

Multitasking Showdown

We've all seen representations of Shiva, the many-armed Hindu god, his multiple hands in several different attitudes, holding symbols of life and death, while he simultaneously dances and meditates. Humans are at least touched by the divine: We often work at more than one thing at a time, despite the fact that we have only two hands. We can switch between tasks fairly rapidly.

The PC is burdened with a one-track mind. A typical PC operating under MS-DOS is designed to take on a single task, complete it, and move to its next assignment.

People, however, are rarely afforded the luxury of dedicating themselves to one task and one task only. More commonly, we find our attention jumping around among multiple projects. We may, for instance, be working on last year's annual sales report and next year's budget at the same time, but yesterday's PC running yesterday's software can't even keep up with *this* relatively simple mental juggling act.

If you could transform your single-tasking DOS-based PC into a multitasking tool, would you be interested?

The good news is that this can be accomplished with relative ease and at a surprisingly low cost.

Multitasking Environments

Two popular programs, *DESQview* (Quarterdeck Office Systems, 606-B Venice Boulevard, Venice, California 90291; 213-314-3240; \$129) and *Windows* (Microsoft, One Microsoft Way, Redmond, Washington 98052; 206-882-8080; \$149), specialize in endowing DOS with the ability to multitask: to run multiple applications concurrently on your DOS-based PC.

Equally important, since both *DESQview* and *Windows* themselves run under DOS, they permit you to multitask virtually any DOS application already on the market. By contrast, OS/2, Microsoft's much-touted second-generation operating system, requires that you replace your current DOS applications with all new software (much of which has yet to be written) before you'll be able to take full advantage of its multitasking capabilities.

Despite their shared goal of adding the ability to multitask to your PC arsenal, *DESQview* and *Windows* differ radically in many critical areas. But before looking at these differences, let's examine one of the most obvious similarities between *DESQview* and *Windows*—specifically, the basic technique used by both programs to accomplish the feat of multitasking under DOS. >

JACK NIMERSHEIM

Sleight of Hand

To get an idea of how *DESQview* and *Windows* work, you need look no farther than your kitchen. Suppose you had to prepare a three-course meal on a single-burner hot plate. One way to accomplish this would be to complete each course before starting the next. Unfortunately, by the time the final course was ready, the food prepared first would be too cold to serve (assuming that vichyssoise was not on the menu).

But what if, instead, you heated up the first course for a short time, then removed it and began cooking the second? Several minutes later, you'd replace the second course with the third. After a bit, you could remove the third course and go back to heating up the first, then replace the first with the second, the second with the third, and so on—continuing to dedicate a short period of burner time to each course until all three items were adequately cooked.

Using this technique, your entire dinner would be ready to serve at approximately the same time, with none of your guests ever suspecting that you had been forced to prepare their three-course meal on a single burner.

Both *DESQview* and *Windows* use a variation on this technique (called *time slicing*) to multitask programs running under DOS. By providing CPU time in round-robin fashion to however many programs you have loaded into RAM, *DESQview* and *Windows* fool each application into thinking that it, and it alone, has exclusive access to your system resources. Furthermore, this prestidigitation occurs at such a rapid pace that you'll barely be aware that it's happening.

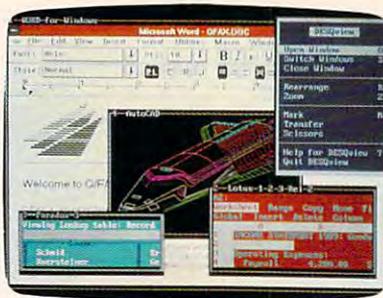
There are similarities in the ways *Windows* and *DESQview* manipulate your CPU, but what sets them apart from one another? Let's begin with their appearance.

Words or Pictures

DESQview eschews the colorful displays and stylized icons that define a graphical user interface (GUI) like *Windows*, opting instead for a spartan interface not very different from the one employed by MS-DOS.

All *DESQview* display elements (command options, pull-down menu boxes, window borders, and the like) are generated using the standard PC character set on the text screen. *DESQview* is perfectly capable of running graphics programs in a multitasking session; only *DESQview's* top-level user interface is limited to character-based operation.

Windows, on the other hand, relies on a bitmapped display, where



Text-based *DESQview*.



Graphics-based *Windows*.

Context Switching and Multitasking

Context switching is an alternative to multitasking. If you often want to access more than one application during the course of your normal PC operations but you don't need to have these applications running when they aren't in view, context switching (also known as task switching) may be what you need.

Context switching differs from multitasking in that only a single program is actually executing code at any given time, even if multiple applications have been loaded into memory. If you're using context-switching software and access one program, any other application running in that session is temporarily suspended, and a snapshot of its current operation is maintained in memory or stored to a disk file. Calling up one of the suspended applications causes it to be shuffled back into active RAM and once again made operational.

For example, one popular context-switching program, *Switch-It* (Better Software Technology, 55 New York Avenue, Framingham, Massachusetts 01701; 800-848-0286; \$99.95), lets you load up to 100 programs in a 640K system—providing, of course, that you have enough free disk space or expanded memory (EMS) to support program swapping on such a large scale.

In truth, context switching resembles using the hold button on a multiline telephone. While it's not possible to carry on more than one conversation at a time under such conditions, you can quickly switch your attention between two or more callers. Context switching provides a convenience to people who don't require full multitasking but would profit from quick and easy access to several DOS applications.

each picture element (pixel) must be individually controlled. A typical VGA display is composed of over 300,000 pixels. As you might suspect, the added resources required to manage the graphical *Windows* display can slow a system down considerably. Therefore, *DESQview* gets the nod over *Windows*, at least as far as speed is concerned.

However, a GUI such as *Windows* has several advantages over a character-based operating environment. GUIs are generally easier to learn and use. These factors take on added significance on a system used by newcomers to PCs. And the fact that one *Windows* program bears at least a passing resemblance to another makes retraining less troublesome when it comes time to upgrade or change applications.

Iconoclast

With the recent release of *Windows* 3.0, Microsoft finally delivered on its longstanding promise to provide a true graphical interface for DOS-based personal computers. The result is an operating environment that even PC neophytes should have little trouble navigating, once they've mastered a few basic techniques.

Windows's reliance on icons, mouse support, and pull-down menus greatly simplifies most PC operations. Starting an application in *Windows*, for example, is a simple matter of positioning a mouse pointer over that application's icon and then double-clicking the mouse button. This point-and-click paradigm carries over into virtually all areas of *Windows* operations.

If you've ever worked in standard DOS, the command `COPY/V C:\TEMP\BUDGET90 D:\LOTUS\DATA\` will look depressingly familiar. This kind of command structure—in this case, a relatively simple command whose sole purpose is to copy a file from one DOS directory to another—can induce nightmares in people just learning how to use a PC. By contrast, performing this same COPY operation under *Windows* is as easy as dragging an icon associated with the BUDGET90 file from its initial location on the *Windows* display to a second window representing the destination directory. In short, *Windows* simplifies DOS operations to such a degree that computer journalists can now legitimately include the words *intuitive* and *PC* in the same sentence.

To be fair, *DESQview's* pull-down menus and dialog boxes also simplify PC operations. In terms of user friendliness, however, *Windows* takes the blue ribbon. ▸

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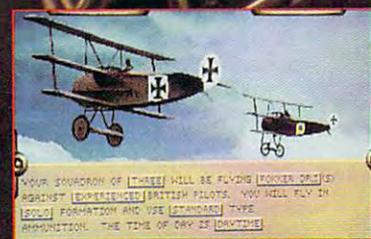
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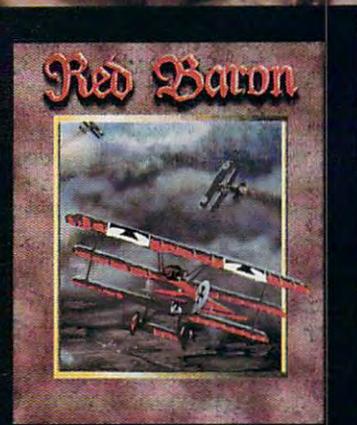
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Moving into Multitasking

The goal of any multitasking environment is to permit you to run multiple applications under DOS. Therefore, multitasking is the most critical area for comparison between *DESQview* and *Windows*. How well does each program set up and manage a multitasking session?

The flippant answer to this question is, quite well. Admittedly, *DESQview* and *Windows* had their share of growing pains through the years. Both take some potentially risky liberties with DOS's native, single-tasking architecture. Early releases of each package were not always 100-percent dependable, especially when it came to managing so-called misbehaved programs—applications that bypassed the standard BIOS routines to improve their performance.

Subsequent upgrades of both *DESQview* and *Windows* have eliminated most of these incompatibility problems. With rare exceptions, both *DESQview* and *Windows* are now capable of handling virtually any DOS program.

I've been working with the latest versions of both *DESQview* and *Windows* 3.0 for several months and have yet to encounter a conflict that could not be resolved with a relatively minor adjustment to either the multi-

tasking environment itself or the problematic application program.

Since they're roughly equal in technical proficiency, the choice between *DESQview* and *Windows* boils down to a personal one based on how you'll use a multitasking environment rather than all the possible uses to which such an environment can be applied.

The Machine Matters

Given the strain time slicing places on your system's CPU, it only makes sense that the kind of computer system you own will influence the overall performance of your multitasking environment.

DESQview will run on any IBM-compatible PC, including 8088- or 8086-based XT-compatible systems having only 512K of RAM. Of course, multitasking on such a system would be severely limited; all your multitasking programs would have to fit within 512K. You'd have trouble finding programs of consequence that would take up so little room.

Windows will run—in real mode—on an 8088 or 8086 machine with 640K, but real mode has the same limitation as we found in *DESQview*: All the multitasking programs must fit entirely within the 640K of conventional memory. You

The Best of Both Worlds

I'm going to let you in on a little secret: It's possible to set up *Windows* 3.0 so that it will run under *DESQview*. Why would you ever want to do this? That's easy. Running *Windows* within a *DESQview* multitasking session allows you to access most of the advanced features associated with each of these DOS multitasking environments—the best of both worlds.

You'll be able to run the impressive *Windows*-aware programs currently flooding the PC market (*Arts & Letters*; *Excel*; *Ventura Publisher*, *Windows Edition*; *Ami Professional*; *Word for Windows*; *Microphone II*, and so forth) and still take advantage of the fact that *DESQview* will execute and switch between standard DOS applications more quickly than its graphics-based competition.

The most critical caveat attached to setting up this hybrid configuration is that, at the time of this writing, the only way to avoid conflicts with *Windows* is to run it in real mode. Rumor has it, however, that a planned *DESQview* upgrade will be compatible with all three *Windows* modes.

can multitask programs designed to run under *Windows* (these programs are sometimes described as *Windows*-aware) using extended memory under *Windows* in standard mode, which, at minimum, requires an 80286-based AT with at least one megabyte of memory, including at least 256K of extended memory. But once again, all the multitasking programs must fit within 640K of conventional memory. If you want to multitask DOS programs under *Windows*, your minimum system must be an 80386 with two megabytes of RAM. These three aspects of *Windows* are covered in full in the accompanying article "Three Faces of *Windows*."

Of course, the more advanced your PC, the more efficiently it will multitask, regardless of whether you ultimately settle on *DESQview* or *Windows*—or even a combination of the two (see "The Best of Both Worlds").

The performance of *DESQview* improves dramatically when it's run on a 80286 AT compatible. And both programs are designed to take full advantage of the advanced memory-management features built into Intel's 80386 and 80486 microprocessors.

DESQview users will need to buy a second program—Quarterdeck's \$59 *QEMM-386* memory manager—to accomplish this (these products can be bought as a set), while the basic *Windows* package includes everything required to run *Windows* efficiently on any IBM-compatible computer (see "Three Faces of *Windows*").

Three Faces of Windows

Starting with *Windows* 3.0, Microsoft eliminated the need to buy different versions of *Windows* for different PC systems. Rather than existing as discrete products (like *Windows/286* and *Windows/386*), *Windows* 3.0 can configure itself to run in one of three operational modes: real, standard, and 386 enhanced.

Get Real

When running in real mode, *Windows* 3.0 is limited to performing all of its multitasking operations in that 640K block of memory commonly referred to as conventional RAM.

If the total memory required by the programs you're using exceeds 640K, *Windows* automatically reverts to context switching rather than multitasking (see "Context Switching and Multitasking"). *Windows* 3.0 automatically configures itself to operate in real mode on any system that has less than one megabyte of RAM.

New Standard

When running in standard mode, *Windows* can transfer some of its operations to extended memory. This increases the amount of conventional RAM available to actually run standard DOS applications. A second major benefit to running *Windows* in standard

mode is that it actually allows text-based programs that employ standard DOS extenders to run in so-called protected mode, thus effectively breaking that infamous 640K DOS barrier. (Perhaps the best known program that currently employs DOS extenders is *Lotus 1-2-3* release 3.)

Peak Performance

The ultimate *Windows* configuration is 386-enhanced mode. In addition to supporting all of the features associated with running *Windows* in standard mode, 386-enhanced mode takes advantage of the advanced memory-management capabilities built into Intel's 80386 and 80486 microprocessors. Primary among these is their ability to use extended memory to set up so-called virtual 8086 machines—discrete segments of RAM that function as if they were isolated 8086-based XT-compatible systems.

Generally, *Windows* itself determines its best operating mode for your system hardware. However, by including the appropriate command switch with the WIN command normally used to start *Windows*, you can override this default configuration. Starting a multitasking session with a WIN /R command, for example, forces *Windows* to run in real mode.



Blast From The Past.

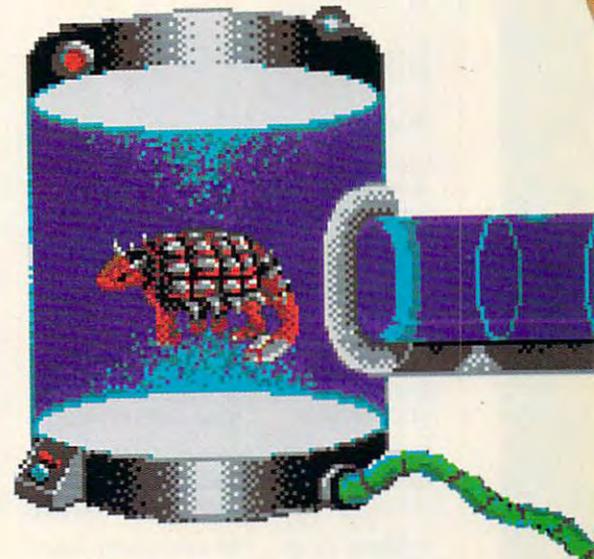
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HOW THEY COMPARE

Here's an item-by-item comparison of *Windows* and *DESQview* features and requirements.

	DESQview	Windows
Cost	\$129 (<i>DESQview</i> only) 59 (<i>QEMM</i> memory manager) 179 (<i>DESQview</i> 386 combination)	\$149
Minimum System Requirements	Any IBM-compatible PC 512K of RAM Any display DOS 2.0 or higher Hard disk recommended	286-based AT (minimum) 640K of RAM Graphics display DOS 3.1 or higher Hard disk
User Interface	Character-based display with pull-down command menus	Graphical interface that includes both icons and pull-down menus
Bundled Applications	None	<i>Write, Paintbrush, Terminal, Cardfile, Calculator, Calendar, Clock, Notepad, Macro Recorder, File Manager</i>
Mouse Support	Yes	Yes (recommended)
Runs Standard DOS Programs	Yes	Yes
Runs Graphics Programs	Yes	Yes
Adjustable Windows	Yes	Yes
Uses Macros	Yes	Yes
Cut-and-Paste Text	Yes	Yes
Cut-and-Paste Graphics	No	Yes
Data Exchange	Mark-and-Transfer Feature	<i>Windows</i> clipboard Also, allows dynamic linking of data between applications designed to support the <i>Windows</i> DDE feature
Runs Standard DOS Program in Small Windows	Yes	Only in 386-enhanced mode
Minimum Multitasking Requirements	XT compatible with 512K of RAM	286-based AT with 1MB of RAM
Minimal Recommended Multitasking Environment	386-based system with 2MB of RAM	286-based AT with 2MB of RAM
Multitasks on 8088-Based XT Compatible	Yes (providing all open applications fit in conventional memory)	Yes (providing all open applications fit in conventional memory)
Multitasks on 286-Based AT	Yes (providing all open applications fit in conventional memory)	Yes (providing all open applications fit in conventional memory)
Multitasks on 386-Based System	Yes (uses <i>QEMM-386</i> memory manager to convert extended memory to expanded memory)	Yes (uses <i>HIMEM.SYS</i> to access extended memory and run in 386-enhanced mode)

Making the Choice

In some situations, choosing between *DESQview* and *Windows* is a relatively straightforward proposition. If you work exclusively with standard, character-based DOS applications—that is, programs not specifically designed to run under *Windows*—then *DESQview* is the logical choice.

The greater speed of the *DESQview* text-based interface makes this decision an easy one. Additionally, *DESQview* is slightly more utilitarian if your PC is an 8088- or 8086-based XT compatible and the only choice if your computer lacks a graphics adaptor capable of running the *Windows* GUI or has only 512K.

On the other hand, *Windows* offers the user-friendly attributes commonly associated with GUIs: icons, point-and-click procedures, interactive dialog boxes, and the like. If you're new to personal computing and want to avail yourself of the advantages of multitasking, it's hard to imagine a DOS environment easier to install, learn, or use than *Windows* 3.0.

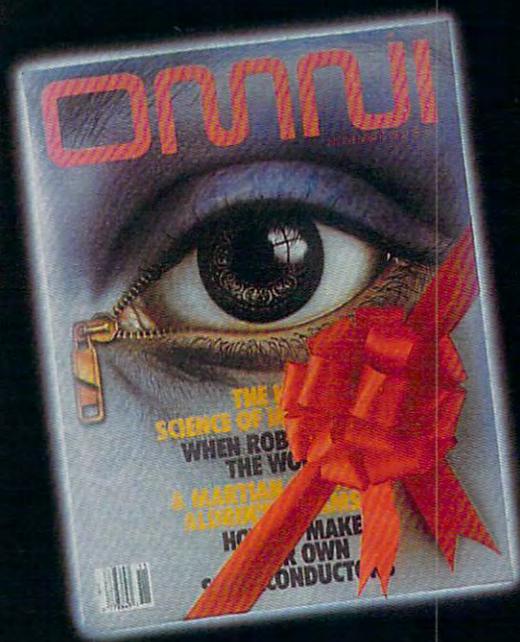
Given *Windows*' graphical interface, it's also the logical choice if you work primarily in graphics-based applications such as desktop publishing, CAD, draw programs, and the like—especially if the specific programs you use for these activities are *Windows*-aware.

The third alternative is a mix-and-match environment, where you use both standard DOS and *Windows* applications. In this case, the choice of whether to organize your multitasking under *DESQview* or *Windows* requires a little more thought.

DESQview handles both character-based and graphics programs with equal ease. Its speed and flexibility should influence your decision.

However, accessing some of *DESQview*'s more advanced features requires a level of technical knowledge surpassing that demanded by *Windows* 3.0. Unlike *DESQview* and, to a certain degree, earlier versions of *Windows* itself, *Windows* 3.0 puts its own house in order. It places few demands on the user.

In the final analysis, *Windows* and *DESQview* perform exactly as promised, bringing almost divine power to the world of silicon. Each endows DOS with the ability to multitask. Regardless of which one you choose, adding multitasking capability to your system will improve your efficiency and increase your overall PC productivity. It will allow your computer to work efficiently on multiple projects at your own pace. And that, after all, is what using a personal computer is all about. □



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INTRODOS

T O N Y R O B E R T S

One of the hidden jewels in DOS versions 3.2 and higher is the XCOPY command. XCOPY is a clear improvement over COPY, but many users ignore it, probably for two reasons. First, COPY is easy, convenient, and already learned; second, one look at the XCOPY page in any DOS manual can scare even DOS aficionados. You have a choice of eight possible switches, and it's hard to know where to begin. Why use XCOPY? It's faster, more powerful, and smarter.

In moving data from a hard disk to a floppy or vice versa, XCOPY reduces the transaction time by about 20 percent. The saving comes because COPY reads and writes each file individually, but XCOPY reads as many files into memory as it can and then writes out the whole group at once.

XCOPY also eliminates the pain of copying files in subdirectories from one disk to another. The command XCOPY A:*.* B:/S copies all the files in the current directory and its subdirectories on drive A to drive B, creating any necessary subdirectories as it goes. If you add /E, empty subdirectories on the source disk will be created on the target disk as well.

If you carry disks with work in progress from your office to your home, XCOPY can help make sure you have the latest versions of the files you need wherever you are. One way to do this is by using the /D, or date, switch. This tells XCOPY to copy only those files that were changed on or after a certain date.

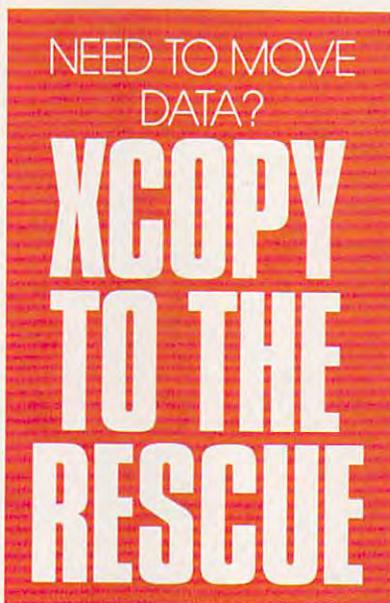
Let's say you're working on a proposal that consists of several data files. The files you're working on are all in the same subdirectory, and all have the extension DAT.

The command XCOPY C:*.DAT A:/D:mm/dd/yy (substituting the current date for mm/dd/yy) copies all the DAT files that were modified today to the disk in drive A. Once you arrive home, switch to the subdirectory that holds your data files and reverse the procedure with the command XCOPY A:C:/D:mm/dd/yy.

When you've finished your work for the evening, use the first command again to update the data files on the disk; then tomorrow morning use the second command to update the files on the hard disk at work.

Using the date switch works well unless there are too many files to fit on one disk. If that's the case, let XCOPY copy files based on the status of the archive bit.

The archive bit is a piece of information DOS keeps about every file.



It's a simple on/off switch. If it's on, the file has been changed since the last backup. If it's off, no changes to the file have occurred.

Later versions of DOS include a command, ATTRIB, that allows you to change the file status bits, which, besides archive, include read-only, hidden, and system file attributes. Most disk utility programs also have ATTRIB commands, and their versions are usually more powerful and easier to use than their DOS counterparts.

Let's say you want to keep daily backups of the files in your word processing subdirectory. Switch to that

subdirectory; then use the command ATTRIB -A to turn off the archive bit in each of the files.

Now, as you create new files or modify existing ones, the archive bits for those files will be turned on. At day's end, you can use XCOPY with the /M switch to copy only those files that have been changed. The command would be XCOPY C:A:/M.

XCOPY will begin copying changed files from the current subdirectory to the disk on drive A. At the same time, it will turn off the archive bit for each of the files it successfully copies. If you have several files to copy, the disk in drive A will eventually get too full to hold more information, and XCOPY will stop work and display an error message indicating that the disk is full.

When this happens, insert another disk and repeat the XCOPY. The files that were copied to the first disk won't be copied again because their archive bit is no longer on. Repeat the process until all the files you want to back up have been copied.

If you're interested in automating this daily backup process, you could set up a batch file that would copy the files from several subdirectories. To make such a batch file work successfully, though, you'd have to know whether all the files in one subdirectory were successfully copied before going on.

The ERRORLEVEL command from DOS's batch programming language could be used for this task. If XCOPY exits without completing its task, it sets an ERRORLEVEL code. Your batch program can test for that condition, and if it occurs, you can prompt the user to insert a new disk and then have the batch file repeat the previous command to copy the remaining files to the floppy.

Four of the eight XCOPY switches have been mentioned. The others are less used but could come in handy for certain applications. Check out XCOPY in your DOS manual and see if this powerful command's other options are useful to you. □

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The tapestry of these struggles was dark to its creators, its final outcome obscure and inevitably the result of a panoply of individual efforts. For example, the French were undone in Spain by Napoleon's inability to personally supervise the campaign.

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- | | |
|---------------------------|-----------------|
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| Field Commander | Army |
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- The Habsburg Monarchy
- The Empire of all the Russias
- The Kingdom of Prussia
- The Ottoman Empire
- Other Power (e.g. Spain)

- | | |
|-------------------------------------|------------|
| (1 to 2) | (1 to 2) |
| Field Commander | Army |
| Strategic/Political Commander | Navy |

MUSKETS & MULES

Please number countries in order of preference:

- (1 to 3)
- French
- Austrian
- Russian
- Prussian

C-12

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NEWS & NOTES

dBase Sequel

It seems that Ashton-Tate's been listening to *dBase* users. Complaints about *dBase IV*'s massive size and lumbering operation have abounded ever since the new database management program was released. According to Ashton-Tate, *dBase IV* version 1.1 requires significantly less memory yet features increased performance, improvements in its Structured Query Language (SQL), a simplified installation procedure, new language commands, and more.

dBase IV 1.1's menu-driven Control Center, with its Design Tools, lets users manage data without having to write program code, while the program's application development environment and the *dBase* language itself allow developers to build applications faster without sacrificing flexibility. The program's Memory Management System handles overlays more efficiently, requiring only 450K of RAM. The overlay-dependent areas of *dBase IV* 1.1 also were supercharged, improving performance when the user is working at the Control Center and in programs that use menus and windows.

While using SQL, users can now browse tables; run reports, labels, and queries; and utilize 23 new or enhanced *dBase* commands. In addition to new language commands, users can also take advantage of conditional indexes, less restricted user-defined functions and ON commands, and an Organize menu accessed from the Browse and Edit screens.

These changes cover many of the things *dBase IV* users have been asking for—and not a moment too soon. Some tough competitors have been breathing down Ashton-Tate's neck, and these changes could be just what *dBase IV* needs to become competitive again. *dBase IV* version 1.1, standard edition, sells for a list price of \$795. A developer's edition is available for \$1,295, and a LAN Pack option sells for \$995.

Ashton-Tate Customer Service, 20101 Hamilton Ave., Torrance, CA 90509

In the Chips

Microchips are now big business, and manufacturers such as Intel, Motorola, and others are probably more than a little worried about Gilbert Hyatt. On July 17, Hyatt, a 52-year-old engineer, received a patent for a computer chip that he invented 20 years ago. The patent seems to include chips used in computers and nearly all electronic devices, such as calculators, dishwashers, and even cars.

Before Hyatt's patent, the invention of the microchip was generally credited to a team of Intel engineers, including Ted Hoff, Federico Faggin, and Stan Mazor. They started work on the idea of the microchip in 1969 and produced the first one by 1971. However, Hyatt invented his first microchip in 1968 and has been attempting to get a patent on it for the past 20 years. The major chip manufacturers have vowed to try every possible way to show that Hyatt's patent doesn't apply to their products. If they lose the fight, however, hundreds of millions of dollars in royalties could start flowing Hyatt's way.

The Sun Moon Star Also Rises

CD-ROM is on the rise, and so is Sun Moon Star. The company's new 286-12/CD system and stand-alone CD-Set CD-ROM drive are among the first that are well suited for small business and home office computing, and the company seems to have a solid grasp on what its customers want. Bundled with approximately \$2,000 worth of CD-ROM software and Sun Moon Star's proprietary installation disc, *CD-SetGo*, the new line offers almost instant productivity. The eight discs included in the CD-ROM library include *Microsoft Bookshelf*; *Microsoft Small Business Consultant*; *Microsoft Stat Pak*; *Software Toolworks' World Atlas*, *Illustrated Encyclopedia*, and *CD Game Pak*; *WGE Publishing's CD Audio Guide*; and *General Information Systems' Hotline II Executive*.

Useful CDs for artists and desktop publishers are also available from other sources. NEC has released CDs containing photography and drawings.

The 286-12/CD system includes a 40MB hard disk, 1MB of RAM, an internal 1.2MB 5¼-inch floppy drive, the CD-ROM drive, and a VGA monitor. In addition to the CD-ROM software, the 40MB hard disk is preloaded with MS-DOS 3.3, *GEM/3 Desktop*, *GEM DRAW*, *PFS:First Choice*, and *CheckIt*. The 286-12/CD is priced at \$2,995. CD-Set external CD-ROM drive is priced at \$995.

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ONLINE

G E O R G E C A M P B E L L

If you occasionally have trouble with your hardware or software (and who doesn't?) and you're tired of being put on hold when you call a support line (and who isn't?), there's an answer as close as your modem. More and more companies are using online support to supplement the more traditional voice-support systems. You can also obtain quick and accurate support from other users on local BBSs and commercial online systems.

One of the best sources of help with any computer problem is as close as your local BBS. This is especially true if you have a hardware question or need help with a popular program. There's probably someone on the BBS who has solved a similar problem.

Just leave an open message describing your problem and asking for help. Most BBS users scan all new messages each time they log on, so your question will get the attention of almost every user. In most cases, you'll find an answer within 24 hours.

How accurate are the answers you get from BBS users? Many times, they're even better than the advice you'll get on a busy voice-support line. A BBS user who takes the time to help you solve a problem is an end-user who understands your situation.

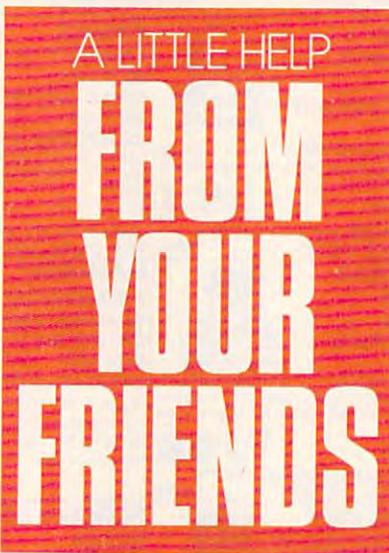
Companies, both large and small, recognize the popularity of commercial online services, like CompuServe and GENie. If you subscribe to one of these services, your online support options are many.

CompuServe offers the widest selection of official support forums, with companies like Microsoft, Borland, Ashton-Tate, Norton, Adobe, and many others offering customer support. The list grows almost weekly and even includes smaller companies like ButtonWare and DataStorm.

GENie also offers a good assortment of support areas among its roundtables. Microsoft is there, along with Ashton-Tate, Borland, Hayes, WordPerfect, and more. You'll find direct and fast answers to your questions from all of them.

It's easy to discover if a company offers support. On CompuServe, enter GO INDEX at any prompt. If you're a GENie user, just enter INDEX. You can then search for support areas by selecting the search feature from a menu.

Once you've found a support forum, use the service's normal message commands to ask your question. As with local BBSs, you'll usually find your answer within 24 hours.



You'll find more than just answers on official support forums. Each company maintains a library of files, including drivers for your favorite monitor or printer, program updates, and utilities designed to enhance your productivity.

Official support forums aren't your only options on these commercial services. As on a local BBS, you can ask for help from other users as well. All you need to do is check into your favorite forum and pose your question.

Naturally, you'll have to pay the normal charges when you call a commercial online service, but the solution is usually worth its cost.

Typically, you can pose your question in just a minute or two and read the answer in just as short a time.

Since most companies no longer offer toll-free support lines, it could end up costing less than a voice call.

As companies discover the benefits of online user support, many have taken the next step: offering a dedicated BBS just for product support. This support method was pioneered by shareware programmers, but it's rapidly spreading to major corporations.

Microsoft, for example, recently put its support BBS online. You can call it at (206) 646-9145 to have questions answered or to download updated printer and display drivers. Other companies also offer dedicated BBS lines. Check your hardware and software manuals for these numbers or call the company's voice-support number and ask about BBS support.

It's often said that the only stupid question is the one that isn't asked. But how you pose your question often determines whether or not you get the answer you need. Whether you call a local BBS, a commercial service, or a dedicated support BBS, you need to ask the right question. Here's a list of the items you should include whenever you ask for help.

- The name and version number of your software. If you're asking about a hardware problem, provide the model number of the hardware in question.
- A detailed description of your system, including CPU type, amount of memory, DOS version, monitor type, and any special hardware involved in the problem. If you're using memory-resident programs, list them as well.
- Details about the problem. The more specific these are, the better. Describe exactly what you were doing when the problem occurred and precisely what happened.
- If an error message was displayed when the problem occurred, quote it exactly when asking your question.

If you always include the information above, you'll be assured of accurate and helpful advice. □

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air combat
sequence

Strategy mode
split screen with
3D Hexboard



- VGA 256
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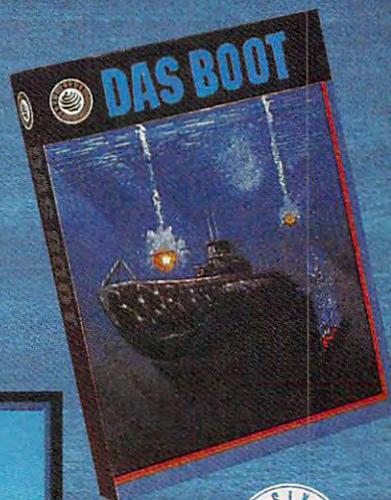
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view of enemy
aircraft

VGA 256 color
mine field
under North
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ON DISK UPDATE

J O Y C E S I D E S

If you've called the technical support department during our transition period, we'd like to thank you for your patience. It's been pretty hectic around here, but the rough spots should be smoothing out now. We're trying a different approach to technical support. We'll return calls from 3:00 p.m. to 5:00 p.m. EST, Monday, Wednesday, and Friday. If you can't take a call between these hours, specify the day of the week and a time during that day when you can be reached.

You can still call between 9:00 a.m. and 4:30 p.m. EST, Monday through Friday at (919) 275-9809 to leave a message. Please state the nature of the problem when you call. We'll make two attempts to return your call.

Be sure to send in your completed disk survey form included in the Information and Extras menu option offered when you run *CMOS (COMPUTE's Menu Operating System)*.

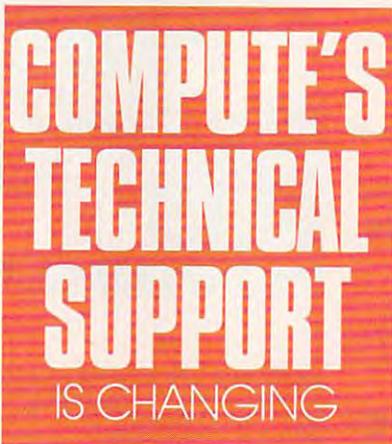
We'd like to hear from you, even if your comments are critical. The survey forms help us decide what types of programs to include on the disk. This is your chance to let your voice be heard.

Before you fill out the form, however, spend some time with the program. Please don't judge any program too severely until you've had sufficient time to work with it. Sometimes first impressions can be deceiving; try a program several times before making your decision about whether it's worthwhile or not. We take your comments very seriously, but we want you to give a fair assessment on the disk survey forms.

Notice that there's a request for your name and address located near the bottom of the current survey form. Some of you have complained of a problem but haven't included a return address or phone number. We can't help you solve your problem if we don't know how to get in touch with you.

For those of you who'd like to expand your disk library, we offer sever-

al special disk products. Available now are *COMPUTE's Best PC Games Disk*, a collection of some of our favorite previously published arcade and educational games; the *Mean 18 Course Disk*, six originally designed golf courses to add to your *Mean 18* collection; and *COMPUTE's Share-Pak Disk*, a thematic disk containing 3-5 large application packages released as shareware. This disk can be ordered from each issue, or you can subscribe to it.



Coming soon is a disk filled with 38 different utility programs ranging from a directory killer, which removes a directory without having to delete the individual files and directories below it, to a batch file menu creator, which includes full mouse support. To order any of our disk products, write to us at 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

Viruscan and Sine Variables

If you've had problems running *Viruscan* (March 1990) or *Sine* (May 1990) from *CMOS*, you may have entered the parameters incorrectly.

Anytime *CMOS* offers the Run option for a program and allows you to enter one or more parameters, don't enter the program name. Only enter the parameters needed to run

the program. For instance, to run *Viruscan*, enter the drive letter (followed by a colon) when asked for parameters.

Some systems won't run *Sine* from the menu because of memory limitations, especially when you're using hi-res modes. If you receive a runtime error message, you should install the program, exit the menu, and run it from DOS by typing *SINE* at the prompt.

What's in a Filename?

The filename of the executable file for *SetRAM* (May 1990) was misspelled in the documentation file *SETRAM.DOC*. The correct spelling of the filename is *SETRAM.EXE*.

Chex It Out

For those of you who own monochrome systems and can't read the *Chex* data screen, here are a few tips on how to customize the screen so you can read it better.

First, install the program from *CMOS*, switch to the disk or directory where the installed files reside, and load the program by typing *CHEX* at the DOS prompt.

Press F8 and then C to bring up the Custom Options menu. The cursor is located on the first line beside Headings and Line Color. Enter 112 at the cursor position and in the next column. Press Enter after you've typed each number.

After you've pressed Enter the second time, the cursor will be located on the second line, Detail Color. Enter 15 twice, pressing Enter after each number. If you'd like, you can also change the Window Color to 15 in both columns. Now press Esc and Y to return to the data screen.

You should be able to see the column headings; the first line, which contains Balance Forward; and the bottom two lines with function-key equivalent information. If the display still is not satisfactory, return to the Custom Options menu and try a different number. The choices range from 0 to 128. □

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HOT TIPS

H I N T S A N D T I P S F R O M O U R R E A D E R S

I've found a way to quickly load and run any program on a hard drive. I created a batch file called RUN.BAT that moves to the drive and directory where the program is located, runs the program, and returns to the root directory.

```
ECHO OFF
PAUSE
ECHO %2 is now loading
%1
CD \ %2
%2
CD \
```

Use the following syntax to run the batch file: `RUN drive: filename`. The directory name and the executable filename must be the same because the same parameter is used for each, and the directory must be located under the root directory for RUN.BAT to work properly.

The batch file can be altered to work with your hard drive configuration. For instance, if you have a WORK directory under the root that contains all your program subdirectories, change line 5 in the batch file to `CD \WORK \ %2`. If you have more than one main directory under the root, such as WORK and DOS, you could create more than one batch file and name them RUNWORK.BAT and RUNDOS.BAT, and so on.

*Matthew Beaudoin
Pawcatuck, CT*

Xtree Pro

I use *Xtree Pro*, and at times I get a message that says there's not enough memory to display all the files. To get rid of this message, I use the XTPROCFG.EXE file to increase the number of files that *Xtree* will hold.

*Norma Gene Butler
Nashville, TN*

Color Prompting

Setting the screen colors in the DOS environment is difficult at best unless you use a program like *ColorSet* (*COMPUTE!'s PC Magazine*, March 1989). I found a way to set the colors

for the screen using the DOS PROMPT command and the ANSI.SYS codes. It's not as easy as running a program written for that purpose, but manipulating the screen colors with the PROMPT command is a lot of fun.

Before you begin, be sure the statement below is included in your CONFIG.SYS file. Substitute the correct drive specification for *drive*, and the full path where ANSI.SYS is located for *path*. After the line is added to your CONFIG.SYS file, reboot your system.

```
DEVICE=drive: \path \ANSI.SYS
```

The command syntax to change the background and foreground (or text) colors is as follows:

```
PROMPT $e[bkgd;foregd;attributem
```

The background (*bkgd*) colors range from 40 to 47, and the foreground (*foregd*) colors range from 30 to 37. These numbers represent the following colors:

30	40	Black
31	41	Red
32	42	Green
33	43	Yellow
34	44	Blue
35	45	Magenta
36	46	Cyan
37	47	White

You can also set the display attribute by including 0-8 in the command.

0	Normal
1	Bold
4	Underline
5	Flashing
7	Reverse
8	Invisible

Remember to separate the numbers with semicolons. You don't have to include all three numbers. If you want to change the foreground but not the background color, enter only the

foreground color number in the command, such as `$e[36m` for cyan text.

*Richard Bigot
Paris, France*

Take a Scroll

In a recent issue of *COMPUTE* magazine, a review of *WordPerfect 5.1* stated that the mouse could not be used to scroll through the document. On the contrary, it scrolls beautifully. Press and hold the right mouse button, drag the cursor in any direction, and the screen will scroll. Hold the left button and drag the mouse pointer to block text. These are features that I use daily.

*Ric French
Jacksonville, FL*

Swap It

There have been times when I wanted to swap the contents of two files and not lose the contents of either one. I wrote the following batch file called SWAP.BAT to exchange the contents of two files the easy way.

```
ECHO OFF
CTTY NUL
COPY %1 TEMP.DOC
COPY %2 %1
COPY TEMP.DOC %2
DEL TEMP.DOC
CTTY CON
```

To use the batch file, enter `SWAP file1.ext file2.ext`. The contents of *file1* will be swapped for the contents of *file2*. The CTTY NUL command keeps the message *1 file copied* from being displayed on the screen.

*Fred Wood
Hubert, NC*

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's PC Hot Tips, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We'll pay you \$25-\$50 and send you a COMPUTE's PC LCD clock radio for each tip we publish. □

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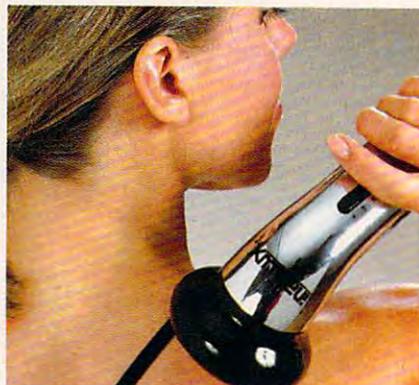
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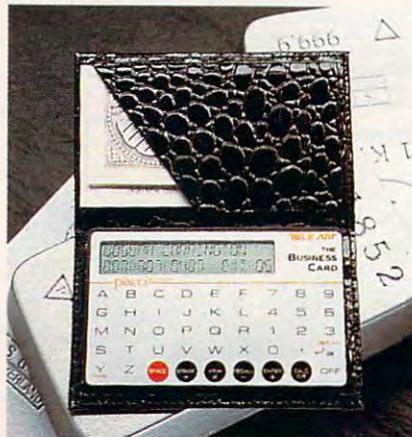
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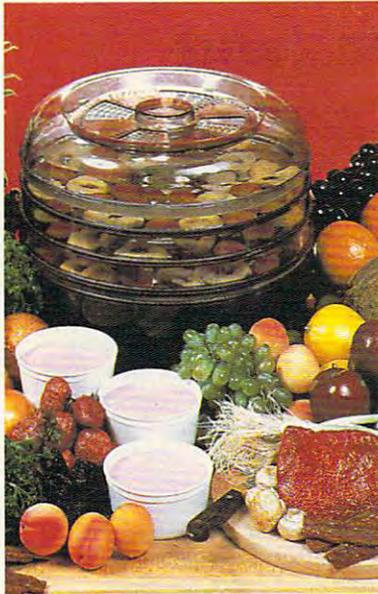
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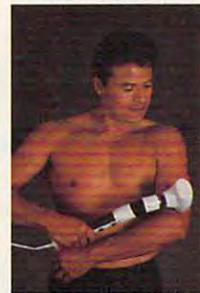


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AMIGA VIEW

D E N N Y A T K I N

It's that time of year again. The holidays are just around the corner (aren't magazine cover dates fun?), the snow is piling deep in the North (and the grass is turning a sickly shade of brown in the South), and COMPUTE is handing out its annual Choice Awards.

One thing you'll notice about the award winners is that they all run on MS-DOS computers. You won't find an Amiga-specific program in the bunch; MS-DOS compatibility was a prerequisite to nomination. This will anger some of you, but when you stop and take an objective look at the size and makeup of the consumer software market, you'll realize that it wasn't an unreasonable editorial decision.

The programs that did win deserved to. Take, for instance, Access's incredible *Mean Streets*, a fascinating graphics adventure with full 256-color VGA graphics and digitized RealSound. This program holds its own against any of its Amiga counterparts (and it will be available on the Amiga soon). Or *Windows 3.0*, which finally brings to high-end IBM PCs some of the capabilities that all Amiga owners have enjoyed since 1985.

There are a couple of Amiga programs, though, that had they been nominated, probably would've taken home prizes. *AmigaVision*, Commodore's new multimedia authoring system, would've had a clear shot at winning the Programming Language award. If you've ever taken even a basic computer programming class, you learned about flow charts. You plotted out your program as a series of interconnected icons on paper; then you translated it into the

equivalent BASIC or Pascal code. With *AmigaVision*, after you've created the flow chart, you're ready to run your program. You can create a multimedia presentation complete with animation and music, an educational quiz program, or a *dBase*-compatible database entry program without ever touching the keyboard.

Softlogik's *PageStream 2.0* (look for a full review of the enhanced version 2.1 next month) certainly would've had a shot at the Desktop Publishing award. This update is unmatched in its flexibility. The program supports not only its own outline fonts, but also IBM and converted Macintosh PostScript Type 1 and Type 3 fonts, and Compugraphic outline fonts to boot. It renders them smoothly both to the screen and to any printer, dot-matrix or laser. Plus, it will import nearly every popular graphics format, including standard and 24-bit IFF, *MacPaint*, TIFF, GIF,

Encapsulated PostScript, GEM Metafiles, *Professional Draw* clips, and others. It's a truly professional program that meets or exceeds the needs of all but the most demanding users.

Looking back, 1990 was a banner year for Amiga software. ASDG's *The Art Department* and *Art Department Professional* have made the Amiga a serious choice for graphics professionals and software houses that must render art on multiple platforms. Gold Disk's *Professional Page*, the first DTP program for any computer capable of four-color process separation, now supports Pantone colors with its 2.0 upgrade. New Horizons' *ProWrite 3.1*'s ease of use, multiple-column support, huge thesaurus, ability to mix color graphics with printer fonts, and unlimited extensibility through its *ARexx* port make it ideal for beginners and pros. And the big news at press time: Macintosh multimedia giant MacroMind announced they

will be doing an Amiga player for *Director* presentations.

It's been an active year on the entertainment front, too. Incredible games such as Psygnosis' *Shadow of the Beast II* and Cinemaware's *Wings* keep the Amiga at the leading edge of game-playing technology. And the major publishers, some of whom dropped out of the Amiga market in the late 1980s, are back in force with fantastic Amiga conversions.

Right now the market research says the momentum is with MS-DOS. But with Amiga software getting better and better and over 2 million Amigas already in the field, the market is bound to stand up and take notice. And it's about time. □





NEWS & NOTES



ANOTHER NEW AMIGA

By the time you read this, Commodore either will or will not have shown its new 3500 computer at the big fall Comdex show in Las Vegas. The 3500 is said to be little more than a 3000 in a tower case (it will definitely not come with a 68040 processor). The larger case will allow for more internal disk drives and more expansion slots, both Amiga and IBM. Since there isn't any new technology in the 3500, it should be a snap to get it ready on time, right? Well, maybe. Even though the main difference is the case, word is that the original design was based on the PC-60, Commodore's 80386 tower-case PC, whose aesthetics can most charitably be described as functional. The last thing that Commodore officials want to do now is introduce another ugly computer. So the 3500 may be delayed, pending a facelift. While they're at it, Commodore might want to modify the 3500 to accept NewTek's Video Toaster. We've been told that even the larger tower-case model won't have the right size video slot for the long-awaited appliance.

Speaking of new models, we keep hearing rumors about a cost-reduced version of the 2000 to match the 3000's slim profile. This computer appears to be about nine months to a year away, but the main thing we've been hearing is that it will have a couple of Amiga expansion slots but no PC slots. The big question is whether it will use a 68000 or a higher-powered processor. We're rooting for at least a 68020. Only Apple would have the nerve to introduce another 68000-based computer at this late date.

—SHELDON LEEMON



A MEG O' CHIP

About the only feature of the 3000 that you can't duplicate on the 2000 by using add-on cards is the ability to use two megabytes of chip RAM. DKB Software of Milford, Michigan, is planning to change all that, however, with its MegAChip board, an add-in that allows you to retrofit the new two-meg Agnus chip to the 2000. This little board contains both the new Agnus chip and one megabyte of RAM, and it plugs right into the Fat Agnus socket.

The board should be in production by the time you read this; it will sell for \$299.95 with a meg of RAM but no two-meg Agnus chip. You'll have to obtain that chip yourself as a service part, since Commodore has declined to furnish them directly to DKB. According to DKB, the reason stated was that the company "does not want to blur the distinctions between the 3000 and 2000 product lines."

DKB is also considering marketing a board that would allow you to switch between version 1.3 ROMs and 2.0 (as does Utilities Unlimited in Oregon) "if there is enough demand for such a product." Give me a break. As hard as Commodore has tried to keep version 2.0 compatible with previous releases, with all of its enhancements it will clearly break more software than any previous update. As soon as users find out that it won't run their 1987 *Bug Blaster* game, they'll be clamoring for a product that allows them to switch back and forth.

—SHELDON LEEMON

A Really Big Show

The AmiEXPO held last October at the Disneyland Hotel in Anaheim was Ami Shows' best attended California event—and with 12,415 paid attendees, the most heavily attended AmiEXPO ever held in the USA.

There were more products on display than I have space to write about, so I'll cover here the newest products and the highlights of the exhibits.

The hardware. This AmiEXPO provided a cornucopia of products for hardware fans, as many innovative new goodies were shown.

Black Belt Systems demonstrated their HAM-E, a book-sized external box that can display 262,144 colors out of a palette of 16 million.

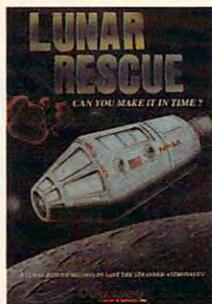
Twenty feet away in a booth big enough to be a Rose Parade float, Digital Creations showed off DCTV (shipping soon), coupled with its 24-bit NTSC paint package.

California Access, known for its floppy drives, had a dazzling booth resembling a fifties-style cafe and showed Bodega Bay,

continued on page A-27 ▸



= INSIDER NEWS AND GOSSIP



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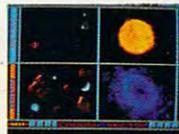
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A NEW PERSPECTIVE AFTER
UPGRADING TO WORKBENCH 2.0

My regular sojourns through information networks and trade shows provide opportunities to talk with many Amiga owners, and I've noticed some consternation about the new Amiga operating system, Workbench 2.0. Most people make positive noises, yet many of them wonder why they should bother with it since Workbench 1.3 seems to do the job. I liked Workbench 1.3, too, but I'm here to tell you that once you've tried Workbench 2.0, you'll never want to see 1.3 again, much less be stuck using it. ▶

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mands. New AmigaDOS commands include CPU, EndShell, Get, IPrefs, MakeLink, Set, UnAlias, Unset, and UnSetEnv. The majority of old familiars have been rewritten and optimized.

The CD command, although resident in 2.0, is now obsolete. Type the name of a disk or the device number of the drive (for instance, DF1:), and the system takes you there without requiring the use of CD. Entering the name of a directory on a disk you've already addressed that way will take you there without CD as well. If typing Endcli is too much trouble for you, the new keyboard shortcut Control-/ will nuke your current shell (you can also close it by clicking on the Shell's close box). And one of the nicest AmigaDOS enhancements is that you can highlight and paste text from a shell into any program that accepts the standard keyboard paste command, Right Amiga-V.

Magic Icons

What deservedly gets the most attention is Workbench 2.0's beautiful, slick, professional, awesome, cool, much-improved new icon system. All files—not just those with associated .info files—can be seen and manipulated from the Workbench using the mouse. This feature alone makes 2.0 worth the upgrade. Previous versions of Workbench made it impossible to see what was inside a drawer that didn't have an icon without resorting to opening a CLI. With 2.0, you can insert any disk—even those made with previous Workbench versions—and, by selecting Show All Files on the Window menu, see everything on that disk represented as temporary icons the system creates for you.

And there's more. Icons don't reveal many particulars about files (such as size, protection bits, and the date and time of creation). The 2.0 Workbench offers access to that data in a mouse-accessible manner. You can now see all files (sorted by name, date, or size) in a text-based Workbench window listing.

Double-clicking on any file opens a requester into which you can enter instructions. Say, for example, that you wanted to use the Info command to see how much space was left on DF1:. Under older versions of the Workbench, you would have had to open a CLI or Shell window. Under 2.0, you can select Show All Files on your Workbench disk, double-click on the C drawer, and then double-click

on the Info icon. A window will open with the Info command in a string gadget. Type any arguments to the command (in this case, type DF1:) and hit Return. Another window will open with the output of the Info command.

The Amiga has long been the only PC to provide both built-in graphics and text-based operating systems, but Workbench 2.0 makes the graphics operating system truly viable for the first time. With it, you can do anything from either environment not only easily but elegantly.



The improved Pointer editor is just one of many new stand-alone Preferences programs.



Other enhanced 2.0 programs include an Ed editor with pull-down menus and a Font Preferences editor.

Backgrounds and Colors and Fonts—Oh, My!

Workbench 2.0 also sports great new colors and background patterns that let you differentiate between different types of windows at a glance.

It offers a slew of new keyboard command shortcuts, such as Right Amiga-I to open an icon's Information window. It will even create a new drawer or directory, complete with icon, from a pull-down menu or with the Right Amiga-N shortcut.

Fonts are shown in the Fonts Preferences window—no more guesswork about which one you want to use—and you can use three different fonts for icons, windows, and menus. There's a new Workbench Startup window into which you can drag any file by icon or name and have it active when you boot your system. For example, you can put Clock and Shell there, and they'll be ready and waiting when you start up your Amiga.

Both the Workbench and AmigaDOS operate faster; there's substantially less waiting around for things to load. Another productivity speedup comes from the ARexx macro language, which comes with 2.0. ARexx allows communication between products developed by different companies as well as being a sophisticated language suitable for creating simple utilities and complex batch files.

I've found overall compatibility with existing programs is reasonably good with 2.0, with the exception of menu formatting on some programs due to 2.0's more permissive use of fonts. But the advantages of 2.0 are worth putting up with any problems you might encounter. If the Workbench had been this good when I started using the Amiga, I wouldn't have bothered to learn the CLI.

Get Your ROMs

Some of the consternation I'm hearing about 2.0 may be due to the fact that, as I write this, Commodore has not announced in detail what will come with Workbench 2.0 or its price. In order to upgrade to 2.0, you'll have to have your Kickstart 1.2 or 1.3 ROM chip swapped for a new 2.0 ROM. (Amiga 1000 owners will have to add a third-party expansion device such as the Rejuvenator to add a Kickstart ROM; 2.0 is too large to be loaded into the 1000's Kickstart RAM.) For most of us, that means taking our Amiga to a technician. I urge you to go for it.

While you're at it, have the SuperAgnus installed as well. It changes the second 512K of memory in your 2000 or expanded 500 into Chip RAM, literally doubling your system's general usability. I'd stack my Amiga 2000—with 3MB of RAM, a 65MB hard drive, SuperAgnus, and Workbench 2.0—up against any stock PC on the market today. I think the only system in its price range that could humble it would be the Amiga 3000—which comes with Workbench 2.0 right out of the box. □

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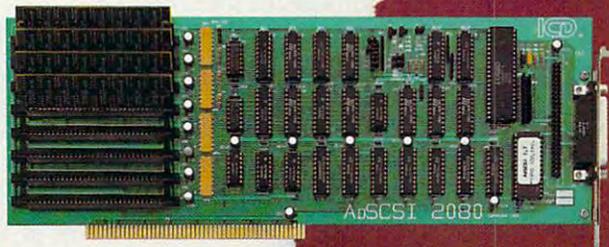
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FEEDBACK

QUESTIONS FROM OUR READERS

Math 101

I just read a letter from Don Hilke titled "Did the Amiga Flunk Math?" in the "Feedback" column in the November 1990 Amiga Resource. Mr. Hilke complained about the lack of mathematics software for the Amiga.

I do all of my mathematical work on my Amiga. For my work, I use a computer algebra system called *Maple*. The Amiga version of *Maple* is available from Waterloo Maple Software. This very powerful software comes with libraries containing routines for doing every level of mathematics from basic algebra and trigonometry up to advanced calculus and differential equations. It can handle problems in complex variables, statistics, and linear algebra. This software will give solutions to problems symbolically—that is, in terms of variables and mathematical expressions. It is even capable of expressing solutions in the form of FORTRAN code.

This software is a sophisticated tool for scientists and engineers. It is definitely not a toy for the kiddies! I would match this software against just about any mathematics software available for the IBM PC or for the Macintosh.

I hope Mr. Hilke contacts Waterloo Software and finds out what his Amiga is capable of.

ELLIOT JACOBS
ORMOND BEACH, FL

Maple's Amiga version is available for \$395 (U.S.) from Waterloo Maple Software, 160 Columbia Street West, Waterloo, Ontario, Canada N2L 3L3; (519) 747-2373. The package requires an Amiga with 1MB of memory and 10MB of free hard disk space.

Getting the Word Out

Just think of it. Until today, with the release of the first issue of the new *COMPUTE* magazine, the only place a PC user would get information on the Amiga computer world was in the slim offerings of *Computer Shopper*.

After all, why would anyone but an Amiga owner purchase or subscribe to an Amiga-specific publication?

Up until now, an inquiring PC user online with any of the Amiga bulletin boards was lambasted with "Amiga arrogance" and made to feel lower than cell life.

While I was initially disappointed at the demise of *Amiga Resource* as a separate magazine, I now realize that, for the first time, information on the real world of Amiga computing will be placed gently into the hands of thousands of PC users.

It's ironic that *COMPUTE* is going to accomplish in one instant of consolidation what Commodore's marketing department has been trying to do for almost six years now: inform the general computing public about the merits of the Amiga, its operating system, and its support community. Bravo.

MICHAEL GERARD
CLEVELAND, OH

Stuck with Skinny Agnes?

I own an Amiga 500 with the Rev. 6 motherboard, the SuperAgnes (8372a), and an Imtronics ProRam 2.3 internal expansion board which isn't populated. The manual says that the board is incapable of providing any CHIP RAM, as Commodore's 501 expander is capable of doing. Is there any way to obtain more CHIP memory, or am I doomed to 512K of CHIP memory? Or is the manual lying to me?

Also, I was wondering about a new case for the Amiga 500. All the other models have detached keyboards. Why couldn't the 500 be designed with that luxury?

KEN HUMPHREY
SEAT PLEASANT, MD

We attempted to contact Imtronics about the ProRam, but there was no answer at its published number. However, if the manual states that the ProRam can't extend CHIP RAM, then it probably can't.

There's even worse news on the

CHIP RAM front, this time from Commodore itself. The company sent out a service bulletin in October to all its U.S. dealers stating that modifying an Amiga 500 to utilize one megabyte of CHIP RAM would not be supported by Commodore. It went on to say that if the modifications were made, even by an authorized service center, the machine's warranty would be voided. With Commodore's new one-year warranty and Commodore Express service program, Amiga owners may want to think twice about making warranty-voiding modifications.

However, some of our contributing editors have modified their Amiga 500s with SuperAgnes chips to utilize one megabyte of CHIP memory and have had no problems with their machines. There's no technical reason for not making the modification to your Amiga. It seems Commodore is simply trying to further differentiate the 500 from the 2000.

Commodore designed the Amiga 500 as a one-piece unit to reduce manufacturing costs. While you probably won't see a 500 with a detachable keyboard from Commodore any time soon, if you're handy with a screwdriver, you can make such a modification yourself.

Pre'Spect Technics (1085 St. Alexandre, Suite 500, Montreal, Quebec, Canada H2Z 1P4; 514-954-1483) has released the Black Workstation case. After you've removed your A500's motherboard and keyboard and placed them in Pre'Spect's \$320 case, your machine takes on the appearance of a sleek black Amiga 1000.

Send questions or comments to Feedback, Amiga Resource, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that, due to the volume of mail received, we cannot respond individually to questions. We reserve the right to edit letters for clarity and length. □



SPOTLIGHT

J O H N F O U S T

This month's "Spotlight" is dedicated to floppy disk users. Floppy-based Amigaphiles have no less enthusiasm than hard disk users, but they might as well be using completely different computers.

Hopefully, if you've yet to purchase a hard disk, this column will convince you to make the leap. An Amiga with a hard disk becomes a radically different machine. With floppies, you tend to avoid tasks that take minutes of disk gronking and swapping. On a hard disk, all tasks take only seconds.

A hard disk is like a big, fast floppy disk. Like a floppy, it stores programs and data. Unlike a floppy, it gives fast access to that information. Ads for hard disks can be confusing. They quote milliseconds and megabytes, but I've never seen one that said "Buy one and save time." That's the most important reason to buy a hard disk.

Here's a simple comparison. Starting *DeluxePaint* from floppies takes almost two minutes. Loading it from a hard disk takes between five and ten seconds. Once inside *DeluxePaint*, bring up the font requester by clicking the right button with the pointer over the text tool icon. Searching a disk for available fonts takes only a few seconds on a hard disk but might take nearly a minute on a floppy, especially if you're using a full custom font disk.

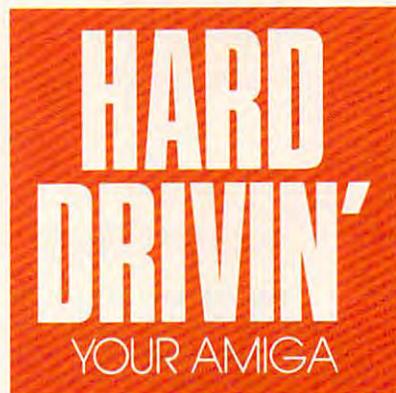
Many floppy-based Amiga users resort to rebooting on a program's own Workbench disk, the disk that came straight out of the product's box. They've correctly discovered that some applications don't work unless you reboot using that program's disk. Rebooting on the program's own Workbench disk solves the problem with wasted time and effort.

With a hard disk, there's no need to reboot between applications. It's much easier to take advantage of the Amiga's multitasking when you don't need to reboot. The hard disk becomes a universal Workbench boot disk that's compatible with every one

of your programs. It holds all the files that each program needs, and there's no need to swap floppies.

Running a software package that comes with three or four disks of programs, data, and tutorials can be a hassle. To store a file on one of your own disks, you need to remove one of the program's disks, and it always seems that it wants that disk back immediately. With a hard disk, all of the program's disks can be stored on the hard drive, freeing your floppies for loading and saving your own data. You won't see *Please insert volume XYZ in any drive* again.

Before shopping for a hard disk, you should know how to decipher hard disk advertisements. The smallest hard drives sold today hold 20



megabytes, or about 25 floppies of information. Buying a larger disk means a small incremental cost, so spending an extra \$100 today might get an extra 10 or 20 megabytes. Most drives can be reinstalled in a new system if you trade up to an Amiga 2000 or 3000, so think of it as an investment. Unless you've got an especially demanding program in mind, a 30- or 40-megabyte drive will serve you well.

Hard drives themselves are rated in milliseconds. A typical low-priced drive takes 65 milliseconds to seek out information on the disk. Some higher-priced drives perform the same seek in 18 milliseconds. If you can afford a faster drive, it's worth it, but a

slow drive is still better than a floppy.

How do you copy programs to a hard drive? Most hard disks come with scripts that copy Workbench to the drive. Copying the Workbench and Extras disks to a hard disk consumes less than three megabytes, leaving plenty of room for other applications. Most newer applications come with scripts for hard disk installation. Remember, if you're consolidating programs from bootable Workbench disks, you might only need to copy 200K or 300K of files from the floppy to the hard drive because you only need one copy of Workbench on the hard drive.

If you bought an auto-booting hard disk, all you do is turn on your Amiga; seconds later, the Workbench screen appears. If the disk isn't auto-booting, you'll insert a minimal Workbench boot floppy, and then the Workbench will appear with a new icon for the hard disk. Within this disk drawer, you can place more drawers and the icons for each of the applications you use most often. Chances are that you'll have plenty of extra space to store more pictures, texts, and sounds than ever. Of course, you're free to start programs from a floppy as you did before.

There are other hidden costs to operating a hard disk drive. Unless your hard drive already includes one, you'll need to purchase a backup program, which preserves all the data on your hard disk by copying it to floppies. Think of it as an insurance policy. If something goes wrong with the drive, you won't lose any data or programs. If it has taken many hours to arrange the applications, drawers, and icons on your hard disk, you don't want to lose that work, either. After the drive has been repaired or reformatted, you can restore it to its original state. It's good to keep an extra set of backups in a safe place away from the computer. You'll need to reserve a stack of disks for these backups.

Thanks go out to Harold Maybeck, who helped to describe what it's like to live without a hard disk. □



ABSTRACTIONS

A R L A N L E V I T A N

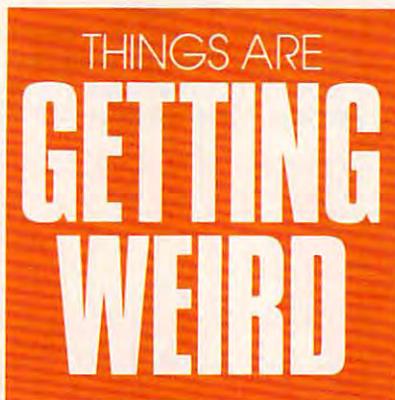
What the heck is going on at my favorite computer company? If things get any weirder, it will have to reincorporate as Twin Peaks Computers. Recent events at Commodore leave the distinct impression that while the wagons are being drawn into a circle, the muskets seem to be pointed in the wrong direction.

At Commodore's home base in West Chester, Pennsylvania, heads are rolling in the marketing department faster than in *Nightmare on Elm Street*. At least six key executives, including the VP of marketing, have vanished in a flurry of pink slips and resignations, and company-wide cut-backs are rumored to be on the way. My sources posit two likely scenarios, with the first placing the axe in the hands of Commodore president Harry Copperman, who has reportedly been less than enthused with marketing's advertising campaigns, or recent lack thereof. The alternative view places Copperman's own tenure in jeopardy, with Commodore chairman Irving Gould cast as the Lord High Executioner. "Irv, I'll take golden parachutes for 500, please."

It's generally conceded that, other than a garish press conference, the marketing group failed to sustain any appreciable Amiga 3000 momentum. The 3000 was prominently featured in dozens of magazines last summer and received generally favorable treatment. Since then, the new machine has made like Elvis. It's a real shame. Besides being jackrabbit quick in Amiga mode, the 3000 packs plenty of punch when outfitted with ReadySoft's A-Max Macintosh emulator package. I recently clocked the aforementioned combo as being slightly faster than a pricey Macintosh IIci.

The few criticisms leveled against the 3000, concerning expandability, should be addressed with the introduction of the Amiga 3500 at the winter COMDEX show in Las Vegas. The 3500 will be housed in a floor-standing tower case, with plenty of expansion slots and a 100-megabyte hard

disk standard and higher capacity drives offered as options. Unfortunately, the fate of a UNIX version of the 3000 seems to be up in the air. The software is reportedly ready to fly, and the system's price/performance ratio makes it a potential PC and Mac workstation killer, but Commodore higher-ups are questioning the firm's ability to sell such a machine into the Fortune 500. It seems nobody is willing to step up to building a corporate sales staff that will actually call on prospective customers.



What little advertising that is planned for the 1990 holiday season is focused on the Amiga 500. The theme of most of the ads is *What do you do when your mind outgrows Nintendo?* Anyone passingly familiar with the home videogame market knows what those people do. They buy Sega Genesis systems.

The only thing that may keep things hot is the impending release of NewTek's Video Toaster, which may end up making the Amiga a *de rigueur* part of any professional or semipro video studio. Commodore execs recently visited NewTek's headquarters/clubhouse in beautiful downtown Topeka. Although they were mightily impressed, they reportedly declined to butter NewTek's toast or kick in any additional bread for Toaster promotion.

There are also strong indications that Commodore may be prepared to

throw the baby out with the bath water. Spokespersons for Commodore USA have recently taken great pains to distance themselves from the company's CDTV project. When questioned about the status of the Amiga-based appliance, Commodore USA representatives disavow any knowledge concerning CDTV, insisting that all aspects of product development and delivery are being handled solely by the company's international division. The inside word is that the project is hopelessly behind schedule, and it's even money whether CDTV will ever become more than a vapor product.

Meanwhile in the United Kingdom, Commodore has released a computer in game-machine clothing. Amiga fans will be disappointed to learn that the new machine is not based on a stripped-down Amiga 500. With no CDTVs to ship, Commodore has come up with a plan to empty those warehouses chock-full of Commodore 64s that can't be given away for love nor money. Those crazy Brits have unleashed the 64GS, a mutated, keyboardless C64 with a cartridge slot and joystick ports. Commodore is packing four games into each cartridge in an effort to fend off increasing sales of game machines in England and Western Europe.

There's a ray of hope amidst all of this doom and gloom. By most accounts there are almost 2 million Amiga owners spread over the face of the planet. Stock analysts estimate that CBM chairman Irving Gould holds about 5 million shares of Commodore stock, which has been going for a shade under 5 bucks a share. If we all kick in 12 bucks or so, we can buy out Irv and install yours truly as chairman of the board. How can we lose? I'll be the first to admit that I've demonstrated a total lack of managerial and/or administrative ability during the ten years I've been writing for *COMPUTE* and that I'm prone to inappropriate random irrational acts. Look at it this way—at the very worst, it'll be a wash. □



CLI CLIPS

J I M B U T T E R F I E L D

There are times when you want to do mouse things but it's inconvenient to use the mouse. Perhaps you have a cramped work area, and the mouse doesn't have grazing space. Perhaps your mouse is buried in a mound of documents. Or your mouse is broken. Recently, I even talked to a poor soul whose mouse had been stolen. Mousenappers? The mind boggles.

You can use the keyboard to do mouse things. The qualifier keys on each side of the space bar and the cursor keys are all you need to do the trick. To move the mouse, hold down one of the Amiga keys (the keys marked *A* next to the space bar), and press a cursor key. The mouse accelerates as the key is held down, so you'll need to develop a tap-and-release method in order to position the pointer exactly as desired. To simulate a left-mouse button click, press both the left-Alt and left-Amiga keys; for a right-button menu click, hold down right-Alt and right-Amiga keys.

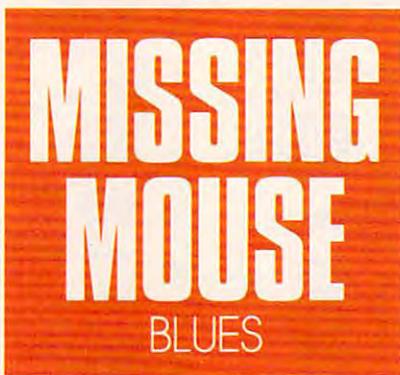
In principle, you can do almost anything with the keyboard that you normally do with a mouse. It takes some skill to handle resizing a window or selecting a menu item, and using a drawing program becomes impractical. Your fingers don't seem to be long enough to reach all the necessary keys; it's best to have a real mouse on hand. Find it, fix it, make room for it, or buy a new one if you need to.

Starting from the CLI or Workbench. Some programs, such as the commands in your *C* directory, can't be started from the Workbench. You must type the command at a CLI or Shell prompt. Workbench 2.0 has a whole new set of features that allow virtually any program to be launched from the Workbench. If you don't have 2.0, it's no hardship to type the commands, unless your Amiga is as bad at spelling as mine seems to be. (When things go wrong, I always blame my computer.)

Many Amiga programs may be started either way: from the Work-

bench by double-clicking the icon, or from the CLI by typing the program name. Sometimes, however, the program seems to run differently according to which way you started it. Tasks launched from the Workbench don't always look the same as they do when they are run from the CLI. There are two major reasons for this.

Icon files. First, there may be extra information stored within the icon of the program. The icon is stored in a file that's named the same as your application, except that it ends with the file extension *.info*.



If you click once on a Workbench icon and then select Info from the Workbench menu, you'll see this extra information in the area called Tool Types. Sometimes this area is empty, and sometimes it contains a lot of data. Use the scroll gadgets to examine the entire list of Tool Types.

When you start a program by double-clicking on its icon, the Workbench reads the *.info* file and its contents. The Workbench then starts the appropriate program and delivers the extra data from the *.info* file to the program. This way, you can customize features such as window size, fonts, and colors using information stored in the *.info* file.

But CLI knows nothing of any *.info* file and starts a program without reference to any such supplementary data. For example, if you type ZONK, the program called *Zonk* will begin to run immediately. The Amiga will take

no notice of a file called *Zonk.info* or its contents.

Many programs also allow you to specify options as part of a CLI command line. These options usually serve the same purpose as the data within a *.info* file. Options, or *switches*, are often preceded by a dash character. For example, the *WordPerfect* icon might contain a Tool Types option named *WORK AREA*. To invoke this same option from the CLI, you would type WP -w followed by the size of work area you needed. As always, check the program's documentation to see how it handles this kind of thing.

Current directory. A second reason that CLI and Workbench programs seem to run differently is related to the program's *current directory*. When you double-click on a Workbench icon, the current directory is set to that program's drawer. If the program then starts looking for files, it will most likely look in this drawer. Such startup data files may contain pictures, hot-key information, text, or almost anything else.

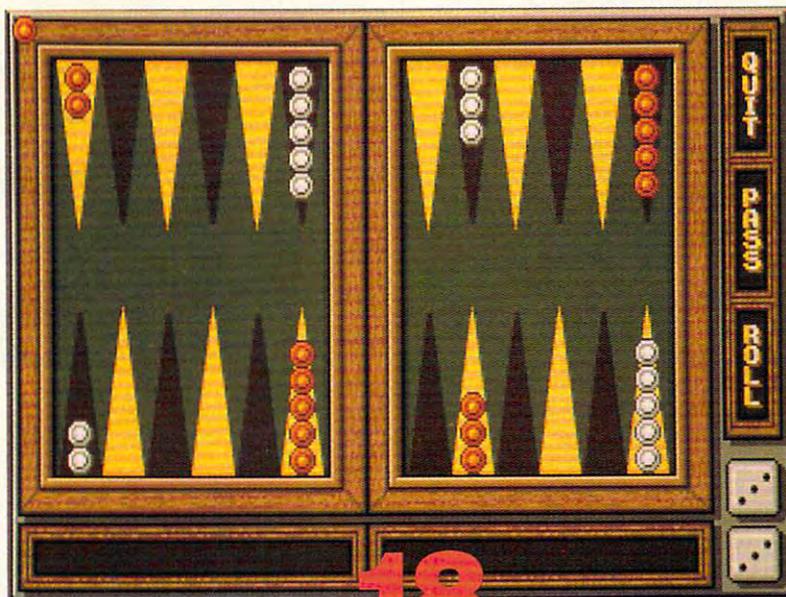
In contrast, a program started from the CLI will often not change the current directory that is active at that time. If such a program looks for files, it may look in your currently specified CLI directory rather than in the directory containing the program and support files.

Suppose your current directory is RAM: and you decide to start a program by typing its full path name, DF0:SOURCE. The program will start to run and might start to look for special files. Chances are it won't look in DF0:, where the files are actually stored. Instead, it will look in the current directory, which is RAM:, and won't find the files it needs.

If you suspect that this is your problem with a program started from the CLI, the fix is easy. Just change the current directory to the one containing the program and support files before you start. In the previous example, you would type CD DF0: and then type SOURCE. □



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ON DISK

GAMMONX

STEVE TIBBETT
AND
BRAD SCHENCK

Note from the Editors: *GammonX* is an Amiga version of the classic board game backgammon. For its five levels of computer opponents and its stunning graphics, *GammonX* received third place in the *Amiga Resource* \$10,000 programming contest.

Getting Started

To run the program, double-click on the *GammonX* icon, which can be found in the *GammonX* drawer on this issue's companion disk. *GammonX* will display a series of credits windows. Click on each window to make it go away. *GammonX* may also be started from the CLI. Be sure to change directories (CD) to the *GammonX* directory so that the program can find its graphics file (*GammonX.Dat*). *GammonX* is fully multitasking so that you can play while you work. Press Left Amiga-N to get to the Workbench screen and Left Amiga-M to get back to *GammonX*.

You set up and start the game using the program's menus. The *GammonX* menu has three selections: New Game, About, and Quit. New Game starts a game, About displays the first credits window, and Quit exits the game. The other two menus let you choose the players. The player controlling either side can be human or one of five types of computer player. So you can play human against human, computer against human, or computer against computer.

To start the game, set up the light and dark players as you wish and then select New Game. The computer will roll the dice. In *GammonX*, the player controlling the dark pieces moves first. You can always tell whose turn it is by looking at the turn indicator (a white or brown backgammon piece) at the top left corner of the screen.

There are three gadgets on the right side of the screen. Quit immediately exits *GammonX*. Pass allows

you to give up your turn when you cannot make a move. Roll forces the computer to move your pieces, which is handy for beginners who are just learning to play the game.

In *GammonX*, the computer rolls the dice. To move a piece, you move the mouse pointer over it and press the left mouse button. While holding down the button, drag the piece to its destination. Then release the button.

How to Play

Backgammon's rules are fairly simple. The backgammon board is divided vertically by a bar. The lower left quadrant is the home table of the dark side. The upper left quadrant is the home table of the light side. Each player has 15 pieces (called *men*), which start the game on four triangles (called *points*). The dark men move from left to right across the top of the table, then right to left across the bottom of the table. The light men move from left to right across the bottom of the table, then from right to left across the top of the table.

In *GammonX*, the dark player moves first. During your move, you choose one of your men and move it along the points according to the value of one of the dice. Then you choose another man (or the same one) and move it according to the value of the other die. In the case of doubles, each die is used twice. For example, a pair of 6s means that four men can be moved 6 points each, two men may move 12 points, two men can move 6 and one man can move 12, and so on.

You can't make a move if it means your man will land on a point occupied by two or more opposing men. If your man is placed on a point containing a single opposing man, the opposing man is sent onto the bar.

If you have a piece on the bar, you can't move until that piece has been taken off the bar. You can take your man off the bar if you roll a number which specifies a point in your opponent's home table that doesn't have two or more opposing men. For example, if you have one piece on the bar and you roll a 1 and a 2, you can place the piece on the table on the leftmost point of your opponent's home table or on the point next to it, assuming that one of those points has fewer than two opposing men already sitting on it.

When you've moved all of your men into your home table, you can begin to bear off. Bearing off is the procedure of removing pieces from the board. The ultimate goal of the game is to bear off all of your pieces. You bear off men according to the dice you roll. For example, if you roll a 3 and a 5, you can pull one piece off the third point from the left and one from the fifth point from the left. If a die indicates a point that's unoccupied, you bear a piece off of the highest point below that value.

GammonX makes it easy to learn how to play backgammon. It doesn't let you make illegal moves, and if you get stuck, you can click on Roll to make *GammonX* move your pieces for you.

There's a lot of strategy to backgammon. To learn more about the game's rules and its strategies, read *According to Hoyle* by Richard L. Frey (Fawcett Crest Books).

SPHEROIDS

KEVEN DIXON
AND
TROY TUCKER

In the year 2100, nuclear weapons are relics of a forgotten era. In this day and age, countries settle their differences in a duel between representative gladiators. The site of their engagement is the Arena, a manmade battlefield consisting of treacherous pits and hills.

At the start of each duel, six lethal spheroid bombs are randomly scattered about the Arena. Each contestant moves about in a hovercraft, collecting the bombs and then firing them at the opposing gladiator. Because of their spherical shape, the bombs roll across the Arena at high speeds. But at the same time, the undulating surface of the playfield makes their movement unpredictable. As you'll soon learn, the keys to survival in *Spheroids* are quick reflexes and a deadly aim.

Getting Started

To play *Spheroids*, plug one or two

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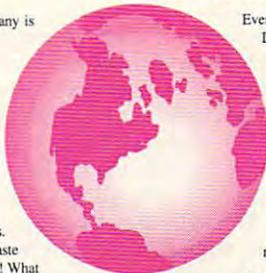
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joysticks into your Amiga and then double-click on the *Spheroids* icon. After a short delay, the game screen will appear. Before each game, you must select a battlefield. There are seven to choose from: Open, Quadrate, Diamond, Cyclone, Corner, Cross, and Lattice; these are selected by pressing F1 through F7, respectively. Each battlefield, with the exception of Open, contains mounds and depressions. These appear as diamond-shaped objects on the screen and come in three different sizes. Mounds are yellow, while depressions are gray.

Every battlefield contains a teleport device that appears on the screen as a pulsating purple square. When a hovercraft or a spheroid enters the teleporter, it's transferred randomly to another location on the playfield. In the process, the teleported object retains its original velocity and direction.

After you've selected a battlefield, you must select the type of game to play. Press F8 for computer vs. computer, F9 for player vs. computer, or F10 for player vs. player. Play begins after you've made a selection. Initially, each player is given nine hovercraft. The green ship, controlled by joystick 1, appears at the upper right corner of the screen; the blue ship, controlled by joystick 2, is at the lower

left. The number of craft remaining for each player is shown at the top of the screen. The game ends when you've destroyed your opponent's entire hovercraft fleet.

If you're slow in making your selections, the game will enter a demo computer vs. computer game. It's a good idea to watch the demo for a few minutes prior to playing, so you can see how the undulations affect the hovercraft and the spheroid bombs. Press Esc at any time to exit.

Playing the Game

Players use bombs, or spheroids, to try to eliminate the opponent. Six spheroids are scattered randomly across the battlefield. These small devices are collected and fired from the hovercraft. When launched, they roll across the battlefield at high speeds. To pick up a spheroid, simply guide your hovercraft over one. When you're ready to fire, push the joystick in the direction you wish to shoot and press the fire button.

Once fired, the spheroid assumes the color of the firing ship. If the opposing player's ship comes into contact with a spheroid armed by your craft, the ship is instantly destroyed. Armed spheroids have enough momentum to propel themselves about

two lengths of the Arena. When its energy has dissipated, the spheroid slows, and its color reverts back to neutral red. Either player can now pick it up and rearm it.

Since the spheroid bombs roll along the surface, the mounds and depressions affect the way they travel across the playfield. For example, if a spheroid is fired into a depression, it will roll around the sides until it eventually settles in the center.

When the game is over, the appropriate bar at the top of the screen will flash, indicating the winner. At this point you can change battlefields with the function keys or immediately begin a new game on the same field. Press Esc to exit the demo mode or a game in progress; then press Esc again to quit the program.

Game Tips

There are several playing strategies that you might like to try. If you fire a spheroid into the teleporter, occasionally it will materialize next to your opponent, destroying his or her craft in the process. Also, try using the mounds and depressions for bank shots.

At times, your craft will fall into a depression. If you simply thrust in the direction that you want to go, it will take you a while to escape. The quick-



ON DISK

est way to get out of a depression is by rocking your hovercraft back and forth until you gain enough momentum to escape.

Sometimes, several spheroids will appear very close together. If you hold down the fire button and maneuver around them, you'll fire a deadly volley in the direction you're traveling. Firing a stream of spheroids into the teleporter is almost certain death for your opponent. Since the teleported spheroids materialize in different locations, your opponent will have a hard time evading all of them.

MOUNTAINS

L. C. HASELMAN

One of the most fascinating things computers do is mimic reality. When workstation computers with powerful graphics became available, programmers took a break from simulating traffic lights and began to model the visual world. *Mountains* brings fractal landscapes to the most graphically powerful home computer—your Amiga.

Mountains is a complex program with many features, but it's easy to get started building landscapes with the program. Just run the program from the Workbench by double-clicking on the *Mountains* icon in the *Mountains* drawer or by typing RUN MOUNTAINS from the CLI. When the *Mountains* screen appears, select the first item in the first menu (Demo). *Mountains* will generate a random landscape (you'll see an overhead view) and then render that landscape in three dimensions.

The demo landscape isn't perfect; it fills only part of the screen. But it does show you the program's potential.

Impressed? The program can do much more. *Mountains* lets you draw your own landscapes with special tools. You can view your landscape from any direction. And if you'd like, you can save your scene as an IFF image.

Getting to Know *Mountains*

When you selected Demo, you saw a 100 × 100 rectangle in the upper left

corner of the screen. This is the map area used in creating mountains. This map area is an overhead view with color-coded altitude information.

The first menu, Control, has six items: Demo, Interrupt, Save Image, Map Data, Clear All, and Undo.

Demo creates a sample landscape, and Interrupt halts *Mountains* while it's rendering a scene. You can save your scene to disk with Save Image; just type the full pathname (such as dh1:images/TwinPeaks) and then click on Store. The Map Data option lets you load or save the point-by-point data of your scene so that you can later render your scene from a different angle. Type in the full pathname of the file you wish to save or load.

Clear All clears the screen and the map data, and Undo lets you correct mistakes or change your mind. (You can even Undo a Clear All if you'd like.) Undo won't be available unless you have enough free memory. If you find that you can't perform an Undo, you may wish to flip back to the Workbench screen (with Left Amiga-M) and close any memory-intensive programs you may be running. Finally, Quit exits *Mountains*.

Options Galore

The next menu, Options, also has six items: Create, Magnify, Lake, Base, Top, and ReScale.

Create lets you place your own peaks on the map. Selecting Create pops the map up onto the screen. The pointer changes into a small rectangle, and a gadget appears to the right of the map. This is the altitude gadget, which determines the height of the mountains that will be created. Adjust the altitude gadget to about half its maximum value. Draw a rectangle anywhere on the map by holding down the mouse button and dragging the pointer. Release the mouse button, and a mountain will be drawn.

Magnify lets you zoom in on part of your map. For instance, suppose that you've drawn a whole range of mountains but you decide that you'd like to just use one of them. Magnify lets you strip out the surrounding area. When you select Magnify, the map pops, and the mouse pointer turns into a small rectangle. Click on the upper left corner of the desired area and drag it to the lower right

quadrant. The map will be redrawn when you release the left mouse button.

Lake lets you set sea level to any height you wish. When you select this item, the mouse pointer will turn into a crosshairs pointer. Click on the map at the point where you'd like sea level to be. All connected points at that level or lower will be rendered as water.

Base lets you set a low point for the land. It works much the same as Lake, except that it affects the entire map, not just adjacent areas. Use Base to create flat valleys or plains.

Top levels off the peaks of mountains. When you select this item, the mouse pointer will turn into a crosshairs pointer. Click on the map, and all points above the altitude you clicked on will be reduced to the level you've chosen. Use Top to create mesas.

ReScale lets you change the data in the map so that it ranges from minimum to maximum elevations (0 and 10,000 units, respectively). If you've used Zoom, Base, Top, or Create, you should try ReScale. The colors in the 3-D image are assigned according to the elevation. If you try ReScale and don't like the effect, select Undo to return to the previous map.

Flexible Viewpoints

The next menu, Display, has eight items, which control the screen display: Clear, Color, Scale, Frame, Mesh, Sky, Map, and 3D Plot.

Color lets you choose the color palette for your scene. There are three choices: Map makes the map easier to view, Day sets daytime coloration, and Night sets nighttime coloration. You can toggle Scale on and off. When Scale is on, the colors will be assigned so that the maximum elevation will have the maximum color. This does not effect the map data. If Scale is off, colors will be assigned according to the map elevations with 0 being the minimum and 10,000 the maximum. Note that it's possible for elevations to be greater than 10,000—unless the map has been ReScaled.

Frame can also be toggled on and off. When it's on, only the outlines of the polygons that make up the rendered scene will be drawn. When it's off, a filled polygon will be drawn. Use Frame for an interesting effect. >

GHOST OF ELVIS HAUNTS COMPUTER New Year Sighting Creates Havoc With DTP

ANIMATION

- ☐ 9206 VIDEO TOOLBOX- A collection of video tools such as Bars'n'Tone, Showiz, Lacer, and VTOT. 4 I SW
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- ☐ 9203 SCHWARTZ ANIMS/1-How to run into a wall, Aggressor, & CoyoteII. 5 B PD
- ☐ 9234 EL GATO-Animation of a cat running in a rotating rectangle. 4 B PD
- ☐ 9239 JUPITER-Animation of the planet Jupiter as it rotates. 3 B PD
- ☐ 9240 BATMAN-Another hilarious animation by Eric Schwartz. 5 B PD

ART GALLERY

- ☐ 9006 SPACE-Digitized pictures of deep-space objects set to music. 5 B PD
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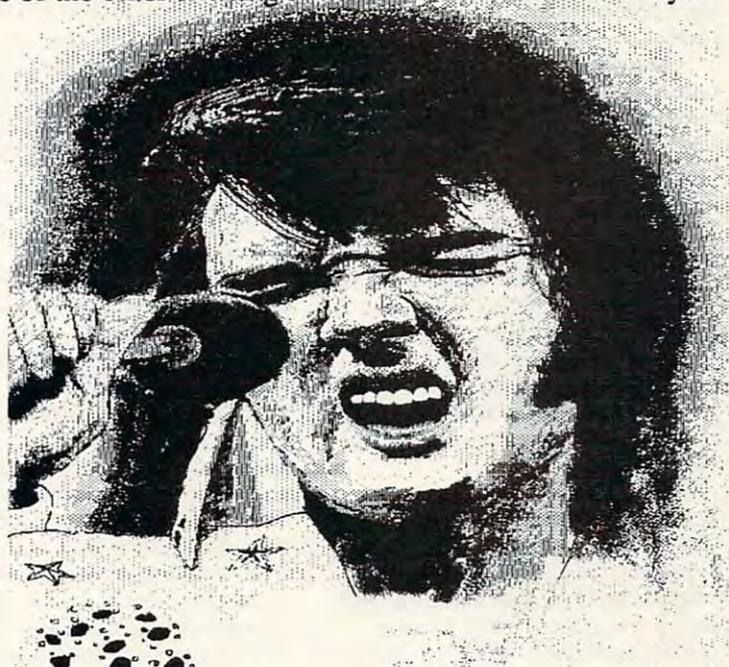
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Elvis Presley is alive and kicking, from one Amigaphile's point of view. Every time a graphic is imported into his Desktop Publishing program it comes up as The King (see illustration below). This Amigan, who wishes to remain anonymous, was able to scan the graphic as a permanent piece of clip-art and has submitted it to our library for distribution. You too can obtain this and other exciting pieces of clip-art (this one is on disk #9075, Clip Art #3) by sending in \$3.99 plus \$2.00 shipping and handling to the address below, or you can call our TOLL FREE number. But before you do take a look at some of the other exciting software we have in store for you:



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ON DISK

Note that Frame works best when the polygons making up the scene are relatively large. Mesh is similar to frame, except that the polygon is drawn in the appropriate color and outlined in black. If you're using a high-resolution grid (that is, your polygons are small), most of the rendered image will be black.

Map brings up the overhead altitude map. This map will probably overlap your rendered image. Selecting 3D Plot or Clear will erase the map. Selecting Sky adds a simple blue swatch of color behind the scene.

3D Plot lets you render your scene. There are three types of 3D Plot. The first is lines, which gives you a quick preview of the coloration, rotation, and placement of your scene. Quads and Triangles use four- and three-sided polygons to render your scene. Quads is faster than Triangles, but Triangles sometimes produces a more detailed image.

Taking Control

The final menu is Parameters. Parameters contains four items: Rotation, Magnification, Scales, and Size-Light. Before trying these items, be sure you're comfortable with the other features of the program. Parameters gives *Mountains* its power. But it will take some experimenting to use that power wisely.

Using Rotation, you can control the angle and position from which you view the scene. When you select Rotation, a requester opens with four numeric gadgets: X-Angle, Z-Angle, X-Start, and Y-Start. X-Angle can range from 0 to 90. At 0, you're looking at the scene from the ground, edge on. At 90, you're looking from the air, straight down. Angles from 20 to 40 degrees are typical. Z-Angle lets you walk around the scene. An angle of 0 lets you look from the south end of the map, an angle of 90 lets you look from the west edge of the map, an angle of 180 lets you look from the north, and an angle of 270 lets you look from the east. The default value is 10, a number just far enough away from 0 to keep the image from looking square or boxish. X-Start and Y-Start let you center the scene on your screen. Since the screen is 320 pixels wide, 160 is the default X-Start value. Since the mountains come up from the base of the terrain, the default Y-

Start is 120, about 20 pixels below the center of the screen.

Magnification controls the size of the rendered image. Magnification opens a requester with four numeric gadgets: X-Axis, Y-Axis, Z-Axis, and View-Pt. X-Axis controls the horizontal magnification. If you'd like to have the image fill the entire screen, increase this number. Similarly, Y-Axis controls the vertical magnification of the image. Z-Axis controls how steep the mountains are. If you want your mountains to be more jagged, increase this number. If you'd rather have rolling hills and gentle valleys, decrease this number.

Scales controls the look of your scene by controlling the low-level fractal creation engine. It opens a requester with four numeric gadgets. The changes you make here will be reflected the next time you use Demo or Create to build mountains. These numbers do not affect the display of mountains you've already built. The Form gadget affects the overall look of the mountains. A large number will create rounded, massive mountains. A small number will allow spires. Use a number in the range 100-900. F Dimn determines the fractal dimension of the map. The smaller the number, the more rugged your terrain; use a number in the range 0-100. Delta is the maximum change allowed in altitude from one point to the next. Scale is the maximum elevation that will be used by the ReScale option; 10,000 is the maximum allowed. For example, 5,000 would scale the map to half the maximum elevation.

The final menu item, Size-Light, controls the size of the map and the lighting. When you expand a scene to fill the entire screen, you'll find that the default size settings make for a rather chunky map. To increase the resolution of your image, increase the map size. X-Size and Y-Size default to 100 each. This makes a map with 10,000 points. If you'd like greater resolution, increase these values. But beware: Working with a 200 x 198 map will be about four times slower than working with a 100 x 100 map. The maximum X-Size is 300; the maximum Y-Size is 198. For reference, each map point requires three bytes of memory with a similar amount being needed by the undo buffer.

Light controls the angle at which

the light strikes the scene. Use a number in the range 0-90. The default value is 45, which corresponds to about 9:30 a.m. A value of 0 places the sun at the horizon. A value of 90 puts the sun directly overhead.

Quad controls the direction from which the light is coming. The top of the map is 1, the right side is 2, the bottom is 3, and the left side is 4. Any other number makes the light overcast and diffuse.

Technical Information

Mountains is a multitasking program. To flip to the Workbench, press Left Amiga-M. To flip back, press Left Amiga-N. *Mountains* was written in *J-Forth*, a language known for its efficiency and quick integer arithmetic.

OTHER PROGRAMS ON DISK

There are a few handy programs contained in the *Amiga Resource Disk's* C directory that some readers may not be familiar with.

RD

A speedy program for reading text files, *RD* works from the Workbench or CLI. Copy *RD* to the C directory of your Workbench disk. To use it from the Workbench, use the Info menu item to change the Default Tool of your text file's icon to C:RD. From the command line, you just type *RD filename(s)*, where *filename(s)* is the name or names of the files you wish to read. *RD* also supports both AmigaDOS- and ARP-style wildcards; typing *RD *.info* will allow you to read all files that don't end with the .info extension.

New in *RD 1.1*: Screen handling is up to two times faster. It no longer needs *arp.library*, so you can add it to almost-full Workbench disks. *RD* now handles complex escape sequences and supports Workbench 2.0-style scroll bars and system fonts.

V

This utility displays both standard IFF and Sliced HAM pictures. The stripped-down version included on this month's disk no longer requires the 17K *arp.library* file but only works from the Workbench.

To use *V*, copy it to the C directory on your Workbench disk and change the Default Tool of your picture's icon to C:V. Then just click on your picture's icon to show it.

ColorBench

This tiny utility adds an extra bitplane to your Workbench screen so you can utilize eight-color icons. Just copy it to the C directory of your Workbench disk and add the command *COLORBENCH* to your *S:startup-sequence* file.



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IMD AND MAKEEMPTY

Dale McBane

Intuition *MakeDir* (*IMD*) is a replacement for the *MakeDir* program that's found in the C directory of your Workbench disk. It works the same way that *MakeDir* works except that it can create a Workbench icon for the directory. If you use *IMD* on a directory that already exists, that directory will be unchanged, but it will now have an icon so that you can view it from the Workbench.

MakeEmpty is a *MakeDir* program for Workbench users. It lets you create a directory called Empty. Normally, you must duplicate a drawer (a drawer is the Workbench name for a directory) called Empty to create a new directory. Then you must drag that drawer over to its destination. By using extended selection, *MakeEmpty* lets you create a new drawer wherever you want it.

Using *IMD*

First, copy *IMD* from the C directory of the *Amiga Resource Disk* to the C (Command) directory on your Workbench disk or hard drive. Enter COPY RESOURCE9:IMAKEDIR/IMD C: at a CLI or Shell prompt to do this. Type *IMD* to see the command's usage instructions. Here's the syntax of the instruction:

IMD dirname
[infofilename]NOICONS]

Dirname is the name of the directory to create, *infofilename* is the name of a .info file to be used as the source for the icon of the directory (optional), and NOICONS is an optional parameter that prevents *IMD* from creating an icon for the directory.

Here are a few examples of how to use *IMD*.

IMD RAM:fred

IMD creates the directory RAM:fred and then looks for the file S:Drawer.info. If *IMD* finds S:Drawer.info, it copies the file to RAM:fred.info. If it doesn't find the file, the program writes a default icon to RAM:fred.info.

IMD RAM:fred SYS:Empty.info

IMD creates the directory RAM:fred and then looks for SYS:Empty.info. If it finds SYS:Empty.info, it copies the file to RAM:fred.info. If it doesn't find SYS:Empty.info, it tries to copy S:Drawer.info. If that fails, it writes the default.

IMD RAM:fred NOICONS

IMD will then behave just like *MakeDir*. If you'd like to make some room on your boot disk, you can delete *MakeDir* from the C directory and rename *IMD* to *MakeDir*. (Always work with a copy of your Workbench disk, not the original.) Or you can delete *MakeDir*, leave *IMD* named as it is, and place the following line in your startup-sequence file or your shell-startup:

ALIAS MakeDir "IMD [] NOICONS"

Then you can type *IMD* if you want an icon created or *MakeDir* if you don't.

If you don't like *IMD*'s default icon, you can replace it with your own icon. Simply copy a drawer .info file to s:Drawer.info, and *IMD* will automatically use that .info file from now on.

Using *MakeEmpty*

Using the Workbench, drag *MakeEmpty* from the *Resource Disk* to your Workbench's Utilities drawer. When you want to make a drawer, open the Utilities drawer so that you can see the *MakeEmpty* icon. Click once on a disk or drawer icon to select it. Then hold down Shift and double-click on the *MakeEmpty* icon. It's that easy. Because of a limitation of the Workbench, you may need to close the destination window and reopen it to see the new folder. Use the Rename Workbench menu item to change the name of the drawer. □

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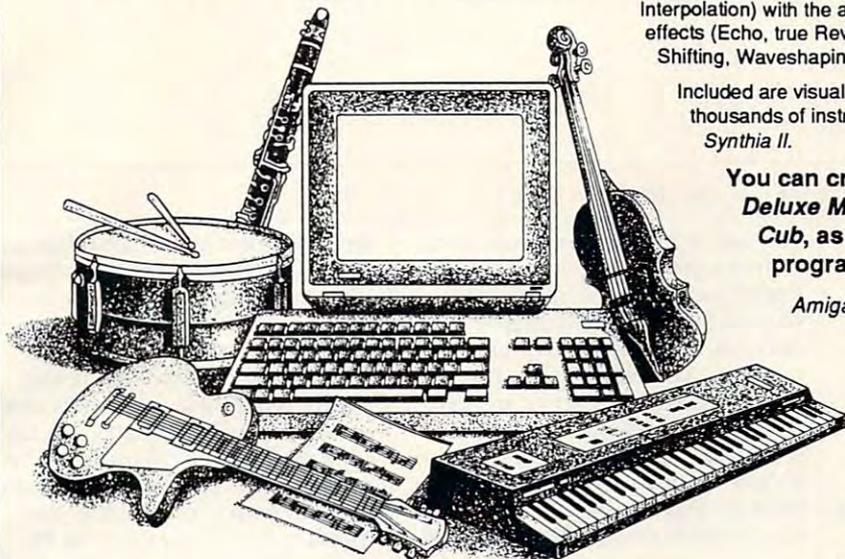
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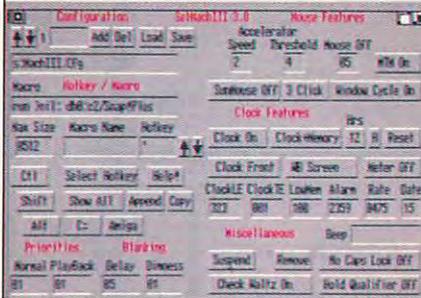
S H E L D O N L E E M O N

When it comes to making everyday computer operations a little faster and a little easier, almost everybody has an opinion on how it should be done. That's one reason so much shareware programming effort is expended on certain categories of utilities. A good example is the category I like to refer to as *mouse thingies*. These catchall programs usually incorporate a mouse accelerator, a clock, a screen blanker, and about a dozen other mouse- and window-manipulation tools. While programs like *DMouse* and *Qmouse* have their supporters, my personal favorite is *Mach III*, which you'll find in the Download drawer of this month's *Amiga Resource Disk*. *Mach III* combines loads of useful functions into a single program. Best of all, it lets you tailor these functions to suit your exact needs.

Mach III disproves the adage that you can't teach an old mouse new tricks. Its first lesson is mouse-pointer acceleration. Acceleration is better than just making the pointer faster, because when you increase the distance the mouse pointer travels for each inch you roll the mouse, you lose accuracy. An accelerator makes the mouse move faster the farther you roll it, so that it zips along if you move from one side of the screen to the other, but it travels at the normal speed if you just move it a little bit. *Mach III*'s accelerator gives you the choice of multiple rates and threshold settings.

The program provides plenty of other mouse-related features, too. The mouse-to-menu feature automatically moves the mouse pointer to the top of the screen when you press the right mouse button. *Mach III* also lets you use the mouse to depth-arrange windows and screen. If you hold down the left button and click the right button over the topmost window, it will move to the back of the stack. If you triple-click on a window in the back, it will move to the front. If you perform these tricks outside of a window, the whole screen moves to the front or back. *Mach III* lets you activate a win-

dow just by moving the mouse pointer over it (a feature known as *SunMouse*, because it imitates the way mice behave on Sun workstations). Finally, *Mach III* turns off the mouse pointer when you start typing (so that it doesn't cover up your text) or after a period of inactivity. (Note that when it blanks the pointer, it shuts off all other sprites, too.) The program also lets you dim or black out the whole screen after a period of



Mach III's setup screen.

inactivity. All of these features may be disabled or adjusted.

Mach III's clock has everything but the kitchen sink. It can display the time and date, the time and amount of free memory, time only, or memory only. When time is money (like when you're using an online service that charges by the minute), it can display the accumulated charges in dollars and cents, instead of in minutes. The clock display changes color to warn you if free memory falls below a certain level. The clock also has an alarm that can play a sampled sound file. You can easily set the position of the clock display, and you can also specify whether you want the clock to always pop in front of any window or even to the topmost screen.

As if all that weren't enough, *Mach III* has outstanding macro capabilities as well. Macros are recorded keyboard and mouse events that you can play back by pressing a hot-key combination. A simple example of a keyboard macro would be assigning the string "diskcopy df0: to df1:" to

the F1 function key. *Mach III* doesn't restrict you to replacing the function keys with strings of alphabetic keystrokes, however. You can use any exotic hot-key combination you can think of (such as Alt-Shift-Q), and macros can include commands as well as keystrokes. You can also turn any of *Mach III*'s functions on or off by using macros. You can even execute a program from a macro (train your Amiga to run *DeluxePaint*, for example, whenever you press the Alt-P combination).

A macro can call another macro or itself. Creating a macro is a snap. You can either enter the text and escape commands manually with the *SetMachIII* configuration program, or you can have *SetMachIII* record your keystrokes and mouse movements as you go.

Mach III's macros have some unique features. For example, the program allows you to link a set of configuration options to a particular window. That means you can have one set of macro keys in effect for your shell window, and automatically switch to another set of keys (or no macros at all) when you activate a program window. There's also an auto-execution feature that allows you to automatically execute a particular macro when you start the *Mach III* program, at a certain time of day, or even every few minutes. Finally, *Mach III* has an *ARexx* port that allows you to execute a *Mach III* macro under the control of another program.

Although *Mach III* started out as a mouse accelerator, it has branched out to give excellent control over the entire stream of input events (mouse movement, button clicks, and keystrokes). While Workbench 2.0 makes a start at providing these kinds of facilities with its mouse acceleration, window click-to-font options, and Commodities Exchange (which provides screen blanking, window sizing with hot keys, and keyboard macros), it still can't match *Mach III*'s wide range of custom settings and versatile programmability. □

an A500 expansion module holding four A2000 Zorro II cards, three drives, a power supply, and a fan.

Great Valley Products' large booth was filled with the things hardware dreams are made of, including a 600MB Ricoh magneto-optical drive.

ICD wowed the crowds with three minutes of *Predator* film and soundtrack (over 300MB of hard drive data) playing back in realtime at 24 frames per second under joystick control. ICD also showed its Flicker Free Video board, which works on all Amigas.

Progressive Peripherals & Software had the show's only functioning 68040 card for the A3000 in an early prototype (the computer case was open, and a fan was blowing across the CPU to cool it), and on the same board was an astonishing data-compression chip which effectively doubles the size of any disk it writes to by compressing and decompressing data in realtime.

PP & S also previewed the Video Blender, a genlock with switching, wipes, f/x, luma-keying, and more.

The software. New software packages were also in abundance. HoloSoft Technologies' new animation/paint program, *Graphics Workshop*, might turn out to be the sleeper of the year. Its includes a ten-brush library, gray scaling, line-art, polygons, rays, patterns, shadows, cell animation, 20 separate palettes, and 1289 simultaneous onscreen colors.

MicroPACE Distributors showed a number of new Amiga games, including KarmaSoft's new *Power Pinball*, the first pinball-construction simulator for the Amiga, and a preview of FTL's *Dungeon Master II*.

New Horizons Software previewed *Graphics Designer*, an object-oriented color drawing program. It looked great, and it's very fast.

Oxxi/Aegis's huge display was bulging with new products, including *AudioMaster III*, now with sequencing and a simulated CD-player; *SpectraColor* from *Photon Paint*'s authors, which adds HAM brush and key-frame animation; Martin Taillefer's new *TurboText* editor and Modula-2 compiler; and some new entertainment titles, including *Fast Eddie's Pool*, *Capitalism*, and *Visionary*, an adventure-game construction kit.

Pelican Software's *Pelican Press* is billed as a publishing program for the entire family. It's capable of creating and printing posters, comic books, and signs and looked like a lot of fun.

Progressive Peripherals & Software showed *Double-talk*, an AppleTalk-compatible network system for Amiga and Macs.

Right Answers Group demonstrated the long-awaited *Director 2.0*, now with an integrated script editor, Workbench operation, SMUS score syncing, and more.

Virtual Reality Lab's astounding *Vista* software, which generates photorealistic landscapes based on U.S.G.S. Data Elevation Map files, gave a sneak peek at *Vista 2.0*, with a ton of new features, including Goraud shading, support for all graphic resolutions, 24-bit file output, and more.

Zardoz displayed *ImageFinder*, a program that scans all IFF images on your disks and builds a visual index from them—postage-stamp-sized pictures to aid you in finding just the right image you need without having to plow through disk directories.

—HARV LASER

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S H A Y A D D A M S

Copperman goes country-and-western. This is just one of many surprising, yet bound to come true, predictions of what 1991 has in store for Commodore and the Amiga.

These predictions were made possible by the latest program from Psychic Software (yes, the same software wizards who brought us last year's *Mystic Term* for telecommunicating with the deceased). An innovative program with countless capabilities, the *Amiga Mage* can forecast anything from the weather to the final point spread on the Lakers' next game. And for people who don't know what they want to know, *Mage* offers the most user-friendly feature yet—a special Intuition mode that reads your mind so it can reveal what you unconsciously want to know. All this, and icons too!

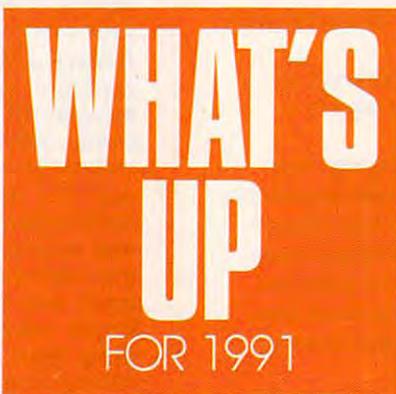
But enough hype. As most of you have figured out by now, I've never even seen the *Amiga Mage*. I'm just doing what lazy software reviewers do: rewriting the press release that accompanied the program. (With dozens of packages arriving daily, who has time to open them all? If it doesn't have lurid pictures of half-naked slave girls on the cover, I won't give it a second look.) And according to the press release, this is what the *Mage* says about the Amiga in 1991.

The Amiga will finally get an operating system. According to game designers, AmigaDOS (which they often refer to as AmigaDOG) will actually work this time, and they won't have to disable it and write their own operating system from scratch! This could cut development time in half, leading to twice as many new Amiga games by 1992 (unless the designers spend that extra time looking for another excuse to bad rap the Amiga, or even more unlikely, finding reasons to bad rap the IBM).

Commodore president Harry Copperman will give up the corporate mantle and go on the road with Willie Nelson's band. His first live gig will be Farm Aid 1991, where Copperman

will play squeezebox and sing harmony with Johnny Paycheck on "Take This CDTV and Shove It."

Because of an obscure subparagraph in United States copyright laws, all commercial software will be recategorized as public domain software by June 30, 1991, thus ending all those frustrating "look up the keyword" sessions, along with all other forms of copy protection. As a result, all USA-based programmers will relocate to Bimini and devise the even more frustrating "Biminese copy-protection scheme."



Imported from Japan, C64 clones will outsell the Amiga, IBM, Nintendo, and Sega combined, forcing software companies to send their designers to Remedial Sprites 101 class in Cupertino.

Jack Tramiel will take over Commodore, but not till he's run Atari even deeper into the ground than he did Commodore. His first official act will be a Jack Attack in which he'll bomb IBM plants in Florida and Texas with tons of unsold CDTV units. He'll then go on to develop the Commodore Plus/68, a 68000-based machine with *TextCraft*, *GraphiCraft*, and two other applications built in that's completely incompatible with the Amiga.

The new, improved *.info Magazine* will publish its first issue that doesn't take a cheap shot at a single Amiga program, peripheral, or even

Commodore itself. But a bar-code read error at the post office will send every copy to software developers in Bimini, so no one else will ever know it happened.

Commodore stock will skyrocket when the United States finally takes the lead in the microchip market, but only after Japan is hit by a massive earthquake and sinks to the bottom of the Pacific.

Thanks to innovations in micro-miniaturization, desktop publishing will be replaced by desk-drawer publishing. All desktop publishers who refuse to purchase the necessary upgrades will be deported to Bimini. (In a related prediction, desktop video will be replaced by desktop radio.)

And now for my own predictions: We'll see many more Amiga conversions of MS-DOS games in 1991 as well as more "Amiga-first" titles from USA-based developers. MicroProse has already changed its mind and decided to convert *Railroad Tycoon*, my favorite simulation last year, and others are bound to follow suit. This is especially true since this is essentially a follow-the-leader industry anyway, and Sierra, one of the strongest Amiga supporters in terms of conversions, is perceived as the leader by many.

The flow of European Amiga software into the U.S. will increase as the Atari ST's popularity wanes over there. As a result, we can look forward to a greater variety of entertainment software this year.

How about hardware, you ask? The Amiga 3000 will gradually garner a bigger share of the multimedia market, mainly because of Microsoft's decision to base its related project on the slow but firmly entrenched 286 chip rather than the zippier 386. As the Apple II, Apple IIGs, and Atari ST die slow but painful deaths, their former owners who don't go MS-DOS will get Amiga 500s, so the 500 will outperform the CDTV and the 3000 in 1991. Naturally, Commodore will decide to kill the machine just about that time. And I will move to Bimini, where the living is easy and the cotton is high. ☐

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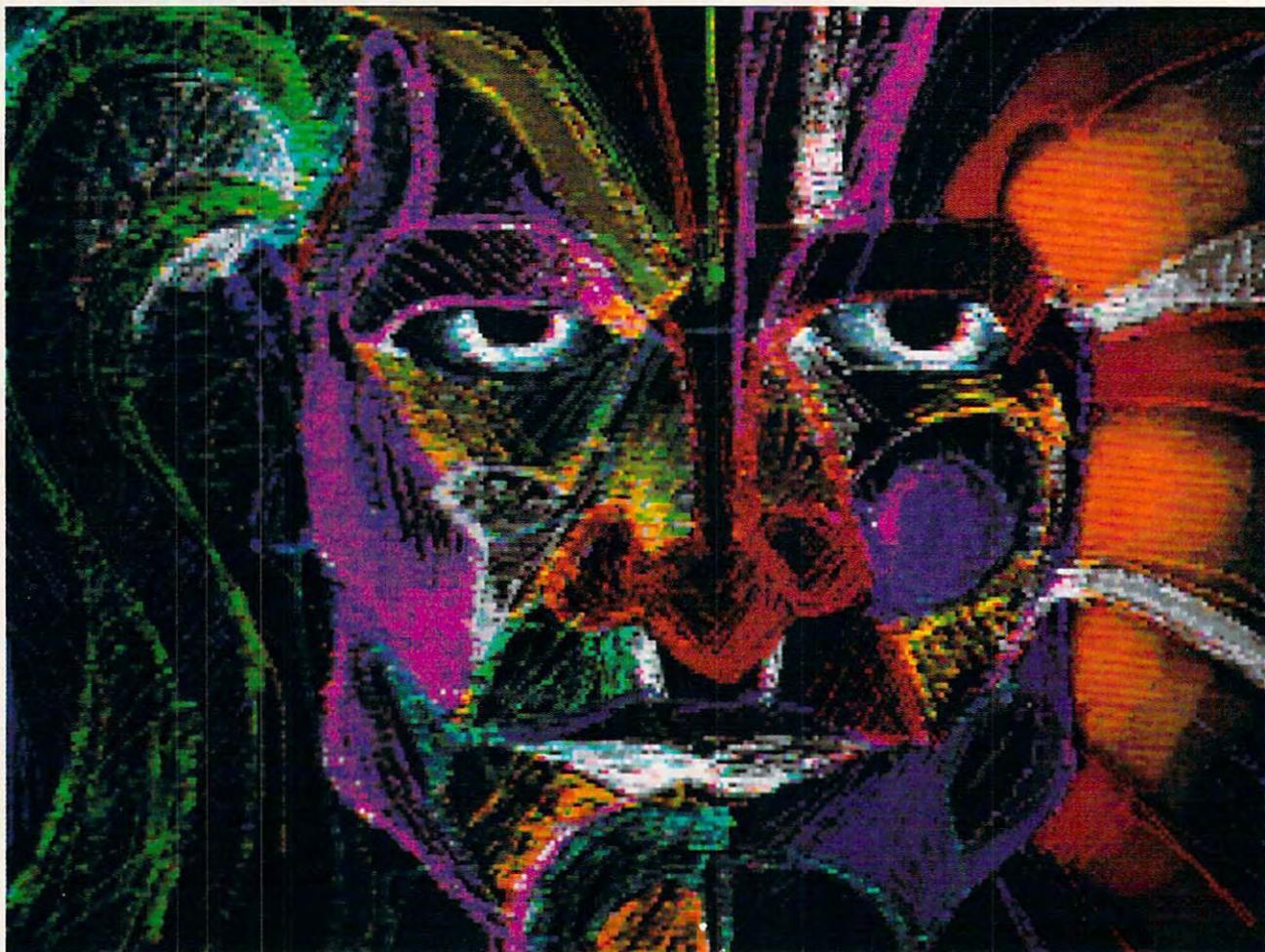
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Saveen Reddy

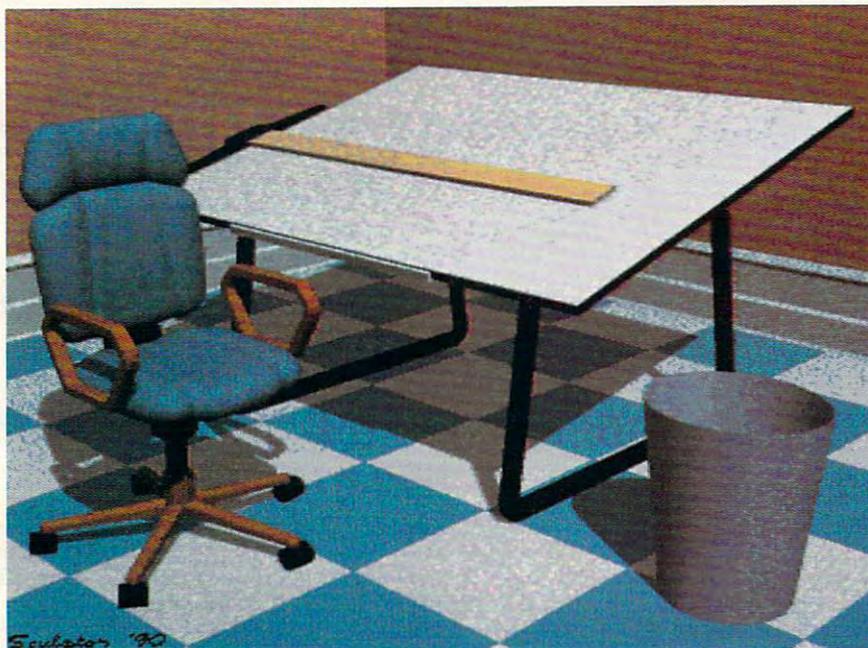
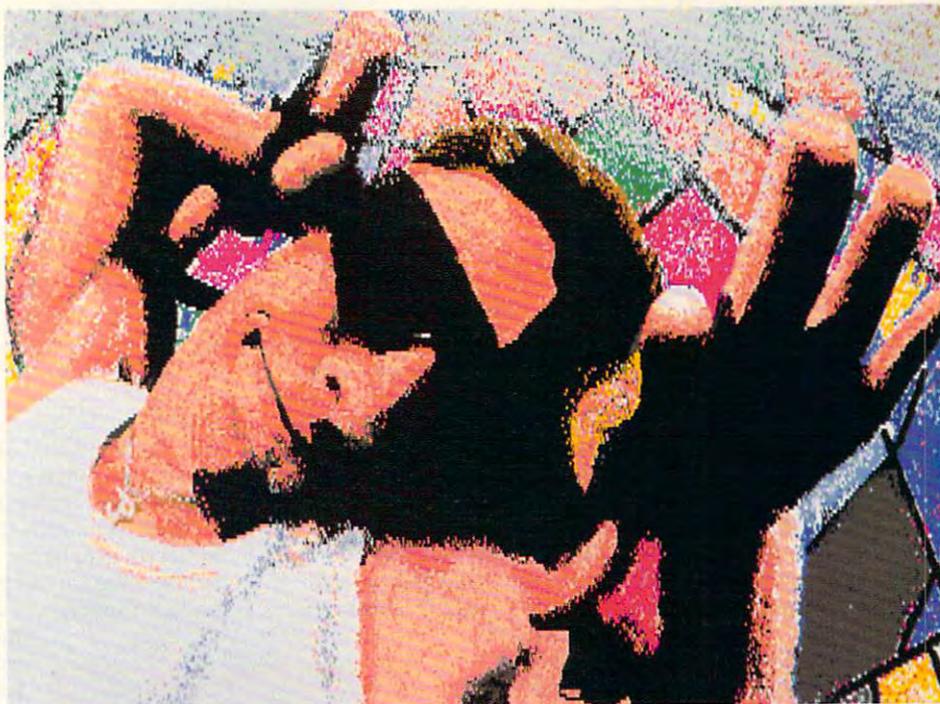
Man, WV

Artist Saveen Reddy created this colorful hand-drawn (or should we say, mouse-drawn) image using MicroIllusions' *Photon Paint* on an Amiga 500 in 320 × 400 HAM mode. In regard to the \$100 fee we pay for the right to publish Amiga art, Saveen says, "Any monetary gain from the use of the pictures will, you can be sure, go to the purchase of an Amiga 3000."

RICK

John Perkins
Corsicana, TX

This picture was digitized and then touched up using a paint program found on the Amiga Appetizer disk that came free with John Perkins's computer. Although John has owned his Amiga 500 for only a few months, he's been programming and drawing on a Commodore 64 for five years.



WORKSTATION

William Christjaener
St. Paul, MN

Workstation was created with *Sculpt Animate 4-D*. Artist William Christjaener says, "I've been using several ray-tracing programs for about three years, *Sculpt 3-D* being the first one I purchased. I just recently upgraded to 2.5 megs, which allows much more freedom to render complex models."

If you'd like to see your art in these pages, send it to us on disk at the address below. We pay \$100 for each piece of art we accept. Rejected submissions are returned only to artists who enclose a self-addressed, stamped envelope.

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TAKING SIDES

R H E T T A N D E R S O N v s . R A N D Y T H O M P S O N

SEGA! Almost seven years ago, Amiga Corporation started work on the ultimate game machine. But the videogame market faded, and the game machine was released as a computer. This schizophrenic birth has always been the pride and embarrassment of the Amiga community. While its heritage made it the most powerful home computer, the Amiga has always been seen as a game system by computer users and a computer by game players.

Still, Amiga owners could take consolation in the fact that their system played the best games around. But that's no longer the case. Three new videogame systems—the Sega Genesis, NEC TurboGrafix, and SNK's NeoGeo—have surpassed the Amiga as a game machine. Another up-and-comer, the Nintendo SFX (known in Japan as the SuperFamicom), will blow it away. Meanwhile, after seven years the Amiga still has the same palette, the same eight sprites, and the same four audio voices.

Let's take the case of the Sega Genesis. It has a 68000 microprocessor, running at about the same speed as the Amiga 500's 68000. Like the Amiga, it has a dual-playfield mode and hardware fine scrolling. It can display 64 colors at once on a screen with a 320 × 224 resolution. Like the Amiga, the Sega supports overscan.

But the Sega has more. Nine sound channels, so that you can hear, for example, four channels of music and five sound effects, all at the same time. A game controller with three buttons instead of the Amiga's one-button joystick. Cartridge games that load instantly. Unit sales that make it worthwhile to invest time and money in the development of the game. And a price tag less than \$200.

But it's Sega's sprite engine that makes the Amiga seem dated. The Sega supports eighty 15-color sprites at 32 × 32 pixels each. Compare that with the Amiga's eight 3-color sprites at 8 pixels wide.

Electronic Arts has shown that even computer-style games like *Populous* are just as good on the Sega as they are on the Amiga. And for arcade-style games, the Amiga doesn't even come close.

Looking over at Mr. Thompson's side, I hear the prototypical Amiga apologist. He will still be saying the Amiga is the best game machine ten years from now.

No, the Genesis won't have genlock or MIDI support. Surprise. What counts in games is color and action, and the Amiga's custom chips just don't measure up. In short, the Genesis has better game hardware, better game software, and better game programmers.

AMIGA! Unlike Mr. Anderson, I don't own a Sega Genesis. Sure, I've used one—I've even used his. As far as dedicated game machines go, the Genesis is tops. But does that make it better at playing games than the Amiga? Hardly.

Yes, technically the Genesis has superior sprite capabilities (they're larger, and there are more of them), comparable color (nothing comparable to 4096-color HAM mode, however), and arguably better sound features (al-

though I've yet to hear a Genesis game match the sound and music found in most Amiga game software). Sega has also persuaded most of the best game developers to write software for its new machine. So at first glance, the Sega may appear to be the game player's choice. However, this \$199 Toys 'R' Us wonder lacks one very important feature: interactivity.

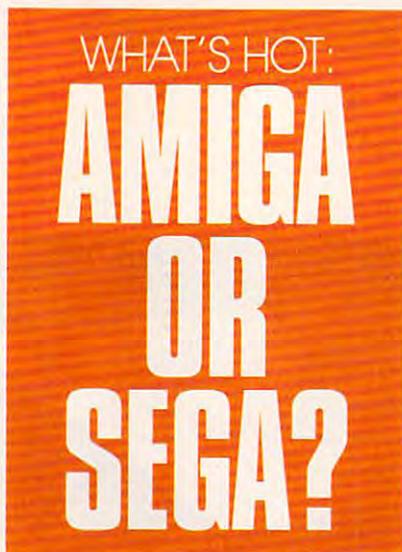
The Amiga doesn't just have a joystick; it has a mouse, a keyboard, and even a disk drive. These items may not be considered standard equipment for gamers, but they go a long way toward making entertainment software more entertaining.

Take adventure games, for example. How do you save a game in progress on the Genesis? Answer: You don't. How do you add additional courses to your favorite golf game if you can't insert a course disk? Cartridges just don't cut it here. And can

you imagine trying to control a flight simulator with one of those tiny controllers? Of course, with the Amiga, you can choose from a wide variety of input devices—the keyboard, the mouse, a light gun, and any of several types of joysticks.

While the Genesis may eventually gain such amenities as a light gun or keyboard, I'll bet my hard drive that it'll never have genlock support for combining video with computer graphics or MIDI support for controlling synthesizers in the creation of music. Why do you think companies such as Mastertronic and Battletech are using Amigas as the basis for stand-alone arcade machines? Because if you're looking for more than shoot-'em-ups, the Amiga blows the Genesis away.

Looking over at Mr. Anderson's side, I notice he conveniently left out a few facts while laboriously extolling the virtues of his favorite new toy. Has he forgotten about the Amiga's blitter, which blasts graphics across the screen at incredible speed; the copper, which allows the Amiga to switch video modes in midscreen; and the severe memory limitations of Genesis cartridges, which keep the graphics and sound quality to a minimum? The Sega Genesis is great for the price, but it's no match for an Amiga. □





64/128 VIEW

T O M N E T S E L

During the past month, a number of us at COMPUTE have attended computer shows in the Philadelphia and Chicago areas. The Commodore Users Fair in Valley Forge, Pennsylvania, gave us a chance to introduce the new *COMPUTE* to the public and gauge the reactions.

Many subscribers stopped by our booth during the two-day show to say hello and to voice their opinions about the magazine's new format. After people had a chance to see the magazine, most had favorable comments. There were exceptions, though, and after a while we could almost spot a negative review coming by reading a person's body language. When one man came to our booth, crossed his arms, leaned against a table, and let out a big sigh, we knew we were in for scathing monologue before he said a word.

After voicing their opinions, most people did give us the chance for a rebuttal, especially if they hadn't seen the October issue. After we showed them the new *COMPUTE*, explained how we had merged the different sections under one cover, and assured them that we were not abandoning the 64 and 128, many people said that their preconceived notions about the magazine were wrong and that they liked the look of it.

In this issue we're running a Gazette Readership Survey, asking all of our readers to give us their reactions to the new format. We also want to know how you feel about different columns and features and what you would like for us to cover in future issues. Also, how do you use your 64 or 128? This is an open-ended ques-

tion, and we encourage you to use additional paper if necessary to give us some idea of how you put your computer to work or play. Your responses to these questions will help us provide you with the magazine you want.

Although the number of exhibitors was down this year at the Valley Forge show, many attendees were enthusiastic about their Commodores. One man from Chicago, A. H. Guzzo Jr., was in town on business but took time out to stop by the show and say hello. He was especially interested in the special we were running on *COMPUTE* books for the 64.

A few weeks later at the World of Amiga in Rosemont, Illinois, Mr. Guzzo showed up again. This time he brought his wife and two teenaged daughters with him. Even though it was an Amiga show, he and many other people took advantage of the books we were offering for the 64 and 128. Most of the people who bought

books ordered 2 or 3 of the 15 we had on sale. After examining the titles for several minutes, the Guzzos put their heads together and had a discussion. When I asked them which ones they wanted, Mr. Guzzo said, "All of them!" That's dedication.

Another dedicated 64 owner showed up at the show in Valley Forge. Sandy Carter, a legal secretary in Philadelphia, owns a 64 and is proud of it. That fact was obvious just by looking at her. She came to the show dressed in a white jogging suit, with a large colorful Commodore logo printed on the front of her sweatshirt. While some 64 and 128 owners are upgrading to Amigas, Mrs. Carter isn't one of them. On the arms of her shirt she'd printed, "An Amiga? What's that?" and "An Amiga? Who needs it?"

Mrs. Carter really has nothing against Amigas; she's just content with her 64. It does what she wants. She uses it for word processing and playing games, and she says it handles those chores very well. She sees no reason to abandon her 8-bit computer.

Mrs. Carter does have one complaint, though. It seems the postal carrier who delivers her mail insists on shoving her 5¼-inch *Gazette Disk* through the 4½-inch mail slot in her front door. The disk doesn't always survive the final leg of its journey.

Despite her quarrel with her postal carrier, Mrs. Carter is a very upbeat person with an infectious smile. She's pleased with her computer, and she's delighted to talk about it with others. I think there are a lot of 64 owners out there who feel the same way about their 8-bit Commodores. □



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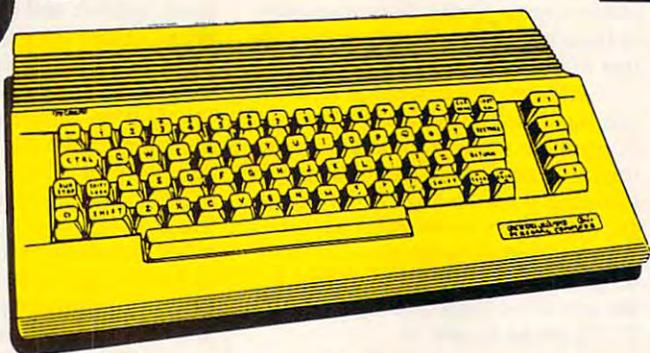
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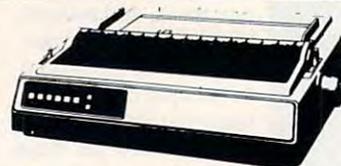


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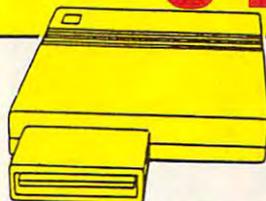


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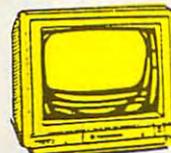
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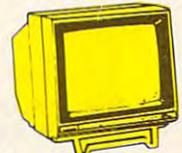
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NEWS & NOTES

Don't Get Puffed Out

Enter the Alien World and face one challenge after another in *Puffy's Saga* (\$29.95), a multilevel arcade-style maze from Ubi Soft (distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, California 94404).

As Puffy or Puffyn, your goal is to advance from one level of a maze to another by collecting Power Goms (power dots). You can also search for Magic Goms that will increase your abilities and speed and give you the option of changing from Puffy to Puffyn.

Race through 20 different levels or explore each one thoroughly, accumulating weapons, energy, and points. Secret passageways may hold keys to hidden treasure chests or acid puddles, one of the many types of enemies you must avoid.

How Fast?

Real R & D (12137 96 Street, Edmonton, Alberta, Canada T5G 1V9) has developed a new BASIC enhancement called *Realfast 64 BASIC (RFB)*. *RFB* (\$30.95) adds more than 90 unsigned integer commands to the 64.

Speed increases of 2-15 times can be expected for 64 software written using *RFB*. All other BASIC commands can be used without changes, and its structure commands allow you to create new programming words. *RFB* occupies only 4K of RAM and can be used with other software such as *MetaBasic*.

Hey, Dudes!

Those outrageous guys who took you on a wacky travel through time and history now star in the latest release from Capstone Entertainment (14160 SW 139th Court, Miami, Florida 33186) in *Bill and Ted's Excellent Adventure—The Computer Game* (\$39.95). Based on the hit movie, this arcade/adventure game is available for the 64.

Bill and Ted are failing history class, and only an awesome final report can save them. At the Circle K you meet an ultracool messenger named Rufus and his time-traveling phone booth. Just step in, dial a year, and take off in time. You're on a most excellent adventure to find some famous dudes. Your goal is to bring them back to school for the most bodacious history report of all time. You'll need to find at least 6 of the 12 famous figures to earn a passing grade, or it's work at the burger joint and off to military school for the two of you.

Time for a Word or Five

Timeworks (444 Lake Cook Road, Deerfield, Illinois 60015-4919) has released *Word Writer 5* for the 64. The updated version of this popular word processor allows you to add graphics to your documents with a built-in art library. You can link files to print out long documents, specify page breaks, and mix single-, double-, or triple-line spacing. You can also read, crop, flip, or invert GEOS or Doodle pictures.

And you get all the features *Word Writer* has offered before, including an 85,000-word spelling checker, an integrated thesaurus, a built-in outliner, and an 80-column preview mode.



Fly

Fly, by Jerry A. Shaver and Clifton B. Ryan of Cambridge, Ohio, is this disk's Picture of the Month.

Welcome to "Gazette Gallery." Each month the *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay \$50 for each piece of art we accept and an additional \$50 for the one selected as Picture of the Month.

Send your original 64/128 art in Doodle, Koala, or any other popular format to Gazette Gallery, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408..



Memory Expansion!

GEORAM

\$124⁹⁵



Believe it or not, GEORAM's disk transfer rate is actually 35 times faster than the 1541, 1571, or 1581 disk drive! This means that screens redraw in a flash, and that your Commodore doesn't waste time spinning disks looking for data. GEORAM makes the GEOS family of programs faster and more powerful than ever. NOTE: GEORAM is designed for use ONLY in the GEOS environment—it cannot be used with non-GEOS software.

GEORAM (requires GEOS)

88604 \$124.95

1750 Clone

\$199⁹⁵



The 1750 Clone offers 512K, and works with all software that is 1750 compatible (e.g., GEOS, Paperclip III, and Maverick). Furthermore, you can use it to create a RAM disk to store files or programs for lightning-fast access. (Unlike GEORAM, the 1750 Clone works with non-GEOS software. Some computers may require power supply.)

1750 Clone 89517 \$199.95

Super Mouse Bargain!

\$38⁹⁵



Includes GEOS 1.5 Plus Graphic & Utility Software!

M3 MOUSE. Proportional mode, joystick mode and paddle mode—three modes in one mouse. Features Hi-Res graphic design software with predefined graphics, sprite and icon designers, and mouse controller, plus, handy disk utilities such as windows, pull-down menus, file, and notepad. Also includes GEOS 1.5. From Contriver Technology, Inc. One-year warranty.

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M4 Mouse for AMIGA 88171 \$34.95

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The Amiga versions of the Minimodems are equipped with a female connector to plug directly into the Amiga 500 or 2000. They need no external wall plug for power, and they use the Amiga's audio output for maximum fidelity.

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What is RAMLink?

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REUs). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- Supports Commodore 1700, 1764, 1750, Berkeley Softworks GEORAM and PPI's RAMDrive.
- Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.
- Pass-thru connector allows use of cartridge port peripherals such as utility cartridges.
- Reset, Disable, Direct Access mode and SWAP functions are all standard features.
- RAM port provides power back-up to REU's.
- Parallel port provides ultra-fast data transfer when connected to CMD HD series hard drives.
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BOTH RAMLINK AND RAMDRIVE INCLUDE RL-DOS

- Allows vast amounts of commercial software, including GEOS, to access all available RAM as a high-performance RAM Disk.
- RL DOS performs up to 20 times faster than Commodore RAMDOS, up to 400 times faster than a stock 1541 and provides full DOS command compatibility.
- Up to 32 1541/1571/1581 emulation or Native mode partitions, plus true subdirectories.
- Includes built-in JiffyDOS Kernel for high-speed access to JiffyDOS equipped disk drives.
- Software for copying files (FCOPY) and complete disks (MCOPI) included.
- Many other features, including CMD's exclusive device number SWAP functions.

WHICH ONE IS RIGHT FOR YOU?

Both RAMLink and RAMDrive give Commodore users powerful features never before available in a RAM expander. RAMDrive is intended mainly for those who do not require the high RAM capacity of RAMLink (up to 16 Mb), RAMLink's Pass-Thru port or the parallel port for communicating with the CMD HD Series of hard drives. RAMDrive is an excellent choice for those who desire portability since the internal battery pack can keep the contents of RAMDrive intact for several days. RAMLink is the perfect choice for geoRAM owners who want the ability to use that device with programs other than GEOS. RAMLink has a built-in RAM port for easy use with a geoRAM or Commodore REU. No matter which CMD RAM device you select, you'll benefit from fantastic capabilities of having a high speed RAMDisk equipped with RL-DOS and the outstanding value of CMD support.

What is RAMDrive?

RAMDrive is a fresh new approach to RAM expansion for the Commodore 64 and 128. RAMDrive is a self contained battery backed cartridge with capacities of 512K, 1 Mb and 2 Mb. RAMDrive incorporates RL-DOS, an ultra-fast, easy-to-use operating system similar to the HD-DOS found in CMD HD series hard drives. This proprietary DOS allows various types of partitioning along with compatibility and speed unsurpassed by previous RAM Expansion systems.

- Compatible with vast amounts of commercial software as an ultra-fast RAM disk.
- RL-DOS operates up to 20 times faster than Commodore RAMDOS.
- Power back-up eliminates the loss of files upon powering down the computer while the battery protects data during transportation or power outages.
- Available in 512K, 1 Mb and 2 Mb models at incredibly low prices.
- DOS includes JiffyDOS Kernel routines for high speed disk access with JiffyDOS equipped disk drives.
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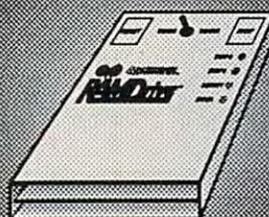
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REVIEWER'S CHOICE

Everybody has a favorite game, and Gazette reviewers are no different. During the past year they've seen practically every major product released for the 64 or 128—and a lot of the smaller ones, too. Since they've had the opportunity to evaluate so many new games, we wanted to know which ones have impressed them most.

During the past year, we've printed reviews of most of these favorites, and some of the just-released products mentioned will be covered more thoroughly in upcoming issues of *COMPUTE*. While the top choices of our reviewers may not be everyone's favorites, you're sure to find some outstanding games on the next few pages that you'll want to try yourself.



R U S S C E C C O L A

SECRET OF THE SILVER BLADES

The latest in the SSI line of AD & D games, this role-playing epic is the best of the gold-box games so far. Your goal is to defeat the monsters emanating from a mine shaft that leads to a city frozen long ago and eliminate the source of these monstrosities.

The early games in this series were too difficult to play because of the many battles you had to fight. *Champions of Krynn* corrected this problem, and *Secret* continues what *Champions* started and adds several outstanding features of its own.



In particular, there are new monsters like UMBER Hulks and Golems in the game. *Secret* also has the largest 3-D area of all the AD & D games from SSI. There are many new spells, too, and characters can rise to the 15th level (18th for thieves). Put this all together with great graphics and documentation, and you can see why it's the best of the year.

Strategic Simulations
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
\$39.95



HONORABLE MENTIONS



GRAVE YARDAGE

How can you not like a game that uses zombies, ghouls, and monsters as players for a football team and a giant eye as the ball? That's what *Graveyardage* has to offer and more, including play selections, lineup choices, and numerous options found in more conventional football games. Graphics and sounds are great and make this one a perfect choice. Here's a tip for you: Use the Elvis Lives play!

Activision/Mediagenic
3885 Bohannon Dr.
Menlo Park, CA 94025
\$24.95



PUFFY'S SAGA

This game comes from Europe's UBI Soft and is the most addictive level game since *Zoom!* hit the shelves. Choose Puffy or Puffyn as your character, and travel through mazes to find weapons that will help you to escape. With excellent graphics, digitized sounds, and a lot of levels, *Puffy's Saga* is great fun. It's also the best European import of 1990.

UBI Soft
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
\$29.95



WHERE IN TIME IS CARMEN SANDIEGO?

Continuing the popular series of educational games that are a hit with children and adults alike, Brøderbund has armed Carmen with a time-travel machine. To help you track down Carmen and her gang and find clues, *The New American Desk Encyclopedia* is included with the game. Colorful graphics and an easy-to-use interface make this a fun mystery game. Plus, it has great educational value. ▶

Brøderbund
17 Paul Dr.
San Rafael, CA 94903
\$39.95

NEW!

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- Simple Operation: Just press the button at any point and make a complete back-up of any* memory-resident program to tape or disk.
- Turbo Reload: All back-ups reload completely independent of the cartridge at Turbo speed.
- Sprite Monitor: View the Sprite set from the frozen program — save the Sprite — transfer the Sprite from one game to another. Wipe out Sprites, view the animation on screen. Create custom programs.
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- Compactor: Efficient compacting techniques — 3 programs per disk — 6 if you use both sides.
- Single File: All programs saved as a single file for maximum compatibility.
- Utility Commands: Many additional commands: Autonom, Append, Old, Delete, Linesaver, etc.
- Screen Dump: Print out any screen in 16 Gray Scales, Double size print options.
- Unstoppable Reset: Reset button to Retrieve System and Reset even so called Unstoppable Programs.
- Fully Compatible: Works with 1541/C/II, 1581, 1571 and with C64, 128, or 128D (in 64 Mode).
- Disk Utilities: Fast Format, Directory, List, Run and many other key commands are operated by Function Keys.
- Unique Restart: Remember all of these utilities are available at one time from an integrated operating system. A running program can be Frozen to enter any Utility and the program is restarted at the touch of a key — without corruption.
- LSI Logic Processor: This is where Action Replay V gets its power. A special custom LSI chip designed to process the logic necessary for this unmatched Freeze/Restart power. No other cartridge has this power!

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ONLY
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A utility to turn your Action Replay 5 into a super-powerful program compactor. Reduce programs by up to 50%! Further compact programs already crunched by AR5's compactor.

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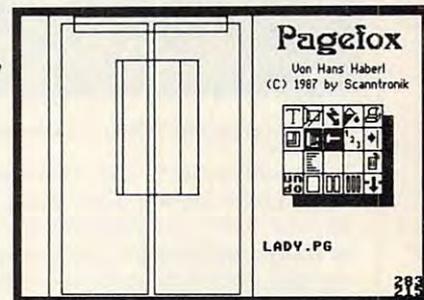
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STEVE HEDRICK

Give me a game that takes months to complete, and I'm a happy guy. Call it getting value for your buck or perhaps just wanting to ponder over complex situations. *Search for the Titanic* offers those of us who enjoy taking weeks to mull over long-range strategies an involved and involving role-playing adventure/ simulation.

Finding the elusive 46,000-ton *Titanic* deep in the Atlantic is the culmination of many hours of exploration, beginning with smaller and easier-to-find wrecks. A player accumulates

SEARCH FOR THE TITANIC



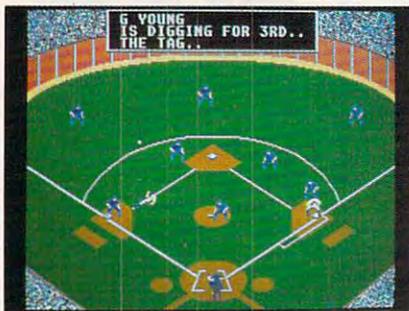
and must maintain a reputation as a master treasure hunter by locating, salvaging, and delivering to his or her investors smaller booty in order to earn the clout to finance bigger operations.

Actual digitized pictures of the *Titanic* wreck, taken by the Bob Ballard expedition, are your reward for locating her, plus knowing you're the baddest salvaging dude on the high seas.

Capstone Software
Distributed by IntraCorp
14160 SW 139th Ct.
Miami, FL 33186
\$29.95



HONORABLE MENTIONS

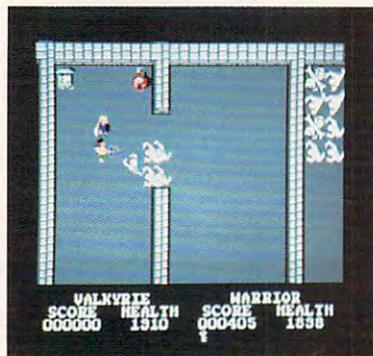


MICRO LEAGUE BASEBALL II ENHANCED

Talk about spending major amounts of time at the keyboard and losing yourself in an alternate universe—this baseball simulation lets you manage and play against the greatest baseball teams of all time.

Have you ever wondered how the great Yankee teams of legend would fare against today's "boys of summer"? Change the rosters, keep stats, trade players, and create series that could only take place in your imagination—or in an Iowa cornfield.

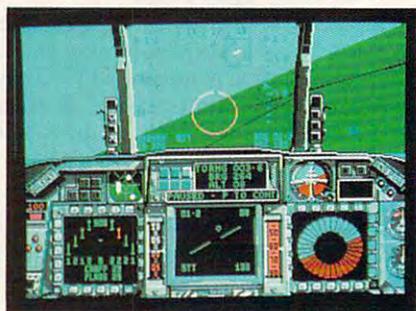
Micro League Sports Association
2201 Drummond Plaza
Newark, DE 19711-5711
\$39.95



GAUNTLET II

Seven types of mutants spring from monster-generating machines, acid puddles surround you, and deadly traps and force fields confound your every move. This could ruin your whole day if you could not assume the role and abilities of Thor the Warrior, Thyra the Valkyrie, Questor the Elf, or Merlin the Wizard. Two players have the option of selecting the heroes they wish to be and then seek out glory and treasure within the 100 mazes.

Mindscape
Distributed by Software Toolworks
60 Leveroni Ct.
Novato, CA 94949
\$29.95



F-16 COMBAT PILOT

Any nation that can muster an air force wants to buy the General Dynamics F-16 Falcon fighter. It is the most complex and deadly machine in the sky, and so is the simulation.

After training, a player takes to the air on five different missions, from tank busting to bogey interception. The final and most challenging multimission, Operation Conquest, is assigned only to those successful pilots who have mastered all the others.

Digital Integration
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
\$34.95



DAVID & ROBIN MINNICK

At first glance it would appear strange to choose a board-game crossover as the top game rather than an action-packed racing program or flight simulation. The choice wasn't easy, but Leisure Genius put the same cut-throat attitude that most competitive sports programs feature into its official version of *Scrabble*.

Faced with up to three computer opponents that know no mercy, all of whom are armed with word lists taken from *The Official Scrabble Player's Dictionary* and *Chamber's Words*, even the most mild-

SCRABBLE



mannered player will learn to come to the computer armed with a dictionary and a military assault rifle.

Scrabble is a great game to bring home, whether you play against your friends or use it to hone your skills. In no time, through the practice of competition alone, you'll be ready to take your rightful place in the *Scrabble* Hall of Fame, right next to Leisure Genius.

Leisure Genius
Distributed by Virgin Mastertronic
711 W. 17th St., Ste. G9
Costa Mesa, CA 92627
\$29.99

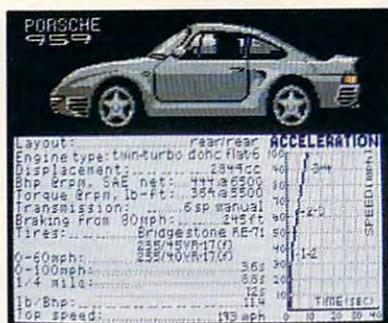
★ ★ ★ ★ ★ ★ HONORABLE MENTIONS ★ ★ ★ ★ ★ ★



STRIKE ACES

This program is one more in an ever-growing list of simulation games that set Accolade apart. Participate in SAC's annual Bombing and Navigation Competition to see just how well you can handle any of four fighter/bombers. Accept your mission, load your munitions, and pilot your aircraft over realistic 3-D scrolling landscapes of the South Dakota Badlands. Sweaty-palm entertaining to sweaty-palm educational—that's what we call this excellent adventure!

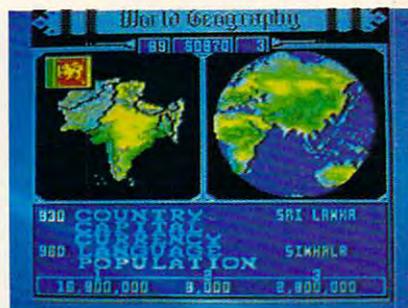
Accolade
550 S. Winchester Blvd.
San Jose, CA 95128
\$39.95



THE DUEL: TEST DRIVE II

Checking out a sports car was never so much fun! Sitting behind your realistic dashboard, pitting your car against another car or against the clock, traversing tremendous graphic scenery, eluding road hazards and police, and parrying clever jibes from the computer are all part of this tension-filled, adrenaline-pumping road run called *The Duel*. Grab this slick package of programming that supports multiple-car and scenery disks.

Accolade
550 S. Winchester Blvd.
San Jose, CA 95128
\$29.95



WORLD OF GEOGRAPHY

An odd choice, to be sure, but who said games can't be educational? *World Geography* is an elegant package that appears simple but represents hard work and some fine programming. Superb eye-catching graphics of maps and globes and flags; snatches of music that entertain and stimulate; and facts about capitals, language, currency, and population make learning geography a challenge and a pleasure instead of a dull and boring chore. >

Bobco
200 Seventh Ave., Ste. 111
Santa Cruz, CA 95062
\$24.95



L E N P O G G I A L I

From the land down under come six sports that will never make the Summer Olympics. These off-beat but entertaining events do, however, make for a lot of fun.

In the Belly Whack, your overweight diver needs as many good breaths as possible so he can spring off the board, go into a horizontal position, and land flat on his tummy.

Equally zany are the Dry River Race, in which you and a friend run with a boat over your heads down a dry river bed, and the Beer Shoot (a.k.a. the Soda Shoot), in which your buddies toss empty bottles from your jeep

AUSSIE GAMES



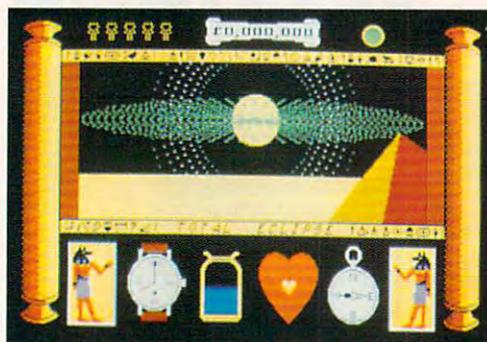
while you pick them off midair with your trusty shotgun.

Less bizarre—but also entertaining—are the Boomerang Throw, Marlin Fishing, and Beach Footy, a kickball game played with two-man teams.

Aussie Games provides attractive graphics, tuneful music, appropriate sound effects, a lot of variety, plenty of challenge, and a tongue-in-cheek attitude that's infectious.

Mindscape
Distributed by Software Toolworks
60 Leveroni Ct.
Novato, CA 94949
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MACARTHUR'S WAR

MacArthur's War presents eight varied, entertaining, and historically accurate battles from the Korean War. As field commander, you issue orders to regiments, whose battalions carry out your directives.

You can modify existing scenarios or create new ones by using Warplan, SSG's war-game construction set, and the WarPaint graphics editor.

An easy-to-learn menu system guarantees that you'll be up and playing in no time. Defeating a tough and resourceful enemy won't be as easy.

Strategic Studies Group
1747 Orleans Ct.
Walnut Grove, CA 94598
\$39.95

TOTAL ECLIPSE

Hidden in an Egyptian pyramid is a sacred shrine that carries a deadly curse. To save the world, you must destroy the shrine before the next eclipse of the sun.

Avoiding pitfalls and traps, maintaining your health, replenishing your water supply, defeating enemies, solving puzzles, discovering hidden rooms, negotiating illogical mazes, traversing multitiered chambers, and locating the shrine will keep computer Egyptologists busy for quite some time. You'll have some fun, too.

Spotlight Software
Distributed by Cinemaware
4165 Thousand Oaks Blvd.
Westlake Village, CA 91362
\$29.95

CENTAURI ALLIANCE

As a member of the Centauri Alliance, you tackle a series of missions that entail traveling to twenty-third-century worlds, combating aliens, avoiding deadly traps, and negotiating mazes.

Success requires that your party of eight become expert in wielding weapons, maintaining mechanical and biological systems, changing shapes, and focusing brainwaves.

Entirely menu-controlled, *Centauri Alliance* features a helpful auto-mapping feature and attractive 3-D graphics. Check this one out.

Broderbund Software
17 Paul Dr.
San Rafael, CA 94903
\$29.95

E R V I N B O B O

BATMAN, THE MOVIE

Of all the computer games published as tie-ins with popular movies, *Batman* comes closer to following the actual plot line than any other I can remember.

Divided into several episodes, which can also be considered as levels of difficulty, the game takes you through the vertical maze of the chemical warehouse, lets you race the Batmobile through city streets, and builds toward the final confrontation with the Joker.



This action-adventure game is the best of a long line of movie-related computer products from Data East. Don't confuse this game with *Batman, The Caped Crusader*, an earlier release from the same company. Jumping Joker, computer gamers, this one's a winner!

Data East USA
470 Needles Dr.
San Jose, CA 95112
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- SCHOOLHSE / 6 (6157) - 15 programs including: MISSPELLING, MATCHING, MM ADVBFORMS, etc.
- SCHOOLHSE / 7 (6158) - 14 programs including: REMEMBERING, READER, RHYMING, SCRAMBL and more.
- SCHOOLHSE / 8 (6159) - 14 math programs including: INTEGERS, ADD, INTEGRATION, LAZER MATH, etc.
- SCHOOLHSE / 9 (6160) - 14 more math programs including: EQUATION MANIPULATION, FUN MACHINE etc.
- SCHOOLHSE / 10 (6161) - 14 more math programs including: BIGTIME, BALANCE, BASE CHANGE, etc.
- SCHOOLHSE / 11 (6162) - 27 math programs including: ADDS/SUBS, AGENT BLOTTO, ALGEBRA and more!
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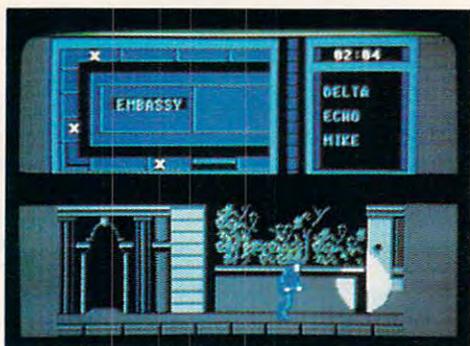
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★ ★ ★ **HONORABLE MENTIONS** ★ ★ ★

HOSTAGE MISSION

Although somewhat improbable even for a computer game, *Hostage Mission* wins important points for its creative use of perspectives. As the action of a hostage rescue mission ensues, you switch from a third-person to a first-person viewpoint. While considered sloppy in novels, the technique works well here and adds to the fun of an otherwise ordinary combat game. Just hang on to your bullet-proof vest; you're going to need it.

Mindscape
Distributed by Software Toolworks
60 Leveroni Ct.
Novato, CA 94949
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SGT. SLAUGHTER'S MAT WARS

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BAM Aid

Short of accidentally performing a full-format operation, the worst thing you can do to a disk that contains valuable programs and data is to accidentally corrupt its BAM blocks or directory track. If files merely have been deleted or if a short NEW command has been given, then the directory entries are still intact, and the programs can be salvaged. If the directory itself has been corrupted, however, the information is lost.

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FEEDBACK

QUESTIONS FROM OUR READERS

Pictures and Text

I am a great fan of role-playing games for the 64 and have been wanting to write my own for quite some time. I have written a few, but they need graphics. I have made some scenes for my games, but I have only been able to show the whole screen in multi-bitmap mode. A friend of mine said there is some way to display a picture and then have text printed at the same time. He thinks it was done by setting rasters, but he doesn't know exactly how it's done. Can you help me out?

JOHN GREEN
FREEPORT, NY

You might try using a split-screen technique for combining graphics with text. Screen splitting takes advantage of the fact that a certain finite time is required for your monitor's electron beam, or raster, to "paint" a picture on the screen. During the time it takes to paint an image on the monitor, the process can be given a different source for its display information, thus combining two display modes such as text and graphics.

On the 128, screen splitting can be handled from BASIC 7.0. On the 64, it can only be done by writing a machine language program for that purpose. Details of the architecture available for this purpose are included in the Commodore 64 Programmer's Reference Guide, pages 150-152. For the code, check out Screen Splitter (COMPUTE!'s Gazette, August 1989). It's a terrific utility for screen splitting.

Datasette Blues

Please let me know how I can get any of your combination BASIC/machine language programs to load properly on my 64 using the Commodore datasette. I've typed in some of your programs, and I get an error message. I've tried changing the loading numbers to indicate the datasette, but I get the same message.

JEFF KRANTZ
LAS VEGAS, NV

Since you didn't specify which error message you're getting, we can't be certain what the problem is. More than likely, the program uses the 64's cassette buffer and other memory locations that make its use with the tape system incompatible. This problem may occur in other programs. Since the vast majority of our readers use a disk drive, we no longer support the datasette.

Frustrating Function

As I was typing in *SynthPlayer* (COMPUTE!'s Gazette, April 1990), I came to a line that said `K$="{f7}"`. The trouble is that my 128 has programmed function keys, and if I press `f7`, it shows LIST. What can I do to correct this?

JOHN E. POTTER
NEW LEXINGTON, OH

SynthPlayer is designed to run on a 64 or on a 128 in 64 mode. You appear to have been entering it in 128 mode. If, however, you are translating from 64 software and need normal function-key usage, re-define the keys as follows.

```
KEY1, CHR$(133) KEY2, CHR$(137)
KEY3, CHR$(134) KEY4, CHR$(138)
KEY5, CHR$(135) KEY6, CHR$(139)
KEY7, CHR$(136) KEY8, CHR$(140)
```

Array Delay

I have written some fairly long BASIC programs that use many and/or large arrays. The same problem seems to arise in each program. While the program is running, the computer will stop and lock up for up to 20 seconds. Do you know what's wrong and how to fix it?

WALTER J. STEGEMILLER
LAWRENCEBURG, IN

Since your computer returns to life after a few seconds, it's not really locked up. The delay could be caused by a couple of things. First, the array may be so large and/or multidimensional that processing

by the program itself may be lengthy. Second, if the BASIC program and its numerical variables occupy a great deal of memory, it may be necessary for the operating system to perform frequent garbage collections—that is, clearing away old string values from the top of memory. During garbage collection other tasks are suspended.

Where Have All the Type-Ins Gone?

I have been a subscriber to both *COMPUTE!* and *COMPUTE!'s Gazette* since 1984. On Monday I received the first issue of your new and improved edition. I can't begin to tell you how disappointed I am with it. You have gone the way of *COMPUTE!* and dropped the type-ins. There were 16 pages devoted to the 64/128, but no projects, games, or programs. The closest thing to programming was something on page 24 referring to *The Automatic Proofreader*.

I had just renewed my subscription through June 1993, but unless I see a radical change in your format, you can count on a cancellation.

THOMAS A. SCHAEFER
ST. PETERSBURG, FL

*Some readers who subscribed to both the old *COMPUTE!* and *COMPUTE!'s Gazette* inadvertently were sent the new *COMPUTE!* subscription edition that does not contain the 16 pages of type-in programs for the 64/128. We believe that mixup has been rectified. If you are a *Gazette* subscriber and your edition of the magazine does not contain the type-ins, please let our subscription department know.*

Setting Up a BBS

I am an elementary teacher with a 64 in the classroom. I have been trying to work out an arrangement with another teacher about 30 miles away who also has a 64. We have experimented communicating with each other using the software that came with the 64

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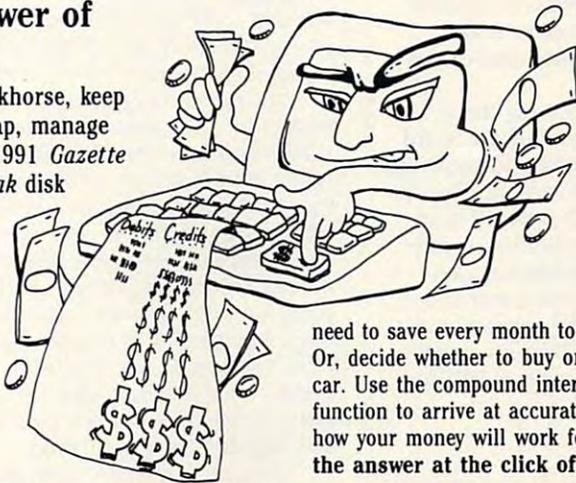
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FEEDBACK *continued from page G-18*

modem. We sent messages to each other during the summer, but our schedules are not always compatible. We can't send and receive information during the same time during the school day.

We're now wondering about sending messages to a bulletin board system (BBS) for reading and replying at another time, but we're not familiar with the process. What would be involved in the way of hardware, software, costs, and restrictions? Do I need to find a BBS that is run on a Commodore to be able to communicate on the system? How involved would it be to start our own BBS for classroom use?

KATHY DOCTOR
YARDVILLE, NJ

If the two of you can communicate directly via computer, modem, and telephone lines, then contacting a BBS should be a breeze. As you already know, to communicate with someone by computer, the only extra hardware you need is a modem, a device that converts your 64's signal into audio tones that can be transmitted by telephone lines. The necessary software is a telecommu-

nications program, often called a terminal program. You can use the one that came with your modem or any of a number of commercial or public domain terminal programs.

If you and your friend can't call each other at the same time, calling a BBS is something like leaving a telephone message on an answering machine. You can call and leave a message for your friend, and then he or she can call and read it whenever his or her schedule permits. With a BBS, however, you can leave more than messages. You can send text files, programs, or graphics. It doesn't matter what computer the BBS is operating on; you can call and access it with any brand.

Setting up your own BBS doesn't require any more hardware, but it does take additional software made especially for the purpose. It also ties up a telephone line. For someone to call in, your line would have to be accessible directly from the outside. Going through the school's switchboard would be impractical. Access to your own BBS could be limited to whomever you wanted. You could give the number

to just a few friends or colleagues for your private use, or you might want to set the BBS up for students to use as well.

For more information on what it takes to set up and run a BBS, be sure to read Gazette in March. Richard Lembrée has been the system operator of his own BBS in Maine since 1984, and he'll share his knowledge and experience with our readers.

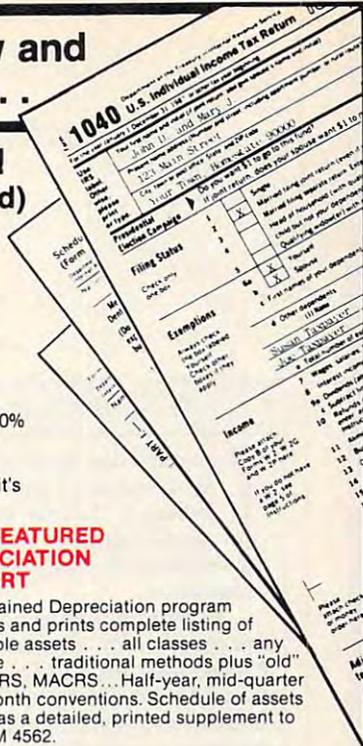
Perfectly Puzzling

I would very much like to buy a copy of *Perfect Calc*. Commodore tells me that it is no longer available. I would like to hear from anyone who knows where I can buy this program.

GERALD GOULD
P.O. BOX 1488
APO, NY 09293

Do you have a question, comment, or problem? Have you discovered something that could help other Commodore users? Write to Gazette Feedback, 324 West Wendover Avenue, Greensboro, North Carolina 27408. Due to the volume of mail received, we cannot respond individually to questions. □

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D'IVERSIONS

F R E D D ' I G N A Z I O

The other day, while working at my computer, I grew tired of looking at the four walls around me. So I decided to take a voyage—a fantastic voyage of the imagination.

I started by calling up a laser control panel on my computer screen. I popped the videodisc *For All Mankind* from Voyager into the laser player attached to my computer. I clicked my mouse on the SPINUP button on the control panel, and suddenly it was 1961, and there was John F. Kennedy telling the world that America was going to the moon. A few moments later it was 1969, and Neil Armstrong was climbing out of the Apollo spaceship saying, "One small step for man, one giant leap for mankind."

I was on the moon with Neil!
(That's how my imagination works, folks!)

For a while I watched my astronaut buddies clowning around on the moon; hopping like bunnies; planting stiff, no-wrinkle flags in the moon's cratered surface; and bouncing around the moon's dunes on their lunar rover. Then I saw the moon picture I wanted and froze it—ZAP!—with one click of my mouse button.

I captured the image with my computer's frame-grabber card and imported it into my favorite paint program. I switched the moon to a second page while I smiled in front of my camcorder. (I always have the camera lens pointed toward my face so I can digitize myself in a flash.)

I digitized a mug shot of myself looking insanely proud (just like the other astronauts). I called up a clip-art image of an astronaut in a spacesuit and placed my grinning face atop the canned, cartoony image.

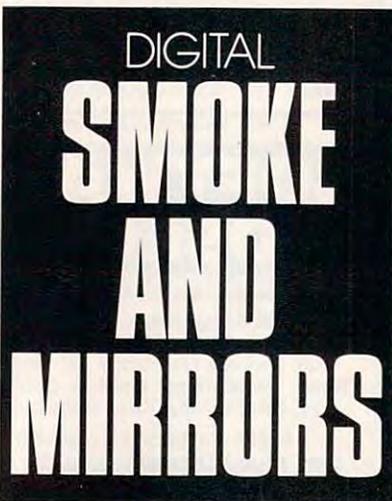
There I was: a smiling, happy guy in a spacesuit. I needed a moon.

I cut out the entire image of me inside the spacesuit and transferred it back to the page with the moon on it. I looked around the moon and finally decided to put myself partly inside a crater. I chopped off the lower half of my body, discarded it into computer-

bit limbo, and lowered the top part of my torso into the crater.

Voilà! Man on the moon! It had taken America almost a decade to accomplish this feat, but it took me only 20 minutes. In a world of digital cutting and pasting—where new virtual realities can be crafted in under an hour—almost anything is possible. Even the sky is no longer the limit.

As with many exotic locations, virtual reality is a fun place to visit, but I'm not sure I'd like to live there.



In virtual reality, distance is only a state of mind. Proof of this occurs every time the phone rings. You press a little crescent-shaped piece of plastic compulsively to your ear. The reality of this is absurd. Anyone from just a hundred or so years ago who saw this would swear you were a swami communing with spirits or some idiot swapping jokes with a carved stick.

But you are oblivious to reality as we know it. You are in virtual reality—talking intimately, arguing, telling jokes, whispering sweet nothings to someone who might be hundreds or thousands of miles away. But there is no distance between you. During your phone conversation (once you rev up and the room around you grows fuzzy and indistinct), you are in Ma Bell's Transporter Room. You and your

phone companion are practically sitting in each other's lap.

It's already possible to take any photograph and digitally retouch it so artfully, so sneakily, that no one could tell whether it was a picture of the real world or a fantasy snapshot.

Take the recent cover of *TV Guide* with the picture of Oprah Winfrey's head on Ann-Margret's body. When the photographer for the story was asked why he had committed such a heinous act (at least, according to Ann-Margret's press agent), he shrugged his shoulders and said, "Because it was so easy I didn't give it a second thought."

Or take the cover of *National Geographic* with the picture of the Sphinx sitting proudly in front of Egypt's great pyramids. This is one beautiful cover. It makes you want to visit Egypt and go there yourself. Except for one thing: *There* isn't really there at all. You couldn't take your Canon Zapshot to the same spot and snap a similar picture, because that spot doesn't exist. To get the Sphinx next to the pyramids, the photographer digitally moved it and plopped it down just where he wanted it.

This sort of feat once cost hundreds of slaves blood, sweat, tears, and dozens of years to accomplish. Now it takes a dozen minutes.

I know a bunch of high-school kids who hang out in virtual reality. One day they decided to play a trick on their principal. They took a tape of some of his speeches to their computer, digitized several of his remarks, and then cut and pasted the individual words into a new speech that the principal had never made. They recorded a copy of this "virtual" speech and carried it proudly into the principal's office and played it for him.

His reaction was priceless. He was dumbfounded! He recognized his voice, he knew he must have said what he was hearing, but what a speech! Had he suffered a micro attack of amnesia, a short burst of dementia?

No, folks. It was far worse. He had entered the Virtual Zone. □

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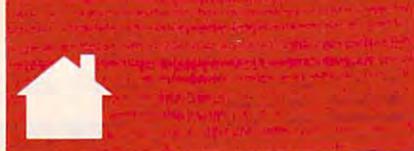
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BEGINNER BASIC

L A R R Y C O T T O N

Happy New Year! My first New Year's resolution is to finish our multiple-sprite program that we began in December's column. Load that program, and we'll continue by positioning all eight sprites.

```
100 FORT=0TO14STEP2:POKEV+T,X
:NEXT
```

V and X were defined in line 90. Since the sprites' horizontal memory registers are V, V+2, V+4, and so on, we use STEP 2 in the FOR-NEXT loop, which causes every other memory register to be poked. The same goes for the sprites' vertical registers (V+1, V+3, V+5, and so on).

```
110 FORT=1TO15STEP2:POKEV+T,
Y:NEXT
```

Memory registers V+23 (53248+23=53271) and V+29 (53248+29=53277) control sprite height and width, respectively.

For sprite 0, if you POKE V+23,1 and POKE V+29,0, the sprite will be tall and narrow; poking both V+23 and V+29 with a 1 will cause sprite 0 to be tall and wide.

The two sprite-size registers (V+23 and V+29) must be poked very carefully with numbers from 0 to 255. Look at the following chart.

Bit No.	7	6	5	4	3	2	1	0
Values	128	64	32	16	8	4	2	1
On/Off	0	0	0	0	0	0	0	1

Poking 1 to a memory register turns on only bit 0. Poking 4 would turn on only bit 2. Poking a sum of 8 and 16, or 24, turns on bits 3 and 4.

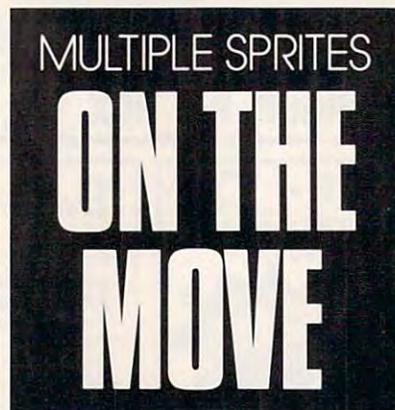
Bit No.	7	6	5	4	3	2	1	0
Values	128	64	32	16	8	4	2	1
On/Off	0	0	0	1	1	0	0	0

Poking a 255 (or K, as defined in line 90) turns on all the bits. The sprites are conventionally numbered the same as the bits. Therefore, poking 1 to V+23 or V+29 controls the size of sprite 0 only. Poking 24 con-

trols sprites 3 and 4. Poking 255 (or K) controls all the sprites. To make all eight as tall and wide as possible, poke V+23 and V+29 with 255 (K).

```
120 POKEV+23,K:POKEV+29,K
```

Memory register V+21 (53269) turns sprites on or off (makes them visible or invisible). To turn all eight sprites on, use POKE V+21,255. (While we're at it, turn the sound on by poking V1 with 23, a funky combination of voice 1, ring mod, and sync.)



```
130 POKEV+21,K:POKEV1,23
```

Now define a few variables.

```
140 J=1:Q=1:F1=1
```

Line 140 is the beginning of a repeatable loop. J starts as 1. Later it will change to -1. Q is the number of pixels the sprites will be displaced from their original locations. F1 is the frequency of voice 1. Now let's make all the sprites green.

```
150 FORT=39TO46:POKEV+T,5:
NEXT
```

Registers V+39 through V+46 control the sprites' colors. Thus, the FOR-NEXT loop assigns color 5 (green) to all eight sprites. Now we need to make a couple of IF-THEN checks to see if the sprites have moved to the extremes of their travel.

```
160 IFQ>MTHENJ=-1:M$="[RED]
MERRY CHRISTMAS":GOSUB300
170 IFQ<0THENM$="(15 spaces)":
GOSUB300:GOTO140
```

Recall that Q is the number of pixels each sprite moves from its original position. M was defined as 79.

When Q becomes greater than M, we want the sprites to reverse direction; thus J becomes -1. Conversely, if Q becomes less than 0, the sprites have returned to their original position, and we begin a new loop at 140.

```
180 Q=Q+J
```

Remember that J can be either 1 or -1. Thus Q will either increase or decrease by 1. Line 190 is reserved for a REMark that explains lines 200-220. Those lines move the sprites by increasing or decreasing their horizontal and vertical locations.

```
200 POKEV,X+Q:POKEV+2,X-Q:
POKEV+5,Y+Q:POKEV+7,Y-Q:
POKEV+8,X+Q:POKEV+9,Y-Q
210 POKEV+10,X-Q:POKEV+11,Y
-Q:POKEV+12,X-Q:POKEV
+13,Y+Q:POKEV+14,X+Q
220 POKEV+15,Y+Q
```

As Q's value increases (J=+1), the sprites move away from each other. As Q decreases (J=-1), the sprites move toward each other.

```
230 POKEVF,F1:F1=F1+J
```

All this does is poke a frequency value to control voice 1's pitch.

```
240 GOTO160
```

We need a subroutine that positions the cursor, prints the message, and causes a short delay.

```
300 POKE214,11:PRINT:POKE211,12:
PRINTM$:FORD=1TO500:NEXT:
RETURN
```

To use sprites of your own creation, change the data in lines 50-70. □



PROGRAMS

P A U L C O M S T O C K

In the year 2450, the universe is an unfriendly place. Planets are at war. Many outlying planets have been colonized, but the inhabitants need goods and supplies from the other colonies. Warring factions have set up blockades to stop these necessary supplies from arriving. It's your job as one of the few brave blockader runners to get the goods through.

Interspatial treaties guarantee your safety once you've landed, but landing at a space port is the problem. You must maneuver your craft through the unfriendly fire of the blockaders, avoid the dangerous mountains that surround the landing sites, and keep an eye on your dwindling fuel supply.

Typing It In

Lander is written entirely in machine language. Enter the program with *MLX*, the machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801

Ending address: 2230

Before exiting *MLX*, save a copy of the program to disk.

Fire Retro Rockets

Plug your joystick into port 2 and then load and run *Lander* just as you would a BASIC program. After the title screen appears, hit any key to begin play. The playing screen is a two-dimensional image of a planet's landing site. The planet itself is black, buildings and cities appear bright yellow, and the landing pad and your ship are white. Your score, amount of fuel remaining, and number of remaining ships are posted at the bottom of the screen. You start with five ships and 1000 units of fuel.

The joystick controls the engine thrust. Pushing it up engages the main thrust and moves the ship up. Pushing the joystick left or right moves the ship in those directions, respectively.

Once a ship starts moving in a particular direction, it continues in that direction until opposite thrust is applied. All maneuvers consume fuel, so keep an eye on your gauge.

There are ten different planets that you must resupply, and each has a unique landing approach. Once you've successfully landed, your score is increased by the amount of fuel you have remaining. You then move immediately to another planet, so be prepared.

LANDER

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GAME FOR THE 64.
JOYSTICK REQUIRED.

If you crash, get shot, or land too hard, your ship will be destroyed. If you have more ships, you'll start on the same planet with the same amount of fuel as when you were destroyed. If your fuel supply was below 500 units, however, you'll start with 500 units. After your last ship has been destroyed, press the fire button to start a new game.

Master the Blaster

Do not overcontrol. It takes time to overcome inertia and change direction. Take advantage of gravity, and plot a deliberate course to your goal. Don't rush. Speed only wastes fuel.

Note that a blockader will not fire until the first shot leaves the screen or hits something. Pay attention to the timing of shots. Happy landings!

LANDER

0801:0B	08	0A	00	9E	37	39	37	55
0809:36	00	00	00	00	00	8D	34	83
0811:03	A9	05	85	FA	A9	68	85	DA
0819:F9	38	AD	34	03	E9	14	8D	A2
0821:34	03	90	10	18	A5	F9	69	D3
0829:50	85	F9	A5	FA	69	00	85	5F
0831:FA	4C	1A	08	18	AD	34	03	78
0839:69	14	0A	18	65	F9	85	F9	DD
0841:A5	FA	69	00	85	FA	60	8D	76
0849:35	03	A5	F9	85	FB	18	A5	FA
0851:FA	69	D4	85	FC	AD	35	03	38
0859:C9	1B	D0	06	A9	07	8D	36	4A
0861:03	60	38	E9	11	90	06	A9	31
0869:07	8D	36	03	60	A9	00	8D	8E
0871:36	03	60	AD	35	03	A0	29	64
0879:91	F9	60	AD	35	03	0A	0A	8B
0881:18	69	80	8D	35	03	A0	00	D7
0889:AD	35	03	91	F9	AD	36	03	2D
0891:91	FB	EE	35	03	AD	35	03	D6
0899:A0	01	91	F9	AD	36	03	91	E9
08A1:FB	EE	35	03	AD	35	03	A0	2B
08A9:28	91	F9	AD	36	03	91	FB	29
08B1:EE	35	03	AD	35	03	A0	29	E1
08B9:91	F9	AD	36	03	91	FB	60	E0
08C1:0A	A8	B9	CF	08	85	FD	C8	50
08C9:B9	CF	08	85	FE	60	17	15	C0
08D1:B7	15	57	16	F7	16	97	17	AD
08D9:37	18	D7	18	77	19	17	1A	70
08E1:B7	1A	20	C1	08	A2	00	8A	C9
08E9:20	0F	08	8A	A8	B1	FD	20	9F
08F1:48	08	20	7C	08	E8	E0	A0	3A
08F9:D0	ED	60	AD	00	DC	29	01	9B
0901:C9	01	F0	0C	20	3A	09	20	33
0909:D9	0A	EA	EA	EA	4C	14	09	50
0911:20	71	09	AD	00	DC	29	04	55
0919:C9	04	F0	0A	20	A8	09	20	A5
0921:D0	0A	EA	EA	EA	60	AD	00	5E
0929:DC	29	08	C9	08	F0	09	20	C7
0931:DF	09	20	C7	0A	EA	EA	EA	B2
0939:60	AD	3B	03	C9	00	F0	1D	CB
0941:38	AD	3B	03	ED	3E	03	90	71
0949:04	8D	3B	03	60	38	AD	3E	D5
0951:03	ED	3B	03	8D	3C	03	A9	05
0959:00	8D	3B	03	60	18	AD	3C	61
0961:03	6D	3E	03	B0	04	8D	3C	35
0969:03	60	A9	FF	8D	3C	03	60	0E
0971:AD	3C	03	C9	00	F0	1D	38	9C
0979:AD	3C	03	ED	3E	03	90	04	DB
0981:8D	3C	03	60	38	AD	3F	03	C9
0989:ED	3C	03	8D	3B	03	A9	00	14
0991:8D	3C	03	60	18	AD	3B	03	D0
0999:6D	3F	03	B0	04	8D	3B	03	6D
09A1:60	A9	FF	8D	3B	03	60	AD	7B
09A9:39	03	C9	00	F0	1D	38	AD	6C
09B1:39	03	ED	3D	03	90	04	8D	A2
09B9:39	03	60	38	AD	3D	03	ED	0F
09C1:39	03	8D	3A	03	A9	00	8D	D2
09C9:39	03	60	18	AD	3A	03	6D	90
09D1:3D	03	B0	04	8D	3A	03	60	55
09D9:A9	FF	8D	3A	03	60	AD	3A	45
09E1:03	C9	00	F0	1D	38	AD	3A	56
09E9:03	ED	3D	03	90	04	8D	3A	BA
09F1:03	60	38	AD	3D	03	ED	3A	8B
09F9:03	8D	39	03	A9	00	8D	3A	EA
0A01:03	60	18	AD	39	03	6D	3D	7A

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0A09:03 B0 04 8D 39 03 60 A9 64
0A11:FF 8D 39 03 60 18 AD 37 D5
0A19:03 6D 39 03 8D 37 03 A0 41
0A21:04 20 77 0A EA 38 AD 37 99
0A29:03 ED 3A 03 8D 37 03 B0 B1
0A31:04 20 9F 0A EA 18 AD 38 2F
0A39:03 6D 3B 03 8D 38 03 90 A5
0A41:04 20 6A 0A EA 38 AD 38 19
0A49:03 ED 3C 03 8D 38 03 B0 16
0A51:03 20 56 0A 60 AD 01 D0 E6
0A59:C9 22 F0 0C CE 01 D0 CE A4
0A61:03 D0 CE 05 D0 CE 07 D0 F5
0A69:60 EE 01 D0 EE 03 D0 EE AA
0A71:05 D0 EE 07 D0 60 AD 10 FD
0A79:D0 29 0F C9 0F D0 07 AD 36
0A81:00 D0 C9 48 F0 17 18 EE 8A
0A89:00 D0 EE 02 D0 EE 04 D0 EA
0A91:EE 06 D0 D0 08 AD 10 D0 AD
0A99:09 0F 8D 10 D0 60 AD 10 1C
0AA1:D0 29 0F C9 0F F0 07 AD DE
0AA9:00 D0 C9 10 F0 17 38 CE 4F
0AB1:00 D0 CE 02 D0 CE 04 D0 8E
0AB9:CE 06 D0 10 08 AD 10 D0 B9
0AC1:29 F0 8D 10 D0 60 AD 15 D1
0AC9:D0 09 02 8D 15 D0 60 AD FB
0AD1:15 D0 09 04 8D 15 D0 60 C8
0AD9:AD 15 D0 09 08 8D 15 D0 26
0AE1:60 20 99 11 A9 C5 8D F8 EA
0AE9:07 A2 00 A0 00 C8 C0 FF D8
0AF1:D0 FB E8 0E F0 D0 F4 A9 F6
0AF9:C6 8D F8 07 A2 00 A0 00 BA
0B01:C8 C0 FF D0 FB E8 E0 F0 EE
0B09:D0 F4 A9 C7 8D F8 07 A2 7F
0B11:00 A0 00 C8 C0 FF D0 FB 77
0B19:E8 E0 F0 D0 F4 60 EA EA F0
0B21:EA A9 C6 8D FD 07 60 EA 80
0B29:EA EA A9 C6 8D FE 07 60 E7
0B31:EA EA A9 C6 8D FF 07 E2
0B39:60 A9 FF 8D 0E D4 8D 0F B0
0B41:D4 A9 11 8D 12 D4 60 0A D5
0B49:0A A8 A9 6E 85 F9 A9 0B 1D
0B51:85 FA B1 F9 8D 0A D0 C8 B0
0B59:B1 F9 8D 0E D0 C8 B1 F9 3D
0B61:4D 10 D0 8D 10 D0 C8 B1 1C
0B69:F9 8D 41 03 60 54 C3 00 14
0B71:03 84 83 00 03 94 C3 00 8C
0B79:02 44 73 00 03 44 83 00 40
0B81:03 84 93 00 03 54 73 00 FC
0B89:03 44 83 00 03 44 73 00 B2
0B91:03 34 73 00 03 0A 0A A8 A1
0B99:A9 BC 85 F9 A9 0B 85 FA 83
0BA1:B1 F9 8D 0C D0 C8 B1 F9 88
0BA9:8D 0D 0C 8B 1F 9D 10 90
0BB1:D0 8D 10 D0 C8 B1 F9 8D 31
0BB9:42 03 60 24 D3 00 03 B4 59
0BC1:A3 00 03 A4 03 00 02 C4 3A
0BC9:73 00 01 C4 73 00 01 14 B7
0BD1:73 40 01 F4 83 00 01 E4 24
0BD9:83 00 01 C4 73 00 01 74 30
0BE1:73 00 01 0A 0A A8 A9 0A C2
0BE9:85 F9 A9 0C 85 FA B1 F9 AC
0BF1:8D 0E D0 C8 B1 F9 8D 0F 98
0BF9:D0 C8 B1 F9 4D 10 D0 8D 5A
0C01:10 D0 C8 B1 F9 8D 43 03 19
0C09:60 D4 C3 00 01 04 C3 80 1F
0C11:01 B4 83 00 02 B4 C3 00 B1
0C19:01 74 D3 00 03 E4 C3 00 7C
0C21:03 54 C3 00 03 D4 C3 00 3B
0C29:01 94 C3 00 02 34 D3 00 E7
0C31:03 AD 0B D0 C9 20 F0 26 7B
0C39:CE 0B D0 AD 10 D0 29 20 A6
0C41:C9 20 F0 0B AD 0A D0 C9 16
0C49:00 F0 13 CE 0A D0 60 18 59
0C51:CE 0A D0 10 08 AD 10 D0 56
0C59:29 DF 8D 10 D0 60 20 CA C3
0C61:0C 60 AD 0B D0 C9 20 F0 DC
0C69:04 CE 0B D0 60 20 CA C0 CA
0C71:60 AD 0B D0 C9 20 F0 25 69
0C79:CE 0B D0 AD 10 D0 29 20 E6
0C81:C9 20 D0 0B AD 0A D0 C9 52
0C89:48 F0 12 EE 0A D0 60 EE 76
0C91:0A D0 D0 8E AD 10 D0 09 D5
0C99:20 8D 10 D0 60 20 CA 0C 59
0CA1:60 AD 41 03 C9 00 D0 0D AA
0CA9:AD 1B D4 4A 4A 4A 4A F8
0CB1:4A 8D 41 03 60 C9 01 D0 A7

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0CB9:04 20 32 0C 60 C9 02 D0 E1
0CC1:04 20 63 0C 60 20 72 0C 85
0CC9:60 20 A4 11 20 48 0B 60 58
0CD1:AD 0D D0 C9 20 F0 26 CE 9A
0CD9:0D F0 AD 10 D0 29 40 C9 D8
0CE1:40 F0 0B AD 0C D0 C9 00 C9
0CE9:F0 13 CE 0C D0 60 18 CE E0
0CF1:0C D0 10 08 AD 10 D0 29 3F
0CF9:BF 8D 10 D0 60 20 69 0D C7
0D01:60 AD 0D D0 C9 20 F0 04 1A
0D09:CE 0D D0 60 20 69 0D 60 0F
0D11:AD 0D D0 C9 20 F0 25 CE D9
0D19:0D D0 AD 10 D0 29 40 C9 1A
0D21:40 D0 0B AD 0C D0 C9 48 4B
0D29:F0 12 EE 0C D0 60 EE 0C D0
0D31:D0 D0 08 AD 10 D0 09 40 D9
0D39:8D 10 D0 60 20 69 0D 60 5F
0D41:AD 42 03 C9 00 D0 0D AD CA
0D49:1B D4 4A 4A 4A 4A 4A 6E
0D51:8D 42 03 60 C9 01 D0 04 21
0D59:20 D1 0C 60 C9 02 D0 04 7B
0D61:20 02 0D 60 20 11 0D 60 73
0D69:20 AD 11 20 96 0B 60 AD 72
0D71:F0 D0 C9 20 F0 26 CE 0F 4F
0D79:D0 AD 10 D0 29 80 C9 80 D5
0D81:F0 0B AD 0E D0 C9 00 F0 0C
0D89:13 CE 0E D0 60 18 CE 0E BE
0D91:D0 10 08 AD 10 D0 29 7F 89
0D99:8D 10 D0 60 20 08 0E 60 3C
0DA1:AD 0F D0 C9 20 F0 04 CE A8
0DA9:0F D0 60 20 08 0E 60 AD 74
0DB1:0F D0 C9 20 F0 25 CE 0F 8B
0DB9:D0 AD 10 D0 29 80 C9 80 16
0DC1:D0 0B AD 0E D0 C9 48 F0 CC
0DC9:12 EE 0E D0 60 EE 0E D0 23
0DD1:D0 08 AD 10 D0 09 80 8D 46
0DD9:10 D0 60 20 08 0E 60 AD 25
0DE1:43 03 C9 00 D0 0D AD 1B C8
0DE9:D4 4A 4A 4A 4A 4A 8D 8C
0DF1:43 03 60 C9 01 D0 04 20 8A
0DF9:70 0D 60 C9 02 D0 04 20 B3
0E01:A1 0D 60 20 B0 0D 60 20 D9
0E09:B6 11 20 E4 0B 60 A9 32 76
0E11:85 F9 A9 0E 85 FA AD 40 38
0E19:03 0A 0A A8 B1 F9 8D 08 9D
0E21:D0 C8 B1 F9 8D 09 D0 C8 A8
0E29:B1 F9 10 D0 8D 10 D0 EC
0E31:60 94 D8 00 00 DC D8 00 E2
0E39:00 6C D8 00 00 A0 D8 00 BF
0E41:00 DC D8 00 00 0C D8 10 A1
0E49:00 68 D8 00 00 9C D8 00 BE
0E51:00 7C D8 00 00 34 D8 10 3A
0E59:00 AD 10 D0 29 DF 8D 10 E3
0E61:D0 AD 40 03 60 AD 10 D0 34
0E69:29 BF 8D 10 D0 AD 40 03 7D
0E71:60 AD 10 D0 29 7F 8D 10 AA
0E79:D0 AD 40 03 60 AD 1F D0 6A
0E81:8D 34 03 29 20 C9 20 D0 9D
0E89:0E 20 1F 0B A9 C5 8D FD C6
0E91:07 20 CA 0C AD 1F D0 AD 8C
0E99:34 03 29 40 C9 40 D0 0E B8
0EA1:20 28 0B A9 C5 8D FE 07 3D
0EA9:20 69 0D AD 1F D0 AD 34 78
0EB1:03 29 80 C9 80 D0 0E 20 C9
0EB9:31 0B A9 C5 8D FF 07 20 5D
0EC1:08 0E AD 1F D0 AD 34 03 B5
0EC9:29 01 C9 01 D0 08 A9 01 FE
0ED1:8D 44 03 4C 12 13 60 AD 36
0ED9:1E D0 8D 34 03 29 11 C9 D6
0EE1:11 D0 09 A9 01 8D 45 03 42
0EE9:4C ED 12 60 AD 34 03 29 5D
0EF1:01 C9 01 D0 08 A9 01 8D A4
0EF9:44 03 4C 12 13 60 A9 01 12
0F01:8D 27 D0 A9 01 8D 28 D0 C3
0F09:8D 29 D0 8D 2A D0 A9 01 14
0F11:8D 2C D0 8D 2D D0 8D 2E B9
0F19:D0 A9 01 8D 2B D0 A9 C0 B3
0F21:8D F8 07 8D C1 8D F9 07 FE
0F29:A9 C2 8D FA 07 A9 C3 8D 22
0F31:FB 07 A9 C4 8D FC 07 A9 A8
0F39:C5 8D FD 07 A9 C5 8D FE 4C
0F41:07 A9 C5 8D FF 07 A9 80 CE
0F49:8D 37 03 8D 38 03 A9 0A 60
0F51:8D 3D 03 A9 0A 8D 3E 03 86
0F59:A9 05 8D 3F 03 A9 00 8D 7F
0F61:39 03 8D 3A 03 8D 3B 03 F9

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0F69:8D 3C 03 60 AD 46 03 C9 1A
0F71:F0 00 0A AD 47 03 C9 01 BA
0F79:F0 30 4C E0 0F A9 00 8D 60
0F81:46 03 A9 01 8D 47 03 A9 02
0F89:78 8D 4A 03 A9 10 8D 4B B4
0F91:03 A9 0C 8D 05 D4 A9 18 DC
0F99:8D 06 D4 A9 00 8D 00 D4 40
0FA1:A9 18 8D 01 D4 A9 81 8D 3A
0FA9:04 D4 AD 47 03 C9 02 F0 5D
0FB1:12 CE 4A 03 D0 26 A9 80 F8
0FB9:8D 04 D4 A9 02 8D 47 03 AC
0FC1:4C DD 0F CE 4B 03 D0 14 68
0FC9:A9 00 8D 47 03 8D 00 D4 06
0FD1:8D 01 D4 8D 04 D4 8D 05 FD
0FD9:D4 8D 06 D4 4C 1C 10 AD 74
0FE1:54 03 C9 01 D0 21 A9 40 D2
0FE9:8D 05 D4 A9 F0 8D 06 D4 E3
0FF1:A9 00 8D 00 D4 A9 18 8D A1
0FF9:01 D4 A9 81 8D 04 D4 A9 EA
1001:00 8D 54 03 4C 1C 10 A9 DB
1009:00 8D 00 D4 8D 01 D4 8D 81
1011:05 D4 8D 06 D4 8D 04 D4 B4
1019:8D 54 03 AD 48 03 C9 00 32
1021:D0 0A AD 49 03 C9 01 F0 A8
1029:30 4C 31 EA A9 00 8D 48 F9
1031:03 A9 01 8D 49 03 A9 02 E1
1039:8D 4C 03 A9 10 8D 4D 03 82
1041:A9 04 8D 0C D4 A9 14 8D AC
1049:0D D4 A9 84 8D 07 D4 A9 7E
1051:3D 8D 08 D4 A9 81 8D 00 3B
1059:D4 AD 49 03 C9 02 F0 12 F2
1061:CE 4C 03 D0 26 A9 80 8D CF
1069:0D D4 A9 02 8D 49 03 4C 7D
1071:31 EA CE 4D 03 0D 14 A9 C0
1079:00 8D 49 03 8D 07 D4 8D 16
1081:08 D4 8D 0B D4 8D 0C D4 07
1089:8D 0D D4 4C 31 EA 00 00 89
1091:B9 9D 10 99 C0 07 C8 C0 06
1099:28 D0 F5 60 20 13 03 0F 29
10A1:12 05 20 3D 20 20 20 20 C5
10A9:20 20 20 06 15 05 0C 82
10B1:20 3D 20 20 20 20 20 19
10B9:20 13 08 09 10 13 20 3D 8A
10C1:20 20 20 18 A2 18 A0 1C
10C9:09 20 F0 FF AE 4E 03 AD F6
10D1:4F 03 20 CD BD 18 A2 18 E6
10D9:AD 17 20 F0 FF AE 50 03 81
10E1:AD 51 03 20 CD BD 18 A2 C7
10E9:18 A0 25 20 F0 FF AE 52 1C
10F1:03 AD 53 03 20 CD BD 60 AD
10F9:AD 50 03 C9 00 D0 0C AD 0B
1101:51 03 C9 00 D0 01 60 38 49
1109:CE 51 03 38 CE 50 03 60 E8
1111:EA EA EA EA EA EA EA EA 33
1119:AD 15 D0 29 08 C9 8D 00 4C
1121:06 20 F9 10 20 F9 10 AD 45
1129:15 D0 29 06 C9 00 F0 03 C2
1131:20 F9 10 AD 15 D0 29 0E 0B
1139:C9 00 D0 08 A9 00 8D 54 97
1141:03 4C 6D 0F A9 01 8D 54 57
1149:03 EA 4C 6D 0F A9 71 85 8F
1151:F9 A9 11 85 FA AD 40 03 67
1159:0A 0A A8 B1 F9 8D 0D 00 0A
1161:C8 B1 F9 8D 01 D0 C8 B1 FA
1169:F9 0D 10 D0 8D 10 D0 60 89
1171:20 30 00 00 50 30 00 00 F2
1179:50 30 00 00 10 30 01 00 13
1181:10 30 01 00 50 30 00 00 1B
1189:50 30 00 00 50 30 00 00 23
1191:50 30 00 00 50 30 00 00 2B
1199:A9 01 8D 46 03 A9 11 8D 55
11A1:15 D0 60 A9 01 8D 48 03 FA
11A9:20 5A 0E 60 A9 01 8D 48 EE
11B1:03 20 66 0E 60 A9 01 8D 44
11B9:48 03 20 72 0E 60 78 A9 78
11C1:19 8D 14 03 A9 11 8D 15 48
11C9:03 58 60 A9 05 8D 52 03 30
11D1:A9 00 8D 53 03 A9 E8 8D CD
11D9:50 03 A9 03 8D 51 03 A9 AB
11E1:00 8D 4E 03 8D 4F 03 60 71
11E9:AD 00 D0 8D 02 D0 8D 04 48
11F1:D0 8D 06 D0 AD 01 D0 8D 4E
11F9:03 D0 8D 05 D0 18 69 15 A2
1201:8D 07 D0 AD 10 D0 29 01 B9
1209:C9 01 D0 09 AD 10 D0 09 55
1211:0E 8D 10 D0 60 AD 10 D0 59

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1A29:09 0A 05 05 05 05 05 05 A0
1A31:03 06 01 05 05 05 09 0A 31
1A39:06 12 02 05 05 05 05 05 D0
1A41:05 03 06 06 18 06 06 06 C4
1A49:06 01 05 05 05 05 05 05 FC
1A51:05 05 05 05 06 06 06 06 9C
1A59:06 06 06 17 06 06 06 05 9D
1A61:05 05 05 05 05 05 05 03 93
1A69:06 06 13 18 06 17 06 06 A4
1A71:06 06 06 01 05 05 05 05 46
1A79:05 05 05 06 15 16 13 06 9F
1A81:06 06 1B 06 12 19 15 16 33
1A89:05 05 05 05 05 05 05 05 BD
1A91:05 05 05 05 06 06 05 05 CC
1A99:13 11 13 13 05 05 05 05 7A
1AA1:05 05 10 10 10 10 10 10 8D
1AA9:10 10 10 10 10 10 10 10 DD
1AB1:10 10 10 10 10 10 06 06 C7
1AB9:1B 04 06 04 1B 06 06 02 7C
1AC1:00 06 06 06 06 06 02 00 E4
1AC9:06 02 06 02 05 05 06 05 AF
1AD1:05 00 02 05 05 00 02 05 4A
1AD9:00 02 05 05 05 05 05 05 CA
1AE1:05 03 06 01 05 05 05 05 75
1AE9:05 05 05 05 05 05 03 06 1B
1AF1:01 05 05 05 05 06 06 06 2B
1AF9:0E 0F 05 03 06 06 0E 0F 3D
1B01:05 03 06 06 06 01 05 05 DE
1B09:03 06 06 06 06 06 0B 06 C7
1B11:06 06 06 06 0B 06 06 06 6F
1B19:06 06 05 05 06 06 06 06 1E
1B21:06 06 06 06 04 06 06 06 47
1B29:06 06 06 06 06 06 05 05 5C
1B31:1B 06 06 02 09 0A 06 02 D5
1B39:05 09 0A 06 06 06 02 05 27
1B41:06 05 10 10 10 10 10 10 AF
1B49:10 10 10 10 10 10 10 10 7F
1B51:10 10 10 10 10 10 80 C0 19
1B59:E0 F0 F8 FC FE FF 00 00 23
1B61:00 00 00 00 00 00 FF FF 97
1B69:FF FF FF FF FF FF 80 C0 61
1B71:E0 F0 F8 FC FE FF FF 7F BA
1B79:3F 1F 0F 07 03 01 FF FF 85
1B81:FF FF FF FF FF FF 00 00 B7
1B89:00 00 00 00 00 00 FF 7F 3F
1B91:3F 1F 0F 07 03 01 00 00 9D
1B99:00 00 00 00 00 00 01 03 D4
1BA1:07 0F 1F 3F 7F FF 01 03 FA
1BA9:07 0F 1F 3F 7F FF FF FF FA
1BB1:FF FF FF FF FF FF FF FF E7
1BB9:FF FF FF FF FF FF FF FE EE
1BC1:FC F8 F0 E0 C0 80 FF FE E7
1BC9:FC F8 F0 E0 C0 80 00 FF F0
1BD1:00 00 00 00 00 00 01 01 0B
1BD9:03 03 07 07 0F 0F 80 80 D9
1BE1:C0 C0 E0 E0 F0 F0 1F 1F 7B
1BE9:3F 3F 7F 7F FF FF F8 F8 62
1BF1:FC FC FE FE FF FF FF FF B5
1BF9:FF FF FF FF FF FF FF FF 30
1C01:FF FF FF FF FF FF FF FF 39
1C09:FF FF FF FF FF FF FF FF 41
1C11:FF FF FF FF FF FF FF FF 49
1C19:00 00 00 00 00 00 00 00 51
1C21:00 00 00 00 00 00 00 00 59
1C29:00 00 00 00 00 00 00 00 61
1C31:00 00 00 00 00 00 00 00 69
1C39:00 00 00 00 00 00 00 00 71
1C41:00 00 00 00 00 00 00 00 79
1C49:00 00 03 0F 3F FF 03 0F E1
1C51:3F FF FF FF FF FF FF FF 29
1C59:00 00 03 0F 3F FF 03 0F F1
1C61:3F FF FF FF FF FF FF FF 39
1C69:FF FF FF FF FF FF FF FF 1C
1C71:FF FF FF FF FF FF C0 F0 1C
1C79:FC FF FF FF FF FF FF 00 30
1C81:00 00 C0 F0 FC FF FF FF C8
1C89:FF FF FF FF FF FF FF FF C9
1C91:FF FF FF FF FF FF FF FF C1
1C99:00 00 00 00 00 00 00 00 D1
1CA1:00 00 00 00 00 00 C0 F0 4C
1CA9:FC FF FF FF FF FF FF 00 60
1CB1:00 00 C0 F0 FC FF FF FF E8
1CB9:7F 7F 3F 3F 1F 1F FF FF E2
1CC1:FE FE FC FE 1F 1F FF FF 81
1CC9:07 07 03 03 01 01 F0 F0 B6
1CD1:E0 E0 C0 C0 80 80 FF FF DC

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```

1CD9:FF FF FF FF FF FF FF 12
1CE1:FF FF FF FF FF FF FF 1A
1CE9:FF FF FF FC F0 C0 FF FC 79
1CF1:F0 C0 00 00 00 00 FF FF D2
1CF9:FF FF FF FC F0 C0 FF FC 89
1D01:F0 C0 00 00 00 00 00 E3
1D09:00 00 00 00 00 00 00 43
1D11:00 00 00 00 00 00 FF 3F 8A
1D19:0F 03 00 00 00 00 FF 9B
1D21:FF FF FF 3F 0F 03 00 D3
1D29:00 00 00 00 00 00 00 63
1D31:00 00 00 00 00 00 FF 6B
1D39:FF FF FF FF FF FF FF 73
1D41:FF FF FF FF FF FF FF 3F BA
1D49:0F 03 00 00 00 00 FF FF CB
1D51:FF FF FF 3F 0F 03 FF FF 04
1D59:FF FF 00 00 00 00 FF FF 93
1D61:FF FF 00 00 00 00 00 9B
1D69:00 00 00 00 00 00 00 A3
1D71:00 00 00 00 00 00 FF AB
1D79:FF FF FF FF FF FF C0 26
1D81:F8 FC FE FE FF FF FF 47
1D89:FF FF FF FF FF FF FF C3
1D91:FF FF FF FF FF FF 03 F0 E0
1D99:1F 3F 7F 7F FF FF C0 F0 8D
1DA1:F8 FC FE FE FF FF FF 67
1DA9:FF FF FF FF FF FF FF E3
1DB1:FF FF FF FF FF FF FF EB
1DB9:FF FF FF FF FF FF FF F3
1DC1:FF FF FF FF FF FF FF FB
1DC9:FF FF FF FF FF FF FF 04
1DD1:FF FF FF FF FF FF 03 0F 21
1DD9:1F 3F 7F 7F FF FF FF 5B
1DE1:FF FF FF FF FF FF FF 1C
1DE9:FF FF FF FF FF FF FF 24
1DF1:FF FF FF FF FF FF 00 2C
1DF9:00 00 01 03 07 0F 00 07 FF
1E01:1F 7F FF FF FF FF 1F 1F 0A
1E09:3F 3F 7F 7F FF FF FF 9C
1E11:FF FF FF FF FF FF E0 2E
1E19:F8 FE FF FF FF FF 00 91
1E21:00 00 80 C0 E0 F0 FF FF 44
1E29:FF FF FF FF FF FF F8 F8 50
1E31:FC FC FE FE FF FF 00 0A
1E39:00 00 00 00 00 00 00 75
1E41:00 00 00 00 00 00 FF FF 7D
1E49:FF FF FF FF FF FF 00 85
1E51:00 00 00 00 00 00 00 8D
1E59:00 00 0F 0F 0F 0F 00 1D
1E61:00 00 F0 F0 F0 F0 0F 43
1E69:0F 0F 00 00 00 00 F0 C3
1E71:F0 F0 00 00 00 00 FF FF 62
1E79:FF FF FF FF FF FF 00 B5
1E81:00 00 00 00 00 00 FF FF BD
1E89:FF FF FF FF FF FF 00 C5
1E91:00 00 00 00 00 00 00 CD
1E99:00 00 00 00 00 00 FF FF D5
1EA1:FF FF FF FF FF FF 00 DD
1EA9:00 00 00 00 00 00 FF FF E5
1EB1:FF FF FF FF FF FF 00 ED
1EB9:00 00 03 0F 1F 3F 00 3D
1EC1:00 00 C0 F0 F8 FC 3F FF 5F
1EC9:FF FF FF FF FF FF FC FF FF
1ED1:FF FF FF FF FF FF A9 AC 0E
1ED9:85 F9 A9 1F 85 FA A9 00 E9
1EE1:85 FB A9 30 85 FC A9 02 8D
1EE9:85 FD A0 00 B1 F9 91 FB 11
1EF1:C8 D0 F0 E6 FA E6 FC C6 A8
1EF9:FD D0 F1 60 20 D7 1E 20 6A
1F01:F0 13 60 20 3D 14 A2 00 0A
1F09:A0 00 C8 C0 FF D0 FE E8 E0
1F11:E0 04 D0 F4 4C B0 14 AD 25
1F19:15 D0 29 F1 8D 15 D0 A9 66
1F21:00 8D 54 03 4C 4D 20 5D
1F29:44 E5 AD 11 D0 29 EF 8D 62
1F31:11 D0 20 FD 1E 20 FF 0E 8F
1F39:A9 A4 8D 00 D0 A9 8D 23
1F41:01 D0 A9 00 8D 10 D0 20 D7
1F49:E9 11 A0 00 B9 96 1F 99 D4
1F51:00 05 A9 F0 99 00 D9 C8 5E
1F59:C0 06 D0 F0 A0 00 B9 9C B7
1F61:1F 99 4B 05 A9 F0 99 4B DE
1F69:D9 C8 10 D0 F0 A9 0F 8C
1F71:8D 15 D0 AD 11 D0 99 10 9E
1F79:8D 11 D0 A2 00 A0 00 C8 52
1F81:C0 FF D0 FB E8 E0 FF D0 95

```

```

1F89:F4 AD 00 DC 29 10 C9 10 A8
1F91:F0 F7 4C 83 14 0C 01 0E E8
1F99:04 05 12 02 19 20 10 01 E7
1FA1:15 0C 20 03 0F 0D 13 14 88
1FA9:0F 03 0B 00 18 00 00 3C 8E
1FB1:00 00 3C 00 00 00 7E 00 71
1FB9:7E 00 00 FF 00 00 FF 00 37
1FC1:00 FF 00 00 FF 00 00 FF FF
1FC9:00 00 FF 00 00 FF 00 00 08
1FD1:FF 00 00 FF 00 00 FF 00 10
1FD9:00 FF 00 00 7E 00 00 3C 48
1FE1:00 00 3C 00 00 00 7E 00 A1
1FE9:FF 00 01 00 00 00 00 00 48
1FFF:00 00 00 00 00 00 00 00 30
1FF9:00 00 00 00 00 00 00 00 38
2001:00 00 00 00 00 00 00 00 41
2009:00 00 00 00 00 00 00 00 49
2011:00 00 00 00 00 00 00 00 51
2019:00 00 00 00 00 00 06 00 65
2021:00 0A 00 00 14 00 00 28 AC
2029:00 00 00 00 00 00 00 00 69
2031:00 00 00 00 00 00 00 00 71
2039:00 00 00 00 00 00 00 00 79
2041:00 00 00 00 00 00 00 00 81
2049:00 00 00 00 00 00 00 00 89
2051:00 00 00 00 00 00 00 00 91
2059:00 00 00 00 00 00 00 00 99
2061:60 00 00 50 00 00 28 00 27
2069:00 14 A5 00 00 00 00 00 63
2071:00 00 AA 00 00 55 00 00 5C
2079:55 00 00 AA 00 00 55 00 B9
2081:00 55 00 00 2A 00 00 00 68
2089:00 00 00 00 00 00 00 00 C9
2091:00 00 00 00 00 00 00 00 D1
2099:00 00 00 00 00 00 00 00 D9
20A1:00 00 00 00 00 00 00 00 E1
20A9:00 00 80 00 00 00 00 00 F9
20B1:00 00 00 00 00 00 00 00 F1
20B9:00 00 00 00 00 00 00 00 F9
20C1:00 00 00 00 00 00 00 00 02
20C9:00 00 00 00 00 00 00 00 0A
20D1:00 00 00 00 00 00 00 00 12
20D9:00 00 00 00 00 00 FF FF 1A
20E1:FF FF FF FF FF FF FF 22
20E9:FF FF 5A 00 00 00 00 00 75
20F1:00 00 00 00 00 00 00 00 32
20F9:00 00 00 00 00 00 00 00 3A
2101:00 00 00 00 00 00 18 5B
2109:00 00 18 00 00 00 00 00 4E
2111:00 00 00 00 00 00 00 00 53
2119:00 00 00 00 00 00 00 00 5B
2121:00 00 00 00 00 00 00 00 63
2129:00 00 00 00 00 00 00 00 6B
2131:00 00 00 00 00 00 00 00 73
2139:00 00 00 00 00 00 4A 00 10
2141:00 11 00 01 44 00 00 29 23
2149:00 00 88 00 00 65 00 00 32
2151:08 00 00 00 00 00 00 00 97
2159:00 00 00 00 00 00 00 00 9B
2161:00 00 00 00 00 00 00 00 A3
2169:00 00 DA 00 00 00 00 00 07
2171:00 00 00 00 00 00 00 00 B3
2179:24 00 01 00 00 00 25 00 38
2181:04 80 40 00 04 00 04 90 A6
2189:40 00 01 00 00 88 00 04 32
2191:24 80 01 02 00 00 50 00 E6
2199:00 00 00 00 00 00 00 00 DB
21A1:00 00 00 00 00 00 00 00 E3
21A9:00 00 00 00 00 00 00 00 EB
21B1:00 00 00 00 00 00 00 00 F3
21B9:00 00 00 00 00 00 00 00 FB
21C1:00 00 4A 00 00 11 00 01 92
21C9:44 00 00 29 00 00 88 00 D1
21D1:00 65 00 00 00 00 00 00 AD
21D9:00 00 00 00 00 00 00 00 1C
21E1:00 00 00 00 00 00 00 00 24
21E9:00 00 00 00 00 00 DA 00 E1
21F1:00 00 00 00 00 00 00 00 34
21F9:00 00 00 00 24 00 01 00 5F
2201:00 00 25 00 04 80 40 00 8C
2209:04 00 04 90 40 00 01 00 DC
2211:00 88 00 04 24 80 01 02 DE
2219:00 00 50 00 00 00 00 00 67
2221:00 00 00 00 00 00 00 00 65
2229:00 00 00 00 00 00 00 00 6D

```

PROGRAMS

DAVID W. MARTIN

Here's a utility that will greatly increase the readability of your BASIC programs. *List Formatter* makes 64 or 128 program listings easier to comprehend.

If you have a 128, you're probably aware of your computer's larger input buffer that allows you to enter lines in a BASIC program as long as 160 characters. This is considered a big improvement over the 64's capacity of 80 characters per line.

The 128's larger buffer means that BASIC programmers can pack twice as many commands on one line. By doing so, they end up with a program that runs faster (since it has fewer line numbers) but is harder to read. Until now programmers had to decide between a program that was faster yet harder to read or one that was slower but easier to read. Now you can have the best of both worlds with *List Formatter*.

Getting Started

List Formatter is a small machine language program in the form of a BASIC loader. Since it's written in BASIC, enter the program by using *The Automatic Proofreader*; see "Typing Aids" elsewhere in this section. When you've finished entering *List Formatter*, be sure to save a copy to disk.

A unique aspect about *List Formatter* is that it automatically determines which system it's being run on (64 or 128) and configures itself to work within that system. This means you'll only need one copy of the program at any time and you'll never have to worry about which version to load. Load and run the program just as you would any BASIC program.

When *List Formatter* executes, it prints information about how to toggle the program on or off with a SYS call followed by a READY message.

You're then ready to load and list any BASIC program. At this point you can also list *List Formatter* to see how the program works. *List Formatter* patches itself into the IQPLOP vector at 774-775 (\$0306-\$0307), which handles the listing of BASIC text.

The list command itself has not been changed. *List Formatter* looks for a colon on a BASIC program line and formats the line based on the lo-

cation of this character. A colon is often used to separate multiple statements on a line. Once a colon has been found, *List Formatter* prints each statement on its own line with the proper amount of indenting for uniform output. But that's not all.

LIST FORMATTER

MAKE PROGRAM LISTINGS EASIER TO READ WITH THIS UTILITY FOR THE 64 OR 128

List Formatter also highlights remarks (REM statements) in reverse video, making them easier to spot and read. As an example, consider the following BASIC line.

```
500 FORI=0TO100:PRINTI:
NEXTI:REMARKS IN
REVERSE VIDEO
```

Using the standard listing, the line would list as above, but with *List Formatter* the line appears as follows.

```
500 FORI=0TO1
:PRINTI
:NEXTI
:REMARKS IN REVERSE
VIDEO
```

List Formatter is ideal for reading your programs or for printing out copies. Attempting to edit lines in this format, however, is not recommended because the length of the statement in the new format usually far exceeds the line's normal input length. If you must edit a line, first turn *List Formatter* off with the SYS address given when the program first runs.

Also note that the variable S used in the program can be changed to different addresses in memory. This makes the program easy to relocate if

it interferes with another program. Once you use *List Formatter* and discover how readable it makes your BASIC listings, you'll probably find it a welcome addition to your utility library.

LIST FORMATTER

```
BP 100 REM COPYRIGHT 1990 - CO
MPUTE PUBLICATIONS INTL
LTD - ALL RIGHTS RESER
VED
RX 105 IFPEEK(40960)<>148ANDPE
EK(45056)<>191THEN110
GX 106 PRINT"{CLR}{DOWN}SETTIN
G UP C64 MODE...":S=828
:GOTO120
XA 110 S=2816:REM RELOCATABLE
{SPACE}PROGRAM
KM 111 PRINT"{CLR}{DOWN}SETTIN
G UP C128 MODE..."
BP 120 PRINT"{DOWN}LIST FORMAT
TER "
EX 130 REM LIST FORMATTER MACH
INE LANGUAGE
CQ 140 DATA 173,7,3,201,81,144
,6,169
RR 150 DATA 203,162,21,208,4,1
69,81,162
PP 160 DATA 81,141,6,3,142,7,3
,96
DC 170 DATA 8,201,58,208,26,36
,17,48
DQ 180 DATA 22,169,13,32,12,86
,162,0
QG 190 DATA 189,0,1,240,8,169,
32,32
JJ 200 DATA 12,86,232,208,243,
169,58,201
XA 210 DATA 143,208,2,133,243,
40,234,76
EB 230 REM POKE ML STARTING AT
ADDR = S
MF 231 FOR D=S TO S+63:READ Y:
POKE D,Y:T=T+Y:NEXT:REM
ARKS ARE HIGHLIGHTED
RE 290 L=PEEK(774):POKED,L:POK
ES+14,L
JR 300 H=PEEK(775):POKED+1,H:P
OKES+16,H
XC 310 M=S+24:L%=M/256
GH 320 POKES+10,L%=POKES+8,M-2
56*L%
GX 325 IFPEEK(40960)=148ANDPEE
K(45056)=191THENGOSUB37
0
HD 330 PRINT:PRINT"ON/OFF: SYS
"S
BA 335 SYS(S):PRINT:PRINT"ENGA
GED":PRINT:LIST231
PP 350 END
RF 360 REM PATCH C128 CODE FOR
C64
CR 370 POKE828+4,167:POKES+36,
71:POKES+37,171:POKES+4
8,71:POKES+49,171
GB 380 POKES+60,199:POKES+30,1
5
PX 390 RETURN
```



PROGRAMS

J E S U S M E N D O Z A E S C A L O N A

To add some zest to your game instructions, messages, or any other text, try this short machine language routine that causes words to dissolve. You can also reverse the process with *Dissolver* and have words slowly appear.

Dissolver hides out of the way of your BASIC programs, ready to be called at any time. It uses one or several collections of 255 characters that may either be defined by you or taken from the 64's standard set.

Typing It In

Dissolver is written in machine language. Enter the program with *MLX*, our machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: CE90

Ending address: CFFF

When you've finished typing, be sure to save the program to disk with the name DISSOLVER.OBJ. A demonstration program that shows how to use *Dissolver* loads the program and looks for it by that name.

The demonstration program is written entirely in BASIC. To ensure accurate entry, use *The Automatic Proofreader*; see "Typing Aids" elsewhere in this section.

The Commands

To use *Dissolver* in your own programs, make the call SYS 52880, *swcopy*, *chrset1*, *chrset2*—where *swcopy*, *chrset1*, and *chrset2* represent numbers that specify how the program will work. If *swcopy* is 1, the program copies the standard 64 character set from ROM. If *swcopy* is 0, the program alternates between any of possibly several character sets that you may have in memory. It reads character data from the set stored at *chrset2* and copies them to the *chrset1* address.

The characters at *chrset1* are copies of the source character set and are visible on the screen. These copies are the characters actually used during the dissolving process.

As a practical example, suppose that your character set is located at memory address 43088 and your copy is to be at address 14336. In this case

the character set is to be a copy of that in ROM. Therefore, the program call would be SYS 52880,1,14336,43088. If the character set were to be your own, you would need to poke the characters in starting at 43088 and use 0 in place of 1 as the first parameter in the above call.

Although any values from 0 through 65535 may be used as character set addresses, addresses under Kernel ROM, from 57344 on, are not accessible. Calls from this area will result in garbage.

DISSOLVER

ADD DRAMA TO
YOUR 64 TEXT
SCREENS BY MAKING
CHARACTERS
DISSOLVE AND
MATERIALIZE

Now you can start having fun by dissolving characters. The dissolving process can also be used in reverse, with characters slowly materializing on the screen. To dissolve characters, use SYS 52963, *swdiss*, *start*, *end*—where *swdiss*, *start*, and *end* represent more special parameters. The value of *swdiss* must be 0 or 1. Use 0 if you want characters to dissolve and 1 if you want them to materialize. The numbers *start* and *end* may take on any values from 0 to 255 and tell the program what range of characters within your set is to be treated as dissolvable text.

To better understand *Dissolver*, examine the demonstration program and the REM statements that explain the different calls. Then put the program to work spicing up your own text screens.

DISSOLVER.OBJ

```
CE90:20 9E CF 84 02 20 9E CF C5
CE98:8C AC CF 8D AD CF 20 9E 06
CEA0:CF 8C AE CF 8D AF CF A5 8C
```

```
CEA8:02 D0 01 60 A2 05 BD AC F2
CEB0:CF 95 FA CA 10 F8 A9 7F DE
CEB8:8D 0D DC A5 01 29 FB 85 80
CEC0:01 A2 08 A0 00 B1 FE 91 E8
CEC8:FA 91 FC C8 D0 F7 E6 FB A4
CED0:E6 FD E6 FF CA D0 EE A5 5B
CED8:01 09 04 85 01 A9 81 8D 51
CEE0:0D DC 60 20 9E CF 84 02 89
CEE8:20 9E CF 84 03 20 9E CF 26
CEF0:84 04 98 38 E5 03 18 69 3D
CEF8:01 85 23 C9 D2 B0 04 A9 84
CF00:01 D0 02 A9 00 85 24 A2 30
CF08:03 BD AC CF 9D A8 CF CA 25
CF10:10 F7 A4 03 F0 1D 18 A9 50
CF18:08 6D A8 CF 8D A8 CF 18 EF
CF20:A9 08 6D AA CF 8D AA CF C8
CF28:90 06 EE A9 CF EE AB CF 6B
CF30:88 D0 E3 A9 36 85 01 A9 D2
CF38:3F 85 FE A9 07 85 FF A5 47
CF40:23 85 22 A2 03 BD A8 CF 71
CF48:95 FA CA 10 F8 A6 FF BD EB
CF50:B2 CF A8 A6 FE A5 02 F0 40
CF58:05 B1 FC 4C 60 CF B1 FA EB
CF60:3D BA CF F0 04 51 FA 91 43
CF68:FA 18 A9 08 65 FA 85 FA 5E
CF70:18 A9 08 65 FC 85 FC 90 66
CF78:04 E6 FB E6 FD C6 22 D0 E1
CF80:CC A5 24 F0 0A A0 0F A2 17
CF88:00 CA D0 FD 88 D0 FA C6 19
CF90:FE C6 FF 10 AA A5 FE 10 5C
CF98:A2 A9 37 85 01 60 20 FD FA
CFA0:AE 20 8A AD 20 F7 B7 60 7C
CFA8:00 00 00 00 00 30 00 38 41
CFB0:00 D0 05 01 03 06 02 07 7C
CFB8:00 04 02 01 02 04 01 20 D0
CFC0:08 10 20 08 40 08 40 01 90
CFC8:04 20 80 02 01 10 08 40 3B
CFD0:20 02 04 40 10 20 02 08 92
CFD8:80 40 08 10 80 04 20 80 9F
CFE0:10 01 01 80 04 80 04 10 2B
CFE8:02 04 40 20 08 02 10 04 01
CFF0:01 80 10 04 20 01 80 02 7B
CFF8:40 08 00 00 00 00 00 00 BA
```

DISSOLVER DEMO

```
AC 10 REM COPYRIGHT 1990 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
PS 60 PRINT CHR$(147)
CB 70 POKE 53281,0:POKE53280,1
      1
CK 80 PRINT CHR$(8);SPC(244);C
      HR$(152);"LOADING DISSOL
      VER OBJECT CODE..."
SE 90 A=A+1
MH 100 IF A=1 THEN LOAD "DISSO
      LVER.OBJ",8,1
BG 110 REM *** COPY ROM CHARAC
      TER SET ****
HR 120 SYS 52880,1,14336,40960
XK 130 REM ***** ENABLE ON BLO
      CK ZERO *****
RA 140 POKE 53272,30
JG 150 REM *** DISSOLVE ALL CH
      RS SET *****
PM 160 SYS 52963,0,0,255
EF 170 PRINT CHR$(147)
AH 180 REM *** PRINT 'INVISIBL
      E' LINES ***
SG 190 PRINT SPC(48);CHR$(155)
      ;"DISSOLVER IS A PROGRA
      M"
DJ 200 PRINT SPC(9)" THAT ALLO
```

```

WS YOU TO
AR 210 REM *** UNDISSOLVE HALF
      SET *****
MJ 220 SYS 52963,1,0,127
PB 230 FOR T=1 TO 1000:NEXT
KP 240 PRINT SPC(84);CHR$(152)
      ;"DISSOLVE ONE CHARACTE
      R AT A TIME"
DA 250 FOR T=1 TO 1000:NEXT
GD 260 PRINT SPC(56);CHR$(158)
      ;"01234"
FP 270 FOR C=48 TO C+4
XF 280 REM *** DISSOLVE A CHAR
      ACTER *****
JJ 290 SYS 52963,0,C,C
FD 300 NEXT
XS 310 REM ** ANOTHER 'INVISIB
      LE' LINES **
CF 320 PRINT SPC(48);CHR$(152)
      ;CHR$(18);"OR WORK WITH
      A GROUP"
XF 330 PRINT SPC(8);CHR$(18);"
      {3 SHIFT-SPACE}OF CHARA
      CTERS{SHIFT-SPACE}
      {2 SHIFT-SPACE}";CHR$(1
      46)
KF 340 REM *** UNDISSOLVE HALF
      SET *****
SX 350 SYS 52963,1,128,255
FR 360 FOR T=1 TO 1500:NEXT
BQ 370 PRINT SPC(56);CHR$(158)
      ;"01234"
HB 380 REM *** UNDISSOLVE FIVE
      NUMBERS **
XP 390 C=48
SR 400 SYS 52963,1,C,C+4
FK 410 PRINT SPC(44);CHR$(152)
      ;"OR WITH A COMPLETE CH
      ARACTER SET"
PD 420 REM *** PRINT 255 CHARA
      CTERS *****
PG 430 FOR C=0 TO 255
PP 440 POKE 1704+C,C
ER 450 NEXT
PG 460 FOR T=1 TO 1500:NEXT
FX 470 REM *** DISSOLVE FULL S
      ET *****
PX 480 SYS 52963,0,0,255
XE 490 FOR T=1 TO 1500:NEXT
DK 500 PRINT CHR$(147)
CP 510 REM *** PRINT 'INVISIBL
      E' LINES ***
AQ 520 PRINT SPC(166);CHR$(155
      );"OR CHANGE BETWEEN DI
      FFERENT"
AE 530 PRINT SPC(52)"CHARACTER
      SETS."
SC 540 REM *** UNDISSOLVE FULL
      SET *****
JA 550 SYS 52963,1,0,255
SJ 560 FOR T=1 TO 1500:NEXT
CK 590 REM *** DISSOLVE OLD SE
      T *****
EB 600 SYS 52963,0,0,255
GC 660 FOR T=1 TO 1500:NEXT
FF 670 PRINT CHR$(147)
PM 680 REM *** START AGAIN ***
      *****
DR 690 GOTO 120

```

M I C H A E L J . G I B B O N S

Programmers quickly learn through frustration the memory limitations of the 64 when trying to design and write large programs. When confronted with such a problem, one may be tempted to pack the program with as much BASIC code as possible, but this can leave the program difficult to read and filled with potential bugs. *Module 64* is a better alternative.

Module 64 is a machine language routine that loads BASIC subroutines (modules) from disk and links them as needed to form your main program. With this capability, you are no longer restricted to program size, as you can store sections of your program on disk to be loaded and executed as required.

Unlike chained programs, *Module 64* lets you keep your main controlling program in memory at all times, and program variables are accessible to all modules. With *Module 64*, you'll be able to write much larger programs than before.

Getting Started

Module 64 is written entirely in BASIC. To prevent typing errors, use *The Automatic Proofreader* to type it in. See "Typing Aids" elsewhere in this section. When you've finished typing in the main program, be sure to save a copy of the program.

To help demonstrate the power of *Module 64*, we've included a calendar program that has three modules. This demonstration requests you to enter a day, month, and year. The program then displays a calendar of that month. The main program calls modules 1, 2, and 3. Type in each of the three modules and save them to disk separately. Be sure to save them with the appropriate filenames, as the main program will call them by those names.

When run, the demo program will load and call module 3, which will prompt you for a date. Enter any date between 0 and 2300, using the format shown. The program will then load and run module 1, which prints the month, year, days of the week, and a grid pattern used with the calendar. Finally, the demo loads and calls module 2, which prints the dates to the appropriate squares, highlighting the day chosen.

MODULE 64

OVERCOME THE 64'S
MEMORY
LIMITATIONS WITH THIS
PROGRAMMING
UTILITY

This demonstration is rather simple, but it shows how *Module 64* works. When writing your own programs, you can write much larger programs, using as many modules as you want. *Module 64* is best suited for programs that call several interrelated functions upon some type of condition, such as menu selections.

Using the Program

Using *Module 64* is fairly simple, but you must follow a few rules. First, your main program, which will reside

in memory, must begin with line 1000, even if it's just a REM statement. Second, you must include lines 2000-2040 of *Module 64* in your main program. Then a simple GOSUB 2040 reads the data into memory. Third, all the modules must use line numbers less than 1000 and each must end with line number 999. This is so *Module 64* can link the end of the modules to the beginning of the main program.

Finally, you must save your largest module along the main program to disk. This is required so enough space will be allocated at the beginning of your program for the other modules. Notice that in the demo programs the main program begins with line 1000 and each of the modules ends with 999. The largest module, 2, is included within the main program as required. To find which of your modules is the largest, load a module and type PRINT PEEK(46) * 256 + PEEK(45) - 2048.

This will print the size in bytes of each module. All that your main program needs now to load and run a module is to execute the command SYS 49152,"module name" (where *module name* is the disk name of the module you want to load). Once the module has been loaded, you need only GOSUB to the first line to be executed of that module. You may also execute the above command in direct mode, which will simply load the module and link it to your program if it's in memory.

Keep in mind that you should not use constant strings in modules if you want them to be accessible to other modules or the main program. If you must, make it a concatenated string by adding a null string constant to the end (for example, A\$ = "HOUSE" + ""). This will make certain the string is stored in memory as



PROGRAMS

opposed to being embedded within the module BASIC text.

MODULE 64

```

AF 1 REM COPYRIGHT 1990 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
RK 10 GOTO 1000
MD 20 LY = 0
AE 30 D = VAL(MID$(CC$,INT(YR/
    100)+2,1))
MG 35 L = YR - INT(YR/100)*100
RA 40 D = D+L:D = D + INT(L/4)
    + VAL(MID$(MC$,MN,1))
PD 50 D=D+1:IF (YR/4-INT(YR/4)
    )=0 AND MN<3THEN D=D-1:L
    Y=1
CA 60 D=D-INT(D/7)*7+1:IF D>6
    {SPACE}THEN D=0
KB 70 PRINTCHR$(19):PRINT:PRIN
    T:PRINT:PRINT:C=D:A=0:RS
    =CHR$(13)
JJ 75 M=VAL(MID$(MD$, (MN-1)*2+
    1,2)):IF LY=1 AND MN=2 T
    HEN M=M+1
XC 80 PRINT SPC(2+5*C);:FOR L=
    C TO 6:A=A+1:IF A>M THEN
    L=7:GOTO100
MB 85 IF A>M THEN L=7:GOTO100
AR 87 IF A=DY THEN PRINTCHR$(2
    8);
GC 90 PRINT RIGHT$(" "+STR$(A)
    ,2);SPC(3);
HH 100 PRINT CHR$(5);:NEXT:PRI
    NT R$;R$:C=0:IF A<M THE
    N 80
SF 110 PRINT CHR$(19):FOR L=1
    {SPACE}TO 23:PRINT:NEXT
    :PRINT SPC(13);"PRESS
    {2 SPACES}ANY KEY"
JK 120 GETA$:IF A$="" THEN 120
SS 130 RETURN
GG 999 END
CF 1000 DIM MN$(12)
XA 1010 CC$="01234567898765436
    4206420"
KB 1020 MC$="033614625035":MD$
    ="31283130313031313031
    3031"
BK 1030 MN$(1)="JANUARY":MN$(2)
    ="FEBRUARY"
JR 1040 MN$(3)="MARCH":MN$(4)=
    "APRIL"
HA 1050 MN$(5)="MAY":MN$(6)="J
    UNE"
GD 1060 MN$(7)="JULY":MN$(8)="
    AUGUST"
GA 1070 MN$(9)="SEPTEMBER":MN$(
    10)="OCTOBER"
RB 1080 MN$(11)="NOVEMBER":MN$(
    12)="DECEMBER"
BH 1085 POKE53280,14:POKE53281
    ,6
HJ 1090 GOSUB 2040
KC 1100 SYS 49152,"MOD#3":GOSU
    B20 REM GET DATE INPUT
DX 1110 SYS 49152,"MOD#1":GOSU
    B20 REM PRINT GRID
ES 1120 SYS 49152,"MOD#2":GOSU
    B20 REM PRINT DAYS
QF 1130 GOT01100
AS 2000 DATA 169,3,141,131,192

```

```

,169,232,141,130,192,3
2,84,192,165,251,141,1
32
SG 2005 DATA 192,165,252,141,1
33,192,32,253,174,169,
1,166,186,168,32,186,2
55
HM 2010 DATA 32,158,173,169,13
,208,5,162,22,76,55,16
4,32,166,182,32,189
FS 2015 DATA 255,169,0,32,213,
255,169,3,141,131,192,
169,231,141,130,192,32
PA 2020 DATA 84,192,173,132,19
2,160,0,145,251,173,13
3,192,200,145,251,96,1
69
CM 2025 DATA 8,133,252,169,1,1
33,251,160,2,177,251,2
05,130,192,208,9,200
RA 2030 DATA 177,251,205,131,1
92,208,1,96,160,0,177,
251,72,200,177,251,133
XQ 2035 DATA 252,104,133,251,1
65,252,201,0,208,219,9
6,231,3,170,9,0
JB 2040 M=49152:FORL=0TO132:RE
    ADA:POKEM+L,A:NEXT:RET
    URN

```

MOD#1

```

XD 20 REM COPYRIGHT 1990 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
QR 21 M$=MN$(MN):PRINT CHR$(14
    7);CHR$(5);SPC((40-LEN(M
    $))/2);M$
QC 25 PRINT SPC(17);YR
JP 30 PRINT:PRINT"{3 SPACES}SU
    N{2 SPACES}MON{2 SPACES}
    TUE{2 SPACES}WED
    {2 SPACES}THU{2 SPACES}F
    RI{2 SPACES}SAT"
MX 40 FOR T=1 TO 6
GK 45 L1$=CHR$(167):L2$=CHR$(1
    75):L3$=CHR$(186)
KK 50 PRINT CHR$(144);:GOSUB20
    0:GOSUB210:GOSUB210:NEXT
    :GOSUB200
DF 55 R$=CHR$(13):PRINT CHR$(1
    9);R$;R$;R$
DH 60 FOR L=1 TO 6:PRINT " ";L1
    $:PRINT SPC(36);L1$
BF 70 PRINT SPC(36);L1$:NEXT:P
    RINT " ";L1$
CP 100 RETURN
BF 200 PRINT"{2 SPACES}";:FOR
    {SPACE}L=1 TO 7:PRINT L
    2$;L2$;L2$;L2$;L3$;:NEX
    T:PRINT:RETURN
RD 210 PRINT " ";:FOR L=1 TO 7:
    PRINT L1$;"{4 SPACES}";
    :NEXT:PRINT:RETURN
GG 999 END

```

MOD#2

```

XD 20 REM COPYRIGHT 1990 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
HE 21 LY=0
AE 30 D= VAL(MID$(CC$,INT(YR/1
    00)+2,1))

```

```

MG 35 L= YR - INT(YR/100)*100
RA 40 D=D+L:D= D + INT(L/4)+VA
    L(MID$(MC$,MN,1))
PD 50 D=D+1:IF (YR/4-INT(YR/4)
    )=0 AND MN<3THEN D=D-1:L
    Y=1
CA 60 D=D - INT(D/7)*7+1:IF D>
    6 THEN D=0
KB 70 PRINT CHR$(19):PRINT:PRI
    NT:PRINT:PRINT:C=D:A=0:R
    $=CHR$(13)
JJ 75 M= VAL(MID$(MD$, (MN-1)*2
    +1,2)):IF LY=1 AND MN=2
    {SPACE}THEN M=M+1
XC 80 PRINT SPC(2+5*C);:FOR L=
    C TO 6:A=A+1:IF A>M THEN
    L=7:GOTO100
MB 85 IF A>M THEN L=7:GOTO100
AR 87 IF A=DY THEN PRINTCHR$(2
    8);
GC 90 PRINT RIGHT$(" "+STR$(A)
    ,2);SPC(3);
HH 100 PRINT CHR$(5);:NEXT:PRI
    NT R$;R$:C=0:IF A<M THE
    N 80
JP 110 PRINT CHR$(19):FOR L=1
    {SPACE}TO 22:PRINT:NEXT
    :PRINT SPC(13);"PRESS
    {2 SPACES}ANY KEY"
JK 120 GETA$:IFA$=""THEN120
SS 130 RETURN
GG 999 END

```

MOD#3

```

XD 20 REM COPYRIGHT 1990 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
FF 21 PRINT CHR$(147):PRINT:PR
    INT
CQ 30 PRINT"ENTER A DATE (MM/D
    D/YYYY)";:INPUT";A$
BF 40 MN= VAL(LEFT$(A$,2)):DY=
    VAL(MID$(A$,4,2)):YR= V
    AL(RIGHT$(A$,4))
EQ 50 IF MN<1 OR MN>12 THEN90
GX 60 M= VAL(MID$(MD$, (MN-1)*2
    +1,2))
EH 70 IF DY<1 OR DY>M THEN90
DS 80 IF YR<1 OR YR>2300 THEN
    {SPACE}90
ME 85 RETURN
EH 90 PRINT:PRINT"INVALID DATE
    ":PRINT:GOTO30
GG 999 END

```

COMING NEXT MONTH . . .**Climbing Your Family Tree**

No telling whom you'll meet when you start climbing your family tree, but keeping track of all those ancestors can be quite a chore. Most genealogists compile family group sheets and pedigree charts by hand, but in this article you can learn how genealogy software for your 64 or 128 can simplify your recordkeeping and eliminate much of the paperwork.



REVIEWS

CREATE IMPRESSIVE SPREADSHEETS • SCAN ART BY HAND
FOLLOW CARMEN THROUGH TIME

WINGZ

These days, if you're going to introduce a high-end spreadsheet program, it had better be good. In a field already crowded with top-selling applications from the industry giants—Lotus, Microsoft, and Borland—your program would have to hit the ground running and never look back.

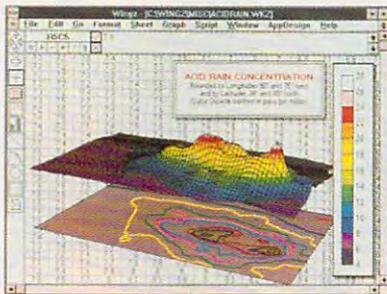
Informix has taken up the challenge with its *Windows* spreadsheet program, *Wingz*. While it has the usual array of noteworthy features and functions, *Wingz* adds outstanding three-dimensional graphics and a powerful scripting language.

Wingz has 20 basic types of charts, in both two and three dimensions, with a variety of title, legend, color, and pattern choices. It's almost embarrassingly easy to create a chart in *Wingz*. Simply select the data range by holding down a mouse button, and click on the chart icon. Then define the area on the spreadsheet where you want the chart to go by holding down a mouse button, dragging to define the chart's size, and releasing the button. That's it. You can use the pull-down menus to change the type of chart, move legends or titles, or perform a variety of other chart modifications.

Unlike other spreadsheet programs, *Wingz* lets you create a chart on the screen right next to your data. This is a true WYSIWYG (What You See Is What You Get) spreadsheet. To move the chart, you simply click on the chart and drag it across the page. To resize it, you click on the chart and move the chart's resizing handles. While *Wingz* offers a full-page preview, you probably won't need it—the screen accurately shows how your page will look.

The scripting language for *Wingz*, HyperScript, is equally impressive. You can create custom menus, dialog boxes, slider controls, buttons that call

other scripts, and spreadsheet functions not included with the program. The menu system is also a script, so you can modify it. With the Learn command, you can have the program record your keystrokes and mouse movements and translate them into HyperScript commands. And, as if writing and recording scripts weren't enough, *Wingz* lets you enter HyperScript commands directly for immediate execution.



With *Wings* you can easily create eye-catching three-dimensional graphics.

As might be expected with the first version of a major new application, *Wingz* does have some problems. When you change a cell to a larger font, you have to manually adjust the cell's row height. While you can load the data and formulas from most 1-2-3 spreadsheets (WKS and WK1, but not WK3, WRI, or WGI), you have to leave your macros behind. The Learn command translates all cell and mouse movements into absolute addresses—with no option for relative references. And I was able to repeatedly crash the program by creating a simple 3-D chart and selecting Contour from the Gallery menu.

Wingz doesn't offer full compatibility with the industry standard *Lotus 1-2-3*, and it isn't a mature *Windows* spreadsheet program, as is *Microsoft Excel*. But if you dream of creating eye-popping charts or if you love programing, you'll fall head over

heels for *Wingz*. It's a groundbreaking program that soars above the competition.

DAVID ENGLISH

Ease of Use	★★★★
Documentation	★★★★
Features	★★★★
Innovation	★★★★

IBM PC and compatibles; package includes both *Windows* and OS/2 versions—\$499

Windows version requires *Windows* 3.0, 2MB of RAM (3MB or more recommended), 2MB of hard disk space, and EGA, VGA, or 8514/A monitor.

OS/2 version requires OS/2 version 1.2 or higher, 4MB of RAM, 2MB of hard disk space, and EGA, VGA, or 8514/A monitor.

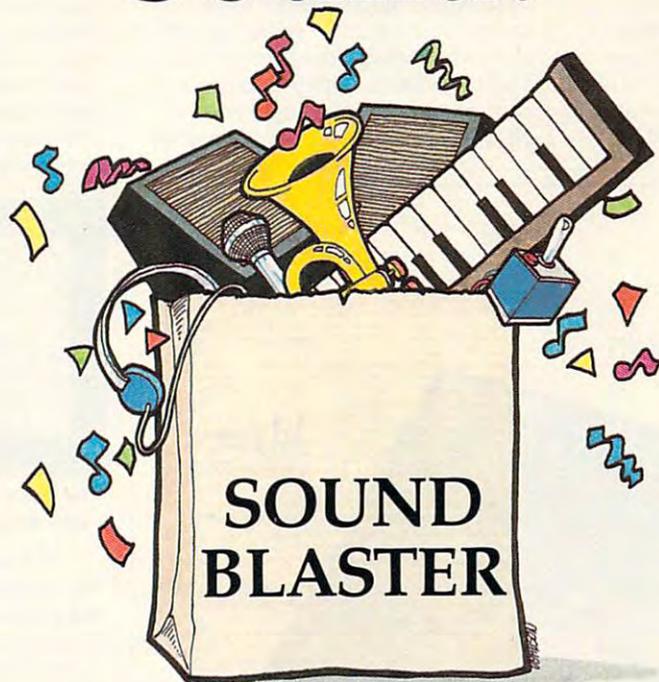
INFORMIX SOFTWARE
4100 Bohannon Dr.
Menlo Park, CA 94025
(415) 926-6300

BALANCE OF THE PLANET

As a game, Chris Crawford's *Balance of the Planet* is no great shakes. As a challenging intellectual puzzle, it's quite effective. As an intriguing educational experience, it's unmatched. If managing and understanding the delicate balance of the ecological and economic forces that hold our beloved mother earth together appeals to you, you're in for hours of fascination.

As the United Nations High Commissioner of the Environment, your job is to set global policies. You control ten taxes and 12 ways to use government funds. Change the policies to match your theories, tell the computer to advance five years to evaluate the consequences of your policies, and display the results. You

Shopping for Sound?



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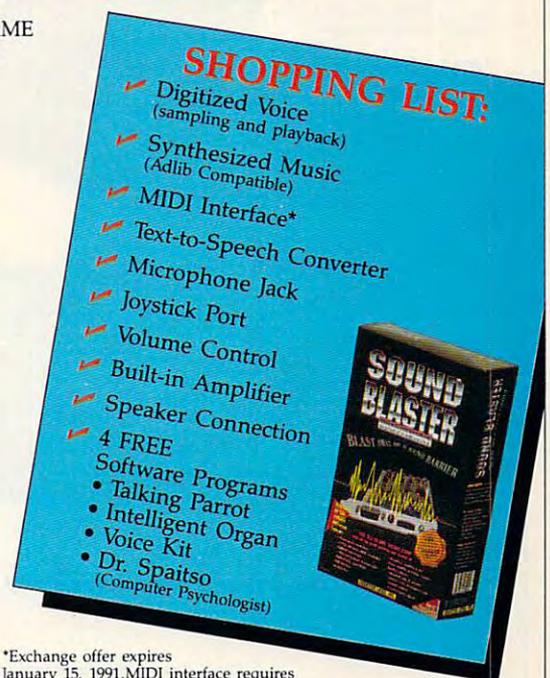
EXCHANGE POLICY: You can exchange your Adlib, C/MS, Covox, or GAME BLASTER and **SAVE \$100** off the suggested retail price. Just send your card and \$139⁹⁵ (check or credit card number) to Brown-Wagh, 130-D Knowles, Los Gatos, CA 95030.

SYSTEM REQUIREMENTS: SOUND BLASTER requires 512K or RAM. DOS 2.0 or higher, and CGA, EGA, VGA, or Hercules monographics, and external speakers.

*Get the MIDI Connector Box
and Voyetra's Sequencer Plus Jr.
for \$129⁹⁵ (a \$150 value)*

SOUND BLASTER \$239⁹⁵

Partial list of companies in development or currently supporting SOUND BLASTER: Access Software, Accolade, Activision, Asymmetrix, Autodesk, B.A.O., Broderbund, Capcom, Cinemaware, Corel Systems, Cosmi, Data East USA, Davidson Assoc., Dynamix, Electronic Arts, Farallon, First Byte, Gamestar, Hewlett-Packard, IBM, ICS, JRM Software, Konami/Ultra, Kyodai, Level 9 Computing, Lucasfilm, Macromind, Mastertronic/Virgin, Mediagenics, Michtron, MicroGrafix, MicroProse, Microsoft, Mindscape, Omnitrend, Origin System, Rix Software, Sierra On-Line, Software Toolworks, Spectrum Holobyte, Strategic Simulations, Synergistic Software, Sublogic Corporation, Taito, The Learning Company, Voyetra and Zuma Group.



*Brown
Wagh*

408-378-3838 (inside CA)
800-451-0900 (outside CA)

*Exchange offer expires January 15, 1991. MIDI interface requires the MIDI Connector Box. Referenced products and companies are registered trademarks of their respective holders.

Circle Reader Service Number 131



REVIEWS

get nine five-year cycles to save the world.

Sounds simple, but lurking beneath that simple surface is a massive set of awesomely complex interrelationships. Take, for example, the wood stove subsidy. You can subsidize poor people's wood stove purchases, thereby increasing the number of wood stoves. As you scan through the screens of this game, jumping

from related topic to cause to effect, you find that increased use of wood stoves in third-world countries decreases the use of wood as fuel. Why? Most fuel wood is now used in open fires, which burn far more wood than stoves. Shifting to the more fuel-efficient wood stoves leaves more forests standing, which helps retard desertification and forest clearing. Forest clearing affects the amount of carbon

dioxide in the air, which is involved in the greenhouse effect and the global warming trend. Desertification increases soil erosion and reduces food supplies by destroying usable farmland, leading to starvation, and on and on. Clearly, wood stoves can make a difference. And that's just wood stoves. Imagine the ripple effects of tampering with oil supplies and natural gas.

Take a Giant Leap in Simulations!

You are commander of *Project Moonbase*, NASA's long-range plan to colonize Earth's moon. From your multi-million dollar annual budgets, you must establish a base, then manage its growth into a full-fledged, independent colony. With savvy (and luck), you may create a self-sufficient city on the Moon, but not without adeptly handling the myriad leadership problems in this highly-charged political and harsh physical environment.

NASA modeling at your command

Select and clear a site for the Lunar colony ... build landing pads ... erect habitat modules ... supply essential life-support services to the colonists ... all using socio- and econometric models from KDT Industries, a NASA contractor.

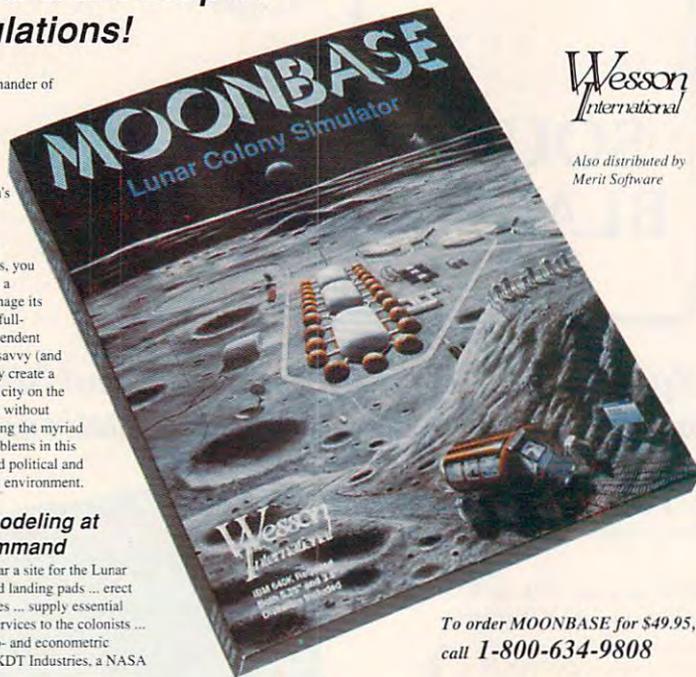
Explore and exploit the Moon's surface

Explore and lunar surface for new mining sites. Process the raw materials you find into oxygen, water and helium-3. Build hotels for fat cats from Earth. Can you make enough profit to declare independence?

Air leak in radiation station #3!

Pressure loss ... radiation leaks ... power outages! Any accident can break your tenuous hold on this hostile surface.

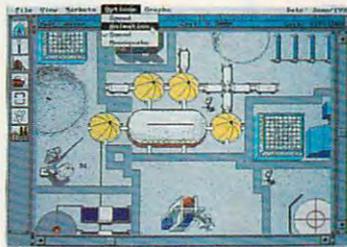
Will Project Moonbase flourish or die, Commander?



Wesson International

Also distributed by Merit Software

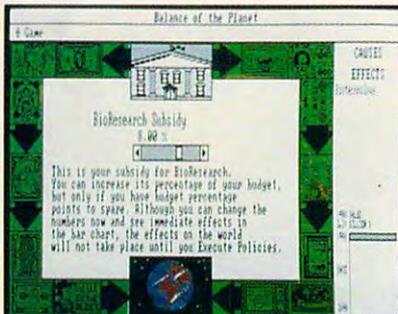
To order MOONBASE for \$49.95, call 1-800-634-9808



Or write to Wesson International, 500 S. Capital of Texas Hwy, Building 5, Suite #200, Austin, TX 78746.

Requires IBM PC compatible with 640K, two disk drives, graphics monitor. Mouse optional. Includes 5.25" and 3.5" disks, manual, on-disk samples. Unconditional 30-day money-back guarantee. Please include \$5 for next-day shipping. Texas residents also add 8% tax.

Circle Reader Service Number 226



The fate of the world rests in your hands with Accolade's *Balance of the Planet*.

Perhaps because it started on a Macintosh, the game is primarily black-and-white with only CGA-quality graphics, even on a VGA monitor. Color serves only as a background for selected screens. No effort has been made to exploit modern computer graphics.

Don't come to *Balance of the Planet* for an escapist adventure. Come to it for thoughtful consideration of the ultimate puzzle you share with world leaders. And be glad that when your people starve and die of skin cancer as a result of your decisions, it's not permanent. Just start over, try a different mix of policies, and hope to keep more of us alive for a little longer.

RICHARD O. MANN

Educational Value	★★★★★
Documentation	★★★★★
Originality	★★★★★
Graphics	★★★

IBM PC and compatibles; 512K; DOS 2.1 or higher; CGA, EGA, or VGA; hard disk required; mouse optional—\$49.95

CHRIS CRAWFORD GAMES
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<input type="checkbox"/>	Employee System	127	Personality analysis that helps you reduce turnover
<input type="checkbox"/>	Form Master	142	An easy-to-use business form generator. Create any form, easily!
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<input type="checkbox"/>	PC-Loans	181	This program computes payments using most common loan methods
<input type="checkbox"/>	PC-Payroll	182, 183	A complete, menu-driven payroll system (2 Disks) HD
<input type="checkbox"/>	Solve-It!	186	Does all necessary financial calculations (IRR, PV, FV, annuities)
<input type="checkbox"/>	Stock Charting System	188	A portfolio management system that supports all types of transactions. 512K
<input type="checkbox"/>	Tickler	191	Rated as the most powerful time-management software available! HD 512K
<input type="checkbox"/>	Year Planner	199	A super calendar and organizer program that can print wall calendars!

DATABASE

<input type="checkbox"/>	File Express	227-228	Database for sorting and storing information. HD (2 disks)
<input type="checkbox"/>	Idea Tree	232	An incredible program that stores and organizes your ideas and thoughts
<input type="checkbox"/>	Mass Appeal	236	Excellent mail list program that prints mailing labels
<input type="checkbox"/>	Wampum	249	A powerful, menu-driven dBASE compatible program HD

SPREADSHEET

<input type="checkbox"/>	As-Easy-As	255	Fantastic Lotus 1-2-3 compatible spreadsheet program
<input type="checkbox"/>	Lotus Macro	265	Collection of powerful macros for 1-2-3 or compatible programs
<input type="checkbox"/>	Lotus Templates	269	Lots of useful templates for Lotus compatible programs
<input type="checkbox"/>	Pivot!	282	Print your spreadsheets sideways. Dot matrix printer needed.

WORD PROCESSING

<input type="checkbox"/>	Galaxy	310	The most easy-to-use word processing program available
<input type="checkbox"/>	PC-Write 3.03	325-327	Full-featured word processing with spell checking. Rated #1 (3 Disks)
<input type="checkbox"/>	Pro Scribe	337	This program will improve the clarity and impact of your writing
<input type="checkbox"/>	Thesaur	345	Very useful when you are looking for the perfect word to make your point

WORDPERFECT 5.0/5.1

<input type="checkbox"/>	PC-Draft III	365, 366	Create your own graphic images. Several examples included (2 Disks)
<input type="checkbox"/>	WP 5.0 Art/Graphics	375, 378	A big collection of clipart images for WordPerfect (2 Disks)
<input type="checkbox"/>	WP 5.0 Learning System	380, 381	Learn to use WordPerfect 5.0 quickly and easily (2 Disks)
<input type="checkbox"/>	WP 5.0 Macros	385, 386	Over 100 excellent macros for WordPerfect (2 Disks)
<input type="checkbox"/>	WP 5.0 Menu/Mice	390, 391	A collection of menu systems and mouse drivers (2 Disks)
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<input type="checkbox"/>	HD Backup	424	An easy-to-use program that backs up your hard drive on floppy disks HD
<input type="checkbox"/>	HD Menu	425	An easy-to-set-up menu for the programs on your hard drive HD
<input type="checkbox"/>	List	430	The best file viewing utility ever created! A must-have program.
<input type="checkbox"/>	MasterKeys	436	Disk multi-utility like Norton Utilities. You'll use this a lot!
<input type="checkbox"/>	QuickCache	455, 456	This disk caching utility will speed up your computer, dramatically! (2 Disks)
<input type="checkbox"/>	ScreenSaver	459	Saves your monitor (any kind) from burn-in
<input type="checkbox"/>	SimCGA	463	Lets a monochrome system run many CGA programs
<input type="checkbox"/>	TreeView	472	A superior DOS command shell with pull-down menus
<input type="checkbox"/>	Virus Killers	474	Several virus detection and elimination programs

GRAPHICS

<input type="checkbox"/>	Charts Unlimited	505	Allows quick and easy creation of virtually any kind of chart or diagram
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<input type="checkbox"/>	Image 3-D	529	Create, view, move, scale, and edit 3-D objects CGA 512K
<input type="checkbox"/>	PC-Key Draw	542-545	Powerful CAD design program. Works with keyboard or mouse (4 Disks) HD
<input type="checkbox"/>	VGA Paint	548	A super-duper paint program—only for you lucky people with VGA
<input type="checkbox"/>	CompuShow	670	A fantastic graphics viewing utility for GIF, MacPaint, RLE, and more.
<input type="checkbox"/>	Cartoon Characters	672	Your favorite cartoon and comic strip characters in GIF format. EGA or VGA
<input type="checkbox"/>	Cars	673	Several GIF dream cars including a Porsche and Corvette. EGA or VGA
<input type="checkbox"/>	Wildlife	674	Beautiful wildlife pictures in GIF format. VGA
<input type="checkbox"/>	Planes	675	Several pictures of planes (mostly warplanes) in GIF format. EGA or VGA

PRINTING

<input type="checkbox"/>	FormGen	133	An easy-to-use package for designing and printing business forms.
<input type="checkbox"/>	FormFill	134	Fill in and print on pre-printed forms or FormGen forms.
<input type="checkbox"/>	Form Collection	135	A great collection of pre-designed forms for many purposes.
<input type="checkbox"/>	Address-O-Matic	553	Envelope printing utility
<input type="checkbox"/>	Banner/Sign Makers	556	Print your own banners and signs on your Epson compatible printer
<input type="checkbox"/>	Bradford	559	A super collection of beautiful dot-matrix fonts
<input type="checkbox"/>	Calendar Printer	562	Design and print a calendar for any month or year
<input type="checkbox"/>	City Desk	566	Create and print your own newsletters and flyers
<input type="checkbox"/>	Epson Utilities	569, 570	Utilities and fonts to enhance your print quality (2 Disks)
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<input type="checkbox"/>	Mr. Label	589	Versatile address printing program
<input type="checkbox"/>	On Side	591	Prints spreadsheets (or anything) sideways
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EDUCATION

<input type="checkbox"/>	Algebra	604	An excellent algebra tutor for the beginning to advanced student.
<input type="checkbox"/>	Amy's First Primer	605	A collection of six fun learning games for kids 4-8 CGA
<input type="checkbox"/>	Computer/DOS Tutor	609	Makes learning to use the computer easy—and fun!
<input type="checkbox"/>	DOS Learning System	613	Great DOS tutorial. Takes the frustration out of using a computer!
<input type="checkbox"/>	French I & II	618-619	Master the French language with this 2 disk set. Requires BASIC.
<input type="checkbox"/>	Funnels and Buckets	621	Wow! They've found a way to make learning math fun for kids. CGA
<input type="checkbox"/>	Googol Math	629	Math learning system with graphics and several levels of difficulty CGA
<input type="checkbox"/>	Japanese	631	An entertaining program that teaches you about Japanese language and culture.
<input type="checkbox"/>	PC-FastType	637	A really fun and useful interactive typing teacher CGA
<input type="checkbox"/>	Physics	641	High school level physics instruction
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<input type="checkbox"/>	Presidents	649, 650	Both a learning tool and quiz on the U.S. presidents (2 Disks)
<input type="checkbox"/>	School Mom	654	Lessons on math, art, music, and spelling for children 2-12 years old
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REVIEWS

MS-DOS

AMIGA

THE GAME OF HARMONY

With a name like *Harmony*, you'd expect this game to be soothing and relaxing, freeing you from the nerve-racking tension and violence of other games. Think again. The challenge is anything but relaxing, and that's what makes it so much fun.

To harmonize the different colored spheres on the screen, you must bump spheres of like color together using a cue ball-like cursor. When the spheres touch, they let out a little musical sigh and disappear happily in harmony. But if spheres of different colors touch, they create a new, smaller sphere of a third color, which can be gobbled up for extra energy. If this smaller sphere is left alone, it will grow into a full-sized sphere also crying to be harmonized. To add to the challenge, the game places walls of various shapes in the way.



It sounds easy, but it's a real challenge to keep your cool as you manipulate the spheres in *Harmony*.

It sounds simple enough, and in Mantra mode it is. There's no time limit, and new spheres aren't created when spheres of different color collide. You just take your time, and eventually you'll find that things work out.

In Normal mode, the challenge increases—and so does the excitement. Here, you're rewarded for calm and deliberate movement. Now the spheres pulsate faster and faster until they just can't stand the discordance any more and explode, costing you a lot of energy. Run out of energy, and

you lose a life. Lose all your lives, and the game is over.

Harmony can be as frustrating and tension producing as any other game, especially in Normal mode with spheres pulsating and exploding around you. It can also be very addicting.

It's one of the easiest games to learn that I've seen in quite some time. You can literally master the concepts and gameplay in one or two minutes.

Harmony cries out to be played on a VGA system. With EGA graphics, the game looks good and plays well. On a VGA system, *Harmony's* graphics are strikingly appealing. Background colors change and merge, and the spheres take on convincing depth. A Roland, CMS, or Ad Lib sound card adds considerably to your enjoyment.

To start the game, you must go through a copy-protection scheme that, unfortunately, uses annoyingly hard-to-read red paper. But at least you can make a backup copy of the disk and load it easily onto your hard drive.

With 50 different screens to harmonize, this is not a game you'll blast through in an afternoon. The real challenge is not only in harmonizing the screen but in doing it in a quick and graceful manner without a whole lot of bumping around. After a few game sessions, you should be able to begin to see patterns in the spheres, and elegant solutions will become more apparent. This is when the real fun begins.

RICHARD SHEFFIELD

Playability	★★★★
Documentation	★★★
Originality	★★★★
Graphics	★★★★
Sound	★★★

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Amiga

MIGRAPH HAND SCANNER AND TOUCH-UP

Migraph has teamed the Omron hand-held scanner with its *Touch-Up* software to create an excellent low-cost scanning solution for Amiga users. The scanner can be conveniently operated with either hand, although its activating push button is located on the left side. In fact, based on the size and shape of the scanner, operating it is like handling a large mouse, except that the tail is at the wrong end. The scanner can be positioned prior to the scan, and the object can be viewed during the scan by peering through a green-tinted window at the front of the scanner while the scanner light is on. The scanner light is controlled by Migraph's *Touch-Up* software. The light stays on during the scan and shuts off automatically after the scan buffer has been filled or within ten seconds after the scan button has been released.



Inside Migraph's Scanner: The scanning window and light source are at the bottom, and imaging optics are at the top.

The scanner offers hardware-switchable resolutions of 100, 200, 300 and 400 dots per inch. A second four-position switch lets you choose between Line-Art mode and three photo settings. Since the Line-Art mode generates a pure black-and-white image, it's suitable for text, en-

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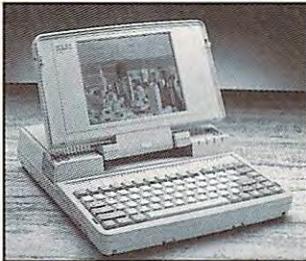
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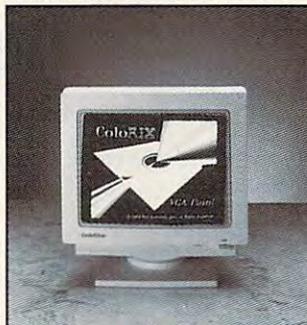
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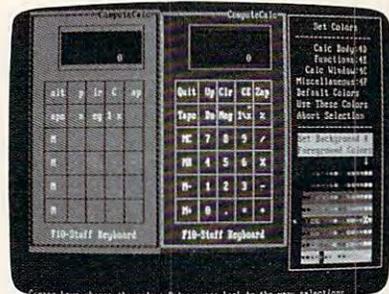
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bility. The forward roller is used to measure the distance and speed the scanner has moved. Since the scanner has limited on-board storage, the scanned data has to be transferred to the computer while the scan is being made. A steadily glowing green light, located on top of the scanner, indicates that all is well during the scan. Scanning speeds range from about three inches per second at 100 dots per inch to a bit less than one inch per second at 400 dots per inch. At these rates, a typical scan takes no more than a few seconds.

The *Touch-Up* software does far more than control the scanner and store the digitized image data. *Touch-Up* is also a full-featured bitmapped paint program. The size of the bitmaps *Touch-Up* can handle is limited only by the available memory. Page sizes can be specified in pixels, inches, or centimeters. As a bitmapped drawing program, *Touch-Up* is limited to black-and-white images or images with a single bit plane. This makes sense because the scanner can only generate single bit-plane image data. Nevertheless, *Touch-Up* can import any color or monochrome IFF image. Color images are converted as they're loaded in. The conversion can be to black-and-white, or it can utilize a variety of dithering modes and patterns to simulate the original colors as a gray scale.

Scanned images tend to be larger than the Amiga's display screen. As a result, *Touch-Up* will look best on a hi-res interlaced screen. Since *Touch-Up* runs on the Workbench screen, you'll have to set Interlace mode from Preferences. An option to have *Touch-Up* run from its own screen would've been more convenient. The Workbench screen will let *Touch-Up* run on a megapixel display device, such as a Viking or 2024 monitor.

Touch-Up operates in one of three modes: Paint, Clip, or Scan. Drawing tools include spray, box, circle, b-spline, and Bezier curves. *Touch-Up* also includes 36 predefined fill patterns, including pure black and pure white, which are used with the drawing tools.

The Clip mode is used to perform operations on the entire image, such as cut, paste, flip, mirror, rotate, stretch, compress, and distort. The Paint mode performs operations at a

pixel-by-pixel level.

You use Scan mode to interact with the scanning hardware. You can scan images directly onto the page or into a predefined clip box. This lets you combine a series of scans into one image. *Touch-Up* has four writing modes that determine how subsequent operations will interact with the existing image. In the Replace mode, the latest image or operation takes precedence. In Transparent mode, the white parts of the overlay do not affect the existing image. The XOR (exclusive OR) mode writes only where one of the images is black; it generates white when both are black. Reverse Transparent is like Transparent with black and white reversed.

Scan mode also lets you convert a dithered photo scan into a true 16-level Amiga gray-scale image. This operation takes each 6 × 6 dot area of the scanned image and converts it into a single pixel of the appropriate shade of gray. The resulting image is 272 dots wide. *Touch-Up* can also generate a 544-pixel-wide image, with 31 gray levels, by dithering image data.

In addition to the Amiga's standard IFF-image file format, *Touch-Up* can also load images in IMG, PCX, TIFF, *MacPaint*, and *PrintMaster* file formats. *Touch-Up* will save files in these formats as well as EPS, *Degas*, and GIF. You'll have to use a program such as *CrossDOS* to exchange files with PCs, or A-Max II or Mac-2-DOS to transfer files to and from Macintosh disks. A modem will work as well.

At a fraction of the cost of a full-size desktop scanner, the Migraph Hand Scanner with *Touch-Up* is well worth considering if your scanning needs can be met with a hand-held unit.

MORTON A. KEVELSON

Ease of Use/Installation . . . ★★★★★
 Documentation ★★★
 Features ★★★
 Compatibility ★★★★★

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64/128

WHERE IN TIME IS CARMEN SANDIEGO?

The Carmen Sandiego series from Brøderbund is an established institution in the software industry. The series is so popular that now there are a kids' game show, a cartoon, a board game, and a storybook series planned. In addition, you can buy Carmen Sandiego merchandise directly from Brøderbund. If you haven't caught the bug, it's not too late—Brøderbund has just released its latest in the popular series, *Where in Time Is Carmen Sandiego?*, for the 64.

The other games in the series took players around the world, teaching them about different lands and cities. The first game included the entire world in its domain. The second and third games concentrated on the United States and Europe, respectively. Although more specialized than the first game, these two were just as enjoyable, and they expanded the audience of users. These three games were based on geographical knowledge. *Where in Time* asks questions about history.

In all of the Carmen titles, you act as a detective for the ACME Detective Agency. Your goal is to find and apprehend Carmen Sandiego or a member of her band of thieves who has made a big heist somewhere within the domain of the game. The starting point of the game is the scene of the crime. Here you pick up clues from people or objects left behind that will point you in the direction of the thief's travels. After you catch the thief, you're promoted to a higher rank, and your status is saved to disk.

As you solve more crimes, the clues given are more difficult, and you have less time to track the thief. If eventually you achieve the highest status, you must use an alias to play again. In effect, your character has been retired. In each game package is