cut each other with software scalpels (the way a couple of kids did with real knives in my high school during an argument over who would get to cut the pig first).

No one claims that computer simulations duplicate the details of living organisms or that they can give students a feel for the inside of a body. Serious students of biology and medicine still must work with real specimens. But do the millions of schoolchildren who perform vivisections and dissections every year need the real thing? Students retain as much or more knowledge from slide shows and even boring biology lectures as they do from dissection. So dissection simulation may be one of the few cases where a computer experience is better than life.

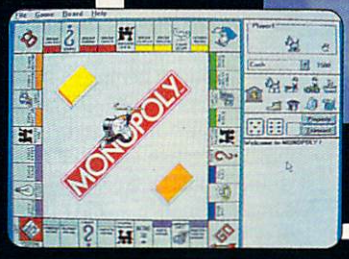
As yet, there's no software that simulates the anatomy of the rats, rabbits, cats, or fetal pigs used for dissection, but you can definitely get into frogs, worms, and people.

Frog Dissection (Cross Educational Software, 504 East Kentucky Avenue, Ruston, Louisiana 71270; 318-255-8921; $29.95) is another inexpensive bullfrog anatomy tutorial with color graphics, step-by-step dissection, definitions of structures, and many review questions. Meanwhile, the anatomy, digestion, reproduction, and sensory apparatus of the lowly earthworm can be investigated with The Worm, a simulation from Ventura Educational Systems (910 Ramona Avenue, Suite E, Grover City, California 93433; 800-336-1022; $59.95). Bodyworks: An Adventure in Anatomy, from Software Marketing (9830 South 51st Street, Building A131, Phoenix, Arizona 85044; 800-545-6626; $79.95) shows the human body in colorful detail, with accurate graphics and online text articles about each body part.

For more information, contact the National Association of Biology Teachers, 11250 Roger Bacon Drive, Suite 19, Reston, Virginia 22090; (703) 471-1134. ❐

Trade Up!

The Game You Grew Up With Has Grown Up Too!



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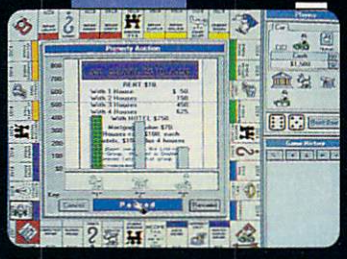

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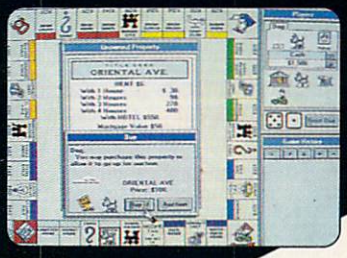

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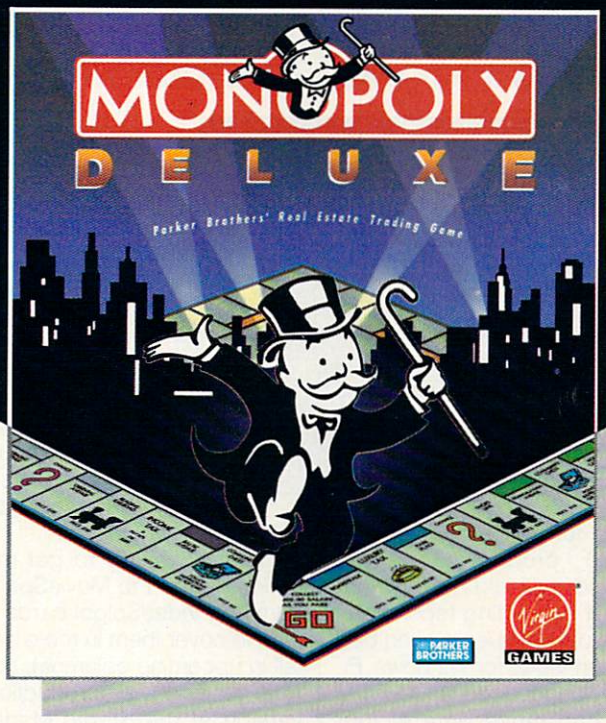

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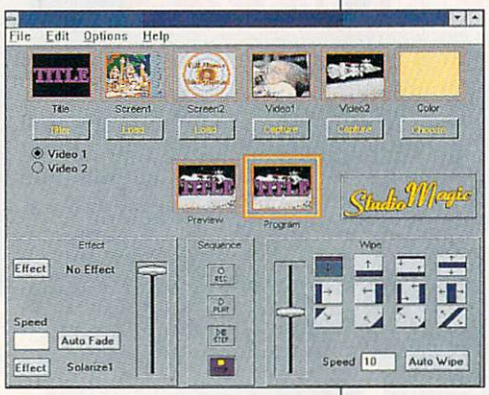
MULTIMEDIA PC

David English

YOUR OWN VIDEO PRODUCTION STUDIO

If the recent Fall COMDEX is any indication, software-based video is coming to Windows in a big way. Microsoft Video for Windows (Microsoft, One Microsoft Way, Redmond, Washington 98052; 800-426-9400; $199) was running on computers throughout the show. (It was even running on new computers using the Pentium—that's Intel's official name for its next-generation 80586 processor.) Apple showed its QuickTime for Windows, a competing technology that Apple argues is even better than Video for Windows. Pioneer announced a CD-ROM that can move data at four times the normal speed (600K rather than 150K per second), making it ideal for reading full-motion video files that usually run tens of megabytes in size.



With a Studio Magic card, you can capture full-motion video, apply special effects, and send the results to a TV or VCR.

In addition, several companies displayed video capture cards that are compatible with Video for Windows and will compete directly with Creative Labs' Video Blaster. Media Vision's Pro MovieSpectrum (Media Vision, 3185 Laurelview Court, Fremont, California; 800-845-5870; $399) doesn't require that your VGA card have a feature connector, so almost anyone with a 386 or 486 can work with video. SuperMac's VideoSpigot is currently the top video card for the Mac. The company is releasing a PC version of the card, called VideoSpigot for Windows (SuperMac, 485 Potero Avenue, Sunnyvale, California; 408-245-2202; $499). It will include SuperMac's own Video for Windows compression driver, called CompactVideo, which lets you expand the size of Video for Windows' onscreen video (from 160 × 120 pixels to 320 × 240 pixels) or double the frame rate (from 15 frames per second to 30 frames per second). Finally, Brown-Wagh showed its Studio Magic card (Brown-Wagh Publishing, 160 Knowles Drive, Los Gatos, California 95030; 408-378-3838; $499.95). It not only brings full-motion video into your computer but also sends that video back out again.

I'm still waiting to get my hands on the Pro MovieSpectrum and VideoSpigot cards (I plan to cover them in more detail in upcoming columns), but I did receive a preproduction version of the Studio Magic card. Like the Video Blaster, it lets you capture full-motion video and save it to your hard drive with Video for Windows, capture individual video frames, and add audio to video. But unlike the Video Blaster, the Studio Magic card lets you display your computer output on a standard television, record your computer and video output to videotape, use your Windows fonts for titling, perform high-end special effects (including colorization, solarization, posterization, and metalization), and program a variety of video transitions and wipes. In other words, you get not only a Video for Windows capture board but a capable video production system that you can use with your VCR or camcorder—all for just $499.95.

Too good to be true? If you want professional-quality special effects and animation, you should consider either a Video Toaster ($4,595–$10,000) or a Matrox Studio ($15,000–$25,000). But if you can't afford a Mercedes and would be happy with a Buick for the price of a Yugo, this may be the card for you. It costs about the same as the other video capture cards but gives you the video production features of a second card for free.

Most of us are new to the concept of a personal video studio. Fortunately, Studio Magic's main Windows interface resembles a familiar remote control with various video and audio options. The postproduction screen looks like a miniature television studio with six monitor-like windows, a preview window, a final-output window, visual-effects selectors, and wipe controls.

You can simultaneously access video from two sources, either S-video or composite. The card can also output to either S-video or composite. That means you can easily combine clips from different videos, add your special effects, and send the results to a standard TV or VCR.

Finally, the Studio Magic package provides an excellent assortment of commercial applications, including PC Animate Plus, 3D Workshop, and Curtain Call. If you're looking for a Video for Windows video capture board and you're interested in bringing your computer videos back to a TV or VCR, check out Studio Magic. It's the closest you'll probably ever come to having our own video production studio. ❐

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ENTERTAINMENT CHOICE

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Anthony Moses

THE LOST FILES OF SHERLOCK HOLMES

First, the music: tingling, brooding. Then a slow fade-in: a foggy twilight in London, November 1888. A cab trundles down the rain-spattered street; firelight dances behind warmly lit windows; Big Ben looms dim in the distance. The scene shifts: We're in an alley outside a theater, where a cat, prowling along a crate, knocks off a bottle, which shatters. The murderer, cloaked, crosses the screen and hides behind a crate, his face flickering briefly as he lights a cigarette. Soon, the victim, lovely young actress Sarah Carroway, appears at the stage door, stopping to look in her handbag. The murderer leaps from his hiding place. Sarah sees him, far too late—there's a dramatic closeup of the screaming girl and then a discreet dissolve to a bobby strolling along Baker Street. The bobby has a message from Inspector Lestrade, requesting the assistance of Mr. Sherlock Holmes, consulting detective.

It's not a movie. It's the animated title sequence for Electronic Arts' adventure game, The Lost Files of Sherlock Holmes, and it clearly announces that what follows is no standard mystery game but a tour-de-force excursion into full-fledged Holmesiana.

In The Lost Files, you, as Sherlock Holmes, scour various locations for clues and pump witnesses for information. Each time you leave a scene, you're shown a scrollable map of Victorian London with location icons indicating where you can travel. The more clues you find, the more icons appear on the map, and the more labyrinthine the game becomes. Soon, what first seemed to be a simple Ripper copycat murder is not quite so simple anymore.

Fortunately, interacting with the game is so simple that, after the first run-through, you probably won't need to check the manual again. About the only time you use your keyboard is to save a game; otherwise, you'll need only your mouse or joystick (the cursor pad on your keyboard, though slower, may also be used).

The bottom third of each location screen is the menu, containing game commands such as Look, Move, Talk, and Pick Up. The menu further allows you to check the inventory of items you've gathered and to browse the journal in which Dr. Watson records your conversations with the characters you meet. The top two-thirds of the screen—well, that's where the fun is.

To appreciate a game of this sort, you must understand what constitutes Holmesian fun. Many adventure games are so preoccupied with problem solving that they leave little room for exploring the world that the adventure takes place in. But people don't read Sherlock Holmes stories just to find out who did it. What we want from these stories is the specifically Holmesian universe: that gilt, gaslit world of hansoms, foggy lamplight, and distant train whistles. Solving the mystery is simply an excuse to play in a world that, after only a century, seems almost as remote to us as the Middle Ages. Luckily, the creators of The Lost Files understand this need: While they do provide problems to solve, they seem just as concerned with re-creating Holmes's world in admirable depth.

For example, moving the pointer around Holmes's headquarters, 221B, lets you examine many of the familiar props in the world's most famous address. The Stradivarius, the initials *VR* pockmarked into the wall by Holmes's revolver, the gazogene, the lab table (which is not just for show), Watson's unframed portrait of Henry Ward Beecher—all are there, accompanied by detailed, sometimes wry descriptions of even the extraneous objects. The bearskin rug at the hearth in 221B plays no part in the mystery, but if you

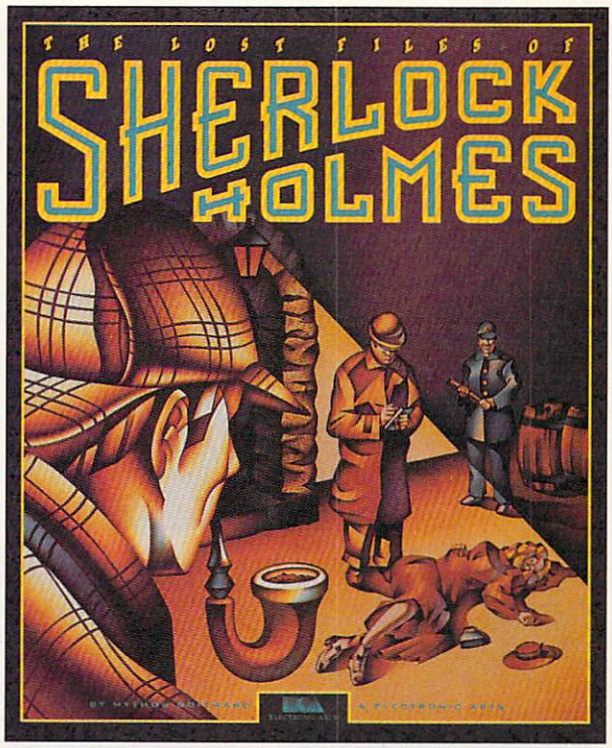
use the Look command on it, you are told that the rug was "supplied unwillingly by an enormous European brown bear. Its close proximity to an almost constantly burning coal fire has rendered its once-lustrous coat a bit dingy and fire-scarred." Examining the props in other locations will elicit similarly detailed descriptions. And while some of these "useless" details help conceal the clues, they also help develop the feel of being in the London of the 1880s.

This illusion is maintained in the conversations with other characters. The Talk command displays an animated, closeup portrait of each speaker and calls up a dialog box which offers you several conversational gambits. Some characters answer willingly; others need to be threatened. There's even a publican who says he'll talk only if you beat him at darts first (the darts episode alone is a self-contained game). But whomever you speak to, the reply will be couched in a Victorian patois suitable to the character's personality and class.

The descriptions of objects in the game also maintain the Victorian tone. The Look function is properly reluctant to talk about what goes on behind the screen in Sarah's dressing room (that's where the chamber pot is), and even newfangled art styles get ribbed. It isn't often that a reviewer gets to address prose style in computer games, but the creators of The Lost Files should get credit for trying to make the game sound as if it were created sometime in the last century. In fact, the Mythos Software team deserves applause for having done its Holmesian homework. The setting of the game, November 1888, is exactly when, according to William Baring-Gould, Holmes was actually involved in the Ripper investigations.

The game is filled with characters and locations familiar to Holmes fans. You can meet and interact with Inspectors Gregson and Lestrade, Old Sherman and Toby, and Wiggins, the leader of the Baker Street Irregulars. You can hang around 221B or visit Scotland Yard, Covent Garden, or Bradley's Tobacco Shop, among many other places. There are also inside jokes for Holmes enthusiasts. One character remarks that Holmes looks just like his portrait in *Beeton's Annual,* where Holmes's first adventure, *A Study in Scarlet,* was published in 1887. Another character, questioned about someone named James, replies that for all he knows, "your friend there with the derby [Watson] is named James," a tongue-in-cheek reference to the ongoing Holmesian debate over whether Watson's given name is John or James. Such details won't help solve the mystery, but they make the investigation a lot more interesting, and they indicate that the game was designed by people who care about the Holmes mythos.

Be forewarned: The Lost Files is not for the impatient. The game requires careful observation and thought to catch the necessary clues and not become repeatedly stalled. And the farther you get in the game, the more difficult this becomes (Electronic Arts provides a 24-hour hint hot line for those with touch-tone phones and no patience). Also, be warned that



if you enable all options at installation, The Lost Files will swallow nearly 29MB of your hard drive, more space than some would want to devote to a game (you can install it at only 15MB, but it will run more slowly). The period-style music and sound effects are effectively atmospheric, but these will be available only if you have a sound board—there's no support for the internal PC speaker.

The manual is worth reading further for its essays on the Ripper murders and the appeal of Holmes. It also includes a hint that this may not be the last lost file we get to peek into. I certainly hope it isn't. The Lost Files of Sherlock Holmes is the sort of literate, engaging game that we could use a lot more of. ❐

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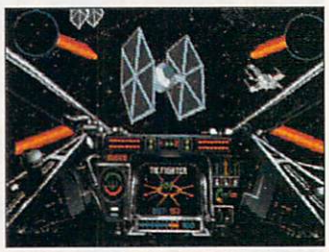
GAMEPLAY

Paul C. Schuytema

CINEMAGICIANS

Disney and LucasArts have delighted us for years with their theatrical voyages into fantastic worlds. From *Snow White* to *Star Wars, Raiders of the Lost Ark,* and *Beauty and the Beast,* we have traveled far into the realm of fantasy. Now, both companies have turned their attention to the small screen. Not TV, but the theater screens sitting on our desks.

Our computers let us investigate the ways movie magic was made—and create some magic for ourselves.



The Indiana Jones story ended its sojourn on celluloid with *Indiana Jones and the Last Crusade,* but LucasArts has brought the fourth Indy adventure to life in an interactive adventure called Indiana Jones and the Fate of Atlantis. The adventure is wildly visual, utilizing LucasArts' own SCUMM story system to create a rich, interwoven plot that may be played through three paths. You can work with the beautiful psychic Sophia Hapwood or utilize Indy's own wits or his fists (and his whip, of course) to travel the globe searching for the sunken utopia of Atlantis. When you're finished with the adventure, it's hard to tell whether you've just finished watching a 70-mm film or playing a computer game. It's all in the story.

Arguably one of the most famous movie series of all time is the Star Wars saga, and LucasArts is bringing us into another facet of that universe. X-Wing is LucasArts' space combat simulator that throws you behind the pressurized glass of an X-Wing fighter with Red Leader at your wing and an R2 unit at your back. You fly and live the struggles of a rebel pilot, blasting the annoying whine of those TIE fighters out of space and time with the satisfying movie magic of flaming explosions.

LucasArts has done a great job of bringing the theatrical feel of Star Wars space combat to the game. The X-Wing fires plasma bursts from the lasers with that reassuring squish sound and banks into a tight turn when chasing a TIE fighter bearing down on your wingman. I'll concede that it defies the laws of physics; you don't bank into a turn in no atmosphere and zero-g, but this is a fictional universe, and the X-Wing feels as if it should bank.

No one questions that Walt Disney Studios is the master of animation. From *Steamboat Willie* to *Aladdin,* Disney's animation is breathtaking, to say the least. Disney Software has created a product that lets us explore this fascinating world of cel animation: The Animation Studio. The Animation Studio gives us the chance to pencil in animations and to study classic Disney cels and the techniques of squash, stretch, and anticipation. You can follow the movement through onionskins (virtual paper that lets you see several cels at once), paint the animation, add sound effects, and even create your own complex backgrounds.

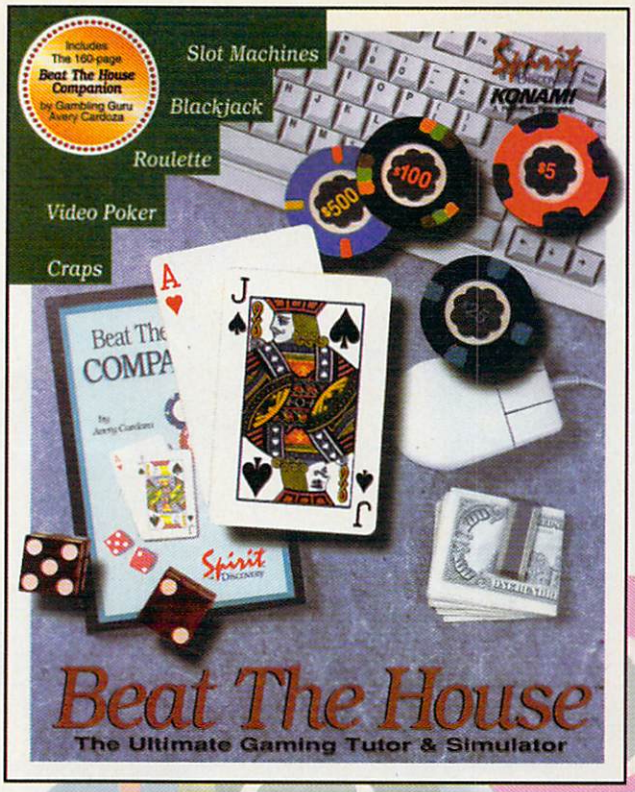
Disney also makes great family adventure films (remember Herbie, the Love Bug?), which have culminated in the wild rides of *The Rocketeer* (Disney also publishes a computer game based on *The Rocketeer*). One of the things that makes *The Rocketeer* so pulse-pounding is the special effects, most notably the aerial stunts. For anyone who ever wondered how they create stunts like that, Disney has created the ultimate toy: Stunt Island.

Stunt Island is a program that is set on an island off the coast of California which is used exclusively for movie magic. The program is a combination flight simulator and complete stunt-based movie studio. You can fly any one of 45 different aircraft, each with its own capabilities, from the SR-71A Blackbird to a Curtis June-Bug (a WWI ultralight).

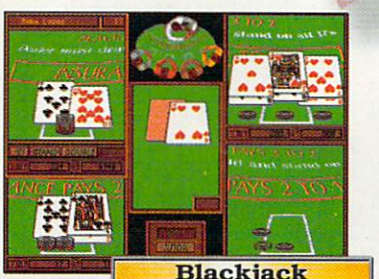
Stunt Island comes with 32 prebuilt crazy stunts (have you ever tried to land a parachutist on top of a hot-air balloon?), which you can explore or fly as part of a Stuntman-of-the-Year competition. You can also design and film your own stunts from scratch, creating sets from a library of over 800 3-D objects that you can animate. When finished filming, you climb behind an editor's console to transform your raw footage into a complete film (up to 20 minutes long) replete with music and sound effects.

Computer entertainment is growing by leaps and bounds, and now we can use our computers to explore the worlds we've enjoyed on the big screen. We can also use our computers to investigate the ways in which this movie magic was made and create a little bit of it for ourselves. ❐

Some play for fun...



Others play to win!



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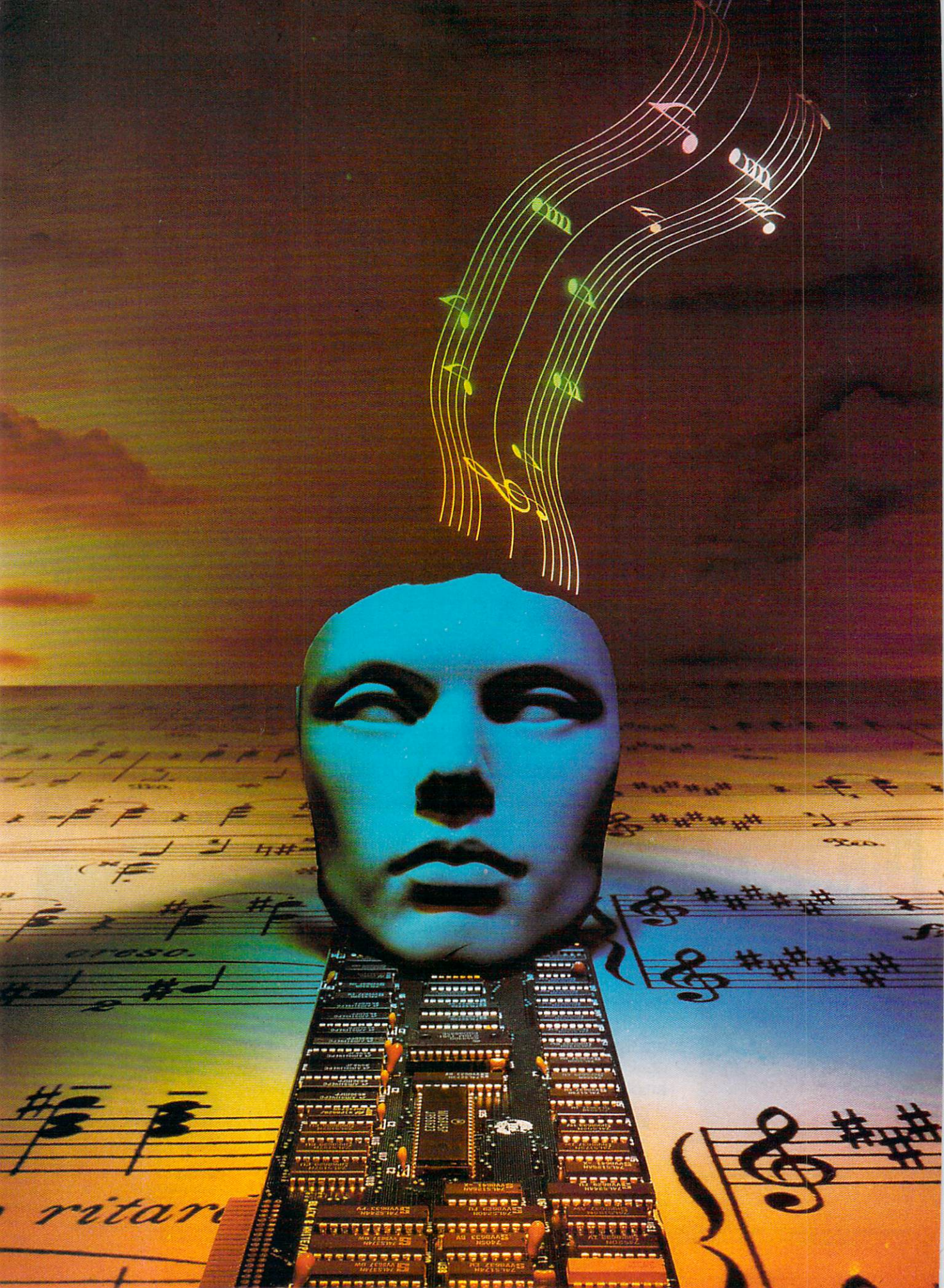

Sound of the Future

BY PAUL C. SCHUYTEMA

Not only can computers talk, but they can listen, play a fugue, or blurt out a hot sax riff at the click of a mouse button.

Sound on the computer has truly entered the mainstream, and the acceptance of this capability has led to a rapid development of sound technology. Now, a PC-sound addict can record an aria in 44-kHz, 16-bit, CD-quality audio (more about this later) and paste it into a memo to his boss.

Sound is one of those computer features you only abstractly miss until you have actually experienced it. Take it from a former nonbeliever: When you plug sound—real sound—into your PC, you will never go back.

YOUR COMPUTER'S SMART. BUT CAN IT TALK?

Sound can transform the output of your computer. A computer without sound relies entirely on vision, which is reasonable because vision is a human's most important sense. But close behind sight is hearing. Having both sight and sound adds a completeness to the computer experience.

Hearing Is Believing

But what good is a talking computer? What do we really need sound for? Answering that question could be arbitrarily complex, but let's look at the beast in simple terms. In terms of your PC, sound comes in two "flavors": digital sound and music.

Digital sound is real-world sound that has been sampled (captured live or off tape) by the computer and represented as binary data. The sounds of glass breaking and the swing of a golf club are examples of digital sound.

Music is played back differently. Sound devices often employ integrated FM synthesizers to create a wide array of musical sounds, from the whining of an oboe to the beeps and boops associated with early electronic synthesizers. PC music comes in two species as well, manufacturer-specific music and MIDI (Musical Instrument Device Interface). While any manufacturer could create its own proprietary music interface, the industry standard is MIDI, a data format that allows a wide range of devices (from computers to the electronic drum sets in your favorite MTV video) to share musical data.

Now that we know a little more about PC sound, the question remains: What good is sound? The answers are many. Sounds can make computer entertainment and education programs come

alive. PC users can record their own sounds to augment applications or leave voice notes on spreadsheet files. Sound can be an aural cue to swap disks or enter another record of data into a database. And sound is essential to the growing field of PC multimedia. In multimedia, visual images are combined with sounds to create interactive experiences (such as encyclopedias, training programs, and reference materials) which the user can control and explore at his or her own rate and level of interest. For ideas about the uses of sound, just flip through the pages of COMPUTE, and you'll see that sound for the PC is everywhere.

What follows is a sampling of sound devices available for personal computers. An exhaustive list would be prohibitively long because so many manufacturers are offering sound equipment now.

The most common type of sound device is a sound card. The sound card is an internal circuit board you would install in your computer's expansion bus. Sound cards generally provide access to sampling, MIDI, and manufacturer-specific synthesis. We'll also talk about several portable devices, such as external peripherals which include sound cards as well as an integrated amplifier and speaker.

How do you decide what type of sound device is best for you? There are several things to consider: cost, compatibility, and purpose. If the card is only for entertainment, a simple 8-bit card would probably do fine, but if you're interested in speech or recording your own music—or if you have an audiophile's ear for sound—look into the new generation of 16-bit cards. If MIDI is your game and you want the features of a full-fledged synthesizer, look into cards like the Roland SCC-1.

ATI Stereo-F/X

The ATI Stereo-F/X is an 8-bit stereo card which allows you to record at either 11 kHz or 22 kHz in stereo (provided you have a stereo microphone or line input). You can record in 11 kHz, 22 kHz, or 44 kHz in mono.

The ATI card installs easily with no jumpers to configure, and the card holds the current settings in memory, allowing you to software-select the volume to a comfortable level and change it only when you need to (it remains constant even after power-down).

The Stereo-F/X comes with the usual assortment of software: drivers, DOS and Windows digital sampling software, a library of sounds and songs, and a program that allows you to synchronize sound and graphics. The software also gives access to the most intricate parts of the card, and the manual provides clear documentation on how to take advantage of the card in your own programming.

The ATI card allows connection to MIDI devices via an optional connector box, but the card has its own 11-voice FM synthesizer that allows it to play MIDI files without any extra equipment. It also sports a joystick port which is software selectable to provide smooth performance on even the fastest computers (a godsend for those of us with 486s). The Stereo-F/X is fully compatible with Sound Blaster and Ad Lib (and doesn't require any memory-resident programs for compatibility), and it simulates stereo when playing mono Sound Blaster files.

The Stereo-F/X is bundled with a pair of small, card-powered speakers, and the card has a built-in eight-watt amplifier (the most powerful I've seen on a card) that delivers plenty of power to the speakers. Setting the card up for Windows is a bit of a chore, since it requires tracking down the information in a cluttered READ.ME file. The READ.ME file gives the wrong location for the Windows drivers, so I had to hunt for them. Once I slogged through the cryptic process (hindered by the less-than-intuitive manner sound is set up in Windows), everything worked fine.

In the included Windows sampling software, the version I received was a newer version than the software manual referred to, and a small additional sheet notified me of this. The newer version of the software separates the mixer program from the recording program, which is at once an improvement and a drawback. It's a nuisance because I had to move from window to window to adjust the volume and the stereo balance. But this proved to be a good idea when I used other software, such as Windows' own Sound Recorder or media player. It allowed me to use a third-party program easily while controlling the ATI card.

Ad Lib Gold 1000

The newly designed Ad Lib Gold 1000 card boasts an impressive array of features. The card provides 20 independent FM channels (16-bit stereo with 96 dB of dynamic range) and 2 digital channels. It also offers 12-bit stereo sampling and the ability to accept either 8-, 12-, or 16-bit data. It can sample at rates from 44 kHz down to 5.5 kHz (the higher the sample rate, the better the sound quality).

The card has a self-contained 1.2-watt amplifier, which was weaker than those of the other cards for powering speakers. Headphones or self-powered speakers worked fine, however.

The Gold 1000 comes bundled with a DOS and Windows mixer program, a music player (jukebox), and a DOS-based voice recorder, as well as other utilities.The card is difficult to install because of its numerous jumpers and cryptic instructions (the instructions label the jumpers according to a diagram and not according to the numbers printed on the card). The dual joystick jumper is especially difficult to adjust. The instructions are also a little foggy about setting up the IRQs and DMAs, never explaining them clearly (although conflict warnings abound).

When it comes to audio quality, the Gold 1000 sounds great (with self-powered speakers). However, at this time it suffers from compatibility problems. The card supports previous Ad Lib formats, but there aren't nearly enough software titles that take advantage of the new capabilities to make this card even as compatible as some of those smaller, compatible-only cards.

By far the best feature of this card is its sound quality, and it looks as if it won't be long before the software catches up to its capabilities. The Gold 1000 is also user upgradable, and it can support a CD-ROM interface and a Surround Sound module as well as a telephone-answering system.

Sound Master II

The Covox Sound Master II is an 8-bit mono audio board that performs well and comes supplied with an interesting array of software. The board sports a four-watt, built-in amplifier.

While the card isn't fully Sound Blaster compatible, it does include a memory-resident program that can emulate Sound Blaster sounds (not Sound Blaster MIDI or voices).

The card comes bundled with a solid package of software, including PC-Lyra, a visual MIDI music composition program.

The most unique feature of the Sound Master II is the voice recognition software. Voice Master allows you, through the included headset microphone, to create DOS macro files that will activate at your spoken word. You simply train the software to recognize your command and edit the macro. Then, when you're running the software, you tap a hot key and speak your command.

I found that the recognition works very well. When you're training the software, you record each command three times, and the software averages

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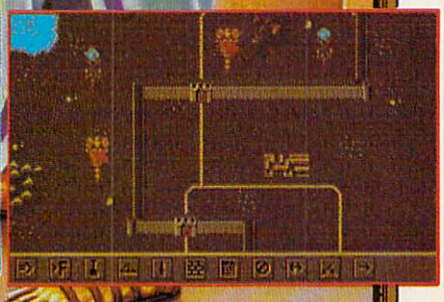

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them all together, to allow the widest possible range of recognition.

The Sound Master includes two speakers, a headset microphone, and MIDI cables, but no joystick port.

While the Sound Master is very impressive in its varied uses, setting the card up is difficult because of its awkward documentation (some is outdated) and clunky IRQ and DMA setups. It took a while to get the Windows multimedia drivers to find the card, even though it was "visible" in DOS.

Pro AudioSpectrum 16

Media Vision's Pro AudioSpectrum 16 is one of the new generation of 16-bit cards that adds another level of realism to the sound quality. By doubling the resolution of digital samples, the quality of a 16-bit card's sound approaches that of a CD's.

Installing the Pro AudioSpectrum 16 is a breeze, the DOS installation works well with the defaults (no manual jumpers on the card to set), and installing the Windows drivers is as easy as running an installation program and restarting Windows. The installation program even lets you know every addition and modification it makes to your SYSTEM.INI and WIN.INI files.

The Pro AudioSpectrum 16 is supplied with the graphically impressive TrackBlaster Pro DOS-based, four-track recording "studio" as well as a customized version of Voyetra's sequencer program. The Windows-based Pocket Recorder and Pocket Mixer programs take a little while to get used to, since there are so many things that you're able to control. During recording, the Pocket Recorder provides a VU meter reminiscent of a tape deck, and the Pocket Mixer allows you to adjust recording (and playback) levels for each form of input and output. The mixer also provides controls for volume, balance, bass, and treble. The Pocket Recorder doesn't allow any cut-and-paste editing for digital samples, but it does offer a wide array of interesting effects.

While the Pro AudioSpectrum 16 claims full Ad Lib and Sound Blaster capability, you must load the PAS program into memory to make the board behave like them. When you're using an extremely memory-hungry software program, the PAS program might eat up enough memory so that your program won't load.

The Pro AudioSpectrum 16 also comes with an interesting text-to-speech TSR program for DOS that allows the card to "read" any selected text in a male robotlike voice. While I'm a little skeptical about the usefulness of this program, it's very interesting to play with. You invoke it with a hot key when the text you want it to read is on the screen and then highlight the text and press Enter. The program is very limited, since you have to select the text, and it will not work with Windows. I am, however, excited by any program (or person) that can pronounce my last name correctly.

The Pro AudioSpectrum 16 is a true 16-bit stereo card, and it records extremely clean sound. It also contains a SCSI port that allows the connection of a CD-ROM drive. (Media Vision also makes a complete multimedia kit.)

SCC-1

If digital samples and games aren't your forte but you have an interest in MIDI, the SCC-1 from Roland is a great card. Basically, the SCC-1 is a preset synthesizer on a card. I use the term *preset* because you can't alter the waveforms and filters of a particular sound; the SCC-1 sounds are built in.

This isn't really a problem (for a desktop computer user) because the SCC-1 contains 127 instrument sounds (from a French horn to a jazz

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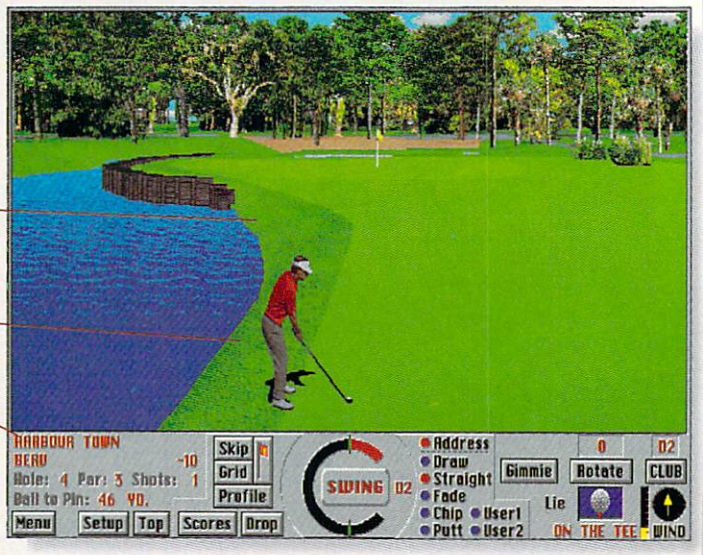

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guitar) and many of the sounds are variable, meaning that the card can create 317 instrument sounds. Beyond that, the card boasts nine complete drum sets as well as a library of special sound effects.

Roland has been in the electronic music business for a long time. The quality of the sounds of the Roland synthesizer is the best I've heard on a PC card. The demo songs that come with the card are so realistic that I found myself thinking that they must have been sampled. I could hardly believe they were just a MIDI file.

This card has limited uses, however. It's not a game card (but it does emulate the Roland LAPC-1's music with breathtaking quality, though digitized sounds and effects are absent), nor can it use programs like Windows' Sound Recorder to sample digital sounds. This is a MIDI synthesizer card, pure and simple, and while this card follows the MIDI standard, it also follows the more stringent GS sound format. The best environment for this card exists when you have a MIDI device (like a keyboard) connected for input and a sequencer program (such as Passport Design's Master Tracks Pro) loaded into your computer.

One of the advantages of the SCC-1 card is that its low computer overhead and unobtrusive presence mean it can be paired with another sound card. Put an SCC-1 into a computer with a 16-bit card like Pro AudioSpectrum 16 or Sound Blaster 16 ASP, and you have an unbeatable combination of talent.

Sound Blaster Pro

Look at nearly any game that supports sound, and you'll see that it supports the Sound Blaster card. When you're looking at a third-party card, Sound Blaster capability is a big draw. So how well does the Sound Blaster Pro card itself perform?

All things considered, it's the industry standard, and it lives up to its reputation. The Sound Blaster Pro is an 8-bit card, so the sampling isn't as crisp as that of a 16-bit card, but it's very good, and you can boost the sampling rate to 44 kHz for superior sound.

What keeps the original Sound Blaster Pro ahead of the competition is the fact that it is the original. When you install the card, you aren't forced to use a pile of memory-resident programs to emulate the Sound Blaster (some emulation programs take up so much memory that you can't run certain programs).

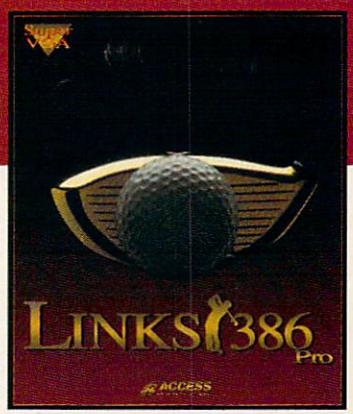
The Sound Blaster Pro card (and 100-percent compatibles) can synthesize speech, which is an important consideration with many of the newer games and multimedia programs. The Sound Blaster Pro also sports a CD-ROM interface and the software to play CD audio through the card.

The Sound Blaster Pro comes with a healthy array of bundled software, including Voyetra's Sequencer Plus Pro MIDI sequencing software (cables included). You also get text-to-voice utilities and a digital recording editor. Ironically, the Sound Blaster Pro is a little weak in its Windows support (you get drivers, a mixer, and a jukebox). You don't get a customized wave recorder, so you must use the one supplied with Windows, which doesn't give you the options you'll want to have when making recordings.

Sound Blaster 16 ASP

Creative Labs has moved beyond the Sound Blaster Pro and has recently released the 16 ASP. This stereo sound card is a 16-bit board that employs an advanced signal processor to do real-time, on-the-fly compression of digital sound data. With multimedia coming into its own, the demand for processor power is becoming more of a premium,

by the game itself.



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What Reviewers Are Saying about LINKS 386 Pro:

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"...with LINKS 386 Pro, *Access* has not so much pushed back the 'envelope' as redefined the term 'simulation.' Right from the opening screen it's clear that something special is happening here."

"...represents a new generation of computer game. Just play it and love it."

PC Entertainment:

"...for sheer, unadulterated realism, no golf simulation equals the performance of LINKS 386 Pro."

"...if you're serious about golf simulations, treat yourself to LINKS 386 Pro. And if you don't own a 386 to run it on, youi've finally got a real good reason to lay out the money for an upgrade."

Computer Gaming World:

"...if you have a fast 386 or 486, think of LINKS 386 Pro as a Ferrari or a Corvette."

"...the ground texturing is dramatically realistic."

Circle Reader Service Number 299

and Creative Labs designed the 16 ASP to be a sleeker, more nimble sound card, especially in the Windows environment.

The Sound Blaster 16 ASP installs easily, but the manual warns that there may be compatibility problems when trying to get the 16-bit addressing to work. The card features a healthy selection of Windows-specific bundled software. The most notable accessories are the Creative WaveStudio and Monologue. Creative WaveStudio is a high-powered wave editor that goes far beyond the tiny Windows Sound Recorder. Monologue is a little Windows application that can read and speak the contents of the Clipboard (and provides powerful capabilities when included within a macro).

The 16 ASP also includes HSC's InterActive, a Windows multimedia authoring program.

Like the Pro, the 16 ASP has a CD-ROM interface. The 16 ASP also has an optional Wave Blaster daughter board that uses sophisticated sampling technology to provide nearly flawless MIDI instrument sounds. The basic instrument sounds are created by digital samples that are tweaked to fit the particular MIDI tone (as opposed to a traditional synthesized instrument which is created by a blending of sound waves and filters). The 16 ASP is also GS MIDI compatible.

The 16 ASP records very cleanly and can reach resolutions up to 16 bits at 44 kHz. The ASP compression makes a noticeable difference in the amount of memory the samples gobble up (less than expected), and the sound quality is as good as it gets.

External Sound Devices

While sound cards can be great, installing a card into the computer might not be practical. The slots may be full, or you may wish to use sound with a laptop for presentations. One of the most popular and easiest-to-use external sound products is Disney's Sound Source. This inexpensive external device connects to the computer's parallel port. The Sound Source runs on one nine-volt battery and is extremely lightweight. It features an integrated amplifier and speaker with a front-mounted volume control and a headphone jack. While the Sound Source isn't a sound-recording device, it can play back wave digital files created by other cards through Windows' Sound Recorder application. The Sound Source is compatible with a wide variety of applications and comes with a substantial library of voice clips and sound effects.

AudioMan is an external, Windows-specific sound device from Logitech which allows both playback and recording of Windows' WAV files. The AudioMan contains an integrated speaker and microphone as well as a headphone jack. It also plugs into the computer's parallel port and provides a pass-through connection for the printer. The AudioMan is ruggedly constructed, making it a good choice for on-the-road use. It's powered by either AA batteries or AC current.

Digispeech has recently released its Port-Able Sound external sound device. Port-Able Sound is an external system which is compatible not only with Windows but with internal sound cards such as Sound Blaster Pro and Pro AudioSpectrum. The device plugs into the computer's parallel port and also allows printer data to pass through. The Port-Able Sound device features a built-in microphone and speaker, stereo sound, and both line-in and line-out jacks. The device can record both 8-bit and 16-bit sound. It's powered by either six AA batteries or an included AC adapter.

Media Vision has created the Audio Port, a pint-sized external device that plugs into the computer's parallel port. The Audio Port is a self-contained unit: There are no cables, and its parallel plug, speaker, and amplifier are all contained in a unit just a little bigger than a pack of cards. The unit runs on either four AAA batteries, a six-volt battery eliminator, or an included AC adapter. The card records at 8 bits through its microphone jack and comes with software to allow it to emulate Ad Lib and Sound Blaster.

MA-12 Micro Monitor

Smaller speakers might be all you ever need to generate your PC sound. But if you're a professional, an enthusiast, or someone who just likes your sound loud and rich, take a look at the MA-12 Micro Monitor from Roland. The MA-12 is a self-powered (ten-watt) four-inch speaker system with the capacity to blow you off your desk chair.

The Sound Experience

Sound cards can give your computer the gift of music as well as the gift of gab. Once you've heard what a sound-savvy computer can do, you'll never settle for a mute desk companion again. ❑

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Sound Source
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64/128 VIEW

The lone programmer of the northern plains keeps cranking out 64 software.

Tom Netsel

Readers who type in Gazette programs will undoubtedly recognize Daniel C. Lightner's name. He lives in Sidney, Montana, a town of about 5500 people in the eastern part of the state near the North Dakota border. Sidney may not be a hotbed of Commodore activity, but it doesn't dampen Lightner's enthusiasm for the 64. Here are portions of a letter he sent me that demonstrate the spirit and dedication he shares with many 64 users.

"I have a program that I sent to Accolade in March of 1991. They sent it to a developer in New York who kept it for more than a year. Accolade finally wrote me saying that they had decided to no longer support 64 software. So after much thought, my spouse and I have decided to take a stab at marketing it ourselves.

"We have tried to tabulate the cost requirements and equipment that would be involved, where to buy supplies, and things like that. We have been conferring with small business representatives and have recently established a base from which to operate. It's called MicroStorm Software.

"At present, we have one product. The program is called Risers and Sliders. I've had several friends and family members learn to play it, and they all seem to enjoy it. It's an addicting game, and I believe people will get many hours of enjoyment from it. I realize it isn't Super Mario Brothers, but I believe it has a place alongside programs such as Boulder Dash and Qbert.

"After reading your editorial (requesting new software), I've decided to send the program to you for review. That will help us decide on a course of action. We have every intention of expanding, especially in the 64 area."

People who are active in user groups benefit from sharing ideas with other 64 owners. Lightner, however, doesn't have that luxury.

"There were only three other people in this area that I knew who owned 64s. Two of them have gone to the PC and no longer turn on the fun one. The other was my computer pal, and he moved to Washington three years ago. I feel like the Lone Ranger. I was on Q-Link, but there weren't any local access numbers within 250 miles. I had to call Bismark, North Dakota, to access it. That cost me about $20 every time I called.

"I've been trying to come up with some programs that you might want to publish, but this Micro nightmare has been pigging most of my time. When I do, I'll send them in. Winter is the best time for programming. The children are in school, and it's too cold to be out of doors. It gets down to 30 below 0 around here, averaging about 10 below at night. I can't think of anything more rewarding than being published in Gazette."

Thanks for sharing your programs with our readers. We'll be looking forward to seeing more type-ins as you and Montana start to thaw. Risers and Sliders arrived and is out for review. I hope you and other 64 enthusiasts will keep us informed of your activities. ❐

GAZETTE

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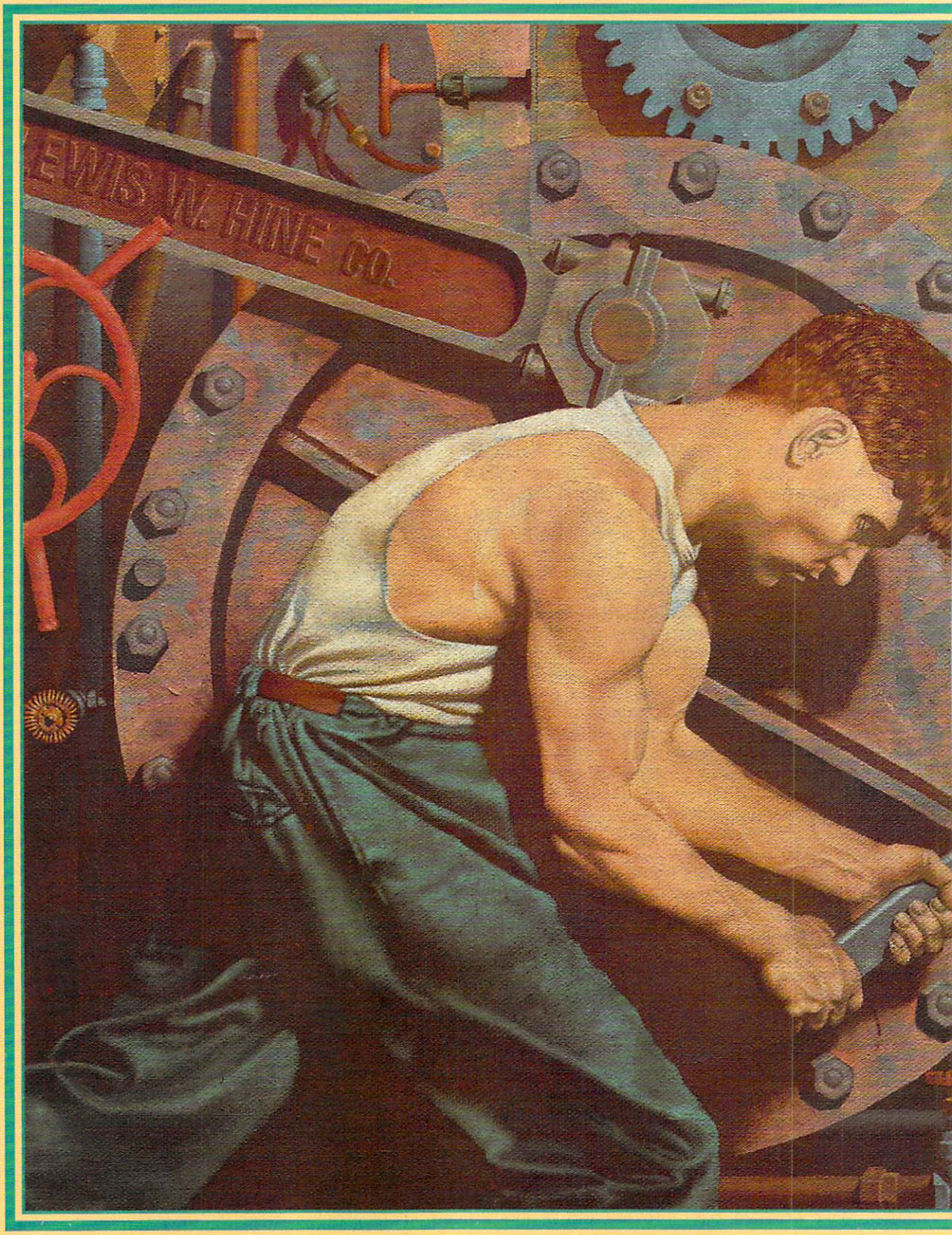
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8-BIT BEYOND MACHINES CONTINUE STATE OF TO HOLD OUT PROMISE THE ART

BY DON RADLER

A recent peek into the world of PCs made me give new thought to what our Commodores really do for us. I was called upon by a couple of friends and relatives to help them with their new PCs. I wasn't much help—I don't know any computer like I do my 64, but I try.

As I was trying, I noticed something striking. Since most computer users point and click to make their machines do things, they don't seem to learn what's behind that user-friendly graphical interface or what's inside the black box itself. And they don't care. Their computer becomes just like a television or washing machine. It's just another home appliance.

For manufacturers to sell home computers by the millions, that's exactly what they have to be: tools that are easy to use. They don't have to be understood, they don't have to be used at anywhere near their potential, and they certainly don't have to enhance their owners' intellectual grasp. From the manufacturers' point of view, they simply have to be purchased.

Mimicking the way cars are sold, PC manufacturers stress their machines' speed and power. Then they throw in an "automatic transmission" to make them easy to drive—the user-friendly interface. In the words of one computer industry analyst reacting to the latest home PC offerings, "Customers are paying for the no-brain nature of the machine."

The graphical user interface (or GUI, pronounced "goo-ey") is the feature that lets people use computers without taxing their brains. A GUI replaces the command line interface with which Commodore users give their machines instructions in words and numbers that both the computer and the operator understand. (It's not a big leap from the simple disk-operating commands of the command line interface to actual programming, which is computing's most demanding—and most reward-

ILLUSTRATION BY RENÉ MILOT

ing—activity. That's why a large percentage of Commodore users program more than PC owners do.)

The Macintosh, whose look and feel launched GUIs in the first place, was described by Joel Shurkin in *Engines of the Mind* as "a machine that requires almost no knowledge of computers. . . . The user does not have to learn operating system commands. All that is required is moving the mouse to the right picture and clicking a button, and the machine does the rest."

In December 1990, Robert Bixby, writing in the PC section of COMPUTE, said this about GUIs:"Users like graphical interfaces, find them easy to work with, and can even develop an affection for them—three statements that could never be made about the command line interface."

Then, in the July 1992 issue, William Harrel described many PC owners' feelings about programming:"The word *programming* brings to mind never-ending lines of confusing and unforgiving computer code complete with bugs and a lot of trial and error. Who needs it? Let the programmers program. Just give me software that does what it's supposed to."

Those quotes pretty well cover the attitude of most non-Commodore computer users I've talked with. It's an attitude considerably different from that of the loving owners and fans of the Commodore 64 and 128. The difference was presaged way back in January 1986 when Fred D'Ignazio wrote a column in COMPUTE!'s Gazette about software then on the drawing boards known as "smart power tools." Fred wrote: "In less than five years, computer tools' power, complexity, and richness will be completely masked from the user. The tools will edit our prose, reshape our ideas, organize our information, and manipulate our numbers, all with almost no supervision by us. Microcomputer companies will have satisfied their critics at last."

We may be satisfied, but as D'Ignazio points out,"we will have sacrificed something even greater—control. To be so easy to use, smart power tools will have to take control over the problems we want solved. The human's job will be reduced to pushing buttons."

D'Ignazio warned that computers "as easy to use as a TV" could become a threat to our thinking skills. Most people would simply accept the machines' answers, never wondering if the answers were right or wrong and never caring how they were derived.

When that article appeared, it read like science fiction. Today, as we all know, it's the state of the art.

A Mindless Approach

This mindless approach is fostered by many schools once they install computers. Look into what they call computer literacy, and you'll see that they're simply teaching how to use the computer as an appliance. Typically, most schools have kids load user-friendly programs and then instruct them to follow the prompts, pointing and clicking away. Does this help kids learn anything beyond just pushing another button?

You would assume that any kind of computer literacy is better than none at all. But the way computers are used in most schools won't attract the best and brightest into computer science. And it won't help America compete with other nations in the Information Age.

If you think this isn't already a serious problem, look at the cover story in the September 28, 1992, issue of *Business Week* about how Japan's Hitachi is threatening to become the world's premier technology company. In that article the author said that Hitachi holds the largest portfolio of Japanese patents and has topped America's list of patent earners for most of the last decade.

It seems to me that 64/128 users have been blessed with some special protection against the trend toward computer unwittingness that stems from PC owners' love affair with user-friendly design.

Walk into a store like Babbage's and look at the shelf space allotted to software for the 64 and 128. It's way down from your last visit, isn't it? Read the ads for new software and see how few titles are issued for the 64 or 128 in comparison to Amiga, Mac, and IBM. Pretty sad, as many letter writers have noted.

Or is it?

A Little Help

Obviously, the big boys are supporting the Commodore market less and less. But the little guys who started it all in the first place, the hackers and inventors who really wanted to know what made their machines tick—those guys are still there. They develop hardware like CMD's RAMDrive and software like Ron Hackley's Fun Graphics Machine. They find new things for old machines to do, many of them things that are done no better by the whiz-bang state-of-the-art platforms. And they share their knowledge, expertise, and products with the Commodore community.

In the Amiga, Mac, and PC worlds—the hotbeds of today's computer development—state-of-the-art means more power, more speed, and more storage capacity. But above all, it means more ease of use. That's where the action is. And that's where the 64/128 user is being left out.

Is that bad? Maybe not.

Most home PCs are used the way most Commodores are used: for word processing, recordkeeping, home finances, and for playing games. For these purposes, the bigger PCs simply don't need all the speed and power they have.

An Educational Process

Meanwhile, our 8-bit Commodores, with much less speed and power, successfully handle all of these activities and much more. Because we have to think about them and figure how to get the most from them, we tend to learn from them. The process of using our machines remains an educational process. This is true, at least in part, because we use words and numbers to communicate with our computers and don't just mindlessly point and click.

Cultures that have not yet learned to read and write interact without symbolic words and numbers. By relying on verbal forms of communication, people in these cultures handle abstract ideas poorly. Their language skills remain stunted; as a result, their social progress is retarded. It's arguable that pointing and clicking in place of communicating with words and numbers is, indeed, a regressive move toward such a preliterate culture.

A New Dark Age

In the Information Age, the GUI may well be the harbinger of both computer and general illiteracy. The mouse might turn out to be a mole, the leader of a lemminglike rush into a faster and more powerful Dark Age. Once again, we might find ourselves the victims of thoughtless application of the technology we invent in an attempt to make our lives better. In his *Briefer Psychology*, way back in 1890, William James wrote that "the more other facts a fact is associated with in the mind, the better possession of it our memory retains."

In contrast, simply pointing and clicking at some icon leaves the facts and the relationships between them hidden within the machine, giving little exercise to the human brain.

Alan C. Kay was the original designer of the Macintosh GUI. In a

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special issue of *Scientific American* on "Communications, Computers and Networks" (September 1991), he expressed some thoughts and concerns about ideas versus the representation of those ideas.

"In the near future, all the representations that human beings have invented will be instantly accessible anywhere in the world on intimate, notebook-size computers. But will we be able to get from the menu to the food? Or will we no longer understand the difference between the two? Worse, will we lose even the ability to read the menu and be satisfied just to recognize that it is one?"

Thanks to the early Commodore years without GUIs and other user-friendly software and thanks even more to computer magazine writers and editors, I pretty much know what goes on inside my machine. Name a memory address, and I probably know what function it controls and what values I can poke in to get the result I'm looking for. Judging from their letters in "Feedback" and by the fact that most of them have had their machines for nearly five years, so do many other Commodore users. (I don't exclude GEOS users. Most of them became familiar with their machines before GEOS came along.)

Now that the big boys have turned away from the Commodore and are devoting their time to making no-think software for the state-of-the-art platforms, I'm convinced that most 64 and 128 owners will continue out of necessity to learn more about their machines.

Get to Work

If you're an active 64 or 128 user, you may be doing many or all of the things in the following list. For those readers who aren't, however, here are some intriguing activities to pursue with a Commodore.

- Transfer your personal records to disk using SpeedFile from Gazette, or build a file of magazine articles of interest to you using a modified version of the swift and powerful Gazette Index.
- Try word processing with SpeedScript. Use one or more of Gazette's many accessory programs to modify SpeedScript to your needs.
- Take a crack at desktop publishing with a program like Newsroom from Springboard, or try sketching or cartooning with Blazing Paddles from Baudville or with Doodle from Crystal Rose. The Fun Graphics Machine from the FGM Connection is another good choice. For an even easier bit of artistic expression, see what you can do with the graphics characters right on your keyboard along the lines described in an article that I wrote in Gazette (June 1991).
- Get into music with Basically Music from Gazette, the simplest way I've ever seen to control all three voices of the powerful SID chip.
- Try some programming in BASIC, which is as easy a language as there is. Programming will hone your logic and planning skills like nothing else. If something you write in BASIC runs too slowly for you, get hold of a compiler like Blitz! from Skyles Electric Works or BASIC 64 from Abacus.
- Teach yourself another computer language such as Logo, C, or Forth, or even try machine language. Gazette provides plenty of help for the latter in every column that Jim Butterfield writes.
- Type in a RAM disk program from the several that have been featured in Gazette through the years. This software enhancement acts like a superfast disk drive, calling up programs as quickly as you can enter the command.
- If you don't yet have one, get a cartridge that speeds up loading programs, such as the Epyx FastLoad that I use. Most of these cartridges include several utilities, such as disk and file copiers. They start at quite reasonable prices.
- Buy a modem and start to telecommunicate with other Commodore users. You can do this one-on-one over a local telephone line, through a bulletin board service (BBS), or on a large online network such as QuantumLink.
- Join a Commodore user group and meet with others who share your interest in computers.

However forsaken your Commodore computer may be by its manufacturer and now by most of the big software producers, there's still plenty of life in the 8-bit world. You can see proof of that every month in COMPUTE's Gazette and at user group meetings all over the world. Continue to approach the Commodore as something you enjoy because you think about it, not because you can use it without thinking at all.

Feel bad because the state of the computing art is passing you by? You really shouldn't. In fact, maybe you should feel thankful. ❑

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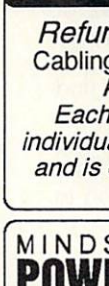

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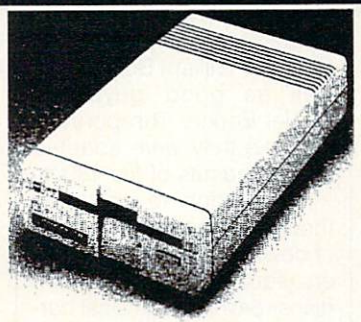

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WESTERN HERITAGE

You don't have to be a city slicker like Billy Crystal to enjoy a taste of the Old West. Now, you can experience it in the comfort of your own home with a new graphics library from Horse Feathers Graphics. Called Western Heritage, this software is a creative collection of 90 graphics, 42 borders, and 11 fonts (including one that's a secret code of Indian symbols). This program is perfect for horse lovers everywhere, but there's more to Western Heritage than its name implies.

First of all, the name is misleading. Granted, the majority of borders and graphics in this library are Wild West related—cowboys-and-Indians stuff—but it also contains borders and graphics for a variety of equestrian activities. Such items as English saddles, miniature steeplechasers, boots, hunt caps, and riding crops make up seven of the borders. The artwork includes graphics for polo, horse racing, jumping, and veterinary medicine, as well as a blue-ribbon graphic for certificates and awards. So if you're planning a barbecue, a hayride, a horse show, or even a polo match, you'll be able to find the perfect graphics for your posters, invitations, and decorations in Western Heritage.

Kids will especially enjoy using the Indian Symbol font. This unusual font converts the standard keyboard characters into 57 authentic Indian symbols. A handy reference card lists the Indian meaning of each symbol as well as the keyboard letter or number that creates it. Using the card, kids can create secret messages by either replacing letters with symbols or, for a more authentic exercise, using the Indian translations of the symbols to create messages.

Press the T key, for example, to print a thunderbird. This can be used with the symbols from other letters to form a word. However, in Indian picture writing, the thunderbird means *happy*. So kids could use the thunderbird in a message to wish a friend a happy birthday. As a mother who has raised three children, I know the Indian Symbol font has a lot of potential as a rainy day activity for young children.

According to the manufacturer, Western Heritage requires The Print Shop 2.0 or 1.0 with The Print Shop Companion or The Graphics Library Holiday Edition. I experimented using just version 1.0 of The Print Shop and found that you can still incorporate graphics from the Western Heritage disk into cards, posters, and so on. If you want to use the Western Heritage borders and fonts, however, you have to use The Print Shop Companion. You'll also need the Companion package if you want to modify any of the borders and fonts. Western Heritage works with both sides of The Print Shop disks, with 7- and 9-pin printers.

GEOS users who don't have The Print Shop can experiment with simple conversion programs and change the graphics into ones that are usable with geoPaint. This will allow you to use the graphics with GEOS without using The Print Shop at all.

The Western Heritage collection is well worth checking into because it isn't the sketchy outline graphics that you sometimes see in clip art kits. These are unique and detailed designs. The set includes portraits of several notorious outlaws (Jesse James, Butch Cassidy, William Bonney) as well as good guys like Daniel Boone. The portraits look like they were adapted from woodcuts of the 1800s.

In addition to portraits, there are generic drawings of cowboys, wranglers, miners, square dancers, and Indians. Several whimsical cartoons complete the portrait group, making this a very versatile graphics program.

Then there are typical Western graphics: wagon wheels, brands, rope, cattle, and six different types of carriages and wagons. But what good is a wagon without a horse? The program offers a choice of 24 different varieties, including such favorites as Appaloosa, Morgan, Arabian, show horse, race horse, Clydesdale, and wild bronco. There's even a picture of Santa's sleigh being pulled by a pony.

Some of the graphics are wonderfully detailed. My favorites are the Indian chief, rain dancer, bull rider, and pony heart. This last one is an intricate combination of a heart and a pony's head. These designs aren't just rehashes of other graphics; they're all original art created by Donna C. Mason.

The Western Heritage fonts remind me of Wild West wanted posters and old saloon signs. You can almost hear spurs jingling when you look at them. The kit also has fonts called sticks, twine, and rope that look like letters created from those materials. An unusual part of the kit is a rather ornate font called Very English. At first, its curlicues and curves seemed out of place in this Western package. Later, I wondered if the designers weren't poking subtle fun at the greenhorns and dandies on their English saddles who were also a part of the Old West.

Western Heritage is packaged in a handsome, shrink-wrapped three-ring notebook, with the disk safely tucked into an inside pocket. The reference manual is filled with tips and suggestions. To get you started, Horse Feathers has included several ideas for posters, letterheads, and cards. Your imagination will suggest hundreds of others. With these graphics, it'll be easy to design your own unique invitations for that Western party I mentioned earlier. You can make decorations and posters for the event, too. Print time varies, depending on the printer you own, but it took me approximately an hour to design and print a dozen invitations. If you decide on a border, graphics, and font ahead of time, you can do it even faster.

You can also make replicas of Old West wanted posters. There are step-by-step directions for this in the reference manual. More advanced users can use geoPaint or scanner programs to incorporate pictures of their friends into posters of wanted desperadoes.

All in all, I think you'll find Western Heritage offers great graphics and is easy enough for most kids to use. It makes a great addition to your graphics library.

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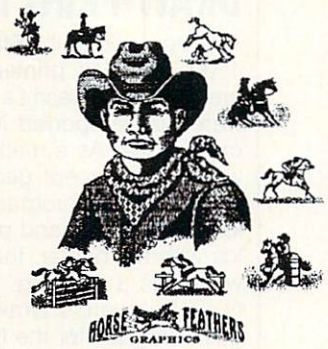

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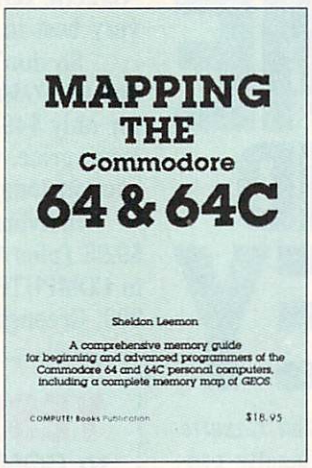

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REVIEWS

DRAW-PRINT IN COLOR

As a new owner of a Star Micronics NX-1000C Rainbow printer, I soon discovered that there wasn't a whole lot of software that supported its color printing capabilities. As a matter of fact, there wasn't any except geoPaint. So when I discovered a program that would allow me to create and print color graphics with my printer, that piece of software was a blessing. That program is G. P. Software's Draw-Print in Color paint program for the NX-1000C and a 64 or 128.

This program comes with a very comprehensive manual and two function key overlays: one for the 64 and the other for the 128. A two-step loading process is required to boot this program, which is not copy-protected. From there, you're prompted to select either text mode or bitmap mode, both of which are available.

With Draw-Print in Color, you draw and color your own graphics on a 320 × 200 bitmapped screen. The drawing pencil or crayon can be controlled from the keyboard or mouse. The program does not support joysticks. (For this review, I'll call the drawing implement a crayon.) There are several crayon aspects that you can adjust to suit your own preferences.

You control the crayon's three modes—Color, Move, and Erase—with the right mouse button or the 1 key on the keyboard. With the number keys 2–9, you can adjust the size of the crayon's tip from one to eight pixels in width for drawing, coloring, or erasing. The left mouse button changes the crayon's color. You can also use the up arrow or space bar to achieve the same function from the keyboard. I found the up arrow to be the best selector of the three, taking me through the range of colors one color at a time. The space bar and mouse button cycle so quickly through the colors that it's difficult to stop on the desired one.

When I used the large-crayon setting to color, the tip skipped and jumped erratically in the direction the crayon was moving. When I tried to color a large area of the screen, the crayon would jump into an area of the drawing that I didn't want colored. Erasing had similar results.

Drawing with the mouse was smooth and fluid, but if I moved it too quickly, the line I was drawing would skip. I found that I could use the keyboard for detailed placement of the crayon in eight directions, and I could

draw continuous lines with the curso keys in their respective directions.

With this program, you have the ability to create detailed graphics in the drawing area. Draw-Print assigns the function keys to turn a coordinate display on or off, switch between bitmap and text modes, erase the screen, and invert the position of the crayon. Inverting the crayon, however, also changes the crayon's mode of operation, which I found objectionable.

The coordinate display in the lower right corner of the screen, used to read the crayon's position on the screen, becomes important when making accurate horizontal or vertical mirror images of portions of the screen. After you flip the screen, your graphic image may lose some of its color information due to the 8- × 8-pixel limitation of hi-res bitmapped graphics. This should happen only with a full screen rotation, however.

A method for stamping or pasting images is also described in the manual. The background and border colors will not appear on the final printed document. This feature is here only to permit you to view your drawing against different color contrasts. If you select a white background, that will give you an idea of how your graphic will look when printed on paper.

You must enter text mode to save or print your finished drawing. From this mode you can also load previously created graphics. Should you have a problem with the loading or saving process, the drive's error channel is displayed in the lower left corner after each disk function. This section of the program is very straightforward and easy to use. To abort any of the functions, just press the Run/Stop key. Specific error messages generated by the program are also described in the manual.

I think you'll find that Draw-Print in Color is the only program that you'll need to start drawing graphics and printing them in color on your Rainbow printer. The only feature missing that I would like to see here is the ability to load other graphic formats. But for those of us who have color printing capabilities and want to put them to use, Draw-Print in Color is just the program we need. I think this would be a good program for Star to package with its Rainbow printers, just as Commodore did with GEOS and the 64.

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FEEDBACK

Missing text, saving partially entered programs, border graphics, and more

Bug-Swatter

After the January issue was printed, we noticed that two lines of type in John Elliott's feature, "Thanks for the Memory," were lost at the printers. Here's what you missed.

The top of page G-4 should read "Since it installs internally in the 64 and 128 and their drives."

And the article ends on page G-6 with "to the point that you can challenge the capabilities of machines costing thousands more."

Although there wasn't much text left out, the omissions certainly made for confusing reading.

The mailing address listed in the review of Invoice Writer II (December 1992) is incorrect. To order this program, send $10 to Maurice Randall, P.O. Box 606, Charlotte, Michigan 48813. We regret printing the old address.

Herbert Bradle of Bethpage, New York, had trouble with line 0979 of Sub Attack II (August 1992). MLX would not accept it. We found that a printing imperfection caused the *F* in the last value to look like an *E*. Line 0979 should read as follows.

```
0979:25 A9 1C 47 09 18 A9 80 FC
```

Save Before Quitting

When entering a program from Gazette, I often am interrupted before I can enter the entire program. When this happens, I turn off the peripherals but leave the computer on until I can resume typing. On occasion, several days elapse before I can return to the program. How can I save the portion of the program already typed in? This happens in BASIC, and with MLX, escape is impossible. Retyping the entire program from the beginning is very frustrating.

JACK CHRISTLAW
LIVONIA, MI

Many Gazette program listings are quite long, and typing them in at one sitting is often impractical if not impossible. It's not necessary, however, to leave your computer on with the program in memory until you can enter the entire listing. It's quite easy to work on incomplete programs, adding to them whenever it's convenient.

When you're typing in a BASIC program from Gazette and you have to quit before you've entered the entire listing, simply save what you've entered so far. Give it a filename and save it with the usual SAVE command. When you're ready to resume work on it, load the file—but don't try to run it—and simply resume typing where you left off. If you can't remember which was the last line you entered, list the program to find out. The last line in the listing will be where you left off.

You can repeat this process any number of times until the entire program has been entered. Just be sure to save the current version with a unique filename. You may want to add a number to each filename to identify the latest version: PROGRAM1, PROGRAM2, and so on. If you like, you can scratch earlier versions to clear them from your disk. Just be sure to save your final version before you attempt to run it. Your program could contain syntax errors and more serious problems that could cause it to crash.

When entering a machine language program with MLX, our machine language entry program, the process is handled by means of a menu. When you run MLX, a Command menu appears before you start work. It presents options to enter data, display data, load a file, save a file, and quit. When you begin typing in a program, you enter the starting and ending addresses and then the data itself. Should you decide to quit during a session, press Return at the beginning of a line, and the menu will reappear. Note the address where you stop since you'll need it when you begin work again. Select the Save option from the menu and enter a filename with which to save the data that you've entered so far.

When you're ready to resume work, load and run MLX again, using the same starting and ending addresses that are listed in the magazine. Select the Load File option from the menu and load your incomplete program. After the program loads, the menu will reappear. Select the Enter Data option, but this time use the address where you left off to resume entering data. If you want to check what you've entered so far, use the Display Data option to see it.

For more complete information about using MLX, read the instructions that are printed with its listing. MLX is printed in Gazette several times a year. You may also write to "Typing Aids" in care of our Greensboro office for a free copy of MLX and The Automatic Proofreader.

Above the Border

I have tried and tried to figure out how software programmers make graphics appear over the border. Could you explain how to do this and how to utilize it in my own programs?

MATT PAKES
PLANO, TX

Graphics that appear in the border areas are normally sprites. These are the most easily implementable objects not constrained by border dimensions. Although sprites

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Circle Reader Service Number 145

Changing the disk drive number via the hardware method, and enhancements to File Logger

can occupy positions beyond the border, they're not normally visible because the border has a higher priority than the sprites. In other words, the border is the last thing drawn.

The way to actually display sprites over the border involves fooling the VIC display chip into not knowing where the border is supposed to start. This is done with the vertical fine-scrolling function. By setting the SCROLY register at location 53265 ($D011) to 25-row mode and then switching to 24-row mode in the last line of text (by using a raster interrupt), the VIC chip never realizes that it should begin displaying the border. The top and bottom portions of the border disappear.

To learn the details of raster interrupts and how to use them for border graphics, you might try reading Commodore 64 Programmer's Reference Guide *from Commodore and* Mapping the 64 *from COMPUTE Books.*

Cutting Jumpers

I have two 1541 disk drives and want to change the address of one of them via the hardware method. I followed the instructions in the owner's manual but can't tell which wires are the jumpers in question. Please help.

M. A. BROWN
GREENSBORO, NC

The "jumpers" referred to in the instruction manual are actually two round disks of solder, each about ¼ inch in diameter. Each disk is separated into semicircles, with a thin strand of solder connecting each half.

Unplug the power cord from the wall and open the disk drive following the instructions in the user's manual. The jumpers are found near the center of the circuit board, toward the front. Jumper 1 is nearest the front.

Changing the device numbers is accomplished by taking a sharp, pointed object and scratching away the thin strand of solder connecting the two halves on one or both of the jumpers. Do this very carefully so you don't damage the circuit board or any other components.

Here's a chart showing which device numbers are produced when you cut various jumpers in your drive.

Jumper Cut	New Device Number
None	8
1	9
2	10
1 and 2	11

Changing the disk drive number via the hardware method is permanent unless you're handy with a soldering iron; so don't do so unless you have to. If you're unsure about exactly what you're doing, have your local Commodore dealer do the modifications for you.

File Logger Update

I've just finished loading and testing Roger Bachelder's File Logger program (June 1992). It's a good program, but I've come up with an enhancement. The following lines can be added.

```
425 IF ASC(K$)>191 THEN
    K=ASC(K$+CHR$(0))-192:
    GOTO 440
```

This code will allow the program to handle locked files, those that are protected from being scratched.

Also, whenever the original version comes across a file that has been scratched, it lists the file type as XXX. If you don't want scratched files to be listed at all, then add the following line to the program.

```
375 IF K$=" " THEN 520
```

DONALD KLICH
MT. PROSPECT, IL

Rename Disk

In order to keep track of my programs in an orderly fashion, I'd like to change the disk name to something more meaningful that would correspond to the disk's contents. Without formatting and naming a new disk and copying the files to it, is there a simple way to change a disk's name?

JIM MASTRANGELO
LAWRENCE, KS

Here's a short program that should do the trick. It asks for the new disk name; pads its length to the required 16 characters; opens disk and direct access channels 15 and 8; reads track 18, sector 0 into a buffer; moves the buffer pointer to the first byte of the disk name; puts the new name in the channel 8 buffer, replacing the old name; writes the buffer and name to the disk; and then closes the channels.

```
10 INPUT"NEW DISK NAME";NN$
20 IF LEN(NN$)<16 THEN NN$
   =NN$+CHR$(160):GOTO20
30 IF LEN(NN$)>16 THEN
   NN$=LEFT$(NN$,16)
40 OPEN15,8,15,"I"
50 OPEN8,8,8,"#"
60 PRINT#15, "U1:"8;0;18;0
70 PRINT#15, "B-P:"8;144
80 PRINT#8, NN$;
90 PRINT#15,"U2:"8;0;18;0
100 CLOSE8:CLOSE15
```

Note that this program doesn't affect the disk's two-character ID; it changes the name only. Keep a separate ID for each disk.

Send your questions and comments to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ❐

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BEGINNER BASIC

Larry Cotton

THROUGH A LOOP IN STEPS

Continuing with our look at FOR-NEXT loops, this month we'll examine STEP, an optional BASIC keyword used inside these loops. Whenever STEP is omitted, the counter inside a FOR-NEXT loop increases in increments or steps of 1. If we assign a number to STEP, it increases—or decreases if it's a negative number—in increments of that number. Here's an example that prints the odd numbers from 1 to 10.

STEP lets your 64 count in increments greater than or less than 1.

```
10 FOR T=1 TO 10 STEP 2
20 PRINT T
30 NEXT
```

To print the even numbers, use FOR T=2 TO 10 STEP 2. STEP can be either positive or negative. The following will count down from 10 to 1.

```
10 FOR T=10 TO 1 STEP -1
20 PRINT T
30 NEXT
```

STEP can also have a decimal value.

```
10 FOR T=1 TO 10 STEP .5
20 PRINT T
30 NEXT
```

Run this, and it will spit out a column of numbers from 1 to 10 in steps of .5: 1, 1.5, 2, 2.5, 3, and so on.

Here's a short program that makes use of a couple of machine language routines to plot a sine wave on the 64 or 128's high-resolution screen. You can see how various values of STEP influence how fast and completely the sine wave is drawn.

```
SB 10 FORT=49152TO49327:READA:
      POKET,A:NEXT
JP 20 POKE820,14:REM SCREEN CO
      LOR
MC 30 K=256:XL=828:YL=830:M=49
      152:A=90:B=40:C=20
PR 40 SYS49262:REM COLOR/CLEAR
PF 50 REM MAX X=255!
CG 60 FORX=0TO255STEP.5
DF 70 Y=INT(A+B*SIN(X/C))
XX 80 GOSUB100:NEXT
JK 90 GOTO90
PA 100 POKEXL,X:POKEYL,Y:SYSM:
       RETURN
SG 1000 DATA169,0,133,254,56,1
        69,199,237,62,3,72,41,
        248,10,38,254,10,38,25
        4,10,38
PK 1010 DATA254,72,141,64,3,16
        5,254,141,65,3,104,10,
        38,254,10,38,254,109,6
        4,3,133
QM 1020 DATA253,165,254,109,65
        ,3,133,254,173,60,3,41
        ,248,101,253,133,253,1
        73,61,3
CP 1030 DATA101,254,133,254,10
        4,41,7,101,253,133,253
        ,165,254,105,32,133,25
        4,173,60
CC 1040 DATA3,41,7,170,189,101
        ,192,141,63,3,160,0,17
        7,253,13,63,3,145,253,
        96,128
FB 1050 DATA64,32,16,8,4,2,1,8
        0,169,8,13,24,208,141,
        24,208,169,32,13,17,20
        8,141,17
PR 1060 DATA208,169,63,133,216
        ,169,0,133,215,168,145
        ,215,160,63,162,32,145
        ,215,136
HM 1070 DATA208,251,198,216,20
        2,208,246,169,4,133,23
        2,169,0,133,231,168,17
        3,52,3
GS 1080 DATA162,4,145,231,200,
        208,251,230,232,202,20
        8,246,96
```

STEP appears in line 60. Try changing its value and note the effect when you run the program again. Even if you don't understand what's happening in this program, you can see the immediate value of STEP in a FOR-NEXT loop. Incidentally, to restore a normal BASIC screen, hold the Run/Stop key and tap the Restore key.

Another valuable use for STEP is to create interesting sounds. Here's a short program that plays a truly funky sound.

```
GF 10 FORL=54272TO54295:POKEL,
      0:NEXT:POKE54296,15
FQ 20 FORD=1TO500:NEXT
KS 30 POKE54278,255
HA 40 POKE54287,4
XM 50 POKE54276,23
HH 60 FORA=1TO130STEP.3
DP 70 POKE54273,A
AK 80 NEXT
DA 90 POKE54278,0
```

Again, STEP is in line 60. The decimal parts of the values aren't actually poked to 54273 in line 70, but the STEP size slows the program just enough to enhance the sound. Changing the STEP size and other values in the program creates an infinite variety of otherworldly sounds that you may want to try.

Right now I'm going to depart from my usual column and include a few paragraphs that you might expect to read in "World View." I was in Germany late last year and picked up a copy of *64'er* (*das Magazin für* Computer Fans). The machine is definitely alive and kicking on the other side of the Atlantic. Here are some of the highlights of this German publication for 64 and 128 users.

The 64 was prominently featured in many ads at around 233 Deutsche marks (about $150). Other items offered in ads were 1541 disk drives (about $160); a mouse; the Final Cartridge; scanners; digitizers; and, of course, *viele Spiele* (many games).

Speaking of games, the "64'er Hit Parade" contained a list of the ten hottest sellers in Germany: Turrican 2 (Rainbow Arts), Zak McKracken (Lucasfilm Games), Turrican (Rainbow Arts), Pirates (MicroProse), Maniac Mansion (Lucasfilm Games), Grand Prix Circuit (Accolade), Last Ninja 3 (System 3), Oil Imperium (Reline), Creatures 2 (Thalamus), and Tetris (Mirrorsoft).

The articles are in German, but if you read that language, you could enjoy articles on copy protection schemes, a program of the month (submitted by readers), fast loaders, MIDI, 3-D high-resolution images, and readers' games that would fit in 2K.

Regular columns include "Assembler Corner," "Profi Corner" (a disk control program in ML), and "Software Corner." One column attracted my attention so that I felt compelled to translate completely. It was "BASIC Corner." ❐

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MACHINE LANGUAGE

Jim Butterfield

ENCRYPTION

Encrypt and decrypt secret messages using a keyword and your 64.

There's no security in substitution ciphers, but there are a number of simple encryption methods that cannot be broken too easily. A simple example is the Vignère method of encryption, which uses a keyword to encode each letter of the message individually.

Another simple encryption technique called a Caesar cipher adds a fixed value to each letter. If we add 3 to each letter, *A* becomes *D*, *B* becomes *E*, *C* becomes *F*, and so on. (At the top of the alphabet, letters wrap around, so that *Z* becomes *C*.) To decode, we would subtract 3. The Vignère cipher, in contrast, adds a different value to each letter; these values are taken from a keyword.

Suppose our Vignère key is the word *COMPUTE*. The first letter, *C*, is the third letter of the alphabet, so we could offset the first character of our secret message by 3. The 15th letter is *O*, and the 13th is *M*. So the second and third characters of our message would be offset by 15 and 13, respectively. In this way, a simple message such as *FEED ME* would be ciphered to read *ITRT HY*. Note that the three *E*s in the original text become three different letters in the cipher text. To decrypt the message, you would need the key, and you would subtract the offset.

Let's write a simple Vignère ciphering program using the word *COMPUTE* as our key. It will encode only unshifted alphabetic characters. The code starts at hex address 2000, decimal 8192; at that point, we reset our pointer to the start of the keyword.

```
2000  A2 00     LDX  #$00
```

Then we get the next character from our key string. At the end of our key, we'll reset X and do it again. After we get our key character, we move X to the next position.

```
2002  BD 3F 20  LDA  $203F,X
2005  F0 F9     BEQ  $2000
2007  E8        INX
```

Reduce the key character to a number in the range 0–31 and store it. A valid alpha character will be in the range 1–26. If we are encoding, we'll add this value; if decoding, we'll subtract.

```
2008  29 3F     AND  #$3F
200A  8D 01 21  STA  $2101
```

Time to input from the keyboard. Save the X register, get the input key, and restore the register. If there's no key pressed, do it all again.

```
200D  8E 00 21  STX  $2100
2010  20 E4 FF  JSR  $FFE4
2013  AE 00 21  LDX  $2100
2016  A8        TAY
2017  F0 F4     BEQ  $200D
```

If the input is not in the range *A–Z*, skip the enciphering.

```
2019  C9 41     CMP  #$41
201B  90 1A     BCC  $2037
201D  C9 5B     CMP  #$5B
201F  B0 16     BCS  $2037
```

We encipher by adding the key value. On the other hand, if we are deciphering, the next two bytes will be changed to read $38, $ED (SEC, SBC) so as to subtract the value.

```
2021  18        CLC
2022  6D 01 21  ADC  $2101
```

We'll skip over some code that adjusts the character if the math takes it above or below the *A–Z* range. The adjustment basically adds or subtracts 26, the number of letters in the alphabet.

The enciphered character is printed, and we go back to get another key value.

```
2031  20 D2 FF  JSR  $FFD2
2034  4C 02 20  JMP  $2002
```

If the input character was not in the cipher range, we print it. If it's a Return, we quit.

```
2037  20 D2 FF  JSR  $FFD2
203A  C9 0D     CMP  #$0D
203C  D0 CF     BNE  $200D
203E  60        RTS
```

Tacked onto the end is the cipher key. There's plenty of room for your own key here; it may be longer. Don't forget to put a binary 0 at the end.

```
203F 43 4F 4D 50 55 54 45 00
  :COMPUTE
```

The BASIC program is straightforward. It's set for encoding; to decode, change lines 130 and 240 to the values in the REM statements.

To encrypt a multiline message, call SYS 8192 for the first line and SYS 8194 for the remainder. That way, the key won't be reset for each line, and your code will be harder to break.

```
100 DATA 162,0,189,63,32,240,
    249,232,41,63
110 DATA 141,1,33,142,0,33,32,
    228,255,174,0,33,168
120 DATA 240,244,201,65,144,26,
    201,91,176,22
130 DATA 24,109: REM 56,237
140 DATA1,33,201,91,144,2,
    233,26,201,65,176,2,105,26
150 DATA 32,210,255,76,2,32,32,
    210,255,201,13,208,207,96
160 DATA 67,79,77,80,85,84,69,0
170 REM THE ENCRYPTION KEY
    SPELLS COMPUTE
200 FOR J=8192 TO 8262
210 READ X:T=T+X
220 POKE J,X
230 NEXT J
240 IF T<>7730 THEN STOP:
    REM 7890
300 PRINT "ENTER LINE OF
    TEXT:"
310 SYS 8192
```

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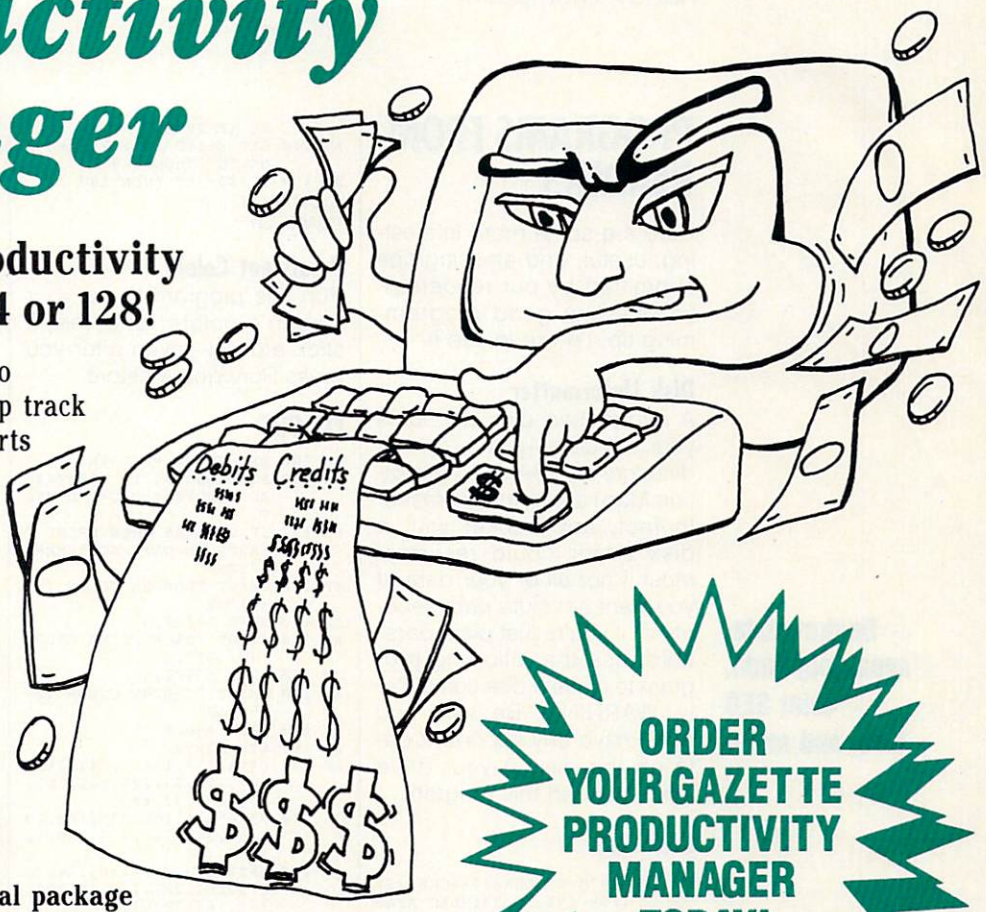

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PROGRAMMER'S PAGE

Randy Thompson

PROGRAMS FROM READERS

Here are some more interesting, useful, and amusing tips submitted by our readers. If you have a good programming tip, I'd like to see it.

Destroy data, speak pig Latin, print SEQ files, and more.

Disk Unformatter

A reformatted disk still holds your old data—just the disk's directory and BAM (Bit Allocation Map) are actually erased. In fact, any hacker with a disk editor could resurrect most if not all of your data. If you want absolute data security or if you're just plain paranoid, use the following program to erase a disk completely. WARNING: Be sure you don't have any important data on the disk in your drive when you run this program.

UNFORM

```
CS 10 A$="M-E"+CHR$(5)+CHR$(2)
      :FOR I=0 TO 33:READ A:A$
      =A$+CHR$(A):NEXT
RQ 20 OPEN 15,8,15:PRINT#15,A$
      :CLOSE 15
MD 30 DATA 162,1,32,26,2,120,1
      69,206,32,21,254,88,166,
      6,232,224,41,208,239,162
PM 40 DATA 18,134,6,169,240,13
      3,0,36,0,48,252,76,0,254
```

This program essentially destroys the disk's DOS formatting—thus the name Disk Unformatter. If you want to use the disk, you'll have to format it once again.

HONG PHAM
ANTIGONISH, NS
CANADA

Habla Ig-Pay Atin-Lay?

Here's an amusing program that translates English (or anything else you throw its way) into the ever-popular language known as pig Latin.

PIG LATIN

```
XJ 100 PRINT:INPUT "ENTER WORD
       ";A$:IF A$="" THEN END
EM 110 X=1:M$=MID$(A$,2,1):IF
       {SPACE}M$="H" OR M$="L"
       OR M$="R" THEN X=2
MQ 120 PRINT MID$(A$,1+X);"-";
       MID$(A$,1,X)+"AY"
EG 130 PRINT:PRINT "ANOTHER WO
       RD (Y OR N)?"
KG 140 GET K$:IF K$<>"Y" AND K
       $<>"N" THEN 140
DP 150 IF K$="Y" THEN 100
```

SCOTT LANG
TIGARD, OR

Persistent Colors

Run this program to set your screen's colors, and they'll stick around—even after you press Run/Stop–Restore.

COLORS

```
HM 100 REM COLOR RESTORE
AR 110 FOR I=52992 TO 53042:RE
       AD D:POKE I,D:C=C+D:NEX
       T
PH 120 IF C<>6705 THEN PRINT "
       ERROR IN DATA STATEMENT
       S":END
KP 130 INPUT "BORDER COLOR (0-
       15)";B
EB 140 POKE 53280,B
RH 150 INPUT "BACKGROUND COLOR
        (0-15)";B
JC 160 POKE 53281,B
AS 170 INPUT "CURSOR COLOR (0-
       15)";B
DS 180 POKE 646,B
AE 190 SYS 52992
XE 200 DATA 173,134,2,141,160,
       207,173,33,208,141,162,
       207,173,32,208
DS 210 DATA 141,161,207,162,29
       ,160,207,142,0,3,140,1,
       3,96,172
QF 220 DATA 160,207,140,134,2,
       172,161,207,140,32,208,
       172,162,207,140
HK 230 DATA 33,208,76,139,227,
       0
```

This program is designed to work on the 64 only.

GEZA LUCZ
KINIZSI, HUNGARY

Sequential File Printer

Greg Waggoner wrote this program to help a friend set up a BBS. It sends sequential text files to the screen or the printer. While reading or printing a file, you can pause the program by holding down the Shift key or abort the program by pressing the Back Arrow key. When the program reaches the end of a file, it stops and asks you to enter another filename. Just press Return to exit the program.

FILE PRINT

```
RR 10 PRINT "{CLR}":D=8
XM 20 PRINT:F$="":INPUT "FILEN
      AME";F$:IF F$="" THEN EN
      D
GP 30 OPEN 15,D,15:OPEN 8,D,8,
      "0:"+F$+",S,R":CLOSE 8:I
      NPUT#15,E,E$:CLOSE 15
XG 40 IF E THEN PRINT E$:GOTO
      {SPACE}20
FS 50 PRINT "{RVS}S{OFF}CREEN
      {SPACE}OR {RVS}P{OFF}RIN
      TER?"
MB 60 GET K$
MQ 70 IF K$="S" THEN 100
RA 80 IF K$="P" THEN 150
FH 90 GOTO 60
QJ 100 OPEN 8,D,8,"0:"+F$+",S,
       R"
RK 110 IF PEEK(653)=1 THEN 110
HB 120 GET K$:IF K$="←" THEN C
       LOSE 8:GOTO 20
EQ 130 GET#8,A$:IF ST=64 THEN
       {SPACE}CLOSE 8:GOTO 20
FD 140 PRINT A$;:GOTO 110
EB 150 OPEN 8,D,8,"0:"+F$+",S,
       R":OPEN 4,4,7
GQ 160 IF PEEK(653)=1 THEN 160
PQ 170 GET K$:IF K$="←" THEN C
       LOSE 8:CLOSE 4:GOTO 20
PB 180 GET#8,A$:IF ST=64 THEN
       {SPACE}CLOSE 8:CLOSE 4:
       GOTO 20
GK 190 PRINT#4,A$;:GOTO 150
```

GREGG WAGGONER
OLNEY, TX

Ascending Tones

You've probably seen (and heard) programs that produce clicks whenever you press a key, but this program is a little more melodic. When you type or enter code, you'll hear an ascending tone as the cursor moves toward the right side of the screen. Press Return, and the tone returns to where it started.

TONES

```
BP 100 FOR I=49152 TO 49228:RE
       AD D:C=C+D:POKEI,D:NEXT
GS 110 IF C<>9456 THEN PRINT"E
       RROR IN DATA STATEMENTS
       ":STOP
CP 120 SYS49152
PX 130 DATA 120,169,43,162,192
       ,141,20,3,142,21
RF 140 DATA 3,162,25,169,0,157
       ,255,211,202,208
GP 150 DATA 250,169,63,141,5,2
       12,169,240,141,6
XF 160 DATA 212,169,17,141,4,2
       12,169,15,141,24
JD 170 DATA 212,88,96,166,203,
       224,64,240,18,169
SJ 180 DATA 17,141,4,212,165,2
       11,105,14,141,1
XJ 190 DATA 212,141,0,212,76,4
       9,234,169,16,141
DD 200 DATA 4,212,76,49,234,23
       ,212
```

R. THOMPSON
EUGENE, OR

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GEOS

Steve Vander Ark

WHAT'S HOT ON QUANTUMLINK

Here are some exciting new programs for GEOS that can be found on Q-Link.

Programs being written these days by people such as Kent Smotherman and Irv Cobb are so clever and interesting that I could almost say we're seeing the golden days of GEOS shareware. The pace may have slowed, but the quality of the work is better than ever.

We've seen a lot of great GEOS programmers over the years. Many of them have moved on to other platforms, but their work survives them in the GEOS libraries on QuantumLink. Here's a brief tour of the latest Q-Link uploads.

One of the recent uploads to Q-Link has done what everyone knows can't be done: change BSW, the GEOS system font. Irv Cobb is the fellow responsible for doing the impossible with his recent file CHANGE-BSW.ARC (uploaded by Irv Cobb).

This little AUTO-EXEC file will change the system font, BSW 9 point, into one of several other 9-point fonts during boot. You heard right: The system font, the untouchable and often unreadable BSW, is no longer out of reach. This file includes four fonts you can use, including a boldface version of BSW. This program runs on the 64 or the 128, but affects only the 40-column system font. Irv is promising a version which will change the 80-column BSW as well.

Kent Smotherman has been pouring out scads of neat little GEOS programs lately. His latest wonders are a chess recordkeeper (CHESSECRETARY2, uploaded by Kent LS) and a utility (BOOTIE) that automatically fires up AUTO-EXEC files on any drive other than the one you're booting from.

Those who have gritted their teeth and struggled with the mouse editor in Preferences will appreciate another of Kent's programs. Mouser allows you to browse through photo albums, find a likely bitmap, and copy it to your pointer. A file called MICE, also uploaded by Kent, is a small album of likely images.

Gateway users in particular will appreciate Kent's directory manager program (DIRMASTER, uploaded by Kent LS). With Directory Master you can sort and rearrange GEOS disk directories to your heart's content. It runs perfectly well under Gateway, a program which has needed a way to organize directories efficiently. Directory Master includes features to make easier the mundane task of keeping everything straight and orderly.

Kent is continually adding to the libraries, so by the time you get there to look around, you might very well discover more treasures with his name on them. All Kent's programs are specifically designed for the 64, but many of them will work just fine on the 128.

There's plenty more. One which I will certainly be using is Diskmaster, uploaded by Steven E. Eyrse. (His onscreen name is ScenicFilm.) This utility changes master disks to regular GEOS disks, which means that you no longer have to move files to the border of your boot disk in order to throw them out. The current version changes the disk status only temporarily, since GEOS changes it back automatically the next time you reboot. A more permanent version has been promised.

Another program from ScenicFilm is Calcmove. The calculator desk accessory is slightly modified by this program to appear at a new, user-specified position. The whole process is as easy as a few mouse clicks, and the result can make the calculator even more useful by getting it out of the way of your work. Steve's programs are specifically written for the 64.

Take a look in the other libraries of GEOS files, and you'll find more treasures waiting for you. In the font library, for example, you'll find several new LQ fonts to be used with GEOS LQ, the incredible new printer control system found in CMD's Perfect Print collection. Try BLKLETTERS LQ uploaded by Aqua Regia or ITALIQUE LQ by JonS1.

George Wells has uploaded a complete selection of printer drivers to support the Epson-compatible 9- and 24-pin printers. These drivers do everything from printing in multiple passes to printing color documents in shades of gray. Just wander into those libraries, and you'll find his excellent files everywhere.

So, what impossible things will these talented folks think of to do next? You never know. There are still a few applications GEOS lacks. For example, it needs a terminal program to support 2400 bps and an 80-column desktop publishing package. My personal dream is to see a presentation program that will let the user create a script similar to a HyperCard stack on the Macintosh and display screens of information, complete with support for multicolor graphics, geoRAW digitized sounds, and SID music files. The basic concept is straightforward, and the Commodore is certainly capable of doing the job.

What about you? If you have any great ideas for GEOS programs, let me know. I'll keep track of them and, if I get enough good suggestions, I'll publish a wish list in an upcoming column. You can contact me through this magazine, or electronically on Q-Link (SteveV14), or GEnie (S.VANDERARK). ❐

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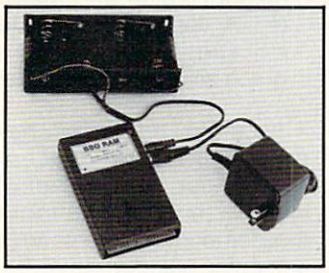

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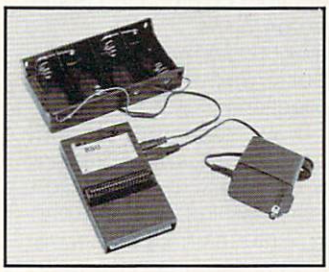

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D'IVERSIONS

Fred D'Ignazio

MULTIMEDIA MULLIGATAWNY

Combine a variety of ingredients with a healthy dash of imagination to create a multimedia stew.

When three science teachers came to my multimedia workshop recently, they brought lots of raw materials to make their own multimedia lessons. They brought pages of leaves from their leaf collections. They brought their bug collections. They also brought their Encyclopedia of Animals videodisc collection from Optical Data. As soon as they arrived at my workshop, the teachers got busy making things.

They propped their bugs on a music stand and used a video camera to scan color images of the insects into the computer. They put pages of leaves facedown in my Howtek personal color scanner and created beautiful, full-color computer images of the foliage. They used my color and gray-scale hand scanners from Logitech to capture photographs they had brought from manuals, guidebooks, and personal photo collections.

They captured sounds from audio CDs: surf breaking on the coast in Cape Cod; fierce, crashing waves in a chilling winter storm; soft sounds of water lapping on a creek bed; wind whistling through trees; leaves flapping and crunching in late fall; and bugs humming and buzzing.

The teachers brought these materials from their "teacher drawers" and "teacher closets." They were science specimens and slices of the real world that spiced up children's lessons and brought a tired, dusty curriculum to life.

In my workshop, the teachers learned how to use a computer to stir these ingredients into a rich multimedia stew filled with sounds, captions, still images, video, and background music. Next they took turns collecting video bites of their colleagues. These were tiny video and audio clips of each teacher explaining key concepts or describing the specimens. We turned these tiny clips into pop-up windows on the computer screen. We wove them into a minitutorial and a pop quiz on invertebrate animals such as the amoeba, the volvox, and the vorticella.

I think of my multimedia classroom as a kitchen for aspiring multimedia chefs. The teachers and students bring a hodgepodge of potluck curriculum materials to my kitchen, and I teach them how to cook up a delicious multimedia dish.

What kinds of ingredients do my multimedia recipes call for? Almost anything will do! Teachers come to my workshops hauling boxes of stuff, including old photos, leaves, bugs, fish, textbooks, crafts, sculptures, paintings, children's pictures, art, souvenirs, fossils, rocks, tree branches, CDs, tapes, videos, musical instruments, library books, buttons, stamps, playing cards, trading cards, and so on.

In my multimedia workshop, I show my apprentice chefs how these ingredients from the real world add sound, color, and moving images to their lessons. I encourage them to take this same cookbook approach back to their classrooms to make their lessons more meaningful and exciting for their students.

In the multimedia kitchen, I stress that the two most important ingredients are your body and your imagination! Recently, I worked with a group of math teachers. What does math have to do with multimedia? A lot, really, when you remember that most children—and most adults—are mathphobic because they can't visualize math concepts and can't apply math rules and symbols to everyday problems.

I challenged my math chefs to cook up some mathematical concepts using only their bodies and the tables and chairs in our classroom. Over the next hour of the workshop I was amazed at all of the ingenious—and hilarious—concoctions that the chefs dreamed up. Here are a few of their scenarios.

- A human fraction consisting of three math teachers kneeling on top of a table and four kneeling underneath a table.
- A moving equation of "sets"consisting of teachers rushing in and out of groups based on their ages, heights, gender, grades taught, and big numbers they wore on their name badges.
- A human graph made up of three teachers of ascending height holding up a fourth (much thinner) teacher demonstrating a line on a graph with a positive slope.

Each time a team of chefs presented a math concept, we captured the concept on video as a still image inside the computer. We entered a computer paint program and added captions and arrows to the image. Then, we digitized a math teacher's voice, and challenged students to identify the concept correctly.

If you were called into the kitchen, what kind of multimedia potluck could you bring together? What kind of multimedia dish would it be fun for you to cook up? What special sights, words, and sounds can you combine that will bring a subject you love to life? You might have the potential to become a gourmet multimedia cook or at least a short-order chef at a multimedia fast-food restaurant. ❐

DROP-DOWN MACROS

By Richard Penn

There are many utilities for programming the function keys on the 64—many even double the available number with key combinations to 16. The trouble is, the more function key combinations you have, the harder it is to remember what they all do. With 16 key combinations to remember, it isn't exactly obvious what Shift-Ctrl-f5 does.

With Drop-Down Macros you'll never forget which function key combination to press. This utility for the 64 lets you select any of 16 macros from a pull-down menu. Simply highlight your choice with the cursor keys and hit Return to execute the macro. That command then executes as if it were typed on the keyboard. For faster operation, all 16 macros have function key shortcuts too.

You can say good-bye to cumbersome key commands and CHR$ codes that other programs require for defining function keys. With Drop-Down Macros, programming macros was never easier. You can even incorporate or pick up commands from the screen.

Getting Started

Drop-Down Macros is written entirely in machine language; enter it with MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts you, respond with the following values.

Starting address: C000
Ending address: CEFF

After you've finished typing in the program, be sure to save a copy to disk with the name Drop-Down Macros.

Activation

To activate Drop-Down Macros, load the program with the ,8,1 extension, type *NEW*, and then type *SYS 49152*. Along with a message informing you that Drop-Down Macros has been installed, you'll see several commands to get you started.

Three Ways

Drop-Down Macros is flexible and friendly. It lets you access macros in three ways. You'll probably use the menu most of the time. Press Ctrl-Shift at any time, and the names of all 16 macros appear in a window. You can cursor to any macro and press Return to activate it. If you call the menu and then change your mind, press Run/Stop to cancel it.

Next to each command is its function key shortcut. Once you've become familiar with a macro, you can bypass the menu and activate the macro by pressing the appropriate keys. You can press f6, for example, to list a disk's directory.

Keys f1–f8 are printed in one color on the menu since they're the standard function keys. Keys f9–f12 are another color to remind you that they're accessed by holding down the Commodore key in conjunction with one of the four function keys. Similarly, the last four function keys are accessed with the Ctrl key. To prevent key conflicts, the function keys are disabled while a program is running, but the menu still works.

Picking up Macros

Unlike some utilities, Drop-Down Macros makes it very easy to program new macros. Simply press Ctrl-Return, and you'll be prompted for the key to define. Highlight the macro that you want to program from the menu and hit Return or, alternately, press its function key. (As before, press Run/Stop to cancel the menu.)

Next, you'll be asked to type in a name for the macro. This is the five-character name that will appear on the menu; any characters beyond five are truncated. When you've named the macro, you'll be prompted for the command itself. This line of code can be up to 80 characters (two screen lines) in length. Enter commands in the order that they're to be executed and use the back arrow (È) to indicate a Return keypress. Whenever Drop-Down Macros executes a macro in direct mode, it will print a "live" Return for each back arrow.

You can also "pick up" commands already printed on the screen. When prompted to enter a macro, use the cursor keys to move the cursor to the line that you want to pick up and press Return. Drop-Down Macros picks up logical lines, so the cursor can be anywhere on the line when you press Return. Also, remember to add a back arrow to the end of a line if you want the macro to execute automatically.

For example, if you're writing a tricky macro, first test it in direct mode. When it's working correctly, press Ctrl-Return and enter a name. Cursor up to the macro, add a back arrow to the end of it, and hit Return to pick it up.

If you need to list a group of lines often, put the LIST command in a macro that's selected with a single keypress, such as f1, f3, f5, or f7. From then on, pressing that one function key will put you in business.

When defining macros, note that the input routine lets you use all keys (it uses the 64's built-in BASIC editor). This can pose problems. Moving the cursor past the bottom line, for example, will make the screen scroll, and pressing Shift-Clr/Home will clear the screen. These potential problems are trade-offs for the line-pickup feature.

Saving Macros

If you've defined several macros and want to save them, press Ctrl-D (think D for disk) and enter a filename at the prompt. To cancel the saving process, press Run/Stop-Restore. This will save a new copy of Drop-Down Macros with your special macros included. To reload them, load this file in place of the original program.

Built-in Power

Drop-Down Macros comes with 16 default macros. As you'll see, many of these are rather powerful. It's not practical to type all of these manually, but when they're only a menu away, they're very handy to have. Here's a list of the default macros.

RUN runs the program currently in memory.

ASCII prints a chart of ASCII codes. Press Ctrl to slow the listing or Run/Stop to halt it at the desired spot.

LIST lists the BASIC program that is in memory.

SCREN prints a chart of screen codes. As with the ASCII chart, press Ctrl to slow the listing or Run/Stop to stop it.

HARD sends the program listing to the printer without printing the READY prompt at the end of the listing. Make sure your printer is turned on before

you select this macro.

DIR loads the disk directory into memory.

BLANK blanks the screen to prevent monitor burn-in when you must leave your monitor turned on but inactive for a while. Press any key to bring back the display.

ERROR displays the disk error when the drive light is blinking.

NEW executes a NEW command to erase the program in memory.

UNNEW recovers a program should you accidentally erase it with the NEW command. Like all similar utilities, it's important to know that making a syntax error or entering a variable before using UNNEW will render your program unrecoverable, so be careful.

UNDEL loads a scratched disk program into memory if no other disk operations have been performed following the scratch. Remember that the file is only loaded into the computer. It's still scratched on disk, so be sure to resave it immediately.

BYTES returns the length of the program in memory.

INIT initializes the disk in the drive.

VALID validates the disk in the drive.

RESET resets the disk drive as if you turned it off and on again. This process takes a few seconds.

VERFY verifies the most recently saved program.

These macros are defaults in the original program. You can overwrite any or all of these defaults with your own macros at any time.

DROP-DOWN MACROS

```
C000:A9 37 85 01 A9 00 8D 0E 5B
C008:DC 85 5F A9 A0 85 60 A9 65
C010:FF 85 5A 85 5B 85 58 85 BD
C018:59 20 BF A3 AD FF FF 8D 7B
C020:FF FF A9 01 8D 0E DC A9 EE
C028:95 8D 04 DC A9 42 8D 05 9C
C030:DC A9 00 8D B5 E5 8D BD 81
C038:E5 8D 3D EB A9 01 8D BA 9D
C040:E5 A9 CF 8D B6 E5 8D BB 16
C048:E5 8D BE E5 8D 3E EB A9 3D
C050:FF 8D 89 02 A9 EA 8D 54 EE
C058:E9 8D 55 E9 78 A9 8F 8D 92
C060:14 03 A9 C0 8D 15 03 A9 5E
C068:35 85 01 A9 ED 8D 02 03 4D
C070:A9 C6 8D 03 03 A2 E9 A0 71
C078:94 86 33 84 34 86 37 84 43
C080:38 A2 00 BD E9 C8 20 D2 28
C088:FF E8 C9 00 D0 F5 60 AD 4A
C090:8D 02 CD 96 C9 F0 1B 8D 52
C098:96 C9 C9 00 F0 14 C9 05 81
C0A0:D0 10 A9 7F 8D 0D DC 20 36
C0A8:CF C1 A9 81 8D 0D DC 4C 76
C0B0:31 EA A5 C5 CD 92 C9 F0 D3
C0B8:F6 8D 92 C9 C9 40 F0 EF 29
C0C0:AD 8D 02 C9 04 D0 69 A5 35
C0C8:C5 C9 01 D0 05 A9 35 4C 52
C0D0:D8 C0 C9 12 D0 5A A9 37 C3
C0D8:8D 06 CF A9 35 8D 07 CF F4
C0E0:A9 32 8D 08 CF A9 8D 8D C3
C0E8:01 CF A9 53 8D 02 CF A9 07
C0F0:D9 8D 03 CF A9 35 8D 04 61
C0F8:CF A9 30 8D 05 CF A9 3A A0
C100:8D 09 CF A9 52 8D 0A CF CD
C108:A9 45 8D 0B CF A9 4D 8D 61
C110:0C CF A9 0D 8D 0D CF A9 7D
C118:0E 85 C6 AD 86 02 8D 8F 9E
C120:C9 AD 21 D0 29 0F AA BD BD
C128:DA E8 8D 00 CF 4C 31 EA 02
C130:A5 3A C9 FF D0 0D A5 C5 1A
C138:C9 03 90 07 C9 07 B0 03 B2
C140:20 46 C1 4C 31 EA AE 8D 82
C148:02 E0 01 F0 0D E0 02 F0 15
C150:0E E0 04 F0 0F A2 00 4C F1
C158:66 C1 A2 04 4C 66 C1 A2 36
C160:08 4C 66 C1 A2 0C 8E 9A E0
C168:C9 C9 03 D0 02 A9 07 38 AD
C170:E9 04 18 6D 9A C9 8D 9A 75
C178:C9 A9 00 8D 94 C9 8D 95 A0
C180:C9 A9 AD 85 FB A9 C9 85 01
C188:FC A2 50 18 AD 94 C9 6D 7F
C190:9A C9 8D 94 C9 AD 95 C9 C8
C198:69 00 8D 95 C9 CA D0 EB E2
C1A0:18 A5 FB 6D 94 C9 85 FB C2
C1A8:8D 98 C9 A5 FC 6D 95 C9 3F
C1B0:85 FC 8D 99 C9 A6 C6 E0 D8
C1B8:B1 B0 13 A0 00 B1 FB 9D 0A
C1C0:00 CF E8 C8 C0 50 B0 04 8E
C1C8:C9 00 D0 F1 86 C6 60 A9 24
C1D0:C1 8D 18 03 A2 02 B5 00 54
C1D8:9D E9 94 E8 E0 C6 D0 F6 81
C1E0:A2 C7 B5 00 9D E9 94 E8 05
C1E8:D0 F8 A9 00 85 FB A9 02 B9
C1F0:85 FC A9 E9 85 FD A9 95 57
C1F8:85 FE A0 00 B1 FB 91 FD B1
C200:E6 FD D0 02 E6 FE E6 FB AF
C208:D0 02 E6 FC A5 FB C9 00 D3
C210:D0 EA A5 FC C9 08 D0 E4 32
C218:A9 00 85 FB A9 D8 85 FC 9B
C220:A9 E9 85 FD A9 9B 85 FE 4B
C228:A0 00 B1 FB 91 FD E6 FD 44
C230:D0 02 E6 FE E6 FB D0 02 36
C238:E6 FC A5 FB C9 E8 D0 EA 63
C240:A5 FC C9 DB D0 E4 A2 00 2E
C248:BD 00 D0 9D D1 9F E8 E0 60
C250:2F D0 F5 20 51 C5 20 07 4B
C258:C3 AD 11 D0 10 FB A9 00 1E
C260:8D 1B D0 A2 02 BD E9 94 27
C268:95 00 E8 E0 C6 D0 F6 A2 ED
C270:C7 BD E9 94 95 00 E8 D0 1F
C278:F8 A9 00 85 FB A9 02 85 4D
C280:FC A9 E9 85 FD A9 95 85 CB
C288:FE A0 00 B1 FD 91 FB E6 E5
C290:FD D0 02 E6 FE E6 FB D0 54
C298:02 E6 FC A5 FB C9 F8 D0 9C
C2A0:EA A5 FC C9 07 D0 E4 A9 30
C2A8:00 85 FB A9 D8 85 FC A9 2A
C2B0:E9 85 FD A9 9B 85 FE A0 78
C2B8:00 B1 FD 91 FB E6 FD D0 CB
C2C0:02 E6 FE E6 FB D0 02 E6 5D
C2C8:FC A5 FB C9 E8 D0 EA A5 58
C2D0:FC C9 DB D0 E4 AD 11 D0 A0
C2D8:10 FB A9 00 8D 15 D0 20 1D
C2E0:51 C5 A2 00 BD E1 9B 9D 1F
C2E8:F8 07 E8 E0 08 D0 F5 AD F4
C2F0:11 D0 10 FB A2 00 BD D1 57
C2F8:9F 9D 00 D0 E8 E0 2F D0 BC
C300:F5 A9 47 8D 18 03 60 A9 E5
C308:FF 8D F8 07 A9 FE 8D F9 E0
C310:07 A9 FD 8D FA 07 8D FC 2A
C318:07 A9 FC 8D FB 07 8D FD 1B
C320:07 A9 FB 8D FE 07 A9 FA 50
C328:8D FF 07 A9 09 A2 08 9D 72
C330:26 D0 CA D0 FA A9 0F 8D 8F
C338:25 D0 A9 0C 8D 26 D0 A9 CC
C340:FF 8D 1C D0 8D 1D D0 8D CB
C348:17 D0 A9 AA 8D 10 D0 A9 67
C350:F4 8D 00 D0 8D 04 D0 8D 6E
C358:08 D0 8D 0C D0 A9 24 8D 8D
C360:02 D0 8D 06 D0 8D 0A D0 D0
C368:8D 0E D0 A9 32 8D 01 D0 89
C370:8D 03 D0 A9 5C 8D 05 D0 28
C378:8D 07 D0 A9 86 8D 09 D0 8A
C380:8D 0B D0 A9 99 8D 0D D0 34
C388:8D 0F D0 A9 00 8D 1B D0 8C
C390:A2 1A B5 D8 09 80 95 D8 82
C398:CA D0 F7 AD 11 D0 10 FB 7B
C3A0:A9 FF 8D 15 D0 A9 1B 85 E8
C3A8:FB A9 04 85 FC A0 13 98 9A
C3B0:48 A0 00 A9 20 A2 0D 91 56
C3B8:FB C8 CA D0 FA 18 A5 FB 56
C3C0:69 28 85 FB A5 FC 69 00 6B
C3C8:85 FC 68 A8 88 D0 E0 A9 DC
C3D0:00 85 C7 85 D4 85 D8 A9 23
C3D8:01 85 CC A9 13 20 D2 FF 35
C3E0:A9 11 20 D2 FF A9 00 8D E6
C3E8:8E C9 A2 01 8A 48 20 D3 18
C3F0:C4 68 AA E8 E0 11 90 F4 3A
C3F8:AD 11 D0 10 FB A9 FF 8D CA
C400:1B D0 A9 37 85 01 A5 C6 36
C408:8D 97 C9 A9 00 85 C6 8D 43
C410:9B C9 A2 01 18 A0 00 20 A1
C418:F0 FF A9 12 8D 8E C9 8A 35
C420:48 20 D3 C4 68 AA 8A 48 E7
C428:A0 06 A2 FF CA D0 FD 88 F5
C430:D0 F8 20 9F FF A5 C5 C9 4A
C438:3F F0 60 C9 03 90 09 C9 7C
C440:07 B0 05 68 AA 4C A5 C4 37
C448:20 E4 FF A8 68 AA C0 0D 22
C450:F0 62 C0 11 F0 07 C0 91 CA
C458:F0 1E 4C 26 C4 A9 00 8D 28
C460:8E C9 A9 91 20 D2 FF 8A C8
C468:48 20 D3 C4 68 AA E8 E0 85
C470:11 90 A7 A2 01 4C 14 C4 EB
C478:A9 00 8D 8E C9 A9 91 20 A9
C480:D2 FF 8A 48 20 D3 C4 68 8B
C488:AA CA A9 91 20 D2 FF 20 D4
C490:D2 FF E0 01 B0 84 A2 10 9C
C498:4C 14 C4 68 A9 01 8D 9B 74
C4A0:C9 20 C9 C4 60 20 C9 C4 78
C4A8:A5 C5 8D 92 C9 8D AE 95 C8
C4B0:20 46 C1 60 20 C9 C4 A5 71
C4B8:C5 8D AE 95 CA 8A E0 08 02
C4C0:B0 03 BD 7E C9 20 76 C1 80
C4C8:60 A9 35 85 01 AD 97 C9 A3
C4D0:85 C6 60 8E 9A C9 AD 8E A9
C4D8:C9 C9 12 D0 05 A9 00 4C 24
C4E0:F9 C4 8E 9A C9 E0 09 90 88
C4E8:09 E0 0D 90 0A A9 07 4C 2B
C4F0:F9 C4 A9 0E 4C F9 C4 A9 3C
C4F8:0F 8D 86 02 A9 1C 85 D3 FA
```

```
C500:AD 8E C9 85 C7 A9 20 20 DC
C508:D2 FF CE 9A C9 A9 00 A0 16
C510:05 18 6D 9A C9 88 D0 FA 88
C518:A8 A2 05 B9 AF CE 20 D2 A0
C520:FF C8 CA D0 F6 AE 9A C9 B5
C528:E8 E0 0A 90 05 A0 01 4C A3
C530:34 C5 A0 02 A9 20 20 D2 5C
C538:FF 88 D0 FA A9 46 20 D2 29
C540:FF A9 00 20 CD BD A9 20 11
C548:20 D2 FF A9 0D 20 D2 FF C1
C550:60 A2 00 BD 0B C7 48 BD 56
C558:80 3E 9D 0B C7 68 9D 80 B3
C560:3E E8 D0 EF BD 0B C8 48 52
C568:BD 80 3F 9D 0B C8 68 9D 9E
C570:80 3F E8 E0 81 90 ED 60 C1
C578:A9 7F 8D 0D DC A9 31 8D B8
C580:14 03 A9 EA 8D 15 03 AD 2F
C588:8F C9 8D 86 02 A2 00 BD C0
C590:8C C8 20 D2 FF E8 C9 00 FC
C598:D0 F5 20 CF C1 A9 81 8D 50
C5A0:0D DC A9 00 85 C6 AD 9B 5D
C5A8:C9 F0 03 4C 2E C6 AE 9A FE
C5B0:C9 E0 08 B0 06 BD 86 C9 63
C5B8:8D 9A C9 A9 00 A0 05 18 2A
C5C0:6D 9A C9 88 D0 FA A8 8C BB
C5C8:9C C9 A9 20 A2 05 99 AE 57
C5D0:CE C8 CA D0 F9 A2 00 BD 74
C5D8:A7 C8 20 D2 FF E8 C9 00 D2
C5E0:D0 F5 AC 9C C9 A2 00 20 AA
C5E8:CF FF C9 0D F0 10 99 AE 10
C5F0:CE C8 E8 E0 05 90 F0 20 AD
C5F8:CF FF C9 0D D0 F9 A2 00 2A
C600:BD BB C8 20 D2 FF E8 C9 A8
C608:00 D0 F5 AD 98 C9 85 FB 56
C610:AD 99 C9 85 FC A0 00 20 F6
C618:CF FF C9 0D F0 0C C9 5F 42
C620:D0 02 A9 0D 91 FB C8 4C F6
C628:17 C6 A9 00 91 FB 78 A9 3F
C630:8F 8D 14 03 A9 C0 8D 15 1C
C638:03 58 A9 0D 20 D2 FF 60 10
C640:78 A9 31 8D 14 03 A9 EA 5E
C648:8D 15 03 58 AD 8F C9 8D 94
C650:86 02 A2 00 BD CB C8 20 C4
C658:D2 FF E8 C9 00 D0 F5 A9 E1
C660:00 85 C6 A0 00 8C 90 C9 4F
C668:A9 A4 20 D2 FF C6 D3 20 08
C670:E4 FF F0 FB AC 90 C9 C9 53
C678:0D D0 07 C0 00 F0 F0 4C 9F
C680:BC C6 C9 14 D0 19 AC 90 6D
C688:C9 F0 E4 C6 D3 A9 20 20 E5
C690:D2 FF 20 D2 FF C6 D3 C6 42
C698:D3 CE 90 C9 4C 68 C6 C0 C4
C6A0:10 F0 CC C9 20 F0 08 C9 47
C6A8:21 90 C4 C9 60 B0 C0 AC 14
C6B0:90 C9 99 9D C9 20 D2 FF 7A
C6B8:C8 4C 65 C6 A9 20 20 D2 B7
C6C0:FF A9 0D 20 D2 FF A9 01 47
C6C8:A2 08 A0 FF 20 BA FF AD 57
C6D0:90 C9 A2 9D A0 C9 20 BD 71
C6D8:FF A9 00 85 FB A9 C0 85 B6
C6E0:FC A9 FB A2 FF A0 CE 20 41
C6E8:D8 FF 4C 2E C6 48 78 A9 41
C6F0:8F 8D 14 03 A9 C0 8D 15 DC
C6F8:03 A9 FF 8D 89 02 A9 35 28
C700:85 01 A9 FF 85 3A 58 68 F5
C708:4C 83 A4 AA AA AB AA AA E1
C710:AB AA AA AB AA AA AB AA 32
C718:AA AB AA AA AB AA AA AB F0
C720:AA AA AB AA AA AB AA AA D3
C728:AB AA AA AB AA AA AB AA 4A
C730:AA AB AA AA AB AA AA AB 09
C738:AA AA AB AA AA AB AA AA EB
C740:AB AA AA AB AA AA AB FF B7
C748:FF FF A0 6A AA AA 6A AA 12
C750:AA 6A AA AA 6A AA AA 6A 8D
C758:AA AA 6A AA AA 6A AA AA DE
C760:6A AA AA 6A AA AA 6A AA 4B
C768:AA 6A AA AA 6A AA AA 6A A5
C770:AA AA 6A AA AA 6A AA AA F6
C778:6A AA AA 6A AA AA 6A AA 63
C780:AA 6A AA AA 6A AA AA 7F D2
C788:FF FF A0 AA AA AB AA AA DA
C790:AB AA AA AB AA AA AB AA B2
C798:AA AB AA AA AB AA AA AB 71
C7A0:AA AA AB AA AA AB AA AA 54
C7A8:AB AA AA AB AA AA AB AA CA
C7B0:AA AB AA AA AB AA AA AB 89
C7B8:AA AA AB AA AA AB AA AA 6C
C7C0:AB AA AA AB AA AA AB AA E2
C7C8:AA AB A0 6A AA AA 6A AA D2
C7D0:AA 6A AA AA 6A AA AA 6A 0E
C7D8:AA AA 6A AA AA 6A AA AA 5F
C7E0:6A AA AA 6A AA AA 6A AA CB
C7E8:AA 6A AA AA 6A AA AA 6A 26
C7F0:AA AA 6A AA AA 6A AA AA 77
C7F8:6A AA AA 6A AA AA 6A AA E3
C800:AA 6A AA AA 6A AA AA 6A 3F
C808:AA AA A0 55 55 55 AA AA 03
C810:AB AA AA AB AA AA AB AA 34
C818:AA AB AA AA AB AA AA AB F2
C820:AA AA AB AA AA AB AA AA D5
C828:AB AA AA AB AA AA AB AA 4C
C830:AA AB AA AA AB AA AA AB 0B
C838:AA AA AB AA AA AB AA AA ED
C840:AB AA AA AB AA AA AB AA 64
C848:AA AB A0 55 55 55 6A AA 03
C850:AA 6A AA AA 6A AA AA 6A 8F
C858:AA AA 6A AA AA 6A AA AA E0
C860:6A AA AA 6A AA AA 6A AA 4D
C868:AA 6A AA AA 6A AA AA 6A A7
C870:AA AA 6A AA AA 6A AA AA F8
C878:6A AA AA 6A AA AA 6A AA 65
C880:AA 6A AA AA 6A AA AA 6A BF
C888:AA AA A0 00 91 53 45 4C DE
C890:45 43 54 20 54 48 45 20 90
C898:4B 45 59 20 54 4F 20 44 B2
C8A0:45 46 49 4E 45 0D 00 0D DF
C8A8:45 4E 54 45 52 20 4D 41 3E
C8B0:43 52 4F 20 4E 41 4D 45 BB
C8B8:3A 0D 00 0D 0D 45 4E 54 E9
C8C0:45 52 20 4D 41 43 52 4F 6D
C8C8:3A 0D 00 91 53 41 56 45 65
C8D0:20 4D 41 43 52 4F 0D 0D 19
C8D8:45 4E 54 45 52 20 46 49 68
C8E0:4C 45 4E 41 4D 45 3A 0D C8
C8E8:00 0D 20 20 20 20 20 20 A5
C8F0:20 44 52 4F 50 2D 44 4F F1
C8F8:57 4E 20 4D 41 43 52 4F AD
C900:53 20 49 4E 53 54 41 4C 0E
C908:4C 45 44 0D 0D 20 20 20 B5
C910:43 54 52 4C 2D 53 48 49 F9
C918:46 54 20 20 20 20 20 20 CB
C920:20 20 20 20 20 20 20 4D E0
C928:41 43 52 4F 20 4D 45 4E 7B
C930:55 0D 20 20 20 43 54 52 C0
C938:4C 2D 52 45 54 55 52 4E C6
C940:20 20 20 20 20 20 20 20 D3
C948:20 20 20 20 44 45 46 49 07
C950:4E 45 20 4B 45 59 0D 20 DE
C958:20 20 43 54 52 4C 2D 44 14
C960:20 28 44 20 46 4F 52 20 CC
C968:44 49 53 4B 29 20 20 20 B9
C970:20 53 41 56 45 20 4D 41 FC
C978:43 52 4F 53 0D 00 00 04 CD
C980:01 05 02 06 03 07 00 02 AC
C988:04 06 01 03 05 07 12 0E 66
C990:10 00 12 FF E0 01 04 00 81
C998:8D CB 06 00 19 44 52 4F 74
C9A0:50 2D 44 4F 57 4E 20 4D A6
C9A8:41 43 52 4F 53 52 55 4E C9
C9B0:0D 00 FF FF 00 00 FF FF CA
C9B8:00 00 FF FF 00 00 FF FF 4C
C9C0:00 00 FF FF 00 00 FF FF 54
C9C8:00 00 FF FF 00 00 FF FF 5C
C9D0:00 00 FF FF 00 00 FF FF 64
C9D8:00 00 FF FF 00 00 FF FF 6C
C9E0:00 00 FF FF 00 00 FF FF 74
C9E8:00 00 FF FF 00 00 FF FF 7C
C9F0:00 00 FF FF 00 00 FF FF 84
C9F8:00 00 FF FF 00 4C 49 53 A3
CA00:54 0D 00 00 FF FF 00 00 03
CA08:FF FF 00 00 FF FF 00 00 9D
CA10:FF FF 00 00 FF FF 00 00 A5
CA18:FF FF 00 00 FF FF 00 00 AD
CA20:FF FF 00 00 FF FF 00 00 B5
CA28:FF FF 00 00 FF FF 00 00 BD
CA30:FF FF 00 00 FF FF 00 00 C5
CA38:FF FF 00 00 FF FF 00 00 CD
CA40:FF FF 00 00 FF FF 00 00 D5
CA48:FF FF 00 00 FF 50 CF 37 F5
CA50:36 38 2C 31 37 34 3A 50 F6
CA58:CF 37 36 39 2C 31 36 37 C7
CA60:3A 4F D0 31 2C 34 3A 43 FD
CA68:CD 31 3A 4C C9 3A 50 D2 E7
CA70:31 3A 43 4C CF 31 3A 50 62
CA78:CF 37 36 38 2C 31 33 39 D3
CA80:3A 50 CF 37 36 39 2C 32 D5
CA88:32 37 0D 00 FF FF 00 00 A6
CA90:FF FF 00 00 FF FF 00 00 26
CA98:FF FF 00 00 FF 58 3D 50 5A
CAA0:C5 28 35 33 32 38 30 29 F8
CAA8:3A 50 CF 35 33 32 38 30 BF
CAB0:2C 30 3A 50 CF 35 33 32 A0
CAB8:36 35 2C 31 31 3A 50 CF 32
CAC0:31 39 38 2C 30 3A 57 C1 E1
CAC8:31 39 38 2C 31 3A 50 CF F1
CAD0:31 39 38 2C 30 3A 50 CF F1
CAD8:35 33 32 38 30 2C 58 3A BC
CAE0:50 CF 35 33 32 36 35 2C 6D
CAE8:32 37 0D 00 FF 3F 43 48 D2
CAF0:52 24 28 31 34 37 29 3B DC
CAF8:3A 46 4F 52 54 3D 30 54 98
CB00:4F 32 35 35 3A 50 CF 32 AA
CB08:31 32 2C 31 3A 3F 43 48 FA
CB10:52 24 28 54 29 3B 3A 50 1F
CB18:CF 32 31 32 2C 30 3A 50 54
CB20:CF 32 31 31 2C 34 3A 3F 4B
CB28:54 3A 4E C5 0D 00 FF FF 07
CB30:00 00 FF FF 00 00 FF FF C7
CB38:00 00 FF FF 00 3F 43 48 9B
CB40:52 24 28 31 34 37 29 3B 2E
CB48:3A 46 CF 54 3D 30 54 4F 70
CB50:31 32 37 3A 58 3D 50 C5 B5
CB58:28 32 30 39 29 2B 32 35 B9
CB60:36 2A 50 C5 28 32 31 30 A0
CB68:29 3A 50 CF 58 2C 54 3A 80
CB70:50 CF 58 2B 35 34 32 37 F7
CB78:32 2C 31 34 3A 50 CF 32 82
CB80:31 31 2C 34 3A 3F 54 3A 77
CB88:4E C5 0D 00 00 4C 4F 41 6B
```

```
CB90:44 20 22 24 22 2C 38 0D 18
CB98:4C 49 53 54 0D 00 FF FF C0
CBA0:00 00 FF FF 00 00 FF FF 38
CBA8:00 00 FF FF 00 00 FF FF 40
CBB0:00 00 FF FF 00 00 FF FF 48
CBB8:00 00 FF FF 00 00 FF FF 50
CBC0:00 00 FF FF 00 00 FF FF 58
CBC8:00 00 FF FF 00 00 FF FF 60
CBD0:00 00 FF FF 00 00 FF FF 68
CBD8:00 00 FF FF 00 50 CF 35 86
CBE0:38 2C 30 3A 20 20 20 20 2B
CBE8:20 20 20 20 20 20 20 20 80
CBF0:20 20 20 20 20 20 20 20 88
CBF8:20 20 20 20 20 20 20 20 90
CC00:20 4F D0 31 2C 38 2C 31 76
CC08:35 3A 49 CE 31 2C 41 24 C1
CC10:2C 42 24 3A 3F 3A 3F 41 1B
CC18:24 2C 42 24 3A 43 4C CF A0
CC20:31 0D 00 00 FF FF 00 00 95
CC28:FF FF 00 00 FF 4E 45 57 DC
CC30:0D 00 00 00 FF FF 00 00 50
CC38:FF FF 00 00 FF FF 00 00 D1
CC40:FF FF 00 00 FF FF 00 00 D9
CC48:FF FF 00 00 FF FF 00 00 E1
CC50:FF FF 00 00 FF FF 00 00 E9
CC58:FF FF 00 00 FF FF 00 00 F1
CC60:FF EF 00 00 FF FF 00 00 F9
CC68:FF FF 00 00 FF FF 00 00 02
CC70:FF FF 00 00 FF FF 00 00 0A
CC78:FF FF 00 00 FF 50 CF 32 25
CC80:30 35 30 2C 31 3A 53 59 BA
CC88:53 34 32 32 39 31 3A 50 95
CC90:CF 34 35 2C 50 C5 28 33 A5
CC98:34 29 3A 50 CF 34 36 2C CA
CCA0:50 C5 28 33 35 29 3A 43 12
CCA8:4C 52 0D 00 FF FF 00 00 9E
CCB0:FF FF 00 00 FF FF 00 00 4A
CCB8:FF FF 00 00 FF FF 00 00 52
CCC0:FF FF 00 00 FF FF 00 00 5A
CCC8:FF FF 00 00 FF 4C 4F 41 73
CCD0:44 20 22 2A 22 2C 38 0D BA
CCD8:00 FF 00 00 FF FF 00 00 72
CCE0:FF FF 00 00 FF FF 00 00 7A
CCE8:FF FF 00 00 FF FF 00 00 82
CCF0:FF FF 00 00 FF FF 00 00 8A
CCF8:FF FF 00 00 FF FF 00 00 92
CD00:00 00 FF FF 00 00 FF FF 9B
CD08:00 00 FF FF 00 00 FF FF A3
CD10:00 00 FF FF 00 00 FF FF AB
CD18:00 00 FF FF 00 43 4C 52 AB
CD20:3A 3F 3A 3F 22 50 52 4F 2A
CD28:47 52 41 4D 20 4C 45 4E 04
CD30:47 54 48 20 3D 22 33 36 9E
CD38:30 37 32 2D 28 46 52 45 17
CD40:28 30 29 2D 28 46 52 45 38
CD48:28 30 29 3C 30 29 2A 36 9D
CD50:35 35 33 36 29 0D 00 FF 1B
CD58:00 00 FF FF 00 00 FF FF F3
CD60:00 00 FF FF 00 00 FF FF FB
CD68:00 00 FF FF 00 4F 50 45 27
CD70:4E 31 35 2C 38 2C 31 35 F2
CD78:2C 22 49 30 22 3A 43 4C AB
CD80:4F 53 45 31 35 0D 00 FF 32
CD88:00 00 FF FF 00 00 FF FF 24
CD90:00 00 FF FF 00 00 FF FF 2C
CD98:00 00 FF FF 00 00 FF FF 34
CDA0:00 00 FF FF 00 00 FF FF 3C
CDA8:00 00 FF FF 00 00 FF FF 44
CDB0:00 00 FF FF 00 00 FF FF 4C
CDB8:00 00 FF FF 00 4F 50 45 77
CDC0:4E 31 35 2C 38 2C 31 35 43
CDC8:2C 22 56 30 22 3A 43 4C 9D
CDD0:4F 53 45 31 35 0D 00 FF 82
CDD8:00 00 FF FF 00 00 FF FF 74
CDE0:00 00 FF FF 00 00 FF FF 7C
CDE8:00 00 FF FF 00 00 FF FF 84
CDF0:00 00 FF FF 00 00 FF FF 8C
CDF8:00 00 FF FF 00 00 FF FF 94
CE00:FF FF 00 00 FF FF 00 00 9D
CE08:FF FF 00 00 FF 4F 50 45 C8
CE10:4E 31 35 2C 38 2C 31 35 94
CE18:2C 22 55 4A 22 3A 46 4F 79
CE20:52 54 3D 31 54 4F 31 32 2B
CE28:35 30 3A 4E 45 58 54 3A 07
CE30:43 4C 4F 53 45 31 35 0D 08
CE38:00 FF 00 00 FF FF 00 00 D5
CE40:FF FF 00 00 FF FF 00 00 DD
CE48:FF FF 00 00 FF FF 00 00 E5
CE50:FF FF 00 00 FF FF 00 00 ED
CE58:FF FF 00 00 FF 56 45 52 2C
CE60:49 46 59 20 22 2A 22 2C 8B
CE68:38 0D 00 00 FF FF 00 00 65
CE70:FF FF 00 00 FF FF 00 00 0E
CE78:FF FF 00 00 FF FF 00 00 16
CE80:FF FF 00 00 FF FF 00 00 1E
CE88:FF FF 00 00 FF FF 00 00 26
CE90:FF FF 00 00 FF FF 00 00 2E
CE98:FF FF 00 00 FF FF 00 00 36
CEA0:FF FF 00 00 FF FF 00 00 3E
CEA8:FF FF 00 00 FF FF 52 55 40
CEB0:4E 20 20 41 53 43 49 49 19
CEB8:4C 49 53 54 20 53 43 52 A5
CEC0:45 4E 48 41 52 44 20 44 D9
CEC8:49 52 20 20 42 4C 41 4E B9
CED0:4B 45 52 52 4F 52 4E 45 7A
CED8:57 20 20 55 4E 4E 45 57 11
CEE0:55 4E 44 45 4C 42 59 54 0C
CEE8:45 53 49 4E 49 54 20 56 3E
CEF0:41 4C 49 44 52 45 53 45 43
CEF8:54 56 45 52 46 59 00 00 BB
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Richard Penn, the author of Xlogic (September 1992), lives in Montreal, Quebec, Canada. ❐

BAFFLES

By Michael Gresham

Baffles is a one-player game of strategy in which you must find ten diagonal mirrors, called baffles. These baffles are hidden randomly under a 10× 10 grid. This game for the 64 is both interesting and challenging.

Baffles is written entirely in BASIC. To help avoid typing errors, use The Automatic Proofreader to enter the program. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before exiting Proofreader. Note that line 910 fills two complete screen lines. Your cursor will drop down to a third line after you enter it. Be sure to cursor back up to line 910 and then press Return. To avoid any problems when entering this line, you may want to use a question mark (?) as a shorthand symbol for the PRINT statement.

Using the Program

When the game begins, the 10 × 10 grid appears with 40 numbered lasers surrounding the perimeter, facing into the grid. You have three choices at this point: fire a laser, look for a baffle, or quit the game. Press F to fire one of the lasers, press L to guess the location of a baffle, or press Q if you decide that you want to end the game and reveal any hidden baffles.

Firing a Laser

Activate a laser by typing its number. Only a one- or two-digit number from 1–40 will be accepted. Use the Del key to make corrections. Press Return without typing in anything to cancel the option.

When a laser beam is fired, it travels unseen in a straight line until it hits a baffle or reaches one of the edges of the grid. If the beam hits a baffle, it is deflected 90 degrees and continues traveling until it hits any other baffle or leaves the grid. The new direction of a deflected beam is chosen by the position of the mirror. For example, if a beam is traveling down the grid and it hits a baffle that looks like the slash symbol (/), then the beam will be deflected to the left. If that beam were traveling up the grid toward the same baffle, the beam would be deflected to the right.

The laser that is activated is colored green. When the beam exits the grid, the laser that it strikes is colored red. By using the results of one or more laser beams as information, you should be able to determine the location of a baffle.

As another example, if a beam is fired down from laser 1 in the top left corner and there are no baffles, then the beam should exit at laser 30 on the opposite side of the playing grid. If it exits to the left at laser 35, for example, there could be a baffle at the intersection of those two lasers (column A, row E). Of course, the beam might have been deflected any number of times. If no baffle is found, try firing a second laser, such as laser 30 or laser 16. With practice, it becomes easier to read the laser results as a series of deflections and misses.

Looking for Baffles

When you think that you know where a baffle is located, press L to look for a baffle. You will be asked to type in two letters, representing the column and row of your guess. The column letters (from A to J) are highlighted in red, and the row letters (also from A to J) are yellow. Each letter is accepted as soon as it is typed in. If you make a mistake, you can cancel the option by pressing Return before entering the row letter.

If your guess is correct, a baffle will be revealed as a yellow diagonal. An empty location is represented as a red asterisk. The game ends when all ten baffles are located.

Keeping Score

The score is kept just below the playing grid, although keeping score isn't necessary. For those people who want to see how good they are or how much they've improved, the object is to find all of the baffles while accumulating the lowest possible score. Each activated laser adds one point to the score, and each guess adds two points. No points are added if you guess a location that has already been revealed.

Theoretically, the lowest possible score is 20, but that would be difficult to achieve. To get a score that low, you'd have to find all ten baffles in exactly ten guesses. Someone who has practiced often (and is very lucky) may receive a score of 30 to 40. An average score would probably be from 40 to 60 points.

Helpful Hints

Although it happens very rarely, it is possible that some baffles may appear hidden, even when hit by lasers. This situation can cause your score to increase dramatically while you're attempting to find the last baffles. While I don't know how many different ways there are to hide baffles, I can offer a few hints. The starting and ending points of a laser beam can be interchanged. This means that if the beam from laser 1 exits at laser 4, then a beam from laser 4 must exit at laser 1. There are actually only 20 laser combinations in any game. By writing down these results (in the form 1 : 4 or 1–4), you can avoid finding the same laser beam path twice and keep your score low.

Even though the path of a laser may seem obvious after one or more baffles have been revealed, the laser beam could have been deflected by even more baffles. Usually, these baffles will reveal themselves after other lasers have been used.

A helpful side effect of writing this program in BASIC is that the laser beam travels considerably slower than the speed of light. If the path of a laser beam is very long because of deflections, the beam will take some time to reach the second laser. Watch for baffles in the path of these lasers.

If all else fails, a good rule is to assume that the missing baffles are on the same column or row as one of the other baffles. Use these locations one at a time as guesses until the baffles are found. This method should not be used unless all possible laser combinations have been fired, since it will increase your score even faster.

BAFFLES

```
PK 5 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
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CE 10 POKE 53281,0:POKE 53280,
     0
QJ 20 GOSUB 1330
HP 30 PRINT"{CLR}";:FOR I=1 TO
      10:FOR J=1 TO 10:B(I,J)
     =0:NEXT J,I
CH 40 R=RND(-TI):FOR BA=1 TO 1
     0:B=2:IF RND(1)<.5 THEN
     {SPACE}B=3
RH 50 I=INT(RND(1)*10)+1:J=INT
     (RND(1)*10)+1:IF B(I,J)<
     >0 THEN 50
AM 60 B(I,J)=B:NEXT BA
DB 70 GOSUB 1110:BA=0:SC=0
XE 80 CY=21:CX=15:GOSUB 240:PR
     INT "{WHT}SCORE: 0"
AQ 90 CY=22:CX=0:GOSUB 240
FF 100 PRINT "{GRN}"TAB(10)"
     {RVS}F{OFF} - FIRE LASE
     R":PRINT TAB(10)"{RVS}L
     {OFF} - LOOK FOR BAFFLE
     "
DJ 110 PRINT TAB(10)"{RVS}Q
     {OFF} - QUIT GAME";
XD 120 POKE 198,0:WAIT 198,1:G
     ET A$
DJ 130 GS=-(A$="F")-2*(A$="L")
     -3*(A$="Q"):ON GS GOSUB
      280,820,1380
HE 140 GOSUB 1070:IF GS=3 THEN
      CY=23:CX=0:GOSUB 240:G
     OTO 170
SD 150 IF BA<10 THEN GOTO 90
GX 160 CY=22:CX=4:GOSUB240:PRI
     NT "{YEL}YOU'VE FOUND A
     LL OF THE BAFFLES!"
FG 170 PRINTTAB(12)"{WHT}PLAY
     {SPACE}AGAIN? [{GRN}Y/N
     {WHT}]":POKE 198,0
CK 180 WAIT 198,1:GET A$:IF A$
     ="Y" THEN 30
EA 190 IF A$<>"N" THEN 180
JA 200 POKE SD+24,0:END
DG 210 REM
EJ 220 REM ***** POSITION CURS
     OR *****
PH 230 REM
RK 240 POKE 781,CY:POKE 782,CX
     :POKE 783,0:SYS65520:RE
     TURN
DK 250 REM
KK 260 REM ***** FIRE LASER **
     ***
PM 270 REM
EE 280 GOSUB1070:CY=22:CX=12:G
     OSUB240:PRINT"LASER TO
     {SPACE}FIRE: ";
QD 290 L$="":C=0
MC 300 PRINT "{RVS} {OFF}
     {LEFT}";
RQ 310 POKE198,0:WAIT 198,1:GE
     T A$:IF A$=CHR$(13) THE
     N PRINT " ":GOTO 350
CM 320 IF A$=CHR$(20) AND C>0
     {SPACE}THEN PRINT A$;:C
     =C-1:L$=LEFT$(L$,C):GOT
     O 310
KX 330 IF A$<"0" OR A$>"9" OR
     {SPACE}C=2 THEN 310
FB 340 PRINT A$;:L$=L$+A$:C=C+
     1:GOTO 300
BS 350 IF L$="" THEN RETURN
RS 360 L=VAL(L$):IF L<1 OR L>4
     0 THEN 280
XR 370 SC=SC+1:IF (L>10 AND L<
     21) OR L>30 THEN 410
MK 380 AA=L-1:IF L>20 THEN AA=
     30-L
QM 390 XL=15+AA:YL=3:IF L>20 T
     HEN YL=16
QP 400 P=55296+XL+40*YL:FOR I=
     0 TO 80 STEP40:POKE P+I
     ,5:NEXT:GOTO 440
SD 410 AA=L-11:IF L>20 THEN AA
     =40-L
MR 420 YL=6+AA:XL=25:IF L>20 T
     HEN XL=12
BE 430 P=55296+XL+40*YL:FOR I=
     0 TO 2:POKE P+I,5:NEXT
HK 440 DY=(L<31 AND L>20)-(L<1
     1)
FE 450 DX=(L<21 AND L>10)-(L>3
     0)
EM 460 X=1:Y=41-L:IF L<31 THEN
      X=31-L:Y=10
CM 470 IF L<21 THEN X=10:Y=L-1
     0
GF 480 IF L<11 THEN X=L:Y=1
```

```
RP 490 FR=2000+L*100:POKE SD+4
       ,65
CF 500 FQ=FR+PEEK(SD+27)/2:HF=
       INT(FQ/256):LF=FQAND255
       :POKE SD,LF:POKE SD+1,H
       F
JS 510 B=ABS(B(Y,X)):IF B<2 TH
       EN 550
QS 520 IF DX=0 THEN 540
RJ 530 DY=1+2*((DX=1 AND B=3)
       {SPACE}OR (DX=-1 AND B=
       2)):DX=0:GOTO 550
RQ 540 DX=1+2*((DY=1 AND B=3)
       {SPACE}OR (DY=-1 AND B=
       2)):DY=0
DM 550 X=X+DX:Y=Y+DY:IF X<11 A
       ND X>0 AND Y<11 AND Y>0
        THEN 500
GD 560 POKE SD+4,64:IF Y=0 THE
       N E=X
CH 570 IF X=11 THEN E=Y+10
KD 580 IF Y=11 THEN E=31-X
MX 590 IF X=0 THEN E=41-Y
MX 600 IF (E>10 AND E<21) OR E
       >30 THEN 640
EA 610 AA=E-1:IF E>20 THEN AA=
       30-E
QM 620 XE=15+AA:YE=3:IF E>20 T
       HEN YE=16
KR 630 P=55296+XE+40*YE:FOR I=
       0 TO 80 STEP40:POKE P+I
       ,2:NEXT:GOTO 670
CK 640 AA=E-11:IF E>20 THEN AA
       =40-E
QS 650 YE=6+AA:XE=25:IF E>20 T
       HEN XE=12
KR 660 P=55296+XE+40*YE:FOR I=
       0 TO 2:POKE P+I,2:NEXT
HP 670 FR=2000+E*100:HF=INT(FR
       /256):LF=FRAND255:POKES
       D,LF:POKESD+1,HF
EF 680 POKE SD+4,65:FOR T=1 TO
        200:NEXT:POKE SD+4,64
XB 690 PRINT TAB(11)"{RED}EXIT
        AT LASER #";E
HP 700 CY=21:CX=21:GOSUB240:PR
       INT"{WHT}"SC"{2 DOWN}"
XA 710 PRINT TAB(8)"{BLU}PRESS
        {RVS}SPACE{OFF} TO CON
       TINUE";
PR 720 POKE 198,0:WAIT 198,1:G
       ET A$:IF A$<>" " THEN 7
       20
MK 730 C=6-8*((L/2)=INT(L/2)):
       P=55296+XL+40*YL:IF YL>
       3 AND YL<16 THEN 750
EA 740 FOR I=0 TO 80 STEP 40:P
       OKE P+I,C:NEXT:GOTO 760
RB 750 FOR I=0 TO 2:POKE P+I,C
       :NEXT
AF 760 C=6-8*((E/2)=INT(E/2)):
       P=55296+XE+40*YE:IF YE>
       3 AND YE<16 THEN 780
SP 770 FOR I=0 TO 80 STEP 40:P
       OKE P+I,C:NEXT:RETURN
BM 780 FOR I=0 TO 2:POKE P+I,C
       :NEXT:RETURN
GP 790 REM
KE 800 REM ***** LOOK FOR A BA
       FFLE *****
PQ 810 REM
AS 820 GOSUB1070:CY=22:CX=10:G
       OSUB240:PRINT "{RED}BAF
       FLE X LOCATION: ";
DC 830 POKE 198,0:WAIT198,1:GE
       T A$:IF A$=CHR$(13) THE
       N RETURN
BC 840 IF A$<"A" OR A$>"J" THE
       N 830
SR 850 X=ASC(A$)-64:PRINT A$
BS 860 PRINTTAB(10)"{YEL}BAFFL
       E Y LOCATION: ";
DB 870 POKE198,0:WAIT 198,1:GE
       T A$:IF A$=CHR$(13) THE
       N RETURN
QF 880 IF A$<"A" OR A$>"J" THE
       N 870
JA 890 Y=75-ASC(A$):PRINT A$
GG 900 B=B(Y,X):IF B>=0 THEN 9
       20
EJ 910 PRINT" {WHT}{RVS}THAT L
       OCATION HAS ALREADY BEE
       N CALLED{OFF}";:POKE198
       ,0:WAIT198,1:RETURN
PE 920 SC=SC+2:CY=21:CX=21:GOS
       UB240:PRINT"{WHT}"SC"
       {2 DOWN}"
GG 930 IF B>0 THEN 990
CQ 940 PRINT TAB(10)"{RED}
       {RVS}THAT IS NOT A BAFF
       LE{OFF}";:B(Y,X)=-1
EQ 950 CY=Y+5:CX=X+14:GOSUB240
       :PRINT"{RED}{OFF}*";
FQ 960 FR=1000:FORBZ=0 TO 10:F
       R=2500-FR:HF=INT(FR/256
       ):LF=FRAND255
MF 970 POKE SD,LF:POKE SD+1,HF
       :POKESD+4,65:FOR T=1 TO
        5:NEXT:POKE SD+4,64:NE
       XT BZ
FM 980 POKE198,0:WAIT198,1:RET
       URN
CM 990 PRINT TAB(8)"{YEL}{RVS}
       YOU HAVE FOUND A BAFFLE
       !{OFF}";:B(Y,X)=-B:BA=B
       A+1
BQ 1000 CY=Y+5:CX=X+14:GOSUB24
        0:A$="M":IF B=3 THEN A
        $="N"
SQ 1010 PRINT"{YEL}"A$;:FR=100
        00:FOR BL=0 TO 10:FR=2
        1000-FR:HF=INT(FR/256)
        :LF=FRAND255
GD 1020 POKESD,LF:POKESD+1,HF:
        POKESD+4,65:FORT=1 TO
        {SPACE}20:NEXT:POKESD+
        4,64:NEXT BL
FB 1030 POKE198,0:WAIT198,1:RE
        TURN
PF 1040 REM
CX 1050 REM ***** CLEAR SCREEN
         BOTTOM *****
BG 1060 REM
QG 1070 CX=0:FOR CY=22TO24:GOS
        UB240:SYS59903:NEXT CY
        :RETURN
XJ 1080 REM
JE 1090 REM ***** DRAW GAME SC
        REEN *****
KJ 1100 REM
FS 1110 PRINT TAB(16)"{YEL}BAF
        FLES{DOWN}"
PJ 1120 PRINTTAB(15)"{RED}ABCD
        EFGHIJ"
HS 1130 PRINT TAB(12)"{7}{RVS}
        £{BLU}{2 SPACES}0{7}0
        {BLU}0{7}0{BLU}0{7}0
        {BLU}0{7}0{BLU}0{7}1
        {2 SPACES}{*}"
XC 1140 PRINT TAB(12)"{7}{RVS}
        {2 SPACES}{BLU} 1{7}2
        {BLU}3{7}4{BLU}5{7}6
        {BLU}7{7}8{BLU}9{7}0
        {2 SPACES}{BLU} "
PP 1150 PRINT TAB(12)"{7}{RVS}
        {2 SPACES}{OFF}£{BLU}
        -{7}-{BLU}-{7}-{BLU}-
        {7}-{BLU}-{7}-{BLU}-
        {7}-{*}{RVS}{BLU}
        {2 SPACES}"
MX 1160 PRINT TAB(11)"{YEL}J
        {7}{RVS}40{OFF}*++++++
        ++++{BLU}*{RVS}11{YEL}
        {OFF}J"
QS 1170 PRINT TAB(11)"{YEL}I
        {BLU}{RVS}39{OFF}*{7}+
        +++++++++*{RVS}12{YEL}
        {OFF}I"
PG 1180 PRINT TAB(11)"{YEL}H
        {7}{RVS}38{OFF}*++++++
        ++++{BLU}*{RVS}13{YEL}
        {OFF}H"
QM 1190 PRINT TAB(11)"{YEL}G
        {BLU}{RVS}37{OFF}*{7}+
        +++++++++*{RVS}14{YEL}
        {OFF}G"
HD 1200 PRINT TAB(11)"{YEL}F
        {7}{RVS}36{OFF}*++++++
        ++++{BLU}*{RVS}15{YEL}
        {OFF}F"
AE 1210 PRINT TAB(11)"{YEL}E
        {BLU}{RVS}35{OFF}*{7}+
        +++++++++*{RVS}16{YEL}
        {OFF}E"
GX 1220 PRINT TAB(11)"{YEL}D
        {7}{RVS}34{OFF}*++++++
        ++++{BLU}*{RVS}17{YEL}
        {OFF}D"
AA 1230 PRINT TAB(11)"{YEL}C
        {BLU}{RVS}33{OFF}*{7}+
        +++++++++*{RVS}18{YEL}
        {OFF}C"
GP 1240 PRINT TAB(11)"{YEL}B
        {7}{RVS}32{OFF}*++++++
        ++++{BLU}*{RVS}19{YEL}
        {OFF}B"
KG 1250 PRINT TAB(11)"{YEL}A
        {BLU}{RVS}31{OFF}*{7}+
        +++++++++*{RVS}20{YEL}
        {OFF}A"
BH 1260 PRINT TAB(12)"{BLU}
```

```
        {RVS}{2 SPACES}{7}{*}
        {OFF}-{BLU}-{7}-{BLU}-
        {7}-{BLU}-{7}-{BLU}-
        {7}-{BLU}-{7}{RVS}£
        {2 SPACES}"
SA 1270 PRINT TAB(12)"{BLU}
        {RVS} {7}{2 SPACES}3
        {BLU}2{7}2{BLU}2{7}2
        {BLU}2{7}2{BLU}2{7}2
        {BLU}2 {7}{2 SPACES}"
HX 1280 PRINT TAB(12)"{7}{*}
        {RVS}{2 SPACES}0{BLU}9
        {7}8{BLU}7{7}6{BLU}5
        {7}4{BLU}3{7}2{BLU}1
        {2 SPACES}{7}{OFF}£"
RX 1290 PRINTTAB(15)"{RED}ABCD
        EFGHIJ":RETURN
CE 1300 REM
JA 1310 REM ***** SOUND SETUP
        {SPACE}*****
EG 1320 REM
XR 1330 SD=54272:FOR L=0TO24:P
        OKESD+L,0:NEXT:POKESD+
        3,8:POKESD+5,41:POKESD
        +6,89
FF 1340 POKE SD+14,117:POKE SD
        +18,16:POKE SD+24,143:
        RETURN
DJ 1350 REM
XM 1360 REM ***** REVEAL BAFFL
        ES *****
FM 1370 REM
SX 1380 CY=6:CX=15:GOSUB240:PR
        INT"{YEL}";
CH 1390 FOR I=1 TO 10:PRINT TA
        B(15);
HR 1400 FOR J=1 TO 10:B=B(I,J)
        :IF B<=0 THEN PRINT "
        {RIGHT}";:GOTO 1430
DP 1410 IF B=2 THEN PRINT "M";
        :GOTO 1430
RP 1420 IF B=3 THEN PRINT "N";
QC 1430 NEXT J:PRINT:NEXT I:RE
        TURN
```

Michael Gresham, 21, has been programming the 64 in BASIC and machine language for eight years but says he still has a lot to learn. He lives in Dunnsville, Virginia.

LARGE NUMBER CALCULATOR

By Bruce M. Bowden

Calculate exact solutions for large factorial and power problems to as many as 5964 digits with this remarkable large number calculator for the 64. You can also send the results to your printer.

When a number is multiplied by itself N times, it's said to be raised to the power of N–1. For example, 2 raised to the power of 3 is 2 multiplied by 2 multiplied by 2. Note that the base (2 in this case) is written N times but actually multiplied by itself N–1 times.

The factorial of any positive integer number, X, is that number multiplied by 1 less than itself, multiplied by 2 less than itself, and so on down until multiplied by 1. Here's an algebraic way of writing this formula.

X! = X(X–1)(X–2)(X–3) . . . (4)(3)(2)(1)

An exclamation mark is used to indicate that a factorial operation is taking place. As a practical illustration, one may write out 5! (read 5-factorial) as 5 times 4 times 3 times 2 times 1, or 120.

A special case is 0!, which is assigned a value of 1. Factorials are also defined, in higher mathematics, for fractional, negative, and complex numbers, but with this program we're sticking to the more common case of positive integers.

Large Number Calculator will give you exact solutions to power and factorial problems, separately or combined, to as many as 5984 digits. After the solution is found, various options are available for displaying, printing, or chain multiplying it to arrive at new solutions.

Typing It In

Large Number Calculator is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. When you've finished, save the program before running it.

Getting Started

Run Large Number Calculator and then press any key for a quick program description. Press another key, and you'll have two options to solve for X to the power of Y or solve for X-factorial. X and Y are integer values which you provide the program.

As a demonstration, press f1. You're prompted for the number which is to be raised to a power. Let's say that we want to know what 17 to the 21st power is. Enter *17* and press Return. Now you're prompted for the power. Enter *21* and press Return. You're advised that the solution has 26 digits. In a moment, the solution will appear in blocks of six digits which are read from left to right and from the top down. There are often leading 0s, and these can be ignored. You should see the following.

000000 000069 091933 913008
732880 827217

Now press any key to get to the options screen. The following options are available:

f1 ** Review the solution
f3 ** Multiply the result by a number
f5 ** Multiply the result by a factorial
f7 ** Multiply by an exponential
f2 ** Start over
f4 ** Send solution to printer
f6 ** End

To continue our demonstration, press f2 (Shift-f1) to start over. Now we're back to the original two options. Let's calculate 93! (93-factorial). Press f3. Now enter *93* at the prompt. You're advised that 93! has 145 digits. After about one and a half minutes, the following solution is displayed.

000001 156772 507081 641574
759205 162306 240436 214753
229576 413535 186142 281213
246807 121467 315215 203289
516844 845303 838996 289387
078090 752000 000000 000000
000000

Press any key for the option screen. Suppose you want to multiply this solution by 17 to the 21st power. To do so, press f7. Again, enter *17* and *21* at the prompts as you did the first time. After less than half a minute, the new solution is shown:

000000 000079 923649 611670
206135 264796 971537 140352
563408 351224 973345 747405
439544 378291 335514 104653
718355 692345 124600 883020
375497 054614 028846 092611
076902 757597 184000 000000
000000 000000

This number is 170 digits long. Press any key to return to the option screen.

Now, try multiplying the result by 201-factorial. Press f5, then enter *201* at the prompt. There will be a wait of about 16½ minutes before the new so-

lution is arrived at and displayed. I won't list them all here, but the answer contains 548 digits. Since it fills more than one screen, you'll see the message *NOT FINISHED YET* below the number. At this message press any key to see a continuation of the digits.

To quit the program cleanly, merely press the f6 (Shift-f5) key.

LARGE NUMBER CALCULATOR

```
MS 10 REM COPYRIGHT 1993 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
SP 20 PRINT"{CLR}{3 DOWN}{N}":
      POKE 53280,6:POKE 53281,
      6
FG 30 PRINT"{YEL}":MS$="LARGE
      {SPACE}NUMBER CALCULATOR
      ":GOSUB 5000
SD 40 PRINT"{CYN}":MS$="BY BRU
      CE M. BOWDEN":GOSUB5000:
      PRINT"{2 DOWN}{WHT}"
KQ 50 MS$="COPYRIGHT, 1993":GO
      SUB5000:MS$="COMPUTE PUB
      LICATIONS INTL LTD":GOSU
      B5000
JP 60 MS$="ALL RIGHTS RESERVED
      ":GOSUB 5000:GOSUB6000
EG 110 PRINT"{CLR}{4 DOWN}
       {WHT} THIS PROGRAM WILL
       GIVE EXACT SOLUTIONS"
HB 120 PRINT"{2 SPACES}FOR POW
       ER (X↑Y) AND FACTORIAL
       {SPACE}(X!)"
XX 130 PRINTTAB(14)"PROBLEMS."
       :PRINT"{2 DOWN}
       {2 SPACES}IF THE PROBLE
       M IS OF THE FORM X↑Y, X
       "
PE 140 PRINT"{4 SPACES}AND Y M
       UST BE POSITIVE INTEGER
       S,"
DF 150 PRINT"{5 SPACES}AS MUST
        X WHEN CALCULATING X!"
       :PRINTTAB(13)"(X-FACTOR
       IAL).{2 DOWN}"
CX 160 PRINTTAB(5)"YOUR SOLUTI
       ONS ARE LIMITED TO":PRI
       NTTAB(14)"5964 DIGITS."
KX 170 GOSUB 6000
BM 180 PRINT"{CLR}{6 DOWN}":MS
       $="CHOOSE A SUITABLE FU
       NCTION:":GOSUB5000
KC 190 DIMM(1000):M(1000)=1:M(
       4)=1000
QB 200 DEFFNL(X)=LOG(X)/LOG(10
       )
EG 210 PRINT"{3 DOWN}":PRINT"F
       1 ** SOLVING FOR X TO T
       HE POWER OF Y{2 DOWN}"
RA 220 PRINT"F3 ** SOLVING FOR
        X FACTORIAL"
CC 230 GETA$:IFA$=""OR(A$<>"
       {F1}"ANDA$<>"{F3}")THEN
       230
RG 240 PRINT"{CLR}{2 DOWN}":ON
       ASC(A$)-132GOTO250,720
CD 250 PRINT"ENTER THE NUMBER
       {SPACE}WHICH IS BEING R
       AISED{2 SPACES}TO A POW
       ER:{2 DOWN}"
HE 260 PRINTTAB(10);:INPUTX
EG 270 IFX>=0THEN300
BP 280 PRINTX;"IS A NUMBER LES
       S THAN ZERO,":PRINT"WHI
       CH IS NOT ALLOWED. TRY
       {SPACE}AGAIN."
MH 290 GOTO260
QH 300 IFLEN(STR$(INT(X)))>4TH
       ENPRINT"{DOWN}
       {4 SPACES}TOO MANY DIGI
       TS! TRY AGAIN.{DOWN}":G
       OTO260
AA 310 GOSUB320:GOTO330
FQ 320 M(2)=INT(X):RETURN
QR 330 PRINTTAB(8)"{2 DOWN}NOW
        ENTER THE POWER:
       {2 DOWN}"
DC 340 PRINTTAB(10);:INPUT Y
CD 350 IFY>=0THEN380
JC 360 PRINTY;"IS A NUMBER LES
       S THAN ZERO, WHICH IS N
       OT ALLOWED. TRY AGAIN."
KP 370 GOTO340
RK 380 IFX<>0THEN400
HJ 390 PRINT"{2 DOWN}
       {4 SPACES}ZERO TO ANY P
       OWER IS STILL ZERO":GOS
       UB 6000:GOTO840
MQ 400 IFY<>0THEN420
FC 410 PRINT"{2 DOWN} ANYTHING
        TO THE POWER OF ZERO I
       S ONE.":GOSUB 6000:GOTO
       840
XM 420 IFLEN(STR$(INT(Y)))>7TH
       ENPRINT"TOO MANY DIGITS
       ! TRY AGAIN.":GOTO340
FA 430 M(3)=Y:A=5964:IFF0=1THE
       N670
DC 440 B=INT(FNL(M(2))*M(3)+1)
ME 450 IFQ$<>""THEN470
PH 460 Q$=STR$(X)+" TO THE POW
       ER OF"+STR$(Y):PRINT"
       {2 DOWN}";Q$;" HAS";B;"
       DIGITS."
HJ 470 IFB>ATHEN730
RK 480 PRINTTAB(7)"{2 DOWN}STA
       NDBY FOR COMPUTATION...
       "
JP 490 M(0)=INT(FNL(999)/FNL(M
       (2))):M(5)=M(2):M(2)=IN
       T(M(2)↑M(0)+.5)
MB 500 M(1)=M(3)/M(0):M(3)=INT
       (M(1))
AS 510 M(5)=INT(M(5)↑(INT((M(1
       )-INT(M(1)))*M(0)+.5))+
       .5):IFM(3)=0THEN620
BA 520 M(1)=0
XG 530 M(0)=(M(2)*M(M(4))+M(1)
       )/INT(1E6+.5):M(1)=INT(
       M(0))
HE 540 M(M(4))=INT(INT(1E6+.5)
       *(M(0)-INT(M(0)))+.5)
AG 550 M(4)=M(4)-1:IFM(M(4))<>
       0THEN530
GX 560 M(4)=M(4)+1:IFM(M(4))<>
       0THEN580
FG 570 M(4)=M(4)-1:GOTO530
GB 580 M(4)=M(4)-1:IFF0=0THEN6
       00
SX 590 M(2)=M(2)+1
SJ 600 M(M(4))=M(1):M(3)=M(3)-
       1:IFM(3)=0THEN620
RA 610 M(4)=1000:M(1)=0:GOTO53
       0
SA 620 M(0)=M(4):IFF1=1THEN750
DK 630 F1=1:A=M(5):GOTO660
FE 640 PRINTTAB(10);:INPUTY:Y=
       INT(ABS(Y)):X=1:GOSUB32
       0:F0=1:F1=1:GOTO420
EJ 650 M(4)=M(0):GOTO750
CK 660 M(2)=A:M(3)=1:B=INT(A/F
       NL(M(2)+.1)):GOTO610
EG 670 B=INT(FNL(M(3))*M(3)-FN
       L(EXP(1))*M(3)+FNL(2*↑*
       M(3))/2)+1
AC 680 IFQ$<>""THEN700
AM 690 Q$=STR$(M(3))+" FACTORI
       AL":PRINT"{2 DOWN}";Q$;
       " HAS";B;"DIGITS."
DF 700 IFB>ATHEN730
DG 710 PRINTTAB(7)"{2 DOWN}STA
       NDBY FOR COMPUTATION...
       ":GOTO530
QM 720 C=2:PRINT"ENTER THE NUM
       BER FOR WHICH YOU NEED
       {SPACE}A{3 SPACES}FACTO
       RIAL:{4 DOWN}":GOTO640
SR 730 PRINT"{2 DOWN}
       {4 SPACES}SORRY, THIS R
       ESULT IS TOO LARGE!"
FP 740 PRINT"{2 DOWN}YOU ARE O
       NLY ALLOWED 5964 DIGITS
        TOTAL.":GOSUB 6000:GOT
       O840
XJ 750 PRINT"{CLR}{2 DOWN}";Q$
       ;" IS EQUAL TO:"
BD 760 PRINT"{2 DOWN}":X=1
AA 770 N$=MID$(STR$(M(M(4))),2
       ,LEN(STR$(M(M(4))))):IF
       M(M(4))=0THENN$=""
AF 780 M(4)=M(4)+1:IFLEN(N$)=6
       THENPRINTN$,:X=X+1:GOTO
       800
AQ 790 FORZ=1TO6-LEN(N$):PRINT
       "0";:NEXT:PRINTN$,:X=X+
       1
FB 800 IFM(4)=1001THEN830
MX 810 IFX<>41THEN770
DE 820 PRINT:PRINTTAB(10)"
       {2 DOWN}(NOT FINISHED Y
       ET)":GOSUB 6000
DE 825 PRINT"{CLR}{DOWN}":MS$=
       "CONTINUING...":GOSUB50
       00:GOTO760
AE 830 PRINT:PRINT"{DOWN}":MS$
       ="--- END OF SOLUTION -
       --":GOSUB 5000:GOSUB600
```

```
      Ø
CQ 840 PRINT"{CLR}{4 DOWN}":MS
       $="CHOOSE A SUITABLE FU
       NCTION KEY:":GOSUB5000
QP 850 PRINT"{2 DOWN}F1 ** REV
       IEW THE SOLUTION"
CX 860 PRINT"{DOWN}F3 ** MULTI
       PLY THE RESULT BY A NUM
       BER"
BJ 870 PRINT"{DOWN}F5 ** MULTI
       PLY THE RESULT BY A FAC
       TORIAL"
JD 880 PRINT"F7 ** MULTIPLY BY
        AN EXPONENTIAL"
FE 890 PRINT"{DOWN}F2 ** START
        OVER":PRINT"{DOWN}F4 *
       * SEND SOLUTION TO PRIN
       TER"
ED 900 PRINT"{DOWN}F6 ** END"
SE 910 M(4)=1000:GETA$:IFA$=""
       THEN910
KR 920 T=ASC(A$)-132:IFT<1ORT>
       7THEN910
CX 930 PRINT"{CLR}{2 DOWN}":ON
        T GOTO 650,940,940,940
       ,980,990,950
DC 940 Q$="THE FINAL SOLUTION"
       :ON T-1 GOTO 970,720,96
       Ø
JS 950 STOP
EQ 960 FØ=0:F1=0:GOTO250
AK 970 INPUT"WHAT IS THE NUMBE
       R";A:GOTO660
HK 980 RUN 180
PM 990 PRINT"{CLR}{2 DOWN}
       {RVS} OUTPUTTING THE SO
       LUTION TO A PRINTER
       {3 SPACES}{OFF}"
JG 1000 PRINT"{2 DOWN}BE SURE
        {SPACE}THAT THE PRINTE
        R IS SWITCHED ON AND I
        S DEVICE NUMBER 4."
MG 1010 GOSUB 6000:M(4)=M(Ø)
MX 1020 OPEN3,4,7:PRINT#3,CHR$
        (14)Q$;" IS EQUAL TO:"
        CHR$(15):PRINT#3:PRINT
        #3:X=1
RS 1030 N$=MID$(STR$(M(M(4))),
        2,LEN(STR$(M(M(4))))):
        IFM(M(4))=ØTHENN$=""
QP 1040 M(4)=M(4)+1:IFLEN(N$)=
        6THENPRINT#3,N$,:X=X+1
        :GOTO1060
HC 1050 FORZ=1TO6-LEN(N$):PRIN
        T#3,"Ø";:NEXT:PRINT#3,
        N$,:X=X+1
KB 1060 IFM(4)=1001THEN1080
KD 1070 GOTO1030
PA 1080 PRINT#3:PRINT#3:PRINT#
        3,"{6 SPACES}--- END O
        F SOLUTION ---"
EF 1090 FORT=1TO5:PRINT#3:NEXT
        :CLOSE3:GOTO840
GB 5000 REM MESSAGE CENTERING
        {SPACE}ROUTINE
KQ 5010 FOR MX=1 TO 20-LEN(MS$
        )/2:PRINTCHR$(32);:NEX
        T:PRINTMS$:RETURN
HP 6000 PRINT"{HOME}{21 DOWN}
        {YEL}"
ER 6010 MS$="PRESS ANY KEY TO
        {SPACE}CONTINUE":GOSUB
         5000
BD 6020 GET A$:IF A$="" THEN 6
        020
CC 6030 PRINT"{WHT}":RETURN
```

Bruce M. Bowden, a programmer at COMPUTE, claims he wrote Large Number Calculator to help him manage his personal finances.

FILE INDEX 128

By Donald Klich

Have you ever tried to locate a file or program but couldn't remember which disk it was on? Have you ever wanted to modify a program and its backups but couldn't remember how many copies you had on how many disks? File Index 128 can help you.

File Index 128 is a utility for the 128 that lets you print an alphabetically arranged report of the files and programs on one or more disks. This report can be placed in a binder to help you organize your disk collection and keep track of files and programs.

File Index 128 is written entirely in BASIC 7.0. To help avoid typing errors, enter the program with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

A Master List

When you run File Index 128 and prepare to print a directory, you have the option of including sequential files, programs, user files, and relative files. Just press Y or N at the individual prompts. You then have the option of including a conventional directory listing that lists block size and file type. You are then prompted to insert a disk and press any key to start the sorting process. Make sure that your printer is on.

File Index 128 lets you sort numerous disks in order to prepare a master listing of your files and programs. After the first disk has been processed, you then have the option of entering another disk. File Index 128 can handle up to 2000 files. (If you wish to enlarge this capability, simply change the DIM statements in line 30.)

When you've entered all the disks that you wish to list, make sure your printer is set at the top of the form. If you requested conventional directories, these will print first, beginning with disk name and ID. Then, File Index 128 will print a master list in alphabetical order, with the file type, disk name, and ID following each filename.

In the future, whenever you want to find a certain program, simply check the master list. If you have copies of the program on several disks, they will be grouped together followed by the names of each disk for easy location.

FILE INDEX 128

```
MS 10 REM COPYRIGHT 1993 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
GP 20 REM PROGRAM TO READ DIRE
      CTORIES AND PRINT THEM A
      LPHABETICALLY.
DM 30 DIM A$(2000),B$(2000),C$
      (2000),D$(2000):COLOR4,1
      :COLOR0,1:COLOR5,4:GRAPH
      IC0,1
HF 40 PRINT"{5 DOWN}DO YOU WIS
      H TO INCLUDE:":PRINTSPC(
      10);"{YEL}SEQ{CYN}ENTIAL
       FILES? Y/N":GOSUB370:IF
      Y$="Y"THENSS=1:ELSEIFY$<
      >"N"THEN40
CJ 50 PRINTSPC(10);"{YEL}PR
      {CYN}O{YEL}G{CYN}RAM FIL
      ES? Y/N":GOSUB370:IFY$="
      Y"THENPP=1:ELSEIFY$<>"N"
      THEN50
EP 60 PRINTSPC(10);"{YEL}US
      {CYN}E{YEL}R{CYN} FILES?
       Y/N":GOSUB370:IFY$="Y"T
      HENUU=1:ELSEIFY$<>"N"THE
      N60
FR 70 PRINTSPC(10);"{YEL}REL
      {CYN}ATIVE FILES? Y/N":G
      OSUB370:IFY$="Y"THENRR=1
      :ELSEIFY$<>"N"THEN70
HX 80 V=3:PRINT"{DOWN}PRINT TH
      E DIRECTORIES? Y/N":GOSU
      B370:IFY$="Y"THENV=4:ELS
      EIFY$<>"N"THEN80
KE 90 Q=1:OPEN15,8,15:OPEN4,V
QQ 100 T=18:S=0:PRINT"{DOWN}IN
       SERT AN INPUT DISK, THE
       N ANY KEY":GOSUB370
GS 110 OPEN5,8,5,"#":PRINT#15,
       "U1";5;0;T;S
PQ 120 FORI=1TO144:GOSUB380:NE
       XTI
DM 130 M$="":FORI=1TO16:GOSUB3
       80:IFASC(Y$)=160THENNEX
       TI:GOTO150
QM 140 M$=M$+Y$:NEXTI
FG 150 GOSUB380:GOSUB380:N$=""
```

```
      :FORI=0TO1:GOSUB380:N$=
      N$+Y$:NEXTI:S=1:PRINT#4
      :PRINT#4:PRINT#4,SPC(10
      );M$,N$
FR 160 PRINT#15,"U1";5;0;T;S:G
      OSUB380:T=ASC(Y$):GOSUB
      380:S=ASC(Y$):FORJ=1TO8
      :GOSUB380
DF 170 IFSS=1ANDASC(Y$)=129THE
      ND$(Q)="SEQ":GOTO220
XH 180 IFPP=1ANDASC(Y$)=130THE
      ND$(Q)="PRG":GOTO220
AE 190 IFUU=1ANDASC(Y$)=131THE
      ND$(Q)="USR":GOTO220
GX 200 IFRR=1ANDASC(Y$)=132THE
      ND$(Q)="REL":GOTO220
FM 210 FORI=1TO31:GOSUB380:NEX
      TI:NEXTJ:GOTO280
SP 220 GOSUB380:GOSUB380:FORI=
      1TO16:GOSUB380:IFASC(Y$
      )<>160THENC$(Q)=C$(Q)+Y
      $:NEXTI:GOTO240
JE 230 NEXTI
CX 240 FORI=1TO9:GOSUB380:NEXT
      :GOSUB380:B=ASC(Y$):GOS
      UB380:B=B+256*ASC(Y$):Z
      =Z-B:GOSUB380:GOSUB380:
      A$(Q)=M$:B$(Q)=N$
RC 250 PRINT#4,SPC(10);B;:IFB<
      10THENPRINT#4,SPC(4);:G
      OTO270
QA 260 IFB<100THENPRINT#4,SPC(
      3);:GOTO270:ELSEPRINT#4
      ,SPC(2);
EX 270 PRINT#4,C$(Q);SPC(19-LE
      N(C$(Q)));D$(Q):Q=Q+1:N
      EXTJ
EQ 280 IF T<>0THEN160:ELSECLOS
      E5
JC 290 PRINT"ARE ALL INPUT DIS
      KS ENTERED? Y/N":GOSUB3
      70:IFY$="N"THEN100
RK 300 IFY$<>"Y"THEN290
DA 310 CLOSE15:CLOSE4:OPEN4,4:
      Q=Q-1:PRINT"{DOWN}SET P
      RINTER TO HEAD OF FORM
      {SPACE}- PRESS ANY KEY
      {SPACE}WHEN READY":GOSU
      B370:P=1:GOSUB400
EA 320 FAST:W=0:T$="ZZZZZZZZZZ
      Z":FORI=1TOQ:IFC$(I)<T$
      THENT$=C$(I):W=I
CF 330 NEXT:IFW=0THENFORJ=1TO6
      0-L:PRINT#4:CLOSE4:SLOW
      :END
PK 340 PRINT#4,SPC(10);C$(W);S
      PC(18-LEN(C$(W)));D$(W)
      ;SPC(3);A$(W);SPC(19-LE
      N(A$(W)));B$(W):C$(W)="
      ZZZZZZZZZZ":LC=LC+1:IF
      LC>59THENFORJ=1TO6:PRIN
      T#4:NEXTJ:GOSUB400
DJ 350 GOTO320
GK 360 PRINT#4,SPC(16);"NAME";
      SPC(8);"TYPE";SPC(7);"H
      EADER";SPC(8);"ID":PRIN
      T#4:RETURN
PX 370 GETY$:IFY$=""THEN370:EL
      SERETURN
HJ 380 GET#5,Y$:IFY$=""THENY$=
      CHR$(0)
PX 390 RETURN
MC 400 LC=5:PRINT#4,SPC(16);"M
      ASTER FILE INDEX
      {5 SPACES}PAGE";P:PRINT
      #4,SPC(16);"FILE";SPC(8
      );"FILE";SPC(8);"DISK";
      SPC(8);"DISK"
KR 410 PRINT#4,SPC(16);"NAME";
      SPC(8);"TYPE";SPC(7);"H
      EADER";SPC(8);"ID":PRIN
      T#4:P=P+1:RETURN
```

Donald Klich has been involved with system design since 1963 (IBM 630). He is now retired and lives in Mount Prospect, Illinois.

MEMORY FLEXER

By Scott Gifford

When you're programming, wouldn't it be nice to have another 64 next to you? You could run and list other programs and look at a disk directory without erasing the program that you're working on. Memory Flexer does just that—almost. Instead of providing you with another computer, this utility for the 64 divides the memory in your computer into two parts, each of which can hold its own program. This allows you to do things other programmers can only dream about.

Typing It In

Memory Flexer consists of two parts, a BASIC program and a machine language program. The first part, Memory Flexer, is written in BASIC. To help you enter it without typing errors, use The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save the program before exiting Proofreader.

Switcher is the second part, and it is written in machine language. Enter it with MLX, our machine language entry program. Again, see "Typing Aids." When MLX prompts, reply with the following values.

Starting address: CF08
Ending address: CFEF

Be sure to save this program with the filename SWITCHER, since Memory Flexer loads and executes this file when it runs. Make sure that you save both programs on the same disk.

How to Switch

Load and run Memory Flexer. The disk drive will run for a few seconds, and then it will ask you for the primary and secondary border colors (0–15). They will change to let you know which bank you are in. The defaults are blue (14) for the primary bank and black (0) for the secondary.

After you've selected the border colors, the screen will clear and you'll be instructed to hit Return five times. Notice that the cursor will jump to five different lines with SYS and other commands. This activates Memory Flexer and clears the program.

To switch between memory banks, simply type *SWAP*. Neither bank will interfere with the other. Each bank can have its own set of variables that will not clear when you switch banks.

Immediately after activating Memory Flexer, it's a good idea to test it by attempting to store a brief program (such as 10 PRINT) in each bank. If you get an *OUT OF MEMORY ERROR* message, Memory Flexer has to "cough." Clear it by typing *NEW* in both banks, and it should run fine.

Disk Operations

One use for Memory Flexer is to simplify disk operations. For instance, if you want to see the directory without erasing a program you are working on, just load the program into the other bank. For another use, you might want to keep a short program to read the error channel in one bank.

Cut-and-Paste Programming

Perhaps the most powerful feature of Memory Flexer is the ability to easily move lines between two programs. You could, for example, create a library of subroutines you often use and simply paste them into programs as you need them.

To move a section of lines, load the program you are copying from into one bank and the program you are copying to into the other. List the lines to be copied, and then swap banks and press Return with the cursor on the lines. If you need more than one screenful, simply repeat the process.

Memory Flexer resides at 53000,

which may conflict with some very long machine language programs that start at 49152. The primary bank is about twice as large as the secondary, so try to keep the longer program there. Also, very large programs may not fit into either bank. Programs saved from the secondary bank must be loaded back in without a ,8,1. Otherwise, they will load into the secondary bank, which is inaccessible without Memory Flexer.

MEMORY FLEXER

```
PK 5 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
      - ALL RIGHTS RESERVED
MD 10 IFA=0THENA=1:LOAD"SWITCH
     ER",8,1
JA 100 OPEN1,0
HG 105 PRINT"{CLR}{6 DOWN}"
QF 195 PRINT
BE 200 PRINTSPC(10)"PRIMARY CO
     LOR #14{2 LEFT}";
CD 210 INPUT#1,C$:PRINT
FG 220 V=VAL(C$):IF V<0ORV>15
     {SPACE}THEN PRINT"{UP}I
     NVALID;{UP}":GOTO200
CM 230 POKE53186,V
GJ 240 PRINTSPC(10)"SECONDARY
     {SPACE}COLOR #0{LEFT}";
CA 250 INPUT#1,C$:PRINT
EK 260 V=VAL(C$):IF V<0ORV>15
     {SPACE}THEN PRINT"{UP}I
     NVALID;{UP}":GOTO200
JJ 270 POKE53205,V
MX 280 PRINT"{CLR}{3 DOWN}SYS
     {SPACE}53000{2 DOWN}"
AM 290 PRINT"NEW{2 DOWN}"
KS 300 PRINT"SWAP{2 DOWN}"
FM 310 PRINT"NEW{2 DOWN}"
AB 320 PRINT"SWAP{2 DOWN}"
GM 330 PRINT"{HOME}PLEASE HIT
     {SPACE}RETURN FIVE TIME
     S."
GG 999 END
```

SWITCHER

```
CF08:20 DA CF 20 94 CF AD 05 AE
CF10:03 8D 37 CF AD 04 03 8D 89
CF18:36 CF A9 25 8D 04 03 A9 7A
CF20:CF 8D 05 03 60 A0 03 B9 21
CF28:00 02 D9 D6 CF D0 06 88 47
CF30:F0 06 4C 27 CF 4C FF FF 75
CF38:A9 3A A0 00 99 00 02 C8 E8
CF40:C0 04 D0 F8 A5 2B CD B0 11
CF48:CF D0 1E A5 2C CD B1 CF ED
CF50:D0 17 4C 55 CF A9 00 8D AF
CF58:20 D0 20 DA CF 20 7D CF B7
CF60:20 E3 CF 20 94 CF 4C 35 B6
CF68:CF A9 01 8D 20 D0 20 E3 BB
CF70:CF 20 7D CF 20 DA CF 20 D8
CF78:94 CF 4C 35 CF A0 00 B9 ED
CF80:2B 00 91 FB C8 C0 0C D0 D9
CF88:F6 B9 75 02 91 FB C8 C0 AF
CF90:10 D0 F6 60 A0 00 B1 FB B5
CF98:99 2B 00 C8 C0 0E D0 F6 33
CFA0:B1 FB 99 73 02 C8 C0 12 49
CFA8:D0 F6 B1 FB 8D 20 D0 60 53
CFB0:01 08 03 08 0A 08 0A 08 40
CFB8:30 75 00 00 30 75 00 08 2D
CFC0:30 75 01 32 75 34 75 3B BB
CFC8:75 3B 75 00 A0 00 00 00 A5
CFD0:A0 31 75 00 A0 00 53 57 BE
CFD8:41 50 A9 B0 85 FB A9 CF AC
CFE0:85 FC 60 A9 C3 85 FB A9 FE
CFE8:CF 85 FC 60 00 00 00 00 77
```

Scott Gifford programs his 64 in Flushing, Michigan.

IRA MINIMUM DISTRIBUTION

By Robert Nellist

The Internal Revenue Service has a well-deserved reputation for writing complex and confusing regulations. It really outdid itself, however, when it wrote the rules governing Individual Retirement Account (IRA) Minimum Distribution.

An IRA owner must start periodic minimum withdrawals from his or her account(s) starting in the year that he or she reaches age 70½—not 70 or 71, mind you, but 70½! The amount that must be withdrawn each year is determined by dividing the combined life expectancy of the owner and the oldest beneficiary into the balance in the account at the end of the preceding year. Combined life expectancy is computed using the ages reached in the year the owner reaches 70½. Depending on his or her month of birth, the owner could reach either 70 or 71 during that year.

To complicate matters even further, life expectancy is almost always expressed in fractions of a year and, in some cases, can be recalculated each year (rather than simply reducing it by one) to attain a slightly lower minimum withdrawal. Finally, if the owner's spouse is not the sole beneficiary, a different set of rules applies.

Of course, you don't have to be too concerned about all this because the institution holding the IRA will undoubtedly figure it for you when the time comes. But if you or a relative or friend would like to know ahead of time what an IRA's minimum distribution schedule will be, Minimum Distribution will print out a personalized, detailed projection based on the answers you give to a few questions. Just answer the questions as you run the program. Having this information in advance could prove important.

Typing It In

Minimum Distribution is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. As always, save a copy before you run it.

Accuracy Considerations

The nearer an IRA owner is to the time when he or she must start periodic withdrawals, the more accurate the projection can be. However, if there will be no further deposits or withdrawals, the program can take the present balance and, using daily compounded interest, predict what the balance will be when its owner reaches 70½—even if that time is several years away. Accuracy will then depend entirely on how well you forecast the interest rate.

The Printout

Let's take a look at a typical printout. Under Account Number and Owner's Name are several of the statistics on which the projection is based. The term *MDIB Applied,* if it appears, indicates that the Minimum Distribution Incidental Benefit Requirement is in effect because the owner's spouse was not named as the sole beneficiary. In this case, the Beneficiary Age In Effect may differ from that person's actual age.

Now look at the projection chart itself. The owner's age is shown and then the year in which each minimum withdrawal must be made. The withdrawal amount appears in the far right column and is obtained by dividing the current life expectancy into the account balance. If the account is earning a decent interest rate, the balance will probably increase for the first few years despite the withdrawals. After studying the chart, an IRA owner may well decide to increase withdrawals in the early years in order to prevent sharply higher minimums in the later years from severely impacting his or her income tax.

A Grace Period

The IRS, in a burst of generosity, has decreed that the withdrawal deadline for the initial year may be delayed until April 1 of the following year without

penalty. After that, however, withdrawals must be completed by December 31 of the year in which they are due.

Limitations

Recalculation (mentioned previously) is not used in this program. It would only reduce minimum withdrawal by a small amount and could cause complications in case of death.

The program can accurately compute combined life expectancy when the oldest beneficiary's age falls between 55 and 90 at the start of mandatory distribution. Anything outside this range would be very unusual.

MINIMUM DISTRIBUTION

```
PK 5 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
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GK 10 CLR:POKE53281,12:POKE532
     80,12:POKE646,11
RG 20 DIM SP$(110),MD$(110),LX
     $(110):T$="00":Q$=".":V$
     =" ":BS$="NO BENEFICIARY
     "
FP 30 FOR X=1 TO 58:DA$=DA$+"=
     ":NEXT
KQ 40 PRINT"{CLR}{2 DOWN} M
     {DOWN} I{DOWN} N{DOWN} I
     {DOWN} M{DOWN} U{DOWN} M
     {DOWN}"SPC(3)"D I S T R
     {SPACE}I B U T I O N"
QE 50 PRINTTAB(3)"{5 DOWN}B Y"
     SPC(5)"R O B E R T
     {2 SPACES}N E L L I S T"
JE 60 PRINTTAB(14)"{5 DOWN}PRE
     SS ANY KEY"
QF 70 WAIT 198,15:GET M$
GD 80 PRINT"{CLR}{2 DOWN}ENTER
      THE IRA ACCOUNT NUMBER"
PB 90 INPUT C$:C$="IRA ACCOUNT
      NO.- "+C$
QS 100 PRINT"{DOWN}ENTER THE I
     RA OWNER'S NAME"
BG 110 INPUT D$:D$="OWNER'S NA
     ME- "+D$:CD=69-LEN(C$+D
     $)
CS 120 PRINT"{DOWN}ENTER THE M
     ONTH AND YEAR THE IRA O
     WNER{2 SPACES}WAS BORN
     {SPACE}- ";
HF 130 PRINT"SEPARATE WITH A C
     OMMA"
JS 140 INPUT"(EXAMPLE - 08,192
     4) ";MA,YA
FC 150 MA=MA+6:YO=YA+70:IF MA>
     12 THEN YO=YO+1
XG 160 OA=YO-YA
GX 170 PRINT "{DOWN}DOES THE A
     CCOUNT NAME AT LEAST ON
     E"SPC(6)"PERSON AS BENE
     FICIARY";
GA 180 PRINT" IN CASE OF THE"S
     PC(4)"OWNERS DEATH?
     {2 SPACES}<Y/N>"
KD 190 GET B$:IF B$="N"AND OA=
     70 THEN LX=16.0:BA$=" N
     O":GOTO 300
JJ 200 IF B$="N"AND OA=71 THEN
      LX=15.3:BA$=" NO":GOTO
      300
CK 210 IF B$<>"Y"THEN 190
BB 220 PRINT"{DOWN}ENTER THE Y
     EAR OF BIRTH OF THE OLD
     EST"SPC(3)"BENEFICIARY"
KJ 230 INPUT"(EXAMPLE - 1927)"
     ;YB:BA=YO-YB:IF BA>90 T
     HEN BA=90
DB 240 IF BA<55 THEN BA=55
PM 250 PRINT"{DOWN}IS THE OWNE
     R'S SPOUSE THE SOLE"SPC
     (10)"BENEFICIARY?
     {2 SPACES}<Y/N>"
MG 260 GET BS$:IFBS$<>"N"AND B
     S$<>"Y"THEN 260
RH 270 IF BS$="N"AND OA=70 AND
      BA<60 THEN BA=60
PK 280 IF BS$="N"AND OA=71 AND
      BA<61 THEN BA=61
GC 290 BA$=STR$(BA):GOSUB 1010
     :REM-COMPUTE LIFE EXPEC
     TANCY
QF 300 PRINT"{CLR}{2 DOWN}THE
     {SPACE}NEXT QUESTION AS
     KS FOR THE ESTIMATEDIRA
      BALANCE AT THE";
KM 310 PRINT" END OF"YO-1:PRIN
     T"THE PROGRAM WILL PROJ
     ECT THIS FOR YOU
     {2 SPACES}";
AD 320 PRINT" (USING DAILY COM
     POUNDED INTEREST) PROVI
     -DING THERE WILL BE NO
     {SPACE}";
HJ 330 PRINT"FURTHER DEPOSITS,
      WITHDRAWALS, OR CHANGE
      IN THE INTEREST
     {2 SPACES}RATE. "
JK 340 PRINT"{DOWN}DO YOU WANT
      THIS PROJECTION?
     {2 SPACES}<Y/N>"
HH 350 GET PR$:IF PR$="N"THEN
     {SPACE}490
RX 360 IF PR$<>"Y"THEN 350
DE 370 PRINT"{CLR}{DOWN}"TAB(1
     0)"SPECIAL COMPUTATION"
GF 380 PRINT"{2 DOWN}ENTER THE
      PRESENT YEAR"
CG 390 INPUT"(EXAMPLE - 1993)"
     ;PY
CB 400 PRINT"{2 DOWN}ENTER THE
      BALANCE IN THE ACCOUNT
      AT THE END OF"PY-1
CX 410 INPUT"(EXAMPLE - 50546.
     00)";CB$:SP=VAL(CB$)
XK 420 PRINT"{2 DOWN}ENTER THE
      CURRENT INTEREST RATE
     {SPACE}THE"SPC(5)"ACCOU
     NT IS EARNING"
BK 430 INPUT"(EXAMPLE - 5.5)";
     IR:IR$=STR$(IR):IR=IR/1
     00
QP 440 PRINT"{CLR}{2 DOWN}"TAB
     (13)"PLEASE WAIT":PRINT
     :YL=YO-PY
JJ 450 FOR R=1 TO YL:GOSUB980:
     PRINT:NEXT:REM-DAILY CO
     MPOUNDING
XF 460 PP$=STR$(SP):IF SP=INT(
     SP)THEN PP$=PP$+Q$
CD 470 PP$=PP$+T$:V=LEN(STR$(I
     NT(SP))):PP$=LEFT$(PP$,
     V+3)
QM 480 PRINT"{CLR}{2 DOWN}"TAB
     (5)"PROJECTED BALANCE -
     "PP$:GOTO 510
KQ 490 PRINT"{CLR}{2 DOWN}ENTE
     R THE ACCOUNT'S ESTIMAT
     ED BALANCE ATTHE END OF
     "YO-1
PS 500 INPUT"(EXAMPLE - 65432.
     00){2 SPACES}";PP$:SP=V
     AL(PP$):PP$=V$+PP$
PJ 510 PRINT"{2 DOWN}ENTER THE
      ESTIMATED YEARLY INTER
     EST RATETHE ACCOUNT IS
     {SPACE}EXPECTED ";
HP 520 PRINT"TO EARN OVER THEP
     AYOUT YEARS"
DJ 530 INPUT "(EXAMPLE - 7.55)
     {2 SPACES}";IR:IN$=STR$
     (IR):IF IR=INT(IR)THEN
     {SPACE}IN$=IN$+".0"
DE 540 PRINT"{CLR}":NY=INT(LX)
     :IF LX=NY THEN NY=NY-1
EQ 550 IR=IR/100:SY=YO
FR 560 FORX=OA TO OA+NY:IF LX<
     1THEN LX=1
KP 570 MD=SP/LX:LX$=STR$(LX)+Q
     $+T$:IF LX<10THEN LX$=V
     $+LX$
GG 580 LX$(X)=LEFT$(LX$,5)
SJ 590 MD=SP/LX:SP$(X)=STR$(SP
     ):MD$(X)=STR$(MD)
QM 600 IF SP<100000 THEN SP$(X
     )=V$+SP$(X)
KB 610 IF SP<10000 THEN SP$(X)
     =V$+SP$(X)
RF 620 IF MD<10000 THEN MD$(X)
     =V$+MD$(X)
BR 630 IF MD<1000 THEN MD$(X)=
     V$+MD$(X)
KA 640 IF MD=INT(MD)THEN MD$(X
     )=MD$(X)+Q$
CS 650 IF SP=INT(SP)THEN SP$(X
     )=SP$(X)+Q$
RC 660 MD$(X)=LEFT$(MD$(X)+T$,
     9):SP$(X)=LEFT$(SP$(X)+
     T$,10)
AP 670 PRINT X;TAB(4)SY;TAB(10
     )SP$(X)TAB(22)LX$(X)TAB
     (29)MD$(X)
PS 680 IF X=OA+NY THEN 710
SK 690 GOSUB 980:REM-DAILY COM
     PUNDING
QC 700 SP=SP-MD:LX=LX-1:SY=SY+
```

```
        1
XH 710 NEXT:PRINT"{2 DOWN}"SPC
       (10)"PRESS P FOR PRINTO
       UT"
BB 720 GET M$:IF M$<>"P"THEN 7
       20
JJ 730 OPEN4,4:IF BS$="Y"THEN
       {SPACE}BS$="{2 SPACES}S
       POUSE ONLY "
GB 740 IF BS$="N"THEN BS$=" MD
       IB APPLIED "
MS 750 PRINT#4,""SPC(3)"M I N
       {SPACE}I M U M"SPC(3)"D
        I S T R I B U T I O N"
       SPC(3);
EA 760 PRINT#4,"P R O J E C T
       {SPACE}I O N"SPC(3)"C H
        A R T"
QK 770 PRINT#4:PRINT#4:PRINT#4
       ,""SPC(5)C$;""SPC(CD)D$
PF 780 PRINT#4:PRINT#4,""SPC(5
       )"OWNER'S AGE AT END OF
       "YO"-"OA;
RC 790 PRINT#4,""SPC(8)"BENEFI
       CIARY AGE IN EFFECT-"BA
       $:IF PR$="N" THEN 820
GS 800 PRINT#4:PRINT#4,""SPC(5
       )"SPECIAL COMPUTATION O
       PTION - ";
PS 810 PRINT#4,CB$" FOR"YL"YEA
       RS @"IR$"% ="PP$
DJ 820 PRINT#4:PRINT#4,""SPC(5
       )"BALANCE AT END OF"YO-
       1"-"PP$;
QD 830 PRINT#4,""SPC(9)"ANNUAL
        INTEREST RATE-"IN$" %"
       :PRINT#4
HM 840 PRINT#4,""SPC(5)"NO REC
       ALCULATION"SPC(11)BS$""
       SPC(11)"DAILY COMPOUNDI
       NG"
EF 850 PRINT#4:PRINT#4:PRINT#4
       :PRINT#4,""SPC(10)"AGE"
       SPC(6)"YEAR";
JQ 860 PRINT#4,""SPC(8)"ACCOUN
       T"SPC(7)"LIFE"SPC(7)"MI
       NIMUM"
JH 870 PRINT#4,""SPC(31)"BALAN
       CE"SPC(7)"EXPECT."SPC(4
       )"DISTRIBUTION"
CM 880 PRINT#4,""SPC(10)DA$:PR
       INT#4
SA 890 FOR Z=OA TO OA+NY
KX 900 PRINT#4,""SPC(9)Z""SPC(
       5)YO""SPC(5)SP$(Z)""SPC
       (5)LX$(Z);""SPC(5)MD$(Z
       )
PH 910 YO=YO+1
HF 920 NEXT:CLOSE4
GQ 930 PRINT"{CLR}{DOWN}"TAB(1
       1)"PLEASE CHOOSE ONE"
RM 940 PRINTTAB(6)"{2 DOWN}P =
        PROCESS ANOTHER ACCOUN
       T":PRINTTAB(6)"{DOWN}Q
       {SPACE}= QUIT"
PE 950 GET M$:IF M$="P"THEN 10
BK 960 IF M$="Q"THEN SYS64738
XF 970 GOTO 950
MX 980 FOR Y=1 TO 365:REM-DAIL
       Y COMPOUNDING LOOP
EQ 990 DY=(SP*IR)/365:SP=SP+DY
       :PRINTTAB(16)"{RVS}"Y"
       {UP}"
SF 1000 NEXT:RETURN
XF 1010 IF OA=70 THEN 1030:REM
       -LIFE EXPECTANCY COMPU
       TATION
PB 1020 FOR X=1 TO 36:READ LL:
       NEXT
XB 1030 FOR X=55 TO 90:READ LL
BQ 1040 IF X=BA THEN LX=LL:X=9
       0
RK 1050 NEXT:RETURN
SE 1060 DATA29.9,29.1,28.4,27.
       6,26.9,26.2,25.6,24.9,
       24.3,23.7,23.1,22.5,22
       .0,21.5
SS 1070 DATA21.1,20.6,30.2,19.
       8,19.4,19.1,18.8,18.5,
       18.3,18.0,17.8,17.6,17
       .4,17.3
BG 1080 DATA17.1,17.0,16.9,16.
       8,16.7,16.6,16.5,16.5
SQ 1090 DATA29.7,29.0,28.2,27.
       5,26.7,26.0,25.3,24.7,
       24.0,23.4,22.8,22.2,21
       .7,21.2
HR 1100 DATA20.7,20.2,19.8,19.
       4,19.0,18.6,18.3,18.0,
       17.7,17.5,17.2,17.0,16
       .8,16.6
SH 1110 DATA16.5,16.3,16.2,16.
       1,16.0,15.9,15.8,15.8
```

Robert Nellist, the author of Ancestry (January 1993), lives in Brockport, New York.

SNAKEY

By Farid Ahmad

Snakey is a game that can help you increase your typing speed. At the lowest level, Snakey can be played by children who are just learning their way around the keyboard; the most difficult level should give even experienced typists a workout.

Snakey consists of a BASIC program and a machine language program. To help prevent typing errors, enter the BASIC program with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save the program before you try to run it. Save both programs on the same disk.

Use MLX, our machine language entry program, to enter the machine language portion. Again, see "Typing Aids." When MLX prompts, reply with the following addresses.

Starting address: CC08
Ending address: CECF

Be sure to save this program with the filename SNAKEY.ML. The BASIC portion loads this file when it runs.

Starting Options

When you run the game, you're first asked to choose a level of difficulty. The game then asks you for the keys on which you want to practice. You can choose alphabet only, numbers only, full keyboard, or specific keys.

If you choose to define specific keys, you're taken to a new screen where you can edit previously entered keys or enter new ones. You cannot enter spaces, as they would not be visible on the game screen.

Gameplay

Once you have made your selections, the actual game starts. Characters start to flow from the left side of the screen, rather like a snake crawling out of a basket. This "snake" of characters makes its way toward the right edge of the screen. The object of the game is to force Snakey back into its basket. To do this, you must type the letter at Snakey's head. But hurry. If you take too long, Snakey will grow another character at its head, and you'll have to type it instead. If Snakey reaches the other side of the screen, you lose.

At each level, Snakey grows at a specific rate, giving you time to react. Should you type in a wrong character, however, Snakey grows immediately. This means that if you start pressing keys randomly, Snakey will grow very quickly, even at the easier levels.

The computer will inform you when you have lost or won. If your score is the highest so far, it will also ask for your name. A separate high-score record is kept for each level and is displayed at the top of the screen during the game.

Modifying Snakey

You can easily change the initial length and reaction time associated with each level. List the program from line 1300 to line 1390. Increase the RT variable to increase reaction time, making the level easier. Increase the RS variable to increase Snakey's initial

length, making the level more difficult.

You can also change the string that is used as the default for the Define Keys option. Just change the variable TS$ in line 1110.

SNAKEY

```
BM 0 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
     - ALL RIGHTS RESERVED
PD 5 IF ML=0 THEN ML = 1:PRINT
     "{CLR}LOADING ML....":LOA
     D"SNAKEY.ML",8,1
FS 10 QQ=52232
FF 20 :
FG 30 GOSUB1010:REM "INITIALIZ
     E
JS 40 GOSUB1590
PD 50 GOSUB1260:REM "OPTIONS
ME 60 PO=0
BD 70 PRINT"{CLR}":SYSQQ,5,08:
      PRINT"PRESS ANY KEY WHEN
       READY":POKE198,0:WAIT19
      8,1
SA 80 GOSUB880:REM "DRAW SCREE
     N
QR 90 TI$="000000"
QX 100 GOSUB210:REM "UPDATE
JJ 110 IF PO=GL THEN GOTO580
BB 120 GOSUB380:REM "GET INPUT
KG 130 GOSUB460:REM "CHECK IT
PR 140 IF PO<>0THEN100
JD 150 CT$=TI$:GOTO680
HP 160 :
SR 200 REM-UPDATE:SELECTS AND
      {SPACE}PRINTS THE NEXT
      {SPACE}CHARACTER+MAKES
      {SPACE}SOUND
QJ 210 CC=PX(PO):PO=PO+1:IFPO=
      GLTHEN RETURN
BC 220 X=RND(1):X=X*TL+1
FP 230 XX=RND(1):XX=INT(XX*2)
XP 240 IFXX=0THENCC=CC+1:IFCC>
      22THENCC=21
FC 250 IFXX=1THEN{2 SPACES}CC=
      CC-1:IFCC<2 THENCC=3
SJ 260 PX(PO)=CC
SR 270 SNAKE$(PO)=MID$(TS$,X,1
      )
KC 280 SYSQQ,CC,PO:PRINTSNAKE$
      (PO)
SC 290 POKESS+1,X+50
PM 300 POKESS+4,17:FOR RR= 1 T
      O 5{2 SPACES}:NEXT
AM 310 POKESS+4,16
XM 320 RETURN
JF 330 :
XJ 370 REM-GET INPUT:GET INPUT
       FROM PLAYER
SE 380 R=0
CB 390 GET RE$:IFRE$<>""THEN41
      0
DA 400 R=R+1 :IF R<>RT THEN390
EX 410 RETURN
HP 420 :
KD 450 REM-CHECK IT :RETRUNS W
      HEN THERE IS WRONG RESP
      ONSE OR WHEN GAME IS OV
      ER
KS 460 IF RE$<>SNAKE$(PO)THEN
      {3 SPACES}RETURN
FH 470 SYSQQ,PX(PO),PO:PRINT"
      {SPACE}"
BQ 480 POKESS+1,PO*2+22
GG 490 POKESS+4,033:FOR RR= 1
      {SPACE}TO 5{2 SPACES}:N
      EXT
DD 500 POKESS+4,032
HA 510 PO=PO-1:IF PO<>0THENGOS
      UB380:GOTO460
EG 520 RETURN
BC 530 :
RA 570 REM-LOST
SE 580 SYSQQ,06,12:PRINT"{CLR}
      SORRY, YOU LOST"
AM 590 SYSQQ,08,08:PRINT"WHY D
      ON'T YOU TRY AGAIN ??"
CQ 600 GOTO770
GH 610 :
FB 670 REM-WON
DR 680 CC$=MID$(CT$,3,2)+":"+R
      IGHT$(CT$,2)
FA 690 SYSQQ,06,12:PRINT"{CLR}
      YOU DID IT!
JF 700 SYSQQ,08,08:PRINT"YOUR
      {SPACE}TIME WAS : "CC$
HD 710 IF CT$=>BT$(LE) THEN770
HQ 720 SYSQQ,12,0:PRINT"WOW!!
      {SPACE}THIS IS A NEW RE
      CORD AT LEVEL";LE
DX 730 SYSQQ,15,05:PRINT"WHAT
      {SPACE}IS YOUR NAME ";
DG 740 R1$="{2 SPACES}AZ":GOSU
      B1690
MR 750 R1$="":SYSQQ,15,23,6,R1
      $:BP$(LE)=R1$
PX 760 BT$(LE)=CT$:BB$(LE)=CC$
FQ 770 SYSQQ,20,0:PRINT"PRESS
      {SPACE}SPACE BAR TO CHA
      NGE OPTIONS
GP 780 SYSQQ,21,0:PRINT"
      {6 SPACES}OR ANY OTHER
      {SPACE}KEY TO PLAY AGAI
      N"
QD 790 SYSQQ,22,0:PRINT"
      {6 SPACES}WITH SAME SET
      TINGS
BP 800 POKE198,0:WAIT198,1:GET
       R$
DB 810 IF R$=" " THEN PRINT"
      {CLR}":{2 SPACES}GOTO50
GJ 820 GOTO60
BF 830 :
BX 870 REM-DRAW SCREEN
GH 880 SYSQQ,0,00:PRINT"{CLR}L
      EVEL=";LE
MC 890 SYSQQ,0,12:PRINT"BEST T
      IME ";BB$(LE)
BJ 900 SYSQQ,0,28:PRINT"BY ";B
      P$(LE)
DX 910 SYSQQ,10,0:PRINT"Q"
EP 920 FORR=1TO22:SYSQQ,R ,39:
      PRINT"Q":NEXT
ER 930 FORR =1TORS:GOSUB210:NE
      XT
XD 940 POKE198,0
CD 950 RETURN
JR 960 :
PH 1000 REM-INITIALIZE
RA 1010 POKE53280,0:POKE53281,
      0:
AS 1020 PRINT"{WHT}" :X=RND(-T
      I)
KQ 1030 DIM SNAKE$(50):REM CON
      TAINS THE ALPHBETS PUT
       ON THE SCREEN
SX 1040 DIMPX(50)
EQ 1050 PX(0)=10{5 SPACES}:REM
       ROW ON WHICH SNAKEOF
      {SPACE}COLUMN X IS PUT
BK 1060 CC=10:REM THE CURRENT
      {SPACE}ROW
HS 1070 PO=0 :REM THE CURRENT
      {SPACE}COLUMN
XH 1080 GL=39:REM GAME LOST
KH 1090 S1$="ABCDEFGHIJKLMNOPQ
      RSTUVWXYZ"
MS 1100 S2$="0123456789"
SF 1110 TS$="SNAKEY"
BQ 1120 FOR R= 0TO09:BT$(R)="9
      91000":BB$(R)="10:00":
      BP$(R)="UMARA":NEXT
XH 1130 :
XX 1140 REM-SOUND
SC 1150 FOR R=54272 TO 54296:P
      OKER,0:NEXT:SS=54272
GA 1160 POKE SS,255
KQ 1170 POKE SS+24,15:REM VOLU
      ME
QX 1180 POKESS+5,10*16+01:REM
      {SPACE}ATT/DELAY
AH 1190 POKESS+6,15*16+1 :REM
      {SPACE}SUS/REL
PP 1200 RETURN
DQ 1210 :
DJ 1250 REM-OPTIONS
RM 1260 RT=0
DD 1270 SYSQQ,4,4:PRINT"{CLR}C
      HOOSE LEVEL (0-9)
BK 1280 SYSQQ,5,4:PRINT"(0 IS
      {SPACE}EASY : 9 IS HAR
      D)
XR 1290 POKE198,0:WAIT198,1:GE
      T LE$:LE=VAL(LE$)
QX 1300 IF LE=0THENRT=150:RS=7
MX 1310 IF LE=1THENRT=100:RS=1
      0
XE 1320 IF LE=2THENRT=80:RS=11
RG 1330 IF LE=3THENRT=70:RS=12
PA 1340 IF LE=4THENRT=60:RS=13
KC 1350 IF LE=5THENRT=50:RS=14
GP 1360 IF LE=6THENRT=45:RS=15
KB 1370 IF LE=7THENRT=40:RS=20
SB 1380 IF LE=8THENRT=30:RS=20
DB 1390 IF LE=9THENRT=20:RS=20
XX 1400 IF RS>37 THEN RS = 37
EG 1410 IF RT=0THEN1290
SG 1420 PRINT:PRINTTAB(4)LE
CM 1430 :
SF 1440 XR=12:XC=3
```

```
QS 1450 SYSQQ,XR,XC:PRINT"CHOO
        SE KEYS TO BE USED"
PG 1460 SYSQQ,XR+2,XC+3:PRINT"
        {RVS}A{OFF}LPHABETS ON
        LY
QS 1470 SYSQQ,XR+3,XC+3:PRINT"
        {RVS}N{OFF}UMBERS ONLY
QA 1480 SYSQQ,XR+4,XC+3:PRINT"
        {RVS}B{OFF}OTH
DA 1490 SYSQQ,XR+5,XC+3:PRINT"
        {RVS}D{OFF}EFINED
KR 1500 POKE198,0:WAIT198,1:GE
        TT$
BF 1510 IFT$="A"THEN TS$= S1$:
        GOTO1580
SA 1520 IFT$="N"THEN TS$= S2$:
        GOTO1580
GM 1530 IFT$="B"THEN TS$= S1$+
        S2$:GOTO1580
JS 1540 IFT$<>"D"THEN GOTO1500
QX 1550 REM-Z
EK 1560 PRINT"{CLR}":R1$="!{*}
        {K}{B}":GOSUB1690
RQ 1570 PRINT"{CLR}":GOSUB1690
        :SYSQQ,0,0,200,TS$
QR 1580 TL=LEN(TS$):RETURN
KG 1590 PRINT"{CLR}":SYSQQ,0,1
        3:PRINT"S N A K E Y"
GE 1600 PRINT"{2 DOWN}SNAKEY H
        AS JUST COME OUT OF IT
        'S BASKET.
QX 1610 PRINT"YOU MUST HELP PU
        T IT BACK IN BY TYPING
FE 1620 PRINT"{DOWN}THE CHARAC
        TER AT IT'S HEAD.
DA 1630 PRINT"{DOWN}BUT HURRY
        {SPACE}UP, IF SNAKEY M
        AKES IT TO
DJ 1640 PRINT"{DOWN}THE WALL O
        N THE OTHER SIDE, YOU
        {SPACE}WILL
DQ 1650 PRINT"{DOWN}NEVER BE A
        BLE TO CATCH UP WITH I
        T!
XP 1660 SYSQQ,23,13:PRINT"PRES
        S ANY KEY":POKE 198,0:
        WAIT198,1
EP 1670 RETURN
AG 1680 REM-XINPUT
RM 1690 R1 = LEN(R1$):POKE5294
        0,R1/2
AA 1700 FOR R2 = 1 TO R1
FG 1710 POKE 52940 + R2, ASC(M
        ID$(R1$,R2,1))
MP 1720 NEXT R2
CQ 1730 RETURN
```

SNAKEY.ML

```
CC08:20 FD AE 20 9E B7 86 02 EB
CC10:20 FD AE 20 9E B7 8A A8 A2
CC18:84 03 A6 02 E0 19 B0 3D B3
CC20:C0 28 B0 39 18 20 F0 FF F0
CC28:18 A9 00 65 03 85 FD A9 62
CC30:04 69 00 85 FE A5 02 F0 02
CC38:11 18 A5 FD 69 28 85 FD E9
CC40:A5 FE 69 00 85 FE C6 02 51
CC48:D0 EF A0 00 B1 7A C9 2C 91
CC50:F0 01 60 20 FD AE 20 9E 3A
CC58:B7 E0 02 B0 05 A2 0E 4C 6C
CC60:37 A4 CA 8E C9 CE 18 A5 60
CC68:FD 6D C9 CE 85 FB A5 FE E8
CC70:69 00 85 FC A5 FC C9 07 FA
CC78:F0 04 B0 0C 90 0D A5 FB 62
CC80:C9 E7 F0 07 B0 02 90 03 39
CC88:4C 5D CC AD CC CE C9 1A 63
CC90:90 05 A9 00 8D CC CE AC D2
CC98:C9 CE A9 A0 91 FD A9 20 02
CCA0:99 FF CE 88 D0 F4 99 FF F6
CCA8:CE A9 A0 91 FD 8C C7 CE C1
CCB0:20 FD AE 20 8B B0 A6 0D 2B
CCB8:E8 F0 05 A2 16 4C 37 A4 C2
CCC0:A5 5F 85 FB A5 60 85 FC 2C
CCC8:A0 02 B1 FB CD C9 CE 90 EC
CCD0:05 AE C9 CE E8 8A 8D C8 14
CCD8:CE AA F0 28 C8 B1 FB 85 AF
CCE0:04 C8 B1 FB 85 05 A0 00 26
CCE8:84 03 8C CA CE A4 03 B1 84
CCF0:04 AC CA CE 20 07 CD E8 9F
CCF8:F0 01 C8 E6 03 A5 03 CD 55
CD00:C8 CE D0 E6 4C 83 CD 84 CC
CD08:02 AC CC CE F0 1C A2 01 94
CD10:DD CC CE B0 04 E8 4C 21 30
CD18:CD E8 DD CC CE 90 0B F0 1D
CD20:09 E8 88 D0 EB A4 02 A2 31
CD28:FF 60 A4 02 99 FF CE C9 C4
CD30:40 90 0D C9 C0 B0 06 38 5B
CD38:E9 40 4C 40 CD 38 E9 80 0A
CD40:09 80 91 FD A2 00 60 AC 15
CD48:C7 CE B1 FD 49 80 91 FD FE
CD50:60 20 47 CD A9 00 85 C6 09
CD58:85 02 AA 85 03 E6 02 D0 6D
CD60:0C E8 E0 3B D0 07 20 47 36
CD68:CD E6 03 A2 00 A5 C6 F0 44
CD70:EC A5 03 4A B0 03 20 47 0A
CD78:CD AD 77 02 C9 A0 D0 02 E9
CD80:A9 20 60 20 51 CD C9 1D 79
CD88:D0 0E AD C7 CE CD C9 CE 52
CD90:B0 F1 EE C7 CE 4C 83 CD D7
CD98:C9 9D D0 0D AD C7 CE C9 5F
CDA0:00 F0 E0 CE C7 CE 4C 83 17
CDA8:CD AE C9 CE E0 28 90 38 FD
CDB0:C9 91 D0 13 AD C7 CE C9 D4
CDB8:28 90 C8 38 AD C7 CE E9 3D
CDC0:28 8D C7 CE 4C 83 CD C9 8F
CDC8:11 D0 1D 38 AD C9 CE E9 64
CDD0:27 8D CB CE AD C7 CE CD C1
CDD8:CB CE B0 A7 18 AD C7 CE 74
CDE0:69 28 8D C7 CE 4C 83 CD E5
CDE8:C9 14 D0 2B AE C7 CE F0 5E
CDF0:F4 8A A8 CA B1 FD 88 91 93
CDF8:FD C8 B9 FF CE 9D FF CE B8
CE00:E8 C8 EC C9 CE 90 ED 88 9B
CE08:A9 A0 91 FD A9 20 99 FF B5
CE10:CE CE C7 CE 4C 83 CD C9 84
CE18:94 D0 45 AC C9 CE B1 FD 92
CE20:C9 A0 F0 03 4C 83 CD AE D3
CE28:C9 CE CA 8A A8 E8 38 ED A7
CE30:C7 CE 8D CA CE EE CA CE 5A
CE38:A9 00 85 02 B1 FD C8 91 24
CE40:FD 88 B9 FF CE 9D FF CE F1
CE48:CA 88 E6 02 A5 02 CD CA 06
CE50:CE D0 E9 C8 A9 A0 91 FD 44
CE58:A9 20 99 FF CE 4C 83 CD 82
CE60:C9 0D D0 03 4C 7B CE AC 0B
CE68:C7 CE 20 07 CD E8 F0 08 0E
CE70:CC C9 CE B0 03 4C 92 CD 08
CE78:4C 83 CD AC C9 CE B9 FF 9E
CE80:CE C9 20 D0 04 88 4C 7E 62
CE88:CE C8 8C C8 CE D0 07 84 2A
CE90:04 84 05 4C B5 CE 38 A5 B5
CE98:33 ED C8 CE 85 33 85 04 59
CEA0:A5 34 E9 00 85 34 85 05 68
CEA8:A0 00 B9 FF CE 91 04 C8 5B
CEB0:CC C8 CE D0 F5 A0 02 AD B1
CEB8:C8 CE 91 FB C8 A5 04 91 D6
CEC0:FB C8 A5 05 91 FB 60 00 D0
CEC8:01 C7 00 A0 02 00 00 00 F2
```

Farid Ahmad is a frequent contributor. He lives Islamabad, Pakistan. ❐

ATTENTION USER GROUPS!

WE WANT TO HEAR FROM YOU!

Gazette will soon publish an up-to-date list of all Commodore 64/128 user groups across the U.S., throughout Canada, and around the world. We are now in the process of updating this information. If your user group has not appeared in any of our previous lists and you'd like to be included, please send your club name, address, and bulletin board service telephone number to the following address.

Commodore 64/128
User Group Update
COMPUTE's Gazette
324 W. Wendover Ave., Ste. 200
Greensboro, NC 27408

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and The Automatic Proofreader are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each Gazette Disk and are printed in all issues of *Gazette* through June 1990.

We'll send you a free printed copy if you send an SASE to Typing Aids, COMPUTE's Gazette 324 West Wendover Avenue, Suite 200k, Greensboro, North Carolina 27408.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

THE AUTOMATIC PROOFREADER

The Automatic Proofreader helps you type in program listings for the 128 and 64 and prevents nearly every kind of typing mistake.

Type in Proofreader exactly as listed. Because the program can't check itself, be sure to enter each line carefully to avoid typographical errors or other mistakes. Don't omit any lines, even if they contain unusual commands. After you've finished, save a copy of the program before running it.

Next, type *RUN* and press Return. After the program displays the message *Proofreader Active*, you're ready to type in a BASIC program.

Every time you finish typing a line and press Return, Proofreader displays a two-letter checksum in the upper left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, the line probably was typed correctly. If not, check for your mistake and correct the line. Also, be sure not to skip any lines.

Proofreader ignores spaces not enclosed in quotation marks, so you can omit or add spaces between keywords and still see a matching checksum. Spaces inside quotes are almost always significant, so the program pays attention to them.

Proofreader does not accept keyword abbreviations (for example, ? instead of PRINT). If you use abbreviations, you can still check the line by listing it, moving the cursor back to the line, and pressing Return.

If you're using Proofreader on the 128, do not perform any GRAPHIC commands while Proofreader is active. When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing Proofreader to crash. The same thing happens if you run any program with a GRAPHIC command while Proofreader is in memory.

Though Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. To disable it, turn the computer off and then on. A gentler method is to SYS to the computer's built-in reset routine (65341 for the 128, 64738 for the 64).

AUTOMATIC PROOFREADER

```
0 CLR
10 VE=PEEK(772)+256*PEEK(773):
     LO=43:HI=44:PRINT"{CLR}
     {WHT}AUTOMATIC PROOFREAD
     ER FOR ";
20 IF VE=42364 THEN PRINT "64"
30 IF VE=17165 THEN LO=45:HI=4
     6:WAIT CLR:PRINT"128"
40 SA=(PEEK(LO)+256*PEEK(HI))+
     6:FOR J=SA TO SA+166:REA
     D B:POKE J,B:CH=CH+B:NEX
     T
50 IF CH<>20570 THEN PRINT "*E
     RROR* CHECK TYPING IN DA
     TA STATEMENTS":END
60 FOR J=1 TO 5:READ RF,LF,HF:
     RS=SA+RF:HB=INT(RS/256):
     LB=RS-(256*HB)
70 CH=CH+RF+LF+HF:POKE SA+LF,L
     B:POKE SA+HF,HB:NEXT
80 IF CH<>22054 THEN PRINT "*E
     RROR* RELOAD PROGRAM AND
      CHECK FINAL LINE":END
90 IF VE=17165 THEN POKE SA+14
     ,22:POKE SA+18,23:POKESA
     +29,224:POKESA+139,224
100 POKE SA+149,PEEK(772):POKE
      SA+150,PEEK(773):PRINT"
     {CLR}PROOFREADER ACTIVE"
110 SYS SA:POKE HI,PEEK(HI)+1:
     POKE (PEEK(LO)+256*PEEK(
     HI))-1,0:NEW
120 DATA120,169,73,141,4,3,169
     ,3,141,5,3,88,96,165,20,
     133,167
130 DATA165,21,133,168,169,0,1
     41,0,255,162,31,181,199,
     157,227
140 DATA3,202,16,248,169,19,32
     ,210,255,169,18,32,210,2
     55,160
150 DATA0,132,180,132,176,136,
     230,180,200,185,0,2,240,
     46,201
160 DATA34,208,8,72,165,176,73
     ,255,133,176,104,72,201,
     32,208
170 DATA7,165,176,208,3,104,20
     8,226,104,166,180,24,165
     ,167
180 DATA121,0,2,133,167,165,16
     8,105,0,133,168,202,208,
     239,240
190 DATA202,165,167,69,168,72,
     41,15,168,185,211,3,32,2
     10,255
200 DATA104,74,74,74,74,168,18
     5,211,3,32,210,255,162,3
     1,189
210 DATA227,3,149,199,202,16,2
     48,169,146,32,210,255,76
     ,86,137
220 DATA65,66,67,68,69,70,71,7
     2,74,75,77,80,81,82,83,8
     8
230 DATA 13,2,7,167,31,32,151,
     116,117,151,128,129,167,
     136,137
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ONLY ON DISK

Here are the bonus programs that you'll find on this month's Gazette Disk.

Mutate
By Gary Noakes
Landover, MD

With its built-in capacity to connect directly to a television or VCR, your 64 can easily create professional-looking titles and sequences for your home videos. Mutate is a sophisticated but user-friendly program that makes it possible. Use the menu to select different fonts and video effects such as blanks, scrolls, and wipes. Mutate does all the work for you. Three help screens are always on hand to give descriptions of each menu function.

128 Utilities
By Eliud Campos Rivera
Arecibo, PR

This disk utility for the 128 is menu-driven. Simply move the cursor to the desired selection and press Return to delete files, format a disk, rename files, or copy programs to the same disk or to a different disk. It sorts directories, retrieves deleted files, and more.

You can have these programs and all the others that appear in this issue by ordering the April Gazette Disk. The price is $9.95 plus $2.00 shipping and handling. Send your order to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

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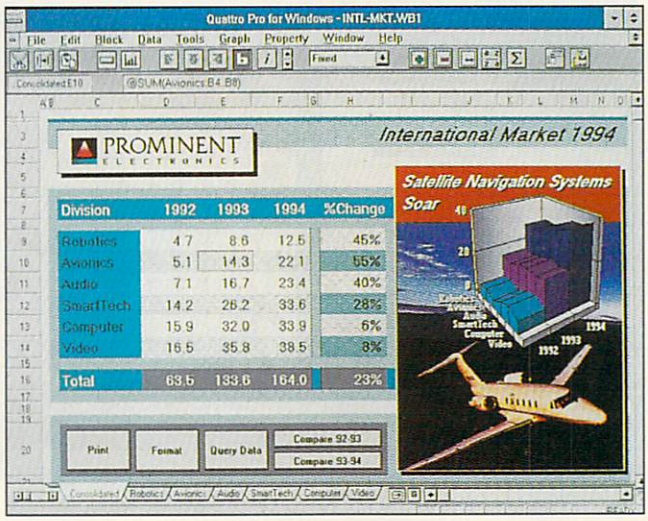
QUATTRO PRO FOR WINDOWS

A spreadsheet is like a soft, comfortable armchair: Once you've spent years sitting in such a chair, it's hard to switch, even if the new one's better for your back. Switching spreadsheet programs can also be quite unsettling after you've learned all the ins and outs of your old one and created complex spreadsheets with it. The good news is that moving from a DOS spreadsheet to Quattro Pro for Windows is not too traumatic. And moving from Quattro Pro for DOS to Quattro Pro for Windows will present few, if any, problems. Experienced Quattro Pro for DOS users will find much familiar in the new Windows version, as well as plenty of new features and capabilities.

The first time you launch Quattro Pro, you'll notice the new Windows interface, the notebook design, and a SpeedBar, Borland's version of the push-button icons that have become standard for Windows applications. Quattro Pro for DOS users will notice that some of the menu items have been rearranged to make them more consistent with other Windows applications. If you've been using Quattro Pro for DOS, Borland recommends that you keep using the DOS version while learning the Windows version. Good advice, since some tasks are accomplished quite differently. But given all the additional versatility and features of Quattro Pro for Windows and the short learning curve to get up to speed, most users will soon move over to this new version.

The notebook feature is what separates Quattro Pro from other Windows spreadsheets. Simply stated, each spreadsheet document (notebook) has 256 spreadsheets (pages) that can either be used together to help organize and manage multiple pages or used separately. Each notebook comes with tabs at the bottom of the screen to make moving from one page of the notebook to another fast and easy. Customizing the tabs to meaningful names is as simple as clicking the right mouse button on the appropriate tab.



It's an easy move from other programs to Quattro Pro for Windows.

The purpose of the notebook is to make organizing your spreadsheets easier. Although working with the notebook is easy and does offer some convenience, most users will opt to have separate files for most of their work and not take full advantage of the convenience of the multiple pages until they've used Quattro Pro for a while.

The multiple-page notebook does offer a tremendous advantage over linked spreadsheets. This is especially true if you keep track of monthly expenses or sales, or if you keep track of anything on a periodic basis. That's because the notebook makes linking information between pages easy. Pages of a notebook can also be grouped, allowing you to enter data or labels onto one page and have them appear on all the grouped pages—much easier than having to copy data from one sheet to another.

Quattro Pro's SpeedBar is just what experienced Windows users have come to expect: easy access to the most often used commands. The SpeedBar can be customized, although other products I've used make the task of customizing the icons easier. Some of the features on the SpeedBar are better than those on other products I've seen, such as the ability to widen a column to a width as large as the widest entry in the column, while other features aren't as good. The instant sum feature, for instance, isn't as versatile as Excel's.

Quattro Pro takes full advantage of the Windows environment, especially when it comes to formatting and printing spreadsheets. The full range of options is available and easy to access. It takes a bit of getting used to, but designing a spreadsheet so that the data is easy to present is fast and simple. I had no problem taking an old spreadsheet that previously required many pages and making it fit nicely on two sheets of paper. And by highlighting different sections of the sheet with different levels of shading, I was able to make the sheet easier to read and use, even though the type size had been reduced to get the required number of columns across one sheet of paper.

The graphing capabilities have also been upgraded and are more intuitive. Quattro Pro has smart graphing in that the software helps you create the graphs and their labels. Of course, you can make adjustments to Quattro Pro's selections. Most users will find Quattro Pro's two- and three-dimensional graphing and seven different types of graphs adequate for their needs.

Quattro Pro also comes with Borland's Database Desktop, which allows you to interactively view, edit, and query Paradox and dBASE database files. The Database Desktop also lets you link Quattro Pro spreadsheets with external database tables.

Quattro Pro for Windows is an important entry into the Windows spreadsheet arena. Like any new product, it has some features that are superior to the competition's and others that could be better; but if you're in the market for a Windows spreadsheet, Quattro Pro for Windows is certainly worth a look.

STEPHEN LEVY

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PRINT SHOP DELUXE

Leave it to Brøderbund to flatten the learning curve—never before has creating professional-quality letterhead and fliers been so simple, so dynamic, so colorful. Leaving full-fledged desktop publishing contemporaries to pick the bullets out of their teeth, Print Shop Deluxe cajoles your PC and printer team into becoming a modern-day printer's devil.

Before you set your sights on a sideline career, however, note the power requirements here. Brøderbund recommends a 386SX for its publishing heavyweight—the 8-bit days of the earliest Print Shop can now head for the recesses of memory. A hard drive goes without saying, of course. After you add on the business and sampler graphics packs, you begin to speak of storage in megabytes, on top of the Windows files you'll probably already have installed. Still, with Stacker in place, Print Shop Deluxe performance suffers no degradation, and the cost in storage is more than offset by the joy of mixing and matching graphics.

Once you sit down with Print Shop Deluxe, expect to stay awhile. Not that the program forces perusal of the outsize and astute manual, but rather, the sheer number of options can lead to giddiness. Text may fade from barely perceptible gray to 300-dpi black; borders, outlines, and drop shadows can surround graphics blocks, lines of text, or even single letters; libraries of new graphics await. Just choosing the elements for a simple sign can lead to an hour-long debate over the merits of headlines versus rectangular graphics. Fortunately, numerous layouts, thoughtfully provided, can alleviate much of the trepidation. Just click on a filename—or use a combination of cursor keys and the Enter key if you don't have a mouse—and a ready-made page appears. You just select the appropriate graphics and text for the empty blocks.

How do you know what goes in a particular block? Each contains an icon. The T icon stands for text; the bear for images. You'll find yourself presented with blocks for column graphics, square graphics, row graphics, and ruled lines. Each of these sports a minilibrary of its own, so the number of visual possibilities grows tremendously. You may alter the properties of these blocks and their resident images via a small onscreen menu—resize, flip, add color, drain color, change color, rotate, shuffle objects forward or backward. These options apply to all text blocks as well.

With adequate hardware, Print Shop Deluxe works wonders.

What might you do with Print Shop Deluxe? Besides the aforementioned letterhead and signs, you'll want to try banners, greeting cards, and versatile calendars. You could even run the export utility to transfer a graphic to another type: EPS, CGM, PCX, or TIF. Tweak the graphic with a paint program before using it in a desktop publishing package of your choice, and then build a sign or memo there to transmit via fax card.

Images on tap run the gamut from balloons to butterflies, Celtic weavings to the Star of David. You can browse a series of graphics specially designed for insertion beneath initial caps for eye-catching text: Victorian, Incan, French, and modern, among others. The square graphics include pumpkins and bunnies, angels and Adirondack chairs; the column graphics, by nature tall and thin, offer lightning bolts and filing cabinets, pillars and pens. The effective and gorgeous borders put the finishing touch on small signs and do-it-yourself notepaper, and almost everyone will find something appropriate in the range of styles available.

Of course, no printing package can look as good on paper as it does onscreen, but Print Shop Deluxe comes close. A laser 150-dpi bon voyage card left no room for complaints with its superb gray scaling and TrueType fonts text output—very few jaggies. Color printing, the biggest selling feature of the package, likewise tends toward excellence; many laser-printer devotees may well come to envy color ink-jet owners, thanks to this product. As always, printing requires patience, and with multiple text and graphics blocks to collate, expect some time to pass before you see the final copy of your work.

In all an exciting product, Print Shop Deluxe provides the solution to your home and small business printing needs. Paired with a respectable printer, this program promises to announce your bake sales, attend your grand openings, express fond farewells, and keep you on schedule. What more could a big-time publisher on a small-time budget ask for?

Editor's note: After this review was written, Brøderbund announced that an upgrade for Print Shop Deluxe—version 1.2—will be available in April. New features will include import capability, allowing the program to import files from oth-

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EAST COAST TEAM: Mitchell E. Kertzman, Captain, Powersoft Corporation; John F. Burton, LEGENT Corporation; Neil J. Colvin, Phoenix Technologies Ltd.; Alain J. Hanover, Viewlogic Systems, Inc.; Patricia B. Seybold, Patricia Seybold Group. WEST COAST TEAM: Harry J. Saal, Captain, Network General Corporation; Jean-Louis Gassée, Be Incorporated; Jerry Kaplan, GO Corporation; Michael A. McConnell, SuperMac, Inc.; Lisa G. Thorell, Dataquest Incorporated. "THE EXAMINER," Bill Gates, Microsoft Corporation. JUDGES: Dr. David L. Nelson, Fluent, Inc.; John F. Shoch, Asset Management Company.

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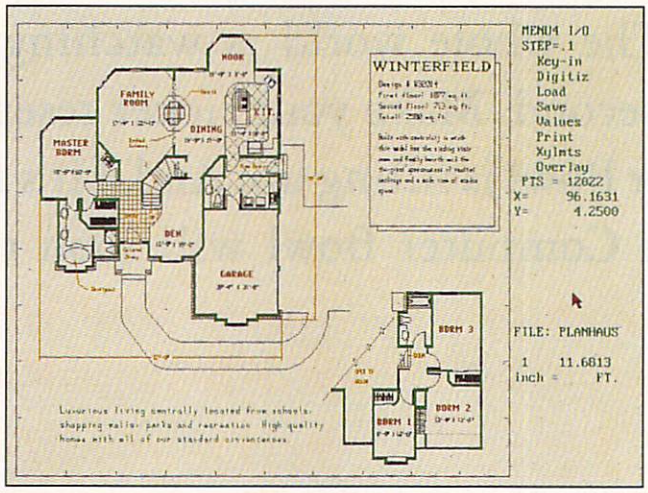
DRAFT & PRINT

These days, everybody's producing drawing programs for PCs. At one extreme are products aimed squarely at the professional market. At the other are packages intended for more casual use. Draft & Print, from Spirit of Discovery, seems to shoot for the middle ground. The package says it's "simple enough for the beginner, yet powerful enough for the professional."

How does it measure up? Generally speaking, it measures up well, starting with a straightforward setup routine. Besides letting you specify input and output devices, setup lets you set screen and text colors and even "linearize" your display so circles do indeed appear as circles on your screen. You also specify scale and drawing units, although only the English system (feet and inches) is directly supported.

D&P's drawing screen is a sight for sore eyes, especially once you've customized the colors to your own preferences. The drawing area is neat and uncluttered, with a space to the right reserved for cursor coordinate displays, menu commands, program messages, and so on.

How about drawing tools? D&P lets you draw lines, boxes, circles, arcs, grids, and more. You can move, mirror, rotate, and smooth, and you've got unlimited zooming. You can layer drawings and add, scale, and rotate text. Importing symbols is easy, and DXF files provide AutoCAD compatibility. A built-in library of basic symbols is useful, too.



For the most part, Draft & Print lives up to its claim of serving the drawing needs of both beginners and professionals.

The program can also give you exact dimensions, and it shows areas and perimeters of boxes and circles. Additionally, an Area command lets you calculate the area and perimeter of irregular figures, even those containing openings. You can use up to 2000 data points to define irregular shapes.

Oddly enough, D&P doesn't let you directly draw an ellipse. To create an ellipse, you must first draw a circle and then apply a scaling factor in the *x* or *y* direction.

D&P connects well with the outside world. It supports printers, plotters, and digitizers, and it can output high-resolution drawings on dot-matrix printers. Paper size can be specified from 8½ × 11 inches to 34 × 44 inches. D&P also includes a utility (Slidesho, executed from DOS) that lets you sequentially display a set of PIC files.

One unusual feature of D&P is spoken confirmation of commands. This package talks to you via Sound Blaster, Ad Lib, and Tandy sound, as well as through your PC's internal speaker. Voice quality is generally good, although the inflection may get on your nerves. One hearer likened it to the unfailingly sunny voice heard when you call information ("The number is . . ."! It should be noted, however, that the voice wasn't always understandable during testing of this feature using the internal speaker on two different PS/2s. Fortunately, you can turn off the voice during setup.

Another interesting feature: You can configure D&P to your level of ability (beginner, intermediate, or advanced). However, the only result at the lower levels seems to be the exclusion of certain subsequent setup options and program commands. On the beginner level, for instance, the Hatch command is not available and you cannot install a digitizer or plotter. The book says this keeps beginners out of trouble. But isn't experimentation one of the best ways to learn a program?

D&P features a menu-based point-and-click help feature. Clicking on an entry opens a text window where short entries describe the purpose and use of the designated command. Some entries also include a note which may contain additional information—or which may say "See manual for crucial details regarding this command." It would be helpful if those details were presented onscreen. Context-sensitive help would be even better.

Overall, D&P is a genuinely useful program. It's easy to use, and though the documentation lacks screen shots, it's loaded with helpful examples.

In fact, there's only one real complaint: D&P offers as options some things that other packages include as standard equipment. For example, D&P does offer math coprocessor support—but it's an option that costs an extra 30 bucks and must be ordered from the manufacturer. That's an aggravation in a package said to be powerful enough for pros. Other add-ons include a library of nine type fonts ($15) and a 50-minute training video ($20), plus an additional symbols library that's sent almost free ($5 for shipping and handling) to users who send in the registration card. These extras are nice, but I expect most users would gladly pay a few dollars more to have them included with the basic program.

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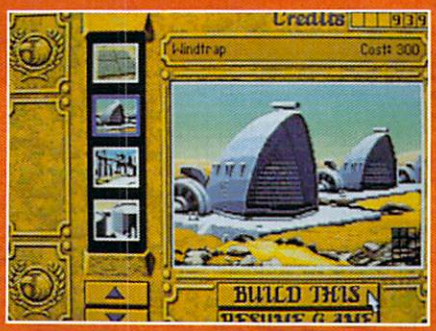

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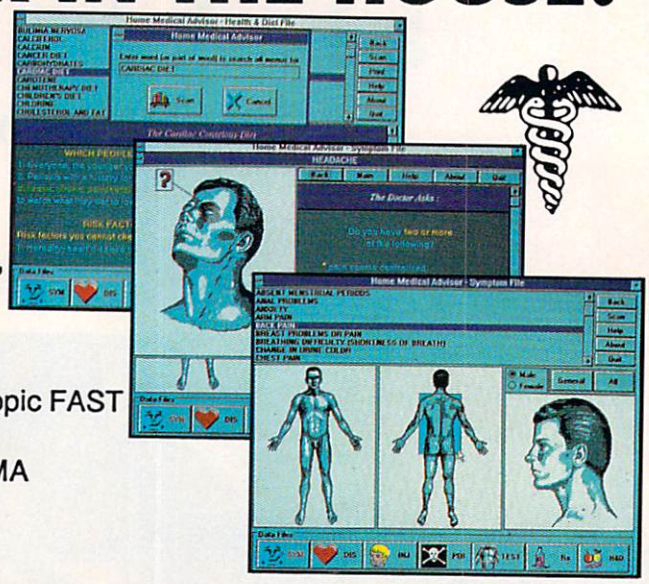

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professionals will probably want a package with built-in math coprocessor support. But if you're a beginner or an intermediate user, or even a pro who doesn't want or need a more costly package such as AutoCAD, then Draft & Print is definitely one to consider.

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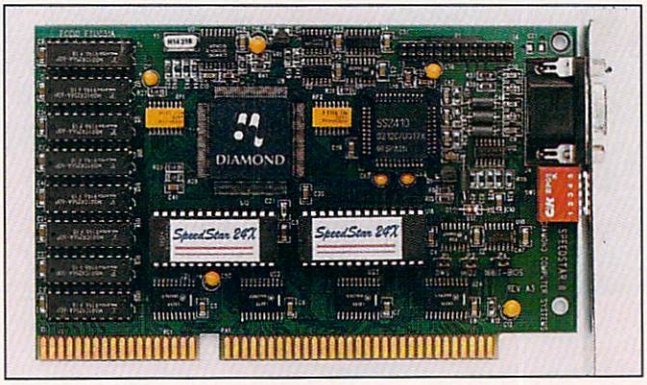
DIAMOND SPEEDSTAR 24X

Diamond Computer Systems' new SpeedStar 24X accelerator represents a minor coup in computer video. Not only does it outperform virtually every accelerator on the market today, but it costs little more than a standard VGA card.



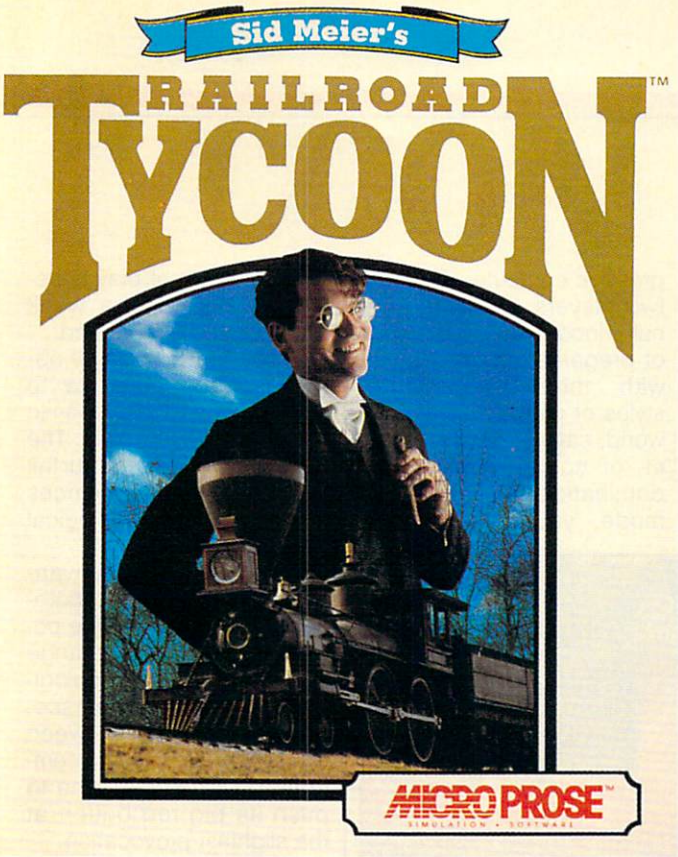
Speed up your graphics with the Diamond SpeedStar 24X, an accelerator card that can dramatically improve performance.

Indeed, at $249 retail—and with street prices under $200—the SpeedStar 24X offers the best price-to-performance ratio of any video card currently available. Not to be confused with the SpeedStar Plus or the original SpeedStar 24, the 24X employs Western Digital's unique WD90C31 chip set to achieve true 24-bit color and blazing speeds. Accelerators based on the ubiquitous S3 chip improve only Windows performance; the 24X hastens DOS applications as well.

On a standard 33-MHz 386 machine, the SpeedStar 24X's Windows benchmark test scores were mediocre—only about 5 times the speed of normal VGA. On a 33-MHz 486 setup, however, the numbers improved dramatically—about 12 times the speed of normal VGA. This ranked the 24X above the fastest accelerators from competitors like ATI and Orchid, and even above the up-and-coming local bus video accelerators.

But numbers don't mean much in real-world computing, so I put the 24X through what I call the Wing Commander test. Origin's Wing Commander II is perhaps the most graphics-intensive game on the market, and it can make even a 486 computer seem slow. On my 33-MHz 386 with a standard VGA card, the animation was jerky and poorly timed with the digitized sounds. The 24X card brought the game to life, making the animation faster and much more fluid.

Another of the 24X's charms is its ability to run Windows in extended graphics modes. Its 24-bit color capabilities allow for a palette of 16.7 million colors in the 640 × 480 mode, and it has drivers for displaying 32,000 colors at 800 × 600, 256 colors at 1024 × 768, and 16



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colors at 1280 × 1024. The 800 × 600 mode is what I use most often, and the 32,000-color driver made Windows glorious to behold. Alas, at least one application balks at the extended spectrum: Aldus PageMaker 4.0 would not load with that driver installed. A quick call to Aldus, however, revealed that PageMaker has inherent troubles with 32,000-color drivers, so the hardware wasn't to blame.

The 24X comes with DOS drivers for everything from AutoCAD to WordPerfect, plus a copy of the Halo Desktop Imager for Windows (an impressive image-editing program) and one of the best instruction manuals I've ever read. The card is backed by a five-year warranty and unlimited technical support. Diamond also maintains a 24-hour BBS for downloading driver updates.

A few technical notes: The initial release of the 24X did not function properly on 50-MHz 486DX machines, but the problem has been corrected. As of this writing, the BIOS on the card is version 1.02. If you have an earlier BIOS, contact Diamond for an upgrade. Currently, there are no OS/2 drivers for the 24X, but a representative at Diamond indicated that the drivers are now in development.

The SpeedStar 24X is the perfect steroid to pump up lackluster video performance. Faster, cheaper, and more flexible than most accelerators, it gives graphics-intensive software new life.

RICK BROIDA

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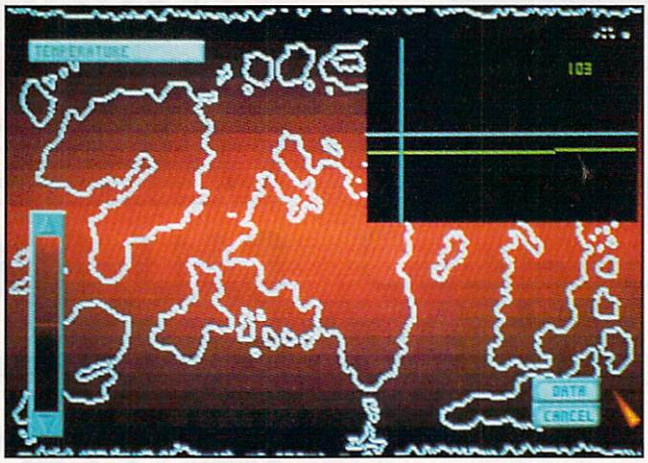
GLOBAL EFFECT

Hell hath no fury like a planet scorned. The popular "god sim" genre takes a pragmatic new twist in Global Effect, a complex game of environmental checks and balances. Would-be leaders can now create, rule, destroy, and save their pixel planets in one fell swoop.



Global Effect, an intriguing simulation with some unfortunate design flaws, challenges you to manage a planet.

Basic gameplay consists of building and managing cities, serviced by waste disposal, fuel sources, power stations, and food and water supplies. The trick is to construct a thriving civilization while maintaining a healthy ecological balance. You must keep population, pollution, and urban sprawl in check, while constantly monitoring environmental data, such as water and air pollution, carbon dioxide levels, ozone depletion, and global warming. The goal is simply to keep this ball of wax alive and well, by whatever means, as long as possible. Because each world is randomly generated, no two games are exactly alike.

Game modes include one player battling an aggressive computer rival and two players connected via null modem link. A plethora of pregame options begins with three fundamental styles of play: create a new world, save a troubled planet, or compete for global domination. In Creation mode, you must choose from a palette of eight predefined world types, including barren, archipelagos, forested, frozen, and mineral rich. There's also a user-defined "green" world, where you control such parameters as temperature, tree density, seismic activity, and fuel/mineral availability. Creation mode offers a fascinating—and often cruel—proving ground for your management skills against a multitude of environmental problems.

Well-weathered players can attempt to save a dying world, by far the game's most challenging segment. With only a limited amount of time, you must bring the world back from the brink in four nightmare scenarios: postnuclear fallout, widespread industrial pollution, global warming, and exhausted natural resources. This advanced mode of play is decidedly not for the weak willed or easily frustrated.

In the final two-player option, leaders compete to rule the world by economic means or military might. The challenge here is to curtail your opponent's advances while maintaining ecological stability.

Battles between conventional forces add yet another element of anxiety: the potential for nuclear exchange and its devastating ecological impact. The military scenario fares best between two human players; the computer opponent is prone to push its big red button at the slightest provocation.

Alas, the designers have corrupted this nearly perfect gaming environment with one unnecessary feature: the power meter. Every player action—from planting a tree to simply viewing updated information—requires power. Poor global management depletes power, while favorable ratings increase it. But the system is too unforgiving. As problems arise, the power available to fix them also decreases. It's an unbalanced, no-win situation, akin to a dog chasing its tail while walking a tightrope. Worse still, when the game ends, players must exit to DOS and reload the program to begin again.

The graphics throughout are handsomely drawn in 256-color VGA, featuring a top-down view of the large scrolling playfield and mouse-driven control-panel overlay. Though it offers detailed descriptions of individual game elements, the 79-page manual includes little in the way of instructions or tips for actual gameplay.

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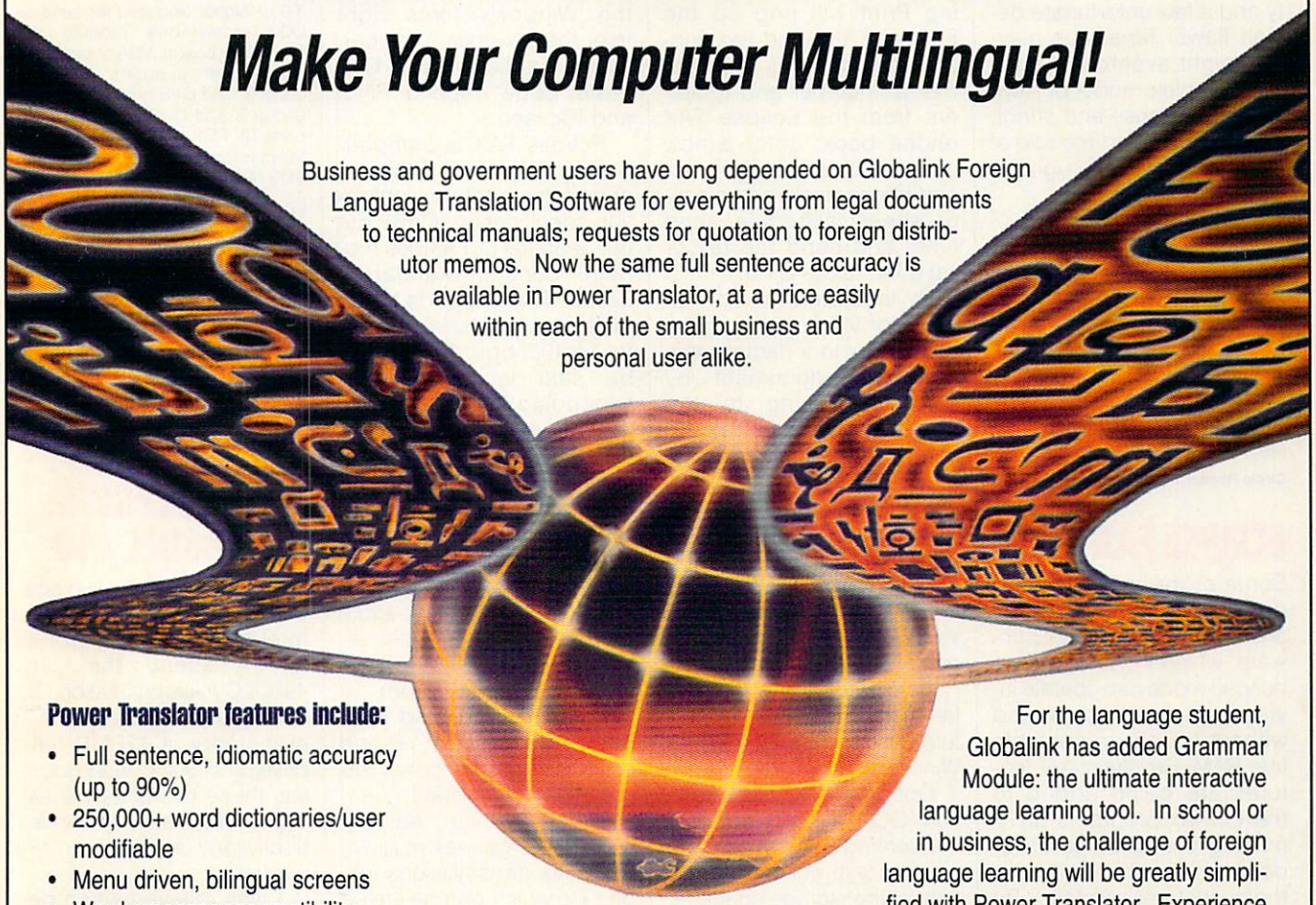

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ty and a few unfortunate design flaws. Tenacious players might eventually enjoy this complex model of environmental cause and effect. All others will find the role of planetary savior a tough job with few rewards.

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Some of the most exciting products available today are Windows-based fax software, which in Windows enhanced mode can operate invisibly in the background without taking up valuable free RAM. Revolutionary features are being added to the top fax programs daily, making the volumes of recent reviews that compare these features useless. By the time the articles with comparison grids are published, the software features have changed so much that the comparisons are inaccurate.

One of the most interesting of the industry leaders in Windows fax software is Eclipse FAX, from Eclipse Systems, a new company. The onscreen, antialiasing, "clear view" feature, unique to Eclipse FAX, allows you to preview fine-print faxes without printing them by filling in the rough edges in the fax image displayed on the screen, and even on the printed image.

By setting the Windows printer up as Eclipse FAX and printing from any Windows application, faxing is as easy as printing. Selecting Print will pop up the Eclipse FAX Send Fax window, allowing you to select the fax number and recipient from the Eclipse FAX phone book, enter a new number into the program and phone book, add a cover sheet, schedule send time, and send the fax or save the fax to a file.

By loading a macro with Word for Windows, you can send a fax to a name within the Word document by cross-referencing to the phone book, using the dynamic data exchange feature of Windows. The macro automatically sets the Windows printer to Eclipse FAX prior to sending the fax and restores the default printer after the fax is sent, saving you the trouble of changing printer driver installations every time you send a fax. Unfortunately, this automatic feature only applies to Word for Windows.

Optical character recognition (OCR) allows you to edit incoming faxes and store them as text, which is 10 percent of the storage space required for fax image files. Eclipse FAX data compression of image files saves more disk space on saved image files. The OCR feature is accurate, fast, and versatile, recognizing a wide variety of text fonts, and it has a learning routine that can be used to teach the program additional fonts. The original bitmap of the faxed document can be revealed to help verify OCR accuracy.

Previewed fax documents can be edited and returned to the sender or forwarded to other fax numbers without printing the faxes and scanning them again. You can draw circles or ellipses on the onscreen fax image and type messages with any of the Windows fonts right from the fax-editing toolbar. Toolbar utilities include Cut, Paste, Copy, Append, Find, and Replace.

Eclipse FAX is compatible with Class 1, Class 2, and communications application specification (CAS), but not Send-fax or FAXBios modem control standards. Eclipse FAX supports transmission speeds from 2400 to 14,400 bps. Faxes can be sent immediately or scheduled for a different time, to one recipient or a group of recipients, from an unlimited number of phone books with a maximum of 16,000 entries per phone book.

Eclipse FAX has its own text editor, composes a full- or half-page cover letter, allows for a signature or logo to be added from a scanned image, and supports the use of a second sheet behind the cover letter. The Thumbnail View, available while editing, sorts and organizes multiple-page fax transmissions into one file which can be saved and sent later, rather than the file-per-page method used by other software.

Eclipse FAX has added some vital features in version 1.2, such as compatibility with Class 1 modems and 200-cps OCR support. Onscreen fax editing, an advanced file conversion utility, ease of use and installation, ultrafast processing (almost all tasks are performed much faster than with other packages), a revolutionary and extensive file index and sorting feature, and other advanced features mark Eclipse FAX as a new leader in the fax features race.

ALFRED C. GIOVETTI

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I was relieved when neither one came shoehorned into a low footprint case. The MicroExpress minitower case and the Diamond Technologies desktop case let me have a field day installing and swapping cards.

There was a noticeable difference in the feel of the two. In general, the MicroExpress felt better. Its keyboard has a superb touch, the included Z-NIX mouse is sleek and comfortable, and the buttons on the case feel solid and durable. In fairness to the folks at Diamond Technologies, theirs costs approximately $400 less.

Both come with video systems well above basic Super VGA. The Diamond Technologies is equipped with a Diamond Stealth VRAM.

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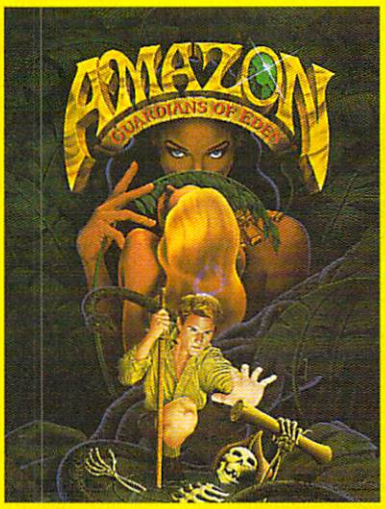

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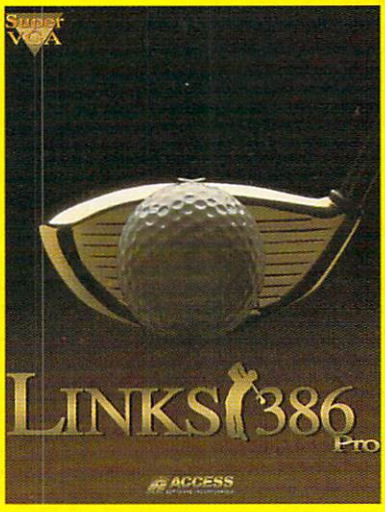

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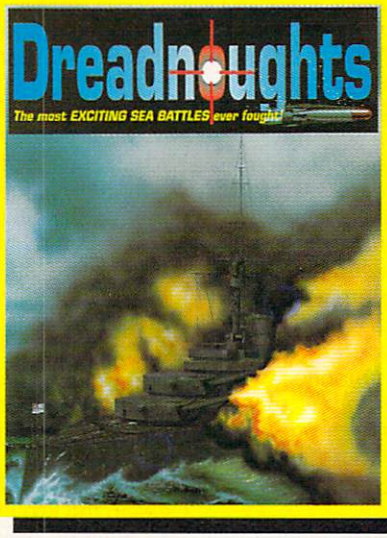

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REVIEWS

These cards are competitive with every nonaccelerator Super VGA card. The MicroExpress comes with an AVIEW Super VGA card with GUI hardware graphics accelerator capabilities.

The 486DLC chip is functionally compatible with Intel's 486SX. Both of these processor types lack the built-in math coprocessor of the Intel 486DX. Cyrix provides a math coprocessor add-on, which, when installed, provides full compatibility with 486DX chips.

Like its Diamond Technologies peer, the MicroExpress ME 486DLC/40 performs well.

You have to ask yourself what advantage you'd gain by buying a 486DLC when 486DX compatibility is so important. One answer is price. The Cyrix alternative is less expensive, even with the math add-on. And many people don't need the math coprocessor functions for the applications they normally run.

There are some other factors besides the obvious. The 486DLC has a smaller processor cache. Intel 486s all have 8K processor caches. The cache stores processor instructions. Keeping 8K of instructions within the processor saves time because the processor doesn't have to go directly to RAM to get the next instruction; it's already within its cache area.

The 486DLC has a 2K cache, and performance is reduced as a result. Fortunately, the performance isn't reduced by a proportional amount. That's because instructions often cause a jump or call to a location so far away that the cache is invalidated anyway.

There is an inherent advantage built into the 486DLC: a faster integer multiplication command. This command is frequently used at the machine level and can dramatically affect performance. The best use is in the area of graphics programming. That's a good area to improve in light of Windows and the proliferation of other graphics-intensive applications.

The best design doesn't mean much if the performance isn't there. But I found both units were up to par. I routinely ran demanding applications from Windows and was satisfied. Math-based programs like Mathematica performed at the same level as on my 486DX.

The MicroExpress has a 256K hard disk cache, while the Diamond Technologies unit has a 64K cache. Most of the performance differences between the two units resulted from this. I compiled identical programs on my own 486DX and these two units, and their performance times were within a few seconds of each other.

I write entertainment software using Super VGA graphics. Manipulating Super VGA graphics makes more demands on microprocessors than practically any other application type. Both of these computers performed at least as well as any computer in my lab. Part of that may be the fine video systems, but a large part of it is a result of the performance of the 486DLC.

Oddly enough, running Norton SYSINFO left me somewhat confused. All of the 33-MHz 486DXs where I work produced a Norton Index of between 70 and 74. The Diamond Technologies computer produced a Norton Index of 65, not too surprising in light of the smaller processor cache size. But the MicroExpress produced a Norton Index of 36. The MicroExpress's performance was good and not at all indicative of the low Norton Index.

Resorting to a benchmark test of my own making, I tested out the claim that the integer multiplication instruction was faster than that of the Intel chips. The 486DXs did 40 percent as many multiply instructions as add instructions. That's just about right, according to the Intel manual. The Diamond Technologies unit did 86 percent as many multiplies as adds, more than twice as good as the 486DXs. The MicroExpress did 100 percent as many multiplies as adds, 2½ times better than the 486DXs.

A technician at Cyrix explained that memory systems and motherboards need to be optimized for the 486DLC chip; otherwise, they perform about as well as 386DX chips. The difference between the two 486DLCs is probably due to system design considerations. If you're considering a 486DLC, you'd be

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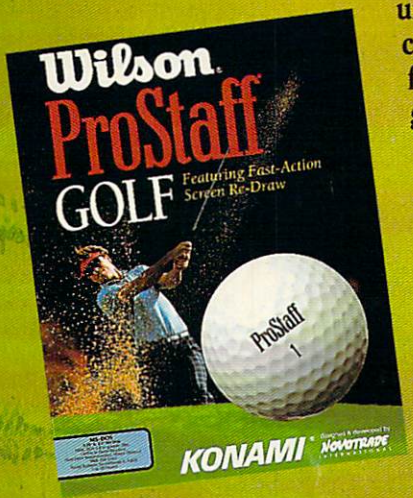

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REVIEWS

well advised to ask the vendor if the system was designed around the chip.

I continued with a benchmark test put out by Chips and Technologies. It measured the number of MIPS (Million Instructions Per Second) for different instruction categories. The results substantiated the low Norton Index I found for the MicroExpress. For almost every category the MicroExpress scored about the same as a 33-MHz 486DX, but lower than the Diamond Technologies.

I ran the PC Benchmark program. It goes through a battery of tests that time the instruction set. The results rated the Diamond Technologies best, the 486DX second, and the MicroExpress third.

The last test I ran was a 3-D benchmark program put out by Virtual Technologies. It goes through a series of 3-D graphics image manipulations. Bearing in mind that the video system has a lot to do with the results, I got the same rating order as with the PC Benchmark test.

Overall, the Diamond Technologies computer outperformed the MicroExpress and a 33-MHz 486DX. The MicroExpress didn't do as well as the 33-MHz 486DX. Given the same processor type, memory speed, and clock speed, that leads me to believe that the MicroExpress wasn't designed as well as it could've been. But since most of my usage involves disk access, the large disk cache made up for the difference. In practical terms, these three computers were neck and neck for real-life applications.

Your decision about whether to buy a 486DLC-based computer will depend on your needs. If price is important and getting every ounce of performance isn't, this might be an alternative to the more expensive Intel 486DX-based machines. After using these for six weeks, I'd recommend them as viable alternatives.

RICHARD C. LEINECKER

Diamond Technologies 486DLC-40—$1,395

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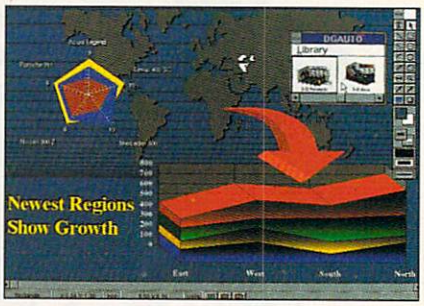

DeltaGraph Professional for Windows features an awe-inspiring array of charts.

many graphing programs on the market. But I've never seen one which even comes close to the scope and power of DeltaGraph Professional for Windows. We're all familiar with line and column and bar and stacked bar and pie charts, but those are just the beginning of this program's repertoire.

Its 2-D options include charts I'd never heard of. A bubble chart, for instance, is a clever way of plotting three parameters on two axes. Suppose you had a set of data on a population giving height and weight and the number of people with those characteristics. A bubble chart could use height and weight as the *x*-axis and *y*-axis, and plot a circle, or bubble, for each data point centered at the proper point, but with the radius of the circle determined by the number of people. To keep the circle radii within bounds, the program uses logarithmic scaling and presents a scale of the radii. Different populations could appear on the same chart by the use of different bubble colors. Novel and striking.

Another chart new to me is the spider chart. This time, suppose you had a set of data on the quality of the water at three different locations, with measurements of a number of constituents such as iron, chlorine, calcium, and so on. The spider chart would have a spoke for each constituent and would plot a point on that spoke for each location. The program connects the points for each location and fills the area defined with a different color for the different locations. The effect is dramatic.

The list of charts goes on and on,

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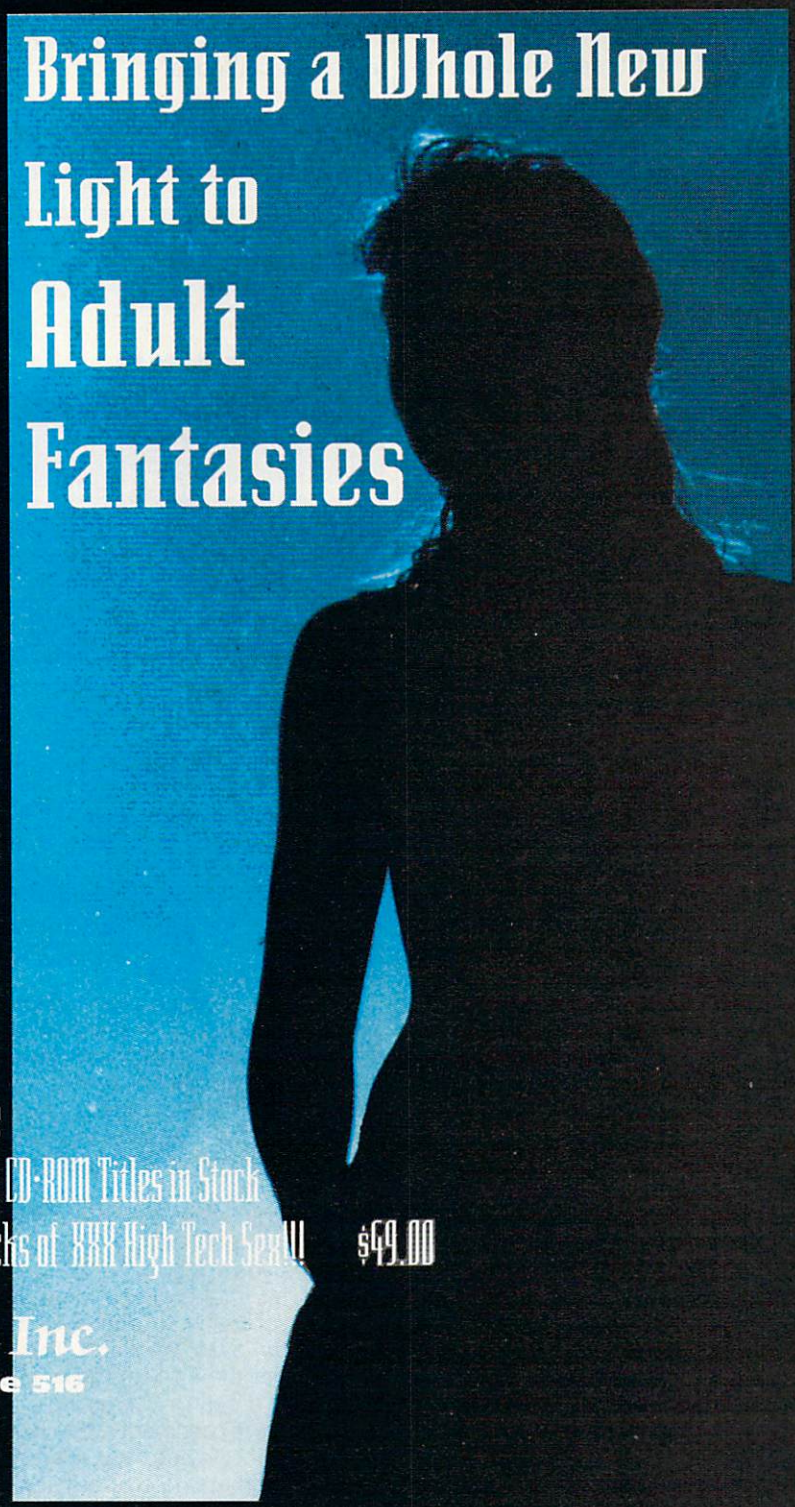

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with 40 different types and 80 subtypes. In 2-D, you can have stacked pie, multiple pie, area, time line, contour line, contour fill, ternary (triangle), polar, and many more, including hierarchy (organizational) charts. If 3-D turns you on, you can have column, ribbon, area, wireframe, surface line, surface fill, X-Y-Z scatter, and more. Even further, if you don't like the view of your 3-D charts, you can rotate them to suit yourself.

For scientific users, DeltaGraph offers six standard curve-fitting routines plus a user-defined option, error bar options, superscripted and subscripted text, and log-log and semi-log axis scaling. The program helps you prepare a slide show, including a stand-alone version, and even includes a spelling checker for the text in your charts. Import capability is extensive. For data, you can import from Data Interchange, dBASE, Excel, Harvard Graphics, Lotus 1-2-3, and Quattro, and export using the Windows OLE and DDE functions. For graphics, you can import from all the popular formats, including AutoCAD DXF and WordPerfect WPG, and export in a number of formats.

DeltaGraph supports both PostScript and Graphics Device Interface (GDI) printing, so you can send your files to a wide range of output devices. PostScript devices include some film recorders and any black-and-white or color laser printer that supports PostScript. GDI devices include all dot-matrix printers; any non-PostScript laser printer; ink-jet, thermal wax, and color GDI printers; plotters; and most film recorders. You can also print a program file directly to disk, creating a PostScript file you can send to a service bureau for printing to a Linotronic or other high-resolution imagesetter.

Program documentation is thorough, with an inch-thick user's manual. The manual includes a brief tutorial; while this doesn't take you through all the options by any means, it suffices to familiarize you with the program features sufficiently that you can explore the other capabilities on your own. With all this power, it's not surprising that the program is voracious in RAM and disk space. The literature is a little misleading in its recommendation of 4MB of RAM and 8MB of hard disk space. To load all the bells and whistles that DeltaGraph offers, you must have 18MB of disk space available.

This is a most impressive program. It left me and others with feelings of admiration and awe. If you have a need for high-quality presentation graphics, DeltaGraph Professional for Windows will not only fill your requirements but also probably suggest some striking creative object modes.

CHARLES IDOL

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Planet's Edge needs a few improvements to become a topflight adventure game.

PLANET'S EDGE

Cast your fate to the stars in this tantalizing sci-fi adventure from the creators of New World Computing's Might and Magic series. Though light years from perfection, Planet's Edge is a minor masterpiece of size, imagination, and diversity of play.

The game's premise is typically far-flung, but engaging. In the year 2045, the earth is visited by an alien vessel of mysterious origin. Nervous military leaders, fearful of the unknown, launch a preemptive strike against the orbiting ship. Though unsuccessful, the attack precedes a violent burst of electromagnetic energy. When the static clears, the alien ship is destroyed, but the earth has vanished.

Scientists stranded on a small lunar outpost scramble to decipher clues found in the alien wreckage. They determine that the earth remains intact, trapped in a cosmic wormhole, victim of a bizarre experiment code-named the Centauri Device. To reverse the earth's enigmatic fate, a duplicate of this mechanism must be assembled. You command a crew of four, searching the stars for eight pieces of the device, scattered throughout eight sectors of deep space.

Gameplay is divided into three basic sections: Moonbase, space travel, and planetary exploration. Lunar facilities include shipyards to custom-design increasingly larger, more powerful rockets. Because supplies are limited, raw materials must be mined or traded and

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then sent to Moonbase for processing into ship parts, weapons, and medical supplies. If a crew member is killed in action, don't fret: Moonbase cloning chambers will fashion another one to your exact specifications. Although rated in 16 attributes, characters cannot increase their skill levels with experience. Character development is one of the most endearing qualities of role-playing games, and its absence will strike many as cold and emotionally distant.

Space travel employs simple, menu-driven interaction among the ship's science officer, engineer, navigator, and weapons/communications station. A central display screen provides a window for manual navigation, planetary surface scans, realtime space combat, and dialogue between ship captains. Diplomacy takes a back seat to firepower, when all hostile alien encounters result in combat.

In the early stages of the game, this questionable tactic is usually one-sided and lethal. Another caveat: Space travel can be dull, especially on repeated trips to distant planets. The ability to multitask navigation with other shipboard duties would add atmosphere to the game and eliminate cabin fever.

Planetary exploration features a three-quarter top-down view of the massive, intricate alien landscapes and mazelike architecture. Here, you must avoid traps, solve puzzles, participate in elaborate schemes, gather information, retrieve items, and engage in tactical combat. The longer you follow the story's delightfully twisted plot, the larger and more challenging the game becomes. Set among approximately 100 star systems, each containing as many as a dozen planets (not all of which are accessible), your quest can be daunting in its magnitude. This section of the game is superbly designed, marred only by a clumsy, limited character interface.

Graphics are tastefully drawn from a 256-color VGA palette, obviously inspired by such groundbreaking titles as Starflight and Breach. Of course, there's always room for improvement: Alien speech, more dynamic combat effects, and even rudimentary character animation would help.

Just to be clear: Computer role-playing zealots need not apply. Those with imagination and tolerance for a few rough spots will find a universe of depth and challenge in Planet's Edge. I can't wait for the next voyage.

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playoffs is to select your game options. Fatigue, injuries, penalties, and fumbles are all options that can be toggled on or off, allowing you to control the game's difficulty and realism. But more importantly, you can choose whether you want to play a strategic game (where you choose the plays and the computer runs them), an action game (where the computer chooses the plays and you run them), or handle both strategy and action yourself.

One of Ultimate Football's slickest options is pass difficulty, which can be set to any of three settings. On the easiest setting, the screen freezes when you decide to pass the ball, giving you a chance to view the possible receivers and choose the one you think has the best shot of receiving. On the hardest setting, you have to handle both the pass and the catch in realtime.

After setting the options, you organize your players in the roster and can even monkey a bit with their speed, skill, and strength attributes. The color editor lets you modify your team's uniform. And if you like, you can even change a player's name or shirt number.

Then, it's off to the field, where men are men and referees wear those silly striped shirts. If you've chosen to coach your team, you select your team's formation and play, after which your players march onto the field for the hike. After the snap, if you're playing offense (and have elected to play the action, rather than delegate it to the computer), you control the player with the ball. If you're playing defense, you usually control the player closest to the ball but can switch quickly to any another player on your team.

As with any sports simulation, the gameplay is fast and furious. Nevertheless, the controls are smooth and handle well. Amazingly, you can control most of a play with only your mouse, eliminating the need to memorize a bunch of keystroke commands.

When you've gotten the hang of the game, the included construction set—which allows you to create, modify, or delete a league—gives you a chance to hone the game to fit your tastes exactly. With the construction set you can create new teams, create new players for your teams, and even edit the contents of your playbook.

With its well-rendered graphics, believable animation, digitized sounds, and smooth gameplay, Mike Ditka Ultimate Football scores a touchdown.

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ZOOKEEPER

Kids love animals, and Davidson's ZooKeeper puts that natural affection to work in a children's game that makes a fun-filled statement about our environment. The game keeps players hurrying from one animal's home to another to foil the efforts of troublemakers who are wrecking the zoo and making it impossible for the scientists there to leave long enough to release an animal back to the wild.

As a player, you begin as a lowly cage cleaner who must take care of the zoo's more than 50 different animals. You must capture the troublemakers who are feeding the beasts the wrong food, littering their habitats, ruining the climate, and upsetting the balance of nature. With every bad deed you right and every troublemaker you catch, Funk E. Monkey pops in to give you little rewards—a passport, sunglasses, even a teddy bear—that you can take along on your ultimate safari to release the animal, once you've seen that the zoo is secure.

Players must not only catch the hoodlums, but they must also clean up the mess, feed animals the appropriate food, and restore the proper climate and habitat. It's not an easy job. It's simple enough to know not to throw raw steak to the giraffes, but should you give those long-necked creatures bark, twigs, sprouts, or all or any combination of the above? And what sort of temperature and humidity should you set to ensure their comfort? ZooKeeper supports all major sound cards, and the game helps you with your choices by providing audible clues. If you select the right food, for instance, a voice calls out "yum!" Select the wrong one, and you hear "blech." There are also animated cartoon characters—the aforementioned Funk E. Monkey and Zoonie the Robot—standing by to give you hints when the going gets tough. Do your job well, and you work your way up to Zoo Master.

ZooKeeper not only highlights the needs of living animals but also calls attention to extinctions. As children track animals through the zoo, they find unidentified footprints that lead to glades bearing plaques that identify extinct animals and tell what happened to them. Lovely scanned-photo images of animals—from the television show "ZooLife with Jack Hanna" (Jack Hanna is the director of the Columbus Zoo) and from *ZooLife* magazine—show the animals as they appear in the wild. Register the product, and Davidson will donate $1 to the William Holden Wildlife Foundation.

The game boasts a hefty hardware requirement that may make it unsuitable for some users. It comes on ten disks. Count 'em, ten. And it consumes a 7½MB space on your hard disk. Installation takes 10 to 30 minutes, depending on your setup. Installing it for a printer with a Sound Blaster Pro, as I did, took the full half-hour. And don't think of running it if your PC has less than 640K of memory or anything less than a high-resolution VGA video system.

Although ZooKeeper is rated for ages 6–11, it isn't an easy game to play. The game's many clues and hints help. But it's still a good idea to keep an encyclopedia or children's animal book around so the kids can look things up. A fine memory for facts you picked up from your last outing to the zoo will also help.

CAROL ELLISON

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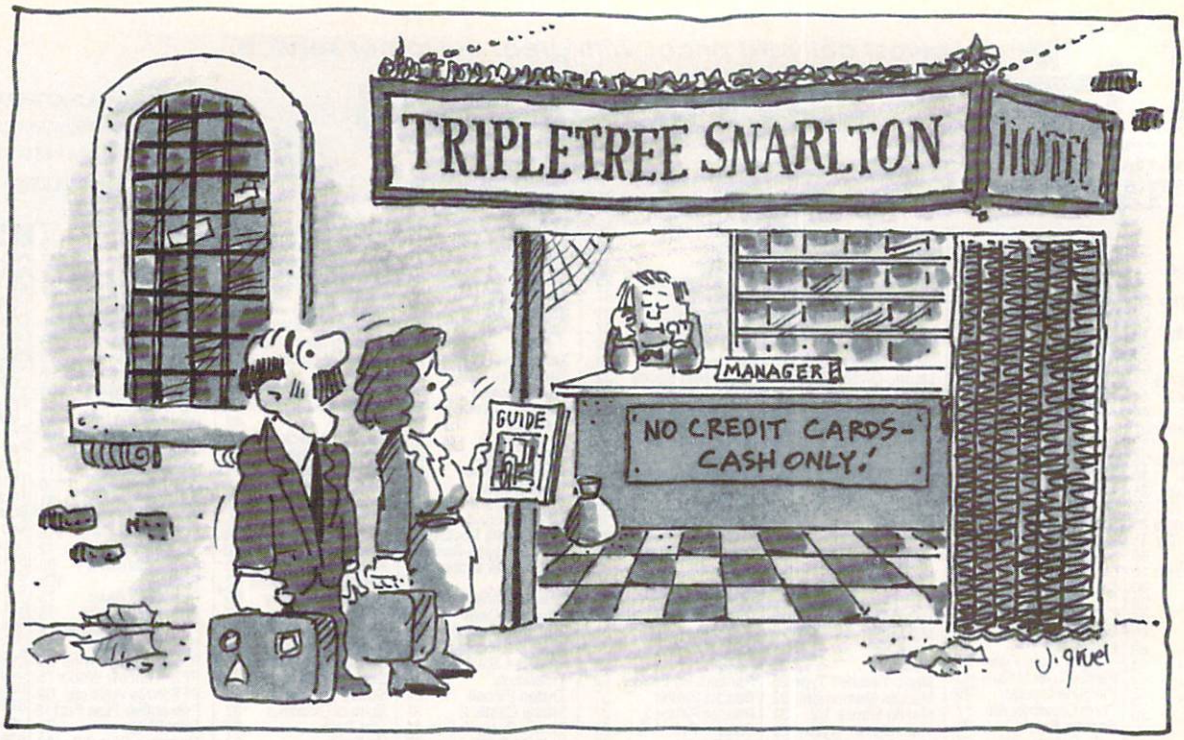

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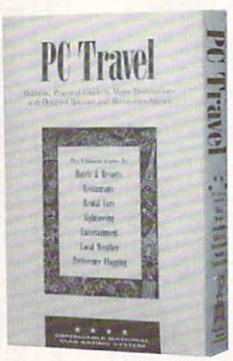

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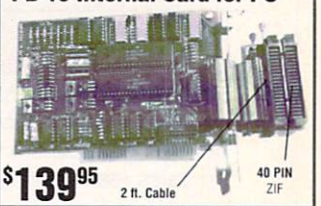

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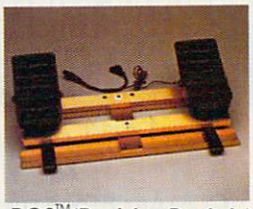

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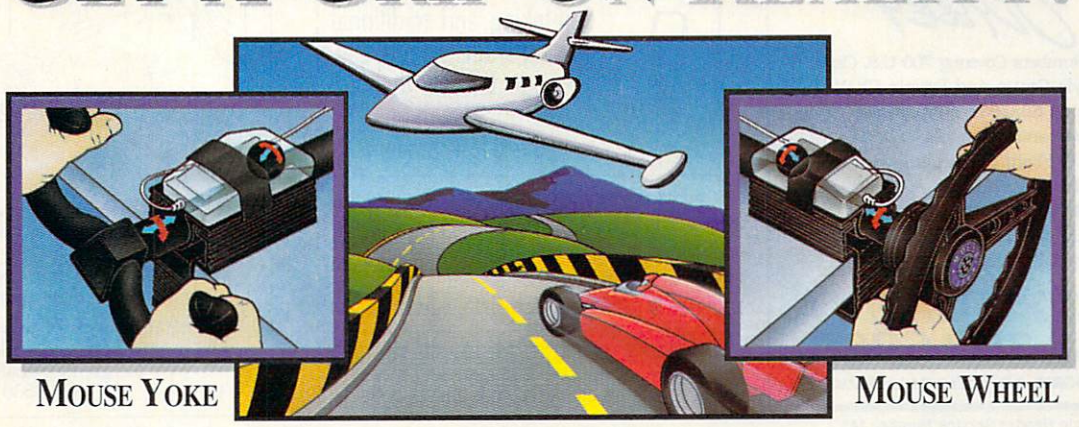

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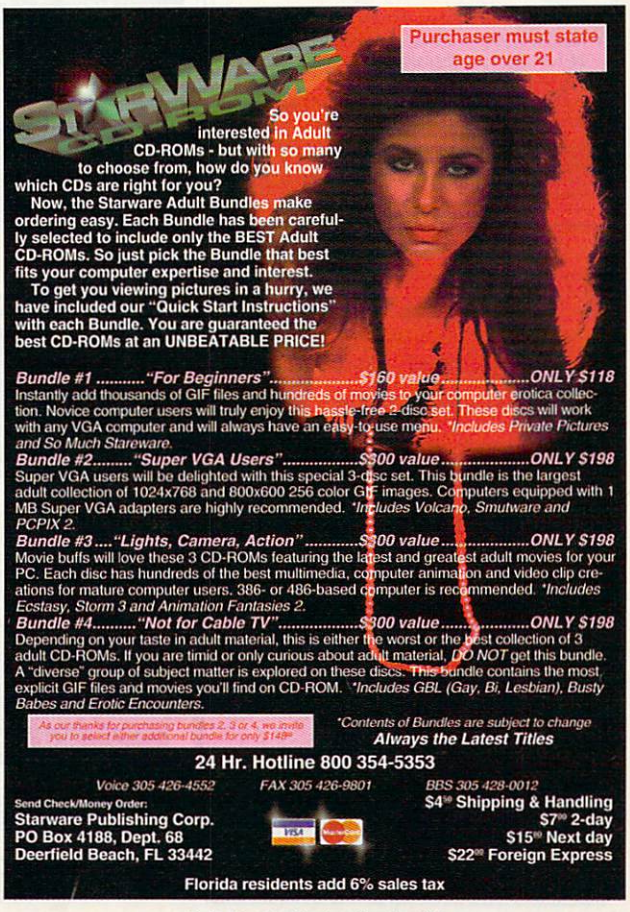

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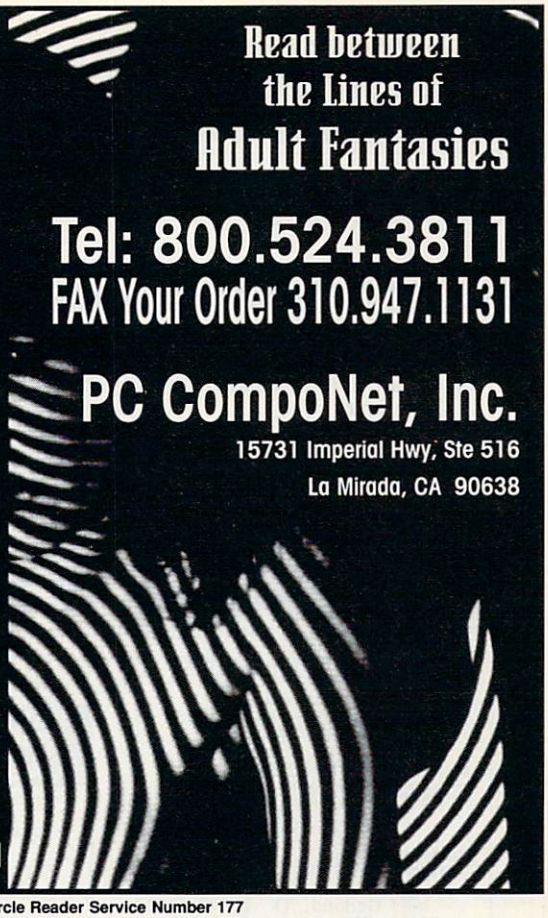

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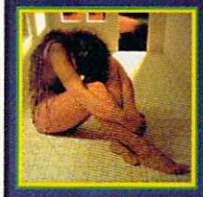

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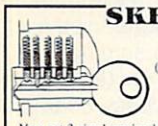

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NEWS BITS

David English

CES HIGHLIGHTS

The latest gadgets and software from the greatest electronics show on earth

What do you get when you combine the world's most surreal city with the nation's largest consumer electronics show? Winter CES, of course. It's when over 90,000 trend followers converge on Las Vegas to see what's new in cellular phones, wide-screen television, satellite receivers, videogames, computer software, and other electronic products.

This year, a lot of the CES gossip focused on the announcement of 3DO (pronounced "three-dee-oh"), a new CD-based entertainment platform that will be available this fall for under $700. 3DO is actually the product of a coalition of four companies: Electronic Arts (the successful computer- and videogame company), Time Warner (the entertainment and cable-TV company), Matsushita (which owns Panasonic and the Hollywood giant, MCA), and Kleiner Perkins (the venture-capital firm that helped launch Lotus and Compaq).

What makes the people at 3DO think their home-CD system can succeed where others have failed? The 3DO box contains a fast 32-bit processor, as well as special chips that independently process the animation, graphics, and sound. The prototype I saw at the Panasonic booth could easily handle high-resolution animation and full-motion video. In addition, the 3DO machine can grab its programs from a cable-TV hookup as well as from its built-in CD drive. 3DO even plans to ship a plug-in board that will bring its technology to the PC.

Other innovative hardware at CES included the UltraSound 3D sound card from Advanced Gravis. Similar to the new Q-Sound technology, UltraSound 3D provides the sensation of 360-degree sound from just two speakers. For example, you might hear an airplane swoop down behind you, pass through your head, and emerge to the front and right of you. I was genuinely confused when they put the motorcycle sound on—I wasn't sure whether it was coming from the headphones or from inside the building. The real kicker was the sound of a dentist's drill, which was almost too painful to experience. Unlike Q-Sound, UltraSound 3D works with headphones. It should be available by the time you read this for $249. According to the company, over 25 software developers will support the new 3-D technology, including Electronic Arts and Sierra.

On the software front, I•MOTION showed Alone in the Dark, which has some of the best 3-D character animation I've seen. As is the case with many of the new games, the backgrounds are bitmapped, while the characters and moving objects are generated with polygons. For this program, the developers combined fast polygon animation with rotoscoping to create lifelike movements. It's available now.

Speaking of advanced 3-D animation, I was surprised to see a first-rate multimedia CD-ROM product from Revell-Monogram, the world's leading manufacturer of plastic model kits. Shipping this summer, Power Modeler uses eye-popping 3-D graphics to help you build exotic sports cars and high-tech aircraft. It comes with one model, but you can easily buy the other models at toy stores and hobby shops. Once you've completed the models, the program lets you race them in its driving and flight simulator games.

Interplay used a 3-D mouse to demo its new multimedia CD-ROM game, StepStone. Like Virgin Games' upcoming 7th Guest, Interplay's StepStone is designed especially for CD-ROM with full-motion video characters, high-resolution backgrounds, and a full movielike musical score. It's truly impressive, and it's scheduled to ship sometime this summer.

Electronic Arts (EA) brought in the world chess champion, Garry Kasparov, to show off his new chess game, Kasparov's Gambit. It has an especially strong tutorial and stunning Super VGA graphics. For a chess game from the other side of the tracks, check out National Lampoon's ChessMeister 5 Billion and 1, from Spectrum HoloByte. It's Battle Chess meets *Animal House*. It's definitely crude, rude, and lewd.

EA is also starting its own line of educational software, called EA*Kids. The five titles cover every age group from 3 to 14 and range from an environmentally correct zoo ride to a program that lets you create your own music videos.

Other exciting software products shown at CES included LucasArts Games' X-Wing (a heart-stopping space-combat game, based on the Star Wars star fighter), Brøderbund's Where in Space Is Carmen Sandiego? (looks like the best Carmen yet), Mallard Software's Air Traffic Controller and Lunar Command (the company's first two stand-alone simulators), Origin's Ultima Underworld: The Stygian Abyss (with a terrific continuous-movement 3-D dungeon), Amtek's Tristan (a dynamite computer pinball game), Spirit of Discovery's Beat the House (the best gambling simulator and trainer), Konami's Air Warrior (the first Super VGA flight simulator), MicroProse's World Circuit (a hell-on-wheels racecar simulator), Tsunami's Wacky Funsters! (5½ arcade-game spoofs that include a Bambi-hunts-the-hunters game), and Maxis's SimFarm (SimCity goes country).

It looks like 1993 will be a great year for consumer electronics, with lots of innovative hardware and software. ❐

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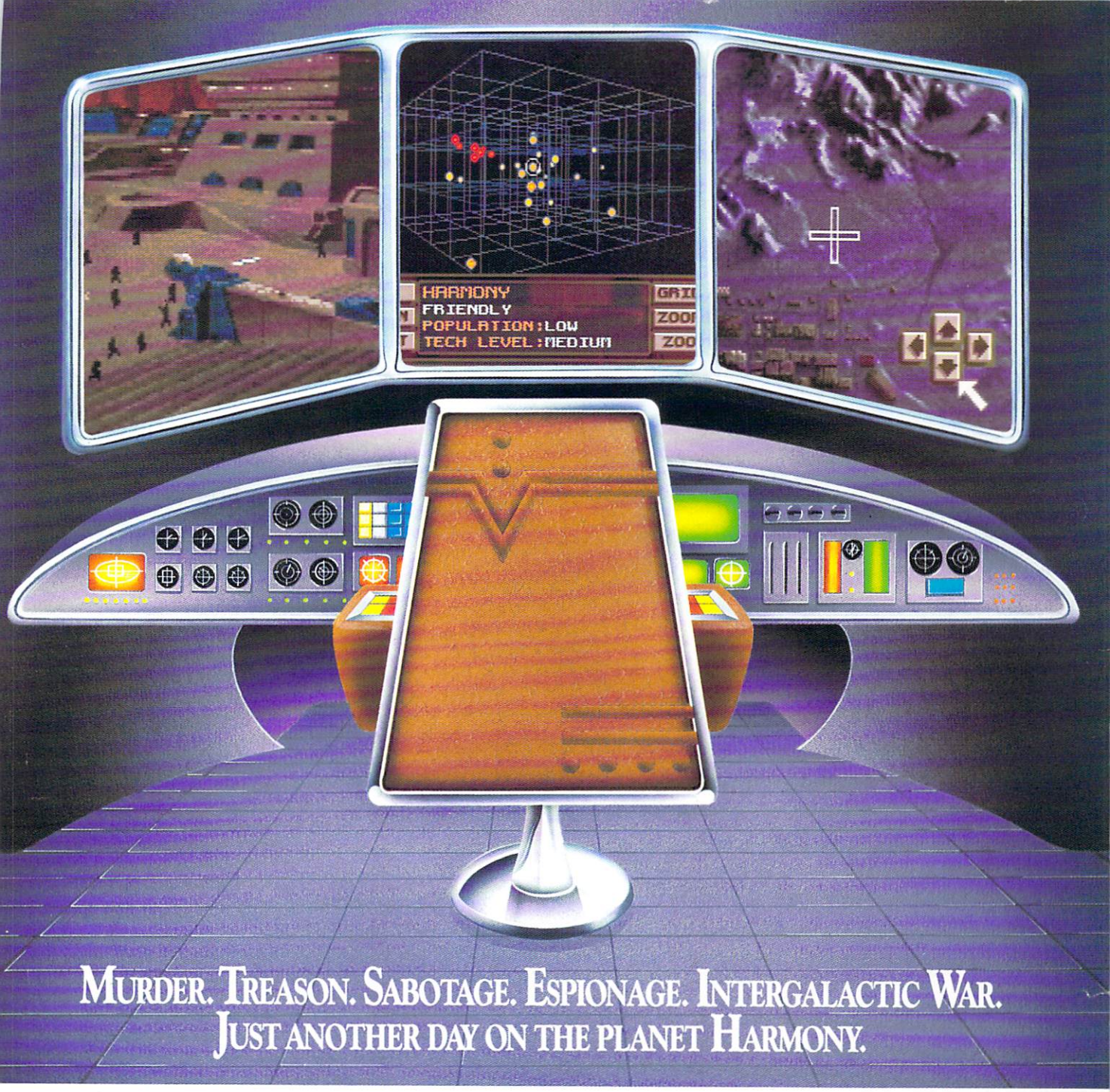

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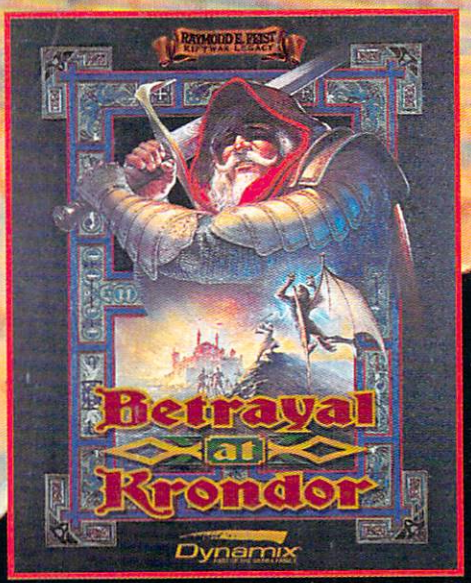

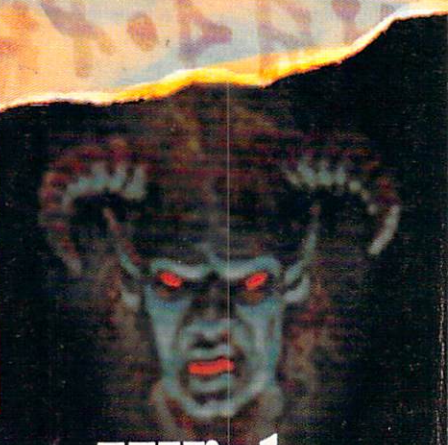

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