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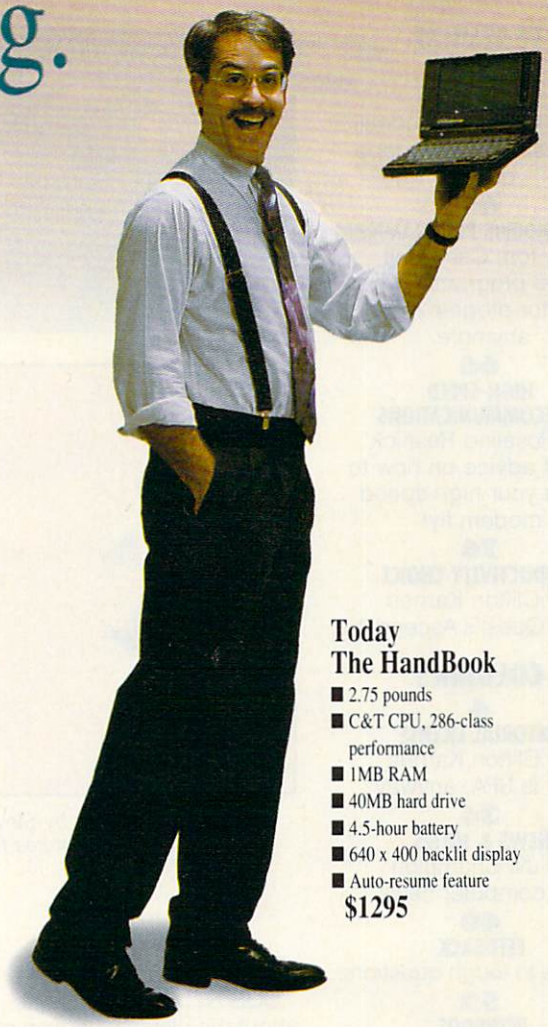

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COMPUTE

VOLUME 15, NO. 5, ISSUE 152 MAY 1993

FEATURES

8
TEST LAB
Edited by Mike Hudnall
We test ten jumbo tape drives.

44
EASY WINDOWS PROGRAMMING
By Tom Campbell
Windows programming isn't just for programmers anymore.

66
HIGH-SPEED TELECOMMUNICATIONS
By Rosalind Resnick
Expert advice on how to make your high-speed modem fly!

76
PRODUCTIVITY CHOICE
By Clifton Karnes
Franklin Quest's Ascend 4.0.

COLUMNS

4
EDITORIAL LICENSE
By Clifton Karnes
What is SPA, anyway?

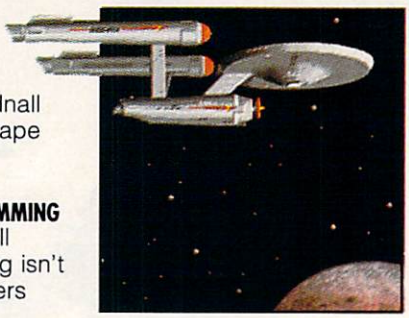
34
NEWS & NOTES
By Jill Champion
Top computer news.

40
FEEDBACK
Answers to tough questions.

52
INTRODOS
By Tony Roberts
Supercharge your batch files.

54
TIPS & TOOLS
Edited by
Richard C. Leinecker
Tips from our readers.

58
WINDOWS WORKSHOP
By Clifton Karnes
Why TrueType is the wave of the future.



Cover photo by Steve Krongard. This issue's cover features the Tandy Sensation!

60
HARDWARE CLINIC
By Mark Minasi
DOS NT: Some thoughts about the ultimate version of DOS on the eve of DOS 6.0.

64
PROGRAMMING POWER
By Tom Campbell
Should you upgrade to Borland's C++ 3.1? The answer is an emphatic yes.

78
PERSONAL PRODUCTIVITY
By Lynn Walford
Why didn't I think of that? Creativity- and idea-generating software.

80
ART WORKS
By Robert Bixby
What's new in presentation, projection, and television hardware.

86
MULTIMEDIA PC
By David English
General MIDI is a standard that makes MIDI easier for everyone to use.

128
NEWS BITS
By Jill Champion
Our intrepid reporter fires off the top computer news stories at press time.

ENTERTAINMENT

82
PATHWAYS
By Steven Anzovin
Live long and prosper: Star Trek's popularity floods the market.

84
DISCOVERY CHOICE
By Clayton Walnum
Brøderbund's Just Grandma and Me.

88
ENTERTAINMENT CHOICE
By Scott A. May
Sierra's King's Quest VI.

90
GAMEPLAY
By Paul C. Schuytema
Making sense of the real world with political simulators.

93
LADY LUCK
By Paul C. Schuytema
Can your luck improve with practice?

REVIEWS

97
Tandy Sensation!,
Rooms for Windows,
Colorado Memory Systems Jumbo Trakker 250,
Might and Magic: Clouds of Xeen,
Darklands,
Three Zoltrix Modems,
Electronic Dictionaries,
Tom Landry Strategy Football,
John Madden Football II,
Hong Kong Mahjong Pro,
Star NX-1040 Rainbow,
Star NX-2430 Multi-Font,
PC File 6.5,
and Plan 9
from Outer Space.

ADVERTISERS INDEX
See page 113.

COMPUTE (ISSN 0194-357X) is published monthly in the United States and Canada by COMPUTE Publications International Ltd., 1965 Broadway, New York, NY 10023-5965. Volume 15, Number 5, Issue 152.

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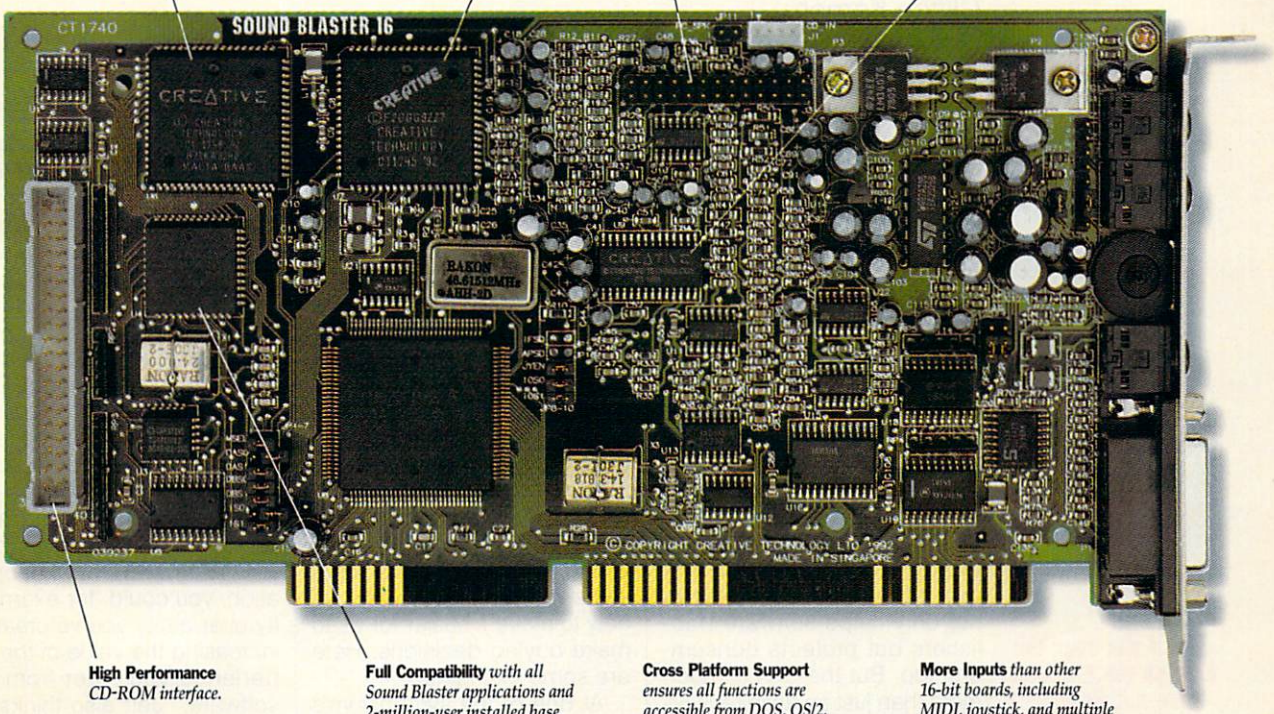

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Clifton Karnes

If you've heard of the SPA (Software Publisher's Association), you probably think of it as the software police. The SPA certainly has been the most active counterpiracy group in the country, and the organization has played a key role in several arrests and legal actions against software pirates. Recently, for example, the SPA aided the FBI in closing down "Rustie & Edie's," a huge pirate BBS located in Boardman, Ohio. This counterpiracy activity is important, and it's worth noting that this not only helps software publishers but protects consumers, too. But the SPA is much more than just an antipiracy organization, and that's what I want to talk about this month.

If you open the door on the SPA and take a look inside, you'll see that this organization is much more than just the software police.

The SPA is a worldwide association with more than 1000 members from the software publishing industry. The membership is generally divided into business, consumer, and education groups, and the entire body meets twice each year, in spring and fall. The SPA spring symposium was held this past March in sunny San Diego and was attended by a record number of members. I attended several meetings, and what impressed me most was that the focus was not on software publishers themselves but on consumers. On how to give us more value for our money. And on how to make it easier for us to make buying decisions. Here are some examples.

At one of the symposium's first meetings, Phil Adam of Interplay Productions told a group of assembled consumer section members that all software publishers needed to arrive at a standard way to express the requirements for their software. "If we can make our packages clear and easy to understand, so someone standing in a store looking at our software can tell in a few seconds if the program will work with his or her hardware, we'll make it easier for everyone to make intelligent decisions on whether or not to buy our package. If our software won't work on a user's system, or won't work well, we don't want someone to buy it and be disappointed later when they try it. And if every package in the store is labeled in the same clear way, it will be easy for consumers to compare and easily tell what's going on." Clearly Phil is interested in more than just sales. He wants to increase the overall quality of software across the board, so end users are better served.

The next day, in a session devoted to the future of consumer software, Jeff Braun from Maxis gave a visionary's view of the future. "Every year," he said, "we have to give consumers more of what's important to them." One aspect of this escalating value is the integration of different software products, something like the way Windows programs can integrate with each other using DDE and OLE. Jeff said he's working with Mallard, the maker of top-notch flight-simulator scenery disks, so that Maxis's Sim products can be integrated with Mallard's scenery disk technology. "With this cooperation, you could, for example, fly over a city you've created, increasing the value of the experience you'll get from the software." Jeff also thinks it's important for larger software companies to nurture smaller companies. "When you find talent," he said, "do everything you can to make it grow."

Another expression of this attitude came from Mike Knox of Park Place Productions, a company that develops software for Spirit of Discovery and several other labels. Recently, his company developed a math-learning tool that Grolier is marketing. "We really worked on this at my company, and it was *fun!* It's the kind of product I really like to do. We're paid by Grolier for producing a good product, Grolier gets revenue when it sells the final program, and kids learn some great math skills. Everybody wins, and that's how I like to do business. In fact, if it doesn't look like everyone's going to win when a project's starting, I cancel it."

These are just three snapshots from a conference that lasted more than four days, but they show you that the SPA is more than just the software police. It's a group whose members are trying to produce better software products for all of us. ❐

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TEST LAB

Edited by Mike Hudnall
Reviews by Tom Benford

Remember when people thought 1.44MB floppy disks would be great for backing up data?

Those days, alas, are gone.

And even if you don't remember, you're sure to recognize that backing up the latest generation of hard drives with floppies, even with high-capacity disks, is a major chore. In addition to changing disks for an inordinate length of time, you're faced with labeling and storing all of those disks. And you have to repeat this chore on a regular basis.

The smallest standard hard drive in our January lineup of 486SX PCs was 80MB, and the rest of the PCs had 120MB or larger drives. The drives in our July lineup of 486DX2/66 PCs will be at least 200MB. Consider backing them up with floppies. Then consider the speed and convenience of backing up your drive with a tape drive—and the good sense it makes. With a tape drive, you can protect your reports, appointment lists, spreadsheets, databases—all of your valuable data—and make the best use of your time.

This month Test Lab focuses on ten tape drives, each capable of backing up 250MB of data on a single cartridge. While 4-mm DAT drives store as much as two gigabytes on a cartridge, they're also much more expensive than the drives tested here (most of them QIC), which are much better suited to backing up a single computer. Eight of these drives are external, and five of them attach to a parallel port. Some of the drives use a proprietary interface, one of the drives is SCSI compliant, and one can attach to a serial port. Most of the drives use compression to fill the cartridge with 250MB of data, one does it without compression, and one stores over 600MB without compression. They range in weight from 1.25 pounds to 9.50 pounds. In short, you have a variety of drives and features from which to choose.

To help you choose the right drive for your particular needs, Test Lab provides in-depth reviews that comment on such matters as the ease of installation and use, the quality of the software and documentation, the level of noise produced, and the kinds of work environments for which a particular drive might prove well suited. In the product boxes accompanying the reviews, you'll find prices not only for the reviewed drives but for options and similarly configured drives from the manufacturers. Keep in mind, however, that the market is changing rapidly, with increasing competition among manufacturers; you should contact the manufacturer or your retailer for the best current street prices before making your purchase.

You'll also find helpful information in the grid of tape drive features—everything from recording formats to capacities, tape speeds, data transfer rates, software information, warranty information, and more. If you aren't up on the latest tape drive terminology, there's a sidebar explaining the various features in the grid.

For the best indication of performance, turn to the benchmark graphs with performance data for a full backup and a full restore. And be sure to read the methodology sidebar, which explains how the testing was set up and carried out.

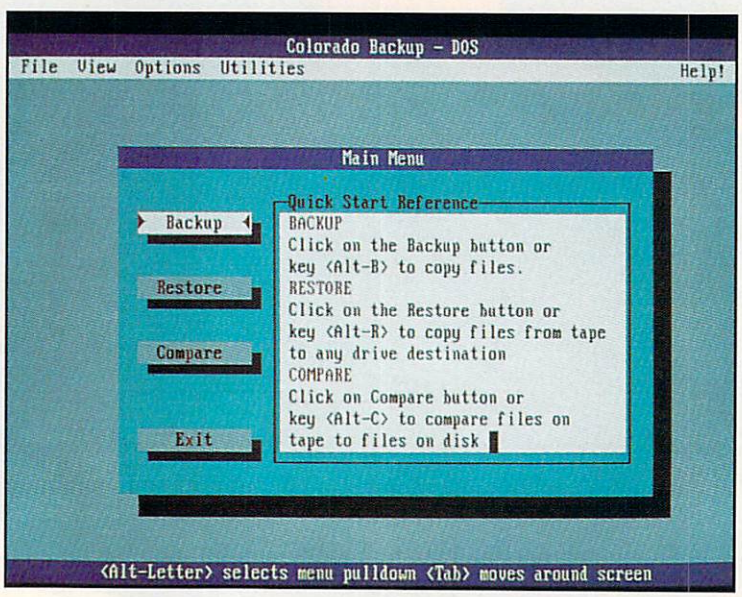
If you feel you can no longer tie up your computer and spend valuable time backing up your data with floppy disks, and if you're ready for the sense of security and freedom that tape drives offer, read on. This Test Lab has information you can use to understand the technology and make a more informed buying decision.

MIKE HUDNALL

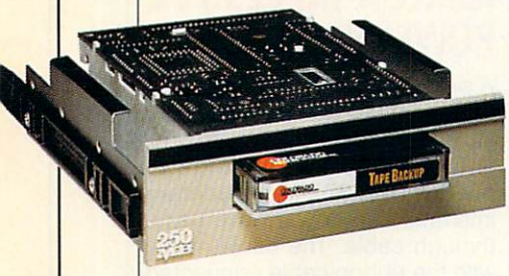
COLORADO JUMBO 250

The Colorado Jumbo 250 offers easy installation, clear documentation, and an optional compression card that substantially reduces the time required for backups and restores of data.

The Jumbo 250 comes with a



Colorado Backup for DOS



Colorado Jumbo 250
COLORADO MEMORY SYSTEMS
800 S. Taft Ave.
Loveland, CO 80537
(800) 845-7905
(303) 669-6500
List price: $279.00 ($438.95 for external version, $229.00 for optional compression card)
Warranty: one year, parts and labor

40-page installation manual that's easy to follow and comprehend. A terrific example of lucid documentation, the manual leaves no question unanswered in the user's mind; it goes to great lengths to provide crystal-clear explanations and illustrations that drive the point home. Each step has at least a half-page of instruction or description and a diagram or an illustration, so virtually anyone should be able to perform the installation in half an hour or less.

The Jumbo 250 mounts in a standard 5¼-inch half-height drive bay and uses the PC's floppy controller for interfacing. A special "piggybacker" ribbon cable supplied with the drive simply plugs into the existing floppy drive's ribbon cable—a great idea which simplifies the installation considerably and reduces the possibility of connecting the cables incorrectly.

Colorado Memory Systems also offers an optional compression card for the Jumbo 250, a card that doubles the storage capacity of the tape and reduces the time required for backing up and restoring by 40–50 percent. When you use the compression card, the Jumbo 250 connects directly to the compression card for interfacing rather than to the floppy controller. I found the manual for the compression card just as thorough and explicit as the manual for the tape drive itself, making installation of this optional card a simple and straightforward process, too.

Without the card, a backup of just over 241MB takes approximately two hours; with the card, this same backup takes about an hour and ten minutes. Though reasonably fast, the Jumbo 250 is one of the noisier tape backup units reviewed, emitting a loud, high-pitched sound with each motion of the tape; this sound grows quite wearisome after an hour or two. And the Jumbo 250 is noisy whether you use the optional compression card or run it straight from the floppy controller.

The utility software for the drive came supplied only on 5¼-inch media, necessitating a copy-over using another PC to put it on a 3½-inch floppy so it could be installed on the Tandy 433DX used for the reviews and performance tests. Dual-sized media should certainly be included as a standard feature, since so many of today's machines sport only a single 3½-inch drive.

Though DOS based, the software for the Jumbo 250 lets you run from within Windows. A Jumbo 250 icon on your Windows desktop allows quick and convenient launching (you perform the backup from within a DOS window on the desktop).

INTERPRETER RETRIEVER/250
INTERPRETER
11455 W. I-70 N. Frontage Rd.
Wheat Ridge, CO 80033
(800) 232-4687
(303) 431-8991
List price: $529 ($679 for the 250/P, a rugged version designed to better withstand wear and tear)
Warranty: one year, parts and labor

If you're looking for an internal tape backup that's easy to install and does a good job even if it does generate a few extra decibels in the process, the Colorado Jumbo 250 is worth considering. And if you want to get the job done in express fashion, you might want to purchase the optional compression board as well.

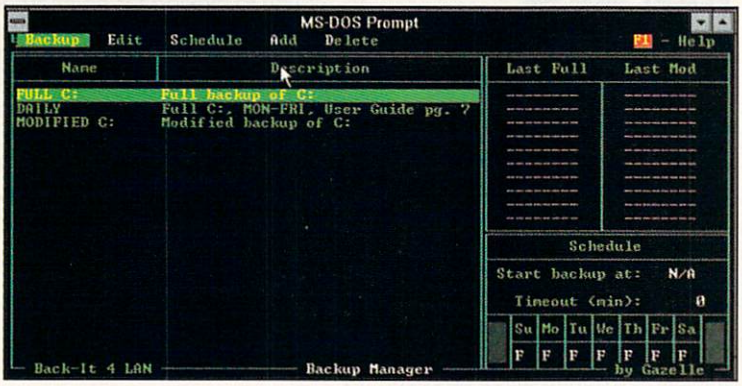
Circle Reader Service Number 371

For coverage of the Trakker 250 drive from Colorado Memory Systems, see the Reviews section.

INTERPRETER RETRIEVER/250

Looking for a compact backup system that attaches to the parallel port and offers easy installation? Then take a look at the RETRIEVER/250 tape backup system from INTERPRETER.

Installing the drive hardware requires only connecting the drive's cable to the PC's parallel port and connecting the AC power adapter to the drive. I found the software installation equally simple. The install utility even provides a few hardware tests to make sure that the system recognizes the drive and that everything is connected and online. In addition to performing read and write tests, the software automatically analyzes the hardware, suggesting an appropriate driver for the particular tape drive model being used. Once you've complet-



Back-It 4

ed these tests and everything checks out to the program's satisfaction, the file copying from the installation disk commences.

To avoid some of the problems encountered with other parallel-port tape backups on our Tandy 433DX test system, I attached the RETRIEVER/250's parallel connector to an auxiliary parallel port installed in the Tandy.

I wish this drive had a power switch, a feature conspicuous by its absence. Since the drive draws its operational power from an AC adapter, you must unplug it from the adapter (or the adapter from the AC outlet) to shut the drive off. While not a major flaw, this omission puzzles me. Why did the manufacturer not include so mundane and utilitarian a feature in an otherwise well-engineered device? If you use a surge-protecting outlet strip to power on your PC and all of its peripherals, then you probably won't notice the lack of a power switch. If you plug the adapter directly into an AC wall outlet, however, you'll soon miss the convenience a power switch would provide for turning the RETRIEVER/250 drive off.

The RETRIEVER/250 package includes a DOS version of Back-It 4 software, provided on both 3½-inch and 5¼-inch media. To order the Windows version of this software, you can call an 800 number listed on an included flyer. While it would be nice if the Windows software were included, the flyer puts the RETRIEVER/250 a step ahead of some competitors who make no provisions whatsoever for using their products from within Windows.

The manual for the software consists of a small booklet, just slightly larger than a pamphlet, which contains only two diagrams (actually screen dumps of the main menu and a parameter configuration screen). Although Spartan, the manual is adequate for its intended purposes of getting you through the installation process and helping you use the RETRIEVER/250.

You can choose among three types of software compression, which naturally speeds up backup time as the level of compression is raised. Many users will find the INTERPRETER RETRIEVER/250 to be a good choice for their file-archiving tasks.

Circle Reader Service Number 372

Iomega Tape250 PC Powered
IOMEGA
1821 W 4000 S
Roy, UT 84067
(800) 777-6179
List price: $429 ($269 for Tape250 Insider [internal], $279 for Tape250 Insider HH, $548 for Tape250 Parallel Port, $150 for optional Fast Floppy Controller AT, $75 for optional Floppy Extender Kit)
Warranty: five years, parts and labor

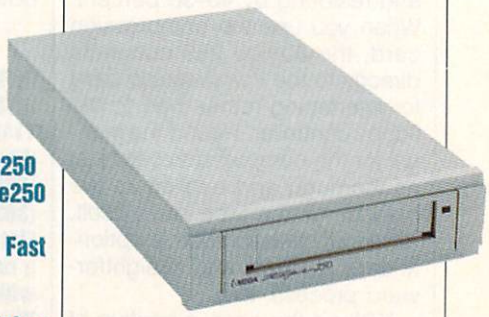
IOMEGA TAPE250 PC POWERED

A sleek external tape backup, the Iomega Tape250 PC Powered installs quickly and is easy to use.

The tape backup unit came supplied with a 37-pin proprietary interface and floppy drive pass-through cable. The cable mates with the ribbon cable connected to the floppy drive and "splices" the tape drive's cable into the circuit path, which then connects to the proprietary card. The interface card, an 8-bit board, fits into any available half-length expansion slot.

I found the supplied software, Central Point Backup for Windows and DOS, extremely easy to use from either platform. Unlike some of the other tape drive packages reviewed here, which supply DOS-only software to be run from within a DOS window in Windows, this drive package includes a true Windows program.

The DOS version of the software bears a marked resemblance to the basic Windows interface, including a *Save settings on exit?* requester which presents itself when you're exiting the program. The DOS version of this program also makes use of windowed panels to provide prompts, choices, and the status of the operation in progress. The first window which presents itself when you run the program gives you three choices—Backup, Restore, and Compare.



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Circle Reader Service Number 170

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To select files to work on, you must first tag them from the Choose Directories section; if you'd like to back up these same files later (especially if you wish to do so regularly), you'll appreciate the option to save the list of these tagged files to another file. In succeeding backups you'll avoid having to select the files all over again.

To simplify file selection, the software uses a directory tree interface, which I like because it provides a useful visual representation of the file and its location on the drive.

Another nice feature I like in this program is its backup-time estimation. After you've selected your files and configured the tape drive, the software estimates how much time the backup will take even before the process has begun. There is some tarnish on this sterling feature, however, since the accuracy of the estimate leaves something to be desired. When I tried it out, the onscreen status clock that shows the time remaining for the operation changed from 1:10.00 to 2:57.00 after the backup had been in progress for approximately 40 minutes; so while this feature is nice to have, its true value depends on your expectations of accuracy.

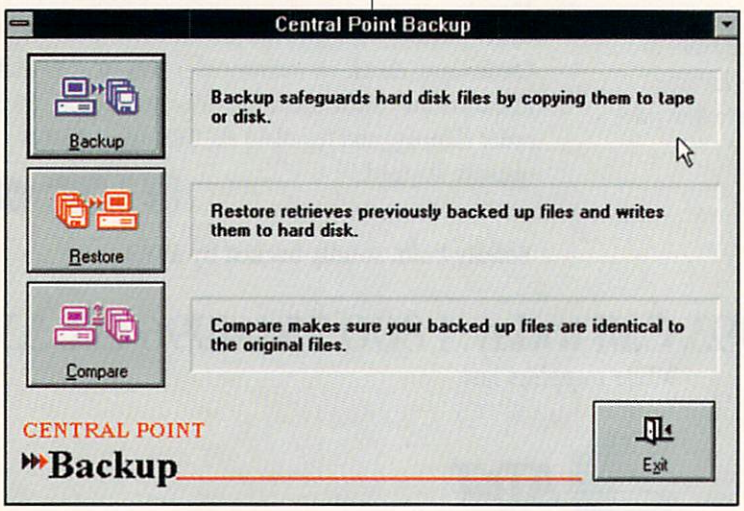
The drive operates very quietly, only a whisper louder than the PC's cooling fan.

Need more speed? An optional one-megabit-per-second connector card from Iomega delivers speedier backups and restores.

A quick-reference card and the drive's owner's manual explain the hardware installation. I found the supplied software manual complete, well written, and well organized. The scope and content of the DOS and Windows sections are excellent; even if you're a novice, you should have no problem installing or using this drive and the Central Point software packed along with it.

Combining performance and ease of use for both DOS and Windows users, the Iomega Tape250 PC Powered is a good choice.

Circle Reader Service Number 373



Central Point Backup for Windows

Irwin AccuTrak Plus A250E
MAYNARD ELECTRONICS
A Division of Conner Peripherals
36 Skyline Dr.
Lake Mary, FL 32746
(800) 222-5871
(407) 263-3500
List price: $419 ($299 for A250PC [internal], $198 for A120PC [internal])
Warranty: two years, parts and labor

IRWIN ACCUTRAK PLUS A250E

Looking for a compact external tape backup unit that performs well and offers software for DOS, Windows, and OS/2? The Irwin AccuTrak Plus A250E fills the bill.

Three separate manuals (for MS-DOS, Windows, and OS/2 software) make this one of the better documented and more versatile tape drive packages. For each of these software versions, the manufacturer provides both 5¼- and 3½-inch media. Covering all the bases this way goes far toward creating a good impression and bolstering confidence in the product.

This drive uses a proprietary interface card which will fit into any 8-bit half-length expansion slot. A ten-position DIP switch on the card allows you to resolve any address conflicts with other devices which may be in the system, but the default settings worked just fine in the Tandy 433DX test system. Once you insert the board, all that remains is to connect the cable to both the D connector on the card's mounting bracket and the port on the back of the tape drive. Unlike most other external tape drives, this one derives its power from the PC itself via the interface card and cable. If your power supply already has all the peripherals it can handle, you'll want to use the optional external power adapter for this tape drive.

The AccuTrak Plus A250E's driver software installs quickly

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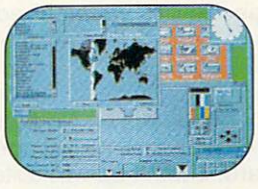

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PROGRAM EXTENDED Commodore AMIGA **THROUGH MAY 2ND, 1993.**

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and easily with minimal user interactivity. I particularly liked the DOS version of the software, since it provides an excellent range of options that I can invoke from the DOS command line—a highly useful feature for automating backups via batch files. The manual supplies an ample description (in tables) of all commands and parameters that can be implemented. A quick-reference card also helps you navigate different sections of the program, especially those sections you encounter as you become acquainted with the software.

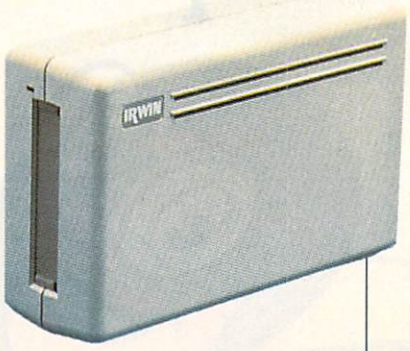
While the drive performed without a hitch, I was somewhat surprised at how much tape it required to back up 241MB of data without compression; I needed three tape cassettes (120MB uncompressed capacity) to back up the hard drive, whereas only two cassettes were required with other drives covered here. If you have lots of data to back up with this drive, it's a good idea to have several preformatted tapes on hand and ready for use. Of course, to save tape and speed up the process, you can also perform selective backups, in which only specific files are archived.

This drive is quite compact, only 4.9 inches high × 2.6 inches wide × 7.5 inches deep, making it easily portable. But since the drive requires an internal interface card, it won't be well suited for use with most laptop or notebook computers.

Overall, the Irwin AccuTrak Plus A250E is a solid unit that looks good and performs well while giving you the choice of using it under DOS, Windows, or OS/2.

Circle Reader Service Number 374

Irwin AccuTrak Plus A250E
MAYNARD ELECTRONICS
A Division of Conner Peripherals
36 Skyline Dr.
Lake Mary, FL 32746
(800) 222-5871
(407) 263-3500
List price: $419 ($299 for A250PC [internal], $198 for A120PC [internal])
Warranty: two years, parts and labor



IRWIN EZPORT

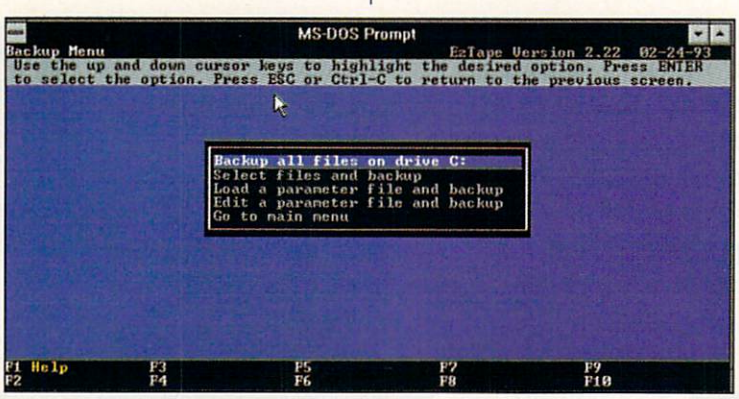
Because it connects to the parallel port rather than a special interface card, the Irwin EzPort external tape drive merits the consideration of people looking for a non-floppy backup solution for their notebook computers.

Installing this drive should be a very simple and straightforward affair, requiring only the connection of the drive's cable to the PC's parallel port and loading the EzTape Software. For the vast majority of installations, that's all you'll need to do. However, if you're the owner of a Tandy 433DX (or presumably any of the Tandy Omni Profile 486 computers, which all use this same motherboard), you're going to have some problems.

The parallel printer port on these Tandy machines deviates from true 100-percent IBM-standard compatibility in some respects. In many instances this deviation from 100-percent compatibility won't be noticed, since normal printer functions seem to be without any problems. However, some other devices that use the parallel port for communication, as does the EzPort, don't find the required signals they're looking for on the Tandy parallel port, thus making a successful installation impossible.

The problem with the Tandy machines is that they do not allow user enabling of an interrupt for LPT1, which the tape drive requires for communication with the PC. Not finding an interrupt, the EzTape 3.1 program assumed no drive was connected, prevented any further operations, and displayed an *Error: Tape Drive Not Found* message.

To work around this problem, I installed in the Tandy 433DX an expansion board containing an additional serial port and a second parallel port. I disabled the serial port and set the parallel port to function as LPT2 on this board prior to inserting it in the expansion slot. Once the I/O board was installed, the software immediately acknowledged the presence of



EzTape 2.22 for DOS

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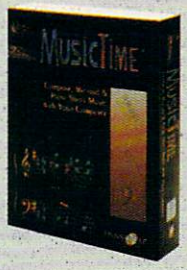

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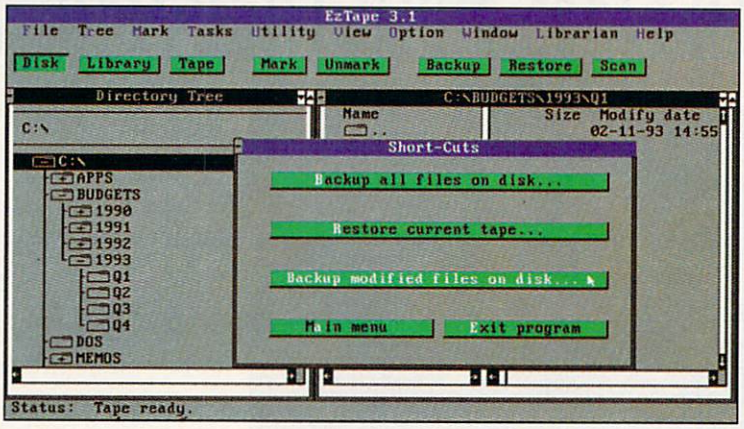


EzTape 3.1

the drive and all functions became operative.

Part of the EzPort hardware installation requires snapping a back piece onto the tape drive's 25-pin connector, but this takes a bit of doing. Getting the pieces to fit snugly together (I had to force them to mate so that the unit resembled the picture on the box) required a considerable amount of pressure, something users may not be comfortable with. Once they were together, I connected the power supply and interface cables to the unit, and the software immediately recognized that the drive was connected. A backup was underway shortly thereafter.

The software's onscreen timer isn't as accurate as it could be, since it updates itself with each new *File Now Being Copied* screen message update. While this takes only a couple of seconds for each incident, it turns into a considerable amount of time for backups of any appreciable size. For instance, the EzTape timer indicated that only 12 minutes had elapsed after 15 minutes of actual time had passed.

This drive's package includes EzTape 3.1 software for both DOS and Windows on 5¼-inch and 3½-inch media. I found the software very easy to use, providing a friendly directory tree representation of the file structure; the directory tree makes selecting files for backup or restore a simple procedure. This drive required three tape cassettes to back up 241MB of data, so it's a good idea to have several preformatted cassettes ready for use if you'll be doing high-volume backups with this unit.

Circle Reader Service Number 375

MAYNARD ARCHIVEXL 9250E

I found the Maynard ArchiveXL 9250E one of the easier of this month's external tape drives to install and use.

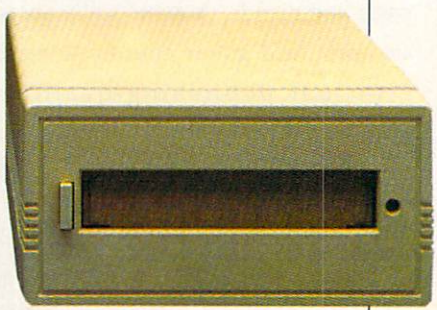
The 9250E uses a 37-pin proprietary card in concert with the PC's own controller. The proprietary card installs easily into any available 8-bit half-length expansion slot, and a ribbon connector from the PC's floppy controller connects to the proprietary card. Another cable attaches a D connector on the card's mounting bracket to the tape drive.

You'll find the installation procedure explained in a few pages near the back of the user manual—a rather odd location for it, since you would expect it to appear in the very beginning. The installation instructions, albeit a bit brief, cover the necessary territory well enough; diagrams and illustrations serve to simplify the installation so that even if you're a novice, you should have no problem performing it.

The software provided by Maynard, QICstream for DOS, runs under Windows as a full-screen DOS application provided that you run Windows in standard mode. This is bound to be a limiting feature for most Windows users, who run Windows in enhanced mode.

Many users will undoubtedly want to use the QICstream software directly from DOS, since it lends itself well to use in batch files to automate the backup process. While not as feature packed as some of the other backup software packages I've seen, the QICstream software is very easy to use. Performing a full backup requires a few keystrokes and answering four questions (for example, whether you want to use compression, back up all files and subdirectories, and so forth).

The ArchiveXL 9250E is certainly one of the quieter tape backup units I've come into contact with thus far; I could barely hear the drive in operation over the system's cooling fan. No loud, high-pitched whines here—just a barely audible hum as the mechanism shuttles the tape back and forth.



Maynard ArchiveXL 9250E
MAYNARD ELECTRONICS
A Division of Conner Peripherals
36 Skyline Dr.
Lake Mary, FL 32746
(800) 222-5871
(407) 263-3500
List price: $679 ($279 for internal version)
Warranty: one year, parts and labor

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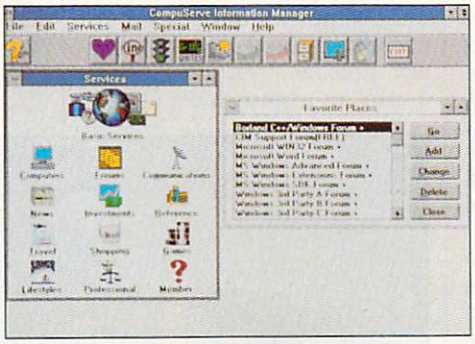

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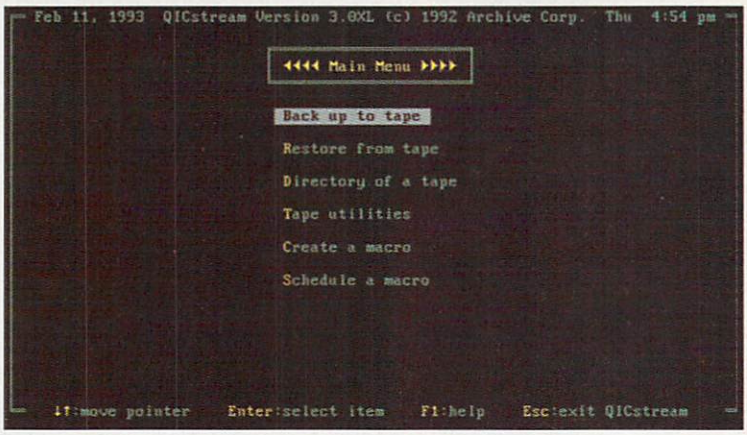


QICstream 3.0

This drive uses QIC industry-standard data compression when backing up data, thereby increasing an archived tape's compatibility with other drives. This compatibility is a handy feature if you want to restore one drive's contents on another PC with a different brand or model of tape unit installed.

The QICstream software does not use a tree format of displaying a tape's contents, and this is unfortunate, since directory tree listings are the easiest to view and use. Users with files buried six or seven directories deep will find that the entire pathname of a file runs off the side of the backup/restore status screen, a definite shortcoming if you regularly nest subdirectories to any extent.

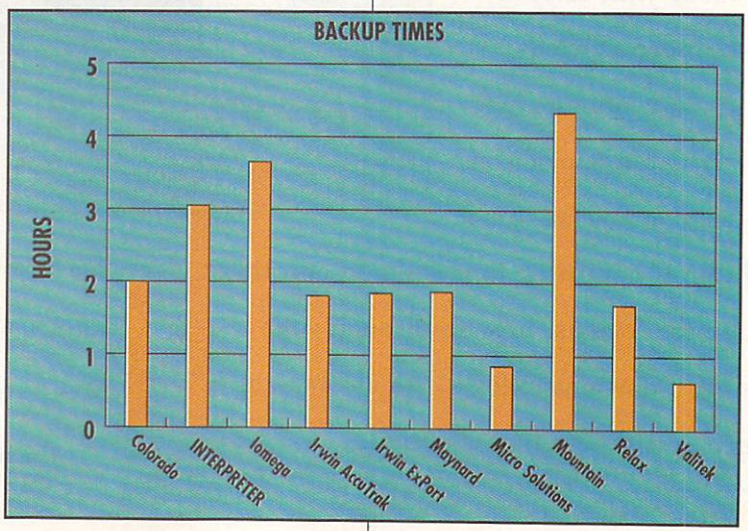
The floppy-based installation software supplied with the drive consisted of one 5¼-inch disk, and I found no mention of how to obtain a 3½-inch copy of the software anywhere in the package. This necessitated copying the software onto a 3½-inch disk on another PC before it could be installed on the Tandy 433DX test system.

If you're interested in a tape backup that does what it's supposed to without a lot of bells and whistles and you can live with the minor shortcomings cited here, then you should check out the ArchiveXL 9250E from Maynard.

Circle Reader Service Number 376

MICRO SOLUTIONS BACKPACK

Good things often come in small packages, and the Micro Solutions Backpack tape drive is an excellent case in point. Weighing in at just 2.50 pounds and measuring only 1.50 inches (height) × 4.00 inches (width) × 7.75 inches (length), the Backpack is light and small enough to tote along in most notebook or laptop carrying cases. And since it's an external unit which connects directly to the computer's parallel port, it doesn't require any internal expansion slots for installation, making it ideal for transportable use.



TAPE DRIVE TIMINGS IN PERSPECTIVE

The type of data in a file can have a significant effect on the amount of time a tape drive takes to perform a backup or restore. For example, manufacturers sometimes use very large test files of *X*'s, *O*'s, or other single characters which, because of the redundant nature of the data, yield best-case performance times; these are usually the figures you'll see published in the advertising material for these products. It's important to remember that such files do not yield timing results comparable to the results involving the kinds of data you use on a daily basis.

Another factor in the speed of a tape drive is the hardware that writes to and reads from the tape. Tape devices using multiple heads have a significant performance edge over single-head devices, and that advantage justifies the higher price tag for these units. A single-head tape drive requires three passes (complete transport of the tape from one reel to the other and then back again) to read, write, and erase data. On the other hand, a three-head tape drive can read, write, and verify or erase in one pass so that, all other factors being equal, it requires only one-third as much time as the single-head drive.

—TOM BENFORD

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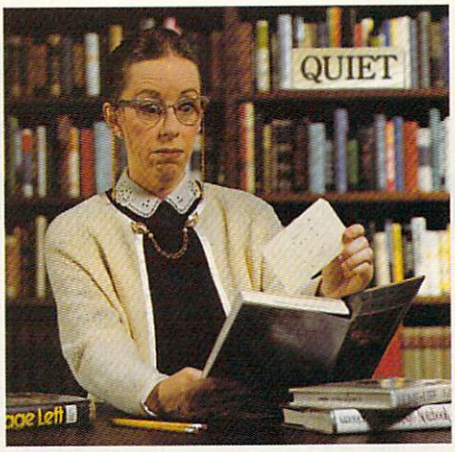

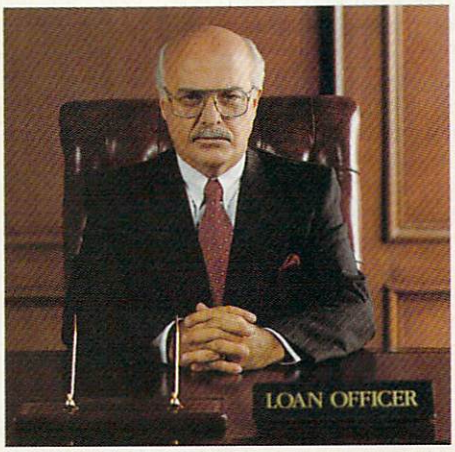

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Circle Reader Service Number 166

Micro Solutions Backpack
MICRO SOLUTIONS COMPUTER PRODUCTS
132 W. Lincoln Hwy.
DeKalb, IL 60115
(815) 756-3411
List price: $539
Warranty: one year, parts and labor

I found installing the Micro Solutions Backpack very straightforward and uncomplicated; that should be the case as long as your PC has a parallel port that conforms 100 percent to the IBM standard. The Tandy 433DX test system, however, does not totally conform; this made the installation interesting, to say the least.

An *Unable to generate printer interrupt* error message appeared very early in the installation, and I immediately suspected that a conflict with some other installed device was to blame. I removed from the computer the audio card (which also contained a SCSI CD-ROM drive interface), yet the error message still presented itself.

A call to tech support at Micro Solutions elicited a courteous response from the technician, who said the only reason for this message would be a device conflict (which I had already eliminated from suspicion by removing the audio card) or a parallel port that was not 100-percent IBM compatible. He suggested I install a second parallel port in the PC, and he felt confident that this would alleviate the problem. Fortunately, there was a multifunction I/O card not being used in the lab, so I immediately installed it in the Tandy with the jumpers set to activate LPT2. Like magic, the error condition disappeared.

It's very important to note here that this problem was not the fault of the Backpack tape drive (or the other unit reviewed here which encountered the same problem). Instead, the problem involves the way Tandy configures its parallel port on the Tandy Omni Profile 486 motherboards. If you own one of these machines and you're thinking of purchasing a Backpack, then add an expansion card with a second parallel port to your shopping list as well.

The Backpack provides a printer pass-through port on the unit so you can keep both the Backpack and your printer connected to the PC simultaneously. The device is transparent when not in use, so normal printer function won't be disturbed in the least.

The Backpack stores up to 250MB using data compression with a standard DC2120 quarter-inch minicartridge. The Backpack can read and write standard QIC-80 tapes and will also read (but not write to) QIC-40 tape cassettes. Featuring a 1MB-per-second data transfer rate, the Backpack is one of the faster tape backup units covered here.

The software provided with the Backpack is almost identical to that which comes with the Maynard ArchiveXL 9250E, and it will run in a DOS window from within Windows, even though it doesn't generate an icon. Using the Backpack software from DOS provides the most flexibility and greatest range of options.

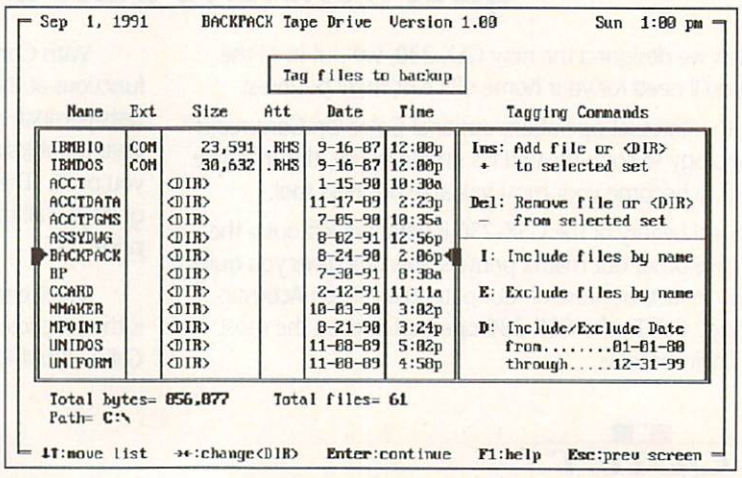
If you're looking for a pint-sized tape backup that's easy to tote and big on performance, the Backpack merits a closer look.

Circle Reader Service Number 377

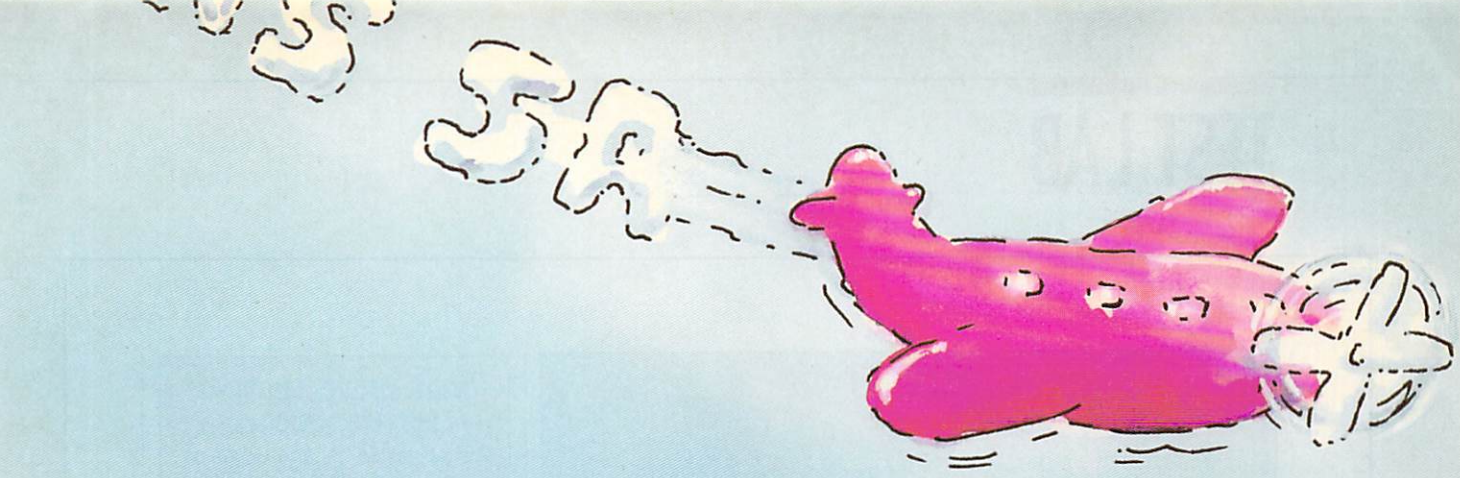
MOUNTAIN FILESAFE TD-250

Another internal-mount tape drive, the Mountain FileSafe TD-250 installs easily in any 5¼-inch half-height bay accessible from the front of the machine and uses the PC's floppy controller for interfacing.

While the installation procedure is uncomplicated and straightforward, the documentation assumes at least some prior PC knowledge on the part of the user. Unlike some of the other tape drives reviewed here, which go to great lengths for clarity and detail in their documentation, the FileSafe TD-250 comes with an installation guide pamphlet rather than a full-blown installation manual.



Backpack 1.0 software



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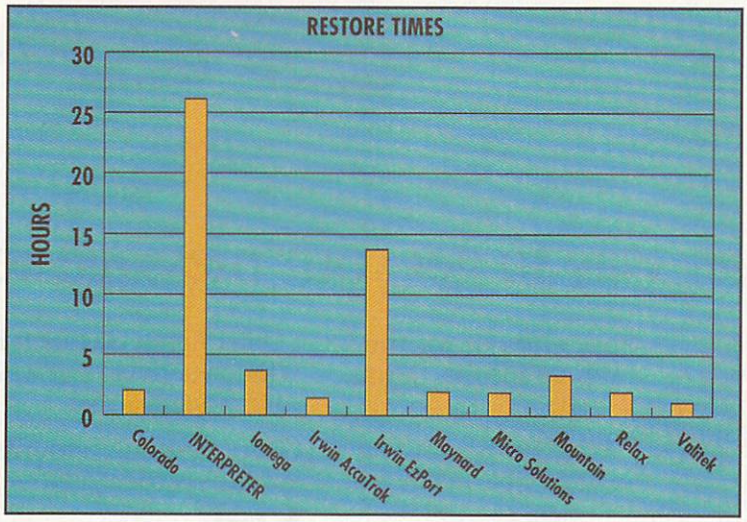

If you've ever installed a peripheral device in your computer system, you shouldn't have any problems with this installation. If you're a first-time installer, however, you may indeed have some trepidation that a bit more detail and explanation in the documentation would alleviate. You're instructed to "refer to [the] computer's manual or consult your dealer on installing an internal device" right from the first paragraph of the installation pamphlet. Since the guide provides only three diagrams to illustrate the installation process, it is entirely conceivable (and very likely) that someone who has never before installed a tape or disk drive might not feel comfortable with this sketchy documentation.

What the hardware installation documentation lacks is more than compensated for in the rather large manual provided for installing and using the backup software. You'll find clear and explicit text, augmented by numerous diagrams to reduce the learning curve and increase understanding of the material. A handy quick-reference card contains all of the DOS commands and prefixes. No Windows software or launching option comes with the drive package.

The software displays an onscreen clock which provides elapsed-time information to let you know how long the backup/restore session will take and has taken thus far. While this is a good idea, the onscreen clock updates itself infrequently rather than running in realtime, and this makes it difficult to estimate how much longer the backup or restore operation will take.

The software gives you excellent file management utilities, allowing files to be tagged for selective restores and backups. You also get a software compression option, which decreases backup and restore times while doubling the tape's storage capacity (you must use the compression option to get the full 250MB capacity on a single tape cassette). A particularly nice feature

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TAPE DRIVE TESTING METHODOLOGY

The lab tested all tape drives using a factory-configured Tandy 433DX desktop PC equipped with a 250MB hard drive.

An accessory I/O card was installed in the Tandy to provide a second parallel port. Because the built-in parallel port of the Tandy machine does not generate an interrupt required by some of the tape devices that connect to this port, the lab tested all of the parallel-port drives by using the parallel port on the accessory board rather than the one that's part of the Tandy's motherboard.

Our testing consisted of performing a total backup of all data within selected subdirectories on the hard disk—241,232,326 bytes in 3679 files in 26 subdirectories nested up to five levels deep. To make the testing more representative of real-world activities (see "Tape Drive Timings in Perspective"), we used a variety of data types: programs, overlays, text, graphics, sound, spreadsheets, CAD files, and more. The sizes of the files ranged from 17 bytes up to 22,876,415 bytes.

The lab performed all tests from DOS and did not use any compression.

Although some of the programs packaged with these drives include a timing capability, we found the timers inaccurate in some cases. Therefore, all times reported were obtained using an external digital stopwatch to ensure realtime figures.

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of the software is that you don't have to run the tape backup program to perform a function; all of the program's functions can be accessed from the DOS command line. This simplifies creating batch files for common backup routines, performing selective backups, and other such applications.

The Mountain FileSafe TD-250 is a relatively quiet tape backup unit. In operation, it produces a low and unobtrusive machinelike sound while the transport mechanism is in motion.

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FileSafe software

TAPE DRIVE FEATURES

	Colorado Jumbo 250	INTERPRETER RETRIEVER/250	Iomega Tape250	Irwin AccuTrak Plus A250E	Irwin EzPort
External or internal	internal	external	external	external	external
Interface	computer's drive controller[1]	parallel port	proprietary with floppy controller	proprietary	parallel port
Dimensions in inches	5.32 × 1.63 × 4.00	7.25 × 2.00 × 5.00	5.50 × 1.00 × 4.00	7.50 × 4.90 × 2.60	12.00 × 4.90 × 2.60
Weight in pounds	1.25	approximately 2.00	2.50	1.75	3.00
Recording format	QIC-80[2]	QIC-80	QIC-80[2]	servo	servo
Recording density in bpi	14,700	14,700	14,700	11,600	11,600
Formatted capacity					
Without compression	125MB	120MB	165MB	120MB	120MB
With compression	250MB	250MB	250MB	250MB	250MB
Number of tracks	28	28	28	32	32
Tape speed in ips	read: 34 write: 68	read: 34 write: 34	read: 34 write: 68	read: 86 write: 43	read: 86 write: 43
Data transfer rate in Kbps	500	up to 800[3]	500	500	500
MTBF in hours	40,000	50,000	30,000	50,000	50,000
MTTR	less than 30 minutes	less than 30 minutes	less than 30 minutes	less than 30 minutes	less than 30 minutes
Hard error rate	less than 1 error in 10^{15} bits	less than 1 error in 10^{14} bits	less than 1 error in 10^{14} bits	less than 1 error in 10^{14} bits	less than 1 error in 10^{14} bits
Magnetic tape	DC2120	3M or compatible	DC2120	AccuTrak 2000-120	AccuTrak 2000-120
Ambient operating temperature in degrees Centigrade	5–45	5–35	10–45	5–45	5–45
Relative operating humidity	20–80%	20–80%	10–80%	20–80%	20–80%
Data compression	hardware option	software option	software option	software option	software option
Software	Colorado Backup for DOS	Back-It 4[4]	Central Point Backup	EzTape	EzTape
DOS	yes	yes	yes	yes	yes
Windows	no	yes	yes	yes	yes
Warranty	one year	one year	five years	two years	one year

[1]Unless you use the optional proprietary compression card.
[2]QIC-40 read only.
[3]Depending on CPU speed, parallel port design, and so forth.
[4]Also available for Windows.

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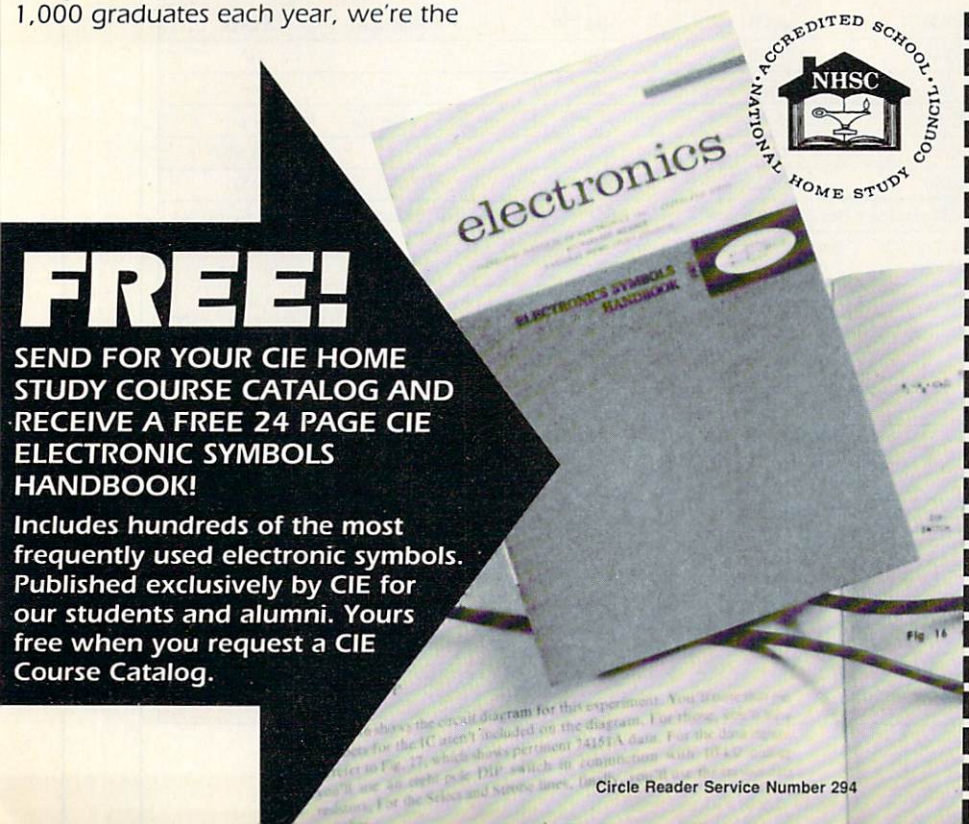

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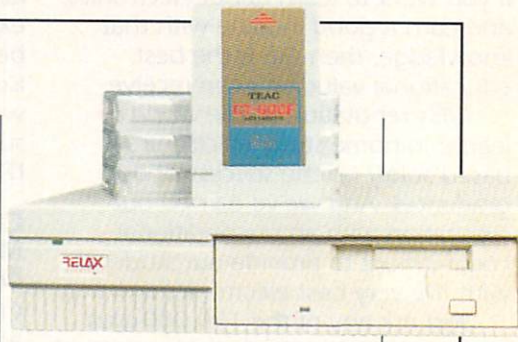

The Relax 600 Meg. Tape Vista external drive employs a SCSI interface to communicate with the host PC. This drive uses a Teac CT-600F tape cassette capable of holding 600MB of data (the total formatted capacity is actually 606.9MB).

Unlike other drives, this one doesn't require you to format cassettes prior to use, and the drive will use tapes from Teac drives such as the MT-2ST/45 (60MB) and the MT-2ST/N (160MB) series. The highly durable CT-600F tapes can exceed 3000 passes (one pass is an entire back-and-forth circuit from supply to take-up reel and back).

Installing the Trantor T-338 parallel-to-SCSI adapter supplied with the drive is a snap, since it plugs right into the PC's parallel port. You can connect a printer simultaneously by joining the printer cable to the T-338's pass-through jack; the SCSI cable that mates with the tape drive connects via another jack at the opposite end of the adapter. Once you

TAPE DRIVE FEATURES

	Maynard ArchiveXL 9250E	Micro Solutions Backpack	Mountain FileSafe TD-250	Relax 600 Meg. Tape Vista	Valitek PST-250F
External or internal	external	external	internal	external	external
Interface	proprietary with floppy controller	parallel port	computer's floppy controller	SCSI compliant	parallel or serial port
Dimensions in inches	8.80× 2.50× 4.50	7.75× 1.50× 4.00	8.00× 1.63× 5.75	5.75× 1.63× 4.00	13.25× 4.50× 6.00
Weight in pounds	2.50	3.25[1]	1.50	1.50	9.50
Recording format	QIC-80	QIC-80[2]	QIC-80[2]	D/CAS-103	QIC-02
Recording density in bpi	14,700	14,700	14,700	38,400	12,500
Formatted capacity					
Without compression	160MB	120MB	NA	606.9MB[3]	250MB
With compression	250MB	250MB	250MB	NA	NA
Number of tracks	28	28	28	21	18
Tape speed in ips	read: 68 write: 34	read: 68 write: 34	read: 34 write: 34	read: 60 write: 60	read: 90 write: 90
Data transfer rate in Kbps	296	500	500	242	up to 800[4]
MTBF in hours	15,000	60,000	12,000	10,000	25,000
MTTR	less than 30 minutes	less than 30 minutes	less than 30 minutes	less than 30 minutes	less than 30 minutes
Hard error rate	less than 1 error in 10^{14} bits	less than 1 error in 10^{14} bits	less than 1 error in 10^{14} bits	less than 1 error in 10^{13} bits	less than 1 error in 10^{12} bits
Magnetic tape	M-11120B	DC2120	DC2120	Teac CT-600F	DC6250
Ambient operating temperature in degrees Centigrade	5–45	10–40	10–40	5–45	5–45
Relative operating humidity	20–80%	20–80%	20–80%	20–80%	20–80%
Data compression	software option	software option	software option	none	software with compression is available
Software	QICstream 3.0	Backpack	FileSafe	Trantor TapeMate II	Valitek
DOS	yes	yes	yes	yes	yes
Windows	no	no	no	no	no
Warranty	one year	one year	one year	one year	one year

[1]The transformer weighs one pound.
[2]QIC-40 read only.
[3]For 21-track mode; 581.5MB for directory-track mode.
[4]Depending on CPU speed.
NA=not applicable or information not available

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TAPE DRIVE TERMS

Recording format. The way that the data is written to the tape. The format defines the number and position of tracks, the number of bits per inch, and the recording code to be used. Most of the drives covered here use QIC standards (established by Quarter Inch Cartridge Standards, Inc.), which allow data interchange between drives of various manufacturers.

Recording density. Usually expressed in bits per inch (bpi), this is a measure of how much data is stored in a given length of tape.

Formatted capacity. Usually expressed in megabytes (MB), this is the amount of data that can be stored on a formatted tape.

Interface. The electrical and logical connection between the tape drive and the host computer.

Number of tracks. The number of rows of serial data bits written across the the tape from top to bottom.

Tape speed. Usually expressed in inches per second (ips), this is how fast the recording medium moves past the head during any operation.

Data transfer rate. The speed at which data is written to or read from tape. This rate is determined by the controller used and is usually expressed as kilobits per second (Kbps).

MTBF. Mean time between failures. The average time before a mechanism requires repair.

MTTR. Mean time to repair. The average time required to make a repair.

Hard error rate. The ratio between readable and unreadable data. In tape drives, error correction codes reduce nonrecoverable errors to an insignificant level.

Ambient operating temperature. The temperature range in which the tape drive is designed to operate.

Relative operating humidity. The humidity range in which the tape drive is designed to operate. This is limited by the tape media.

Data compression. A technique for increasing storage capacity by eliminating redundant data patterns.

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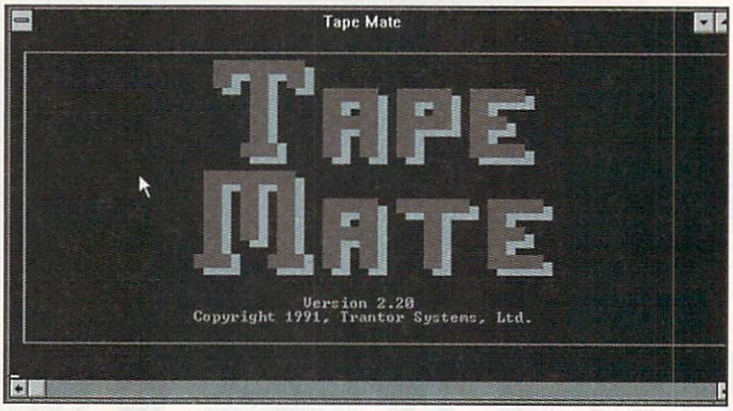

Trantor Tape Mate 2.2

plug the T-338 in, all that's required is to run the Trantor installation software, which copies the required device driver and modifies the CONFIG.SYS file automatically. You can complete the entire highly automated software installation process in just a few minutes.

The tape drive did not come with any diagrams or instructions pertaining to the physical hardware installation, but since all of the cables and jacks will mate only one way, I had no difficulty figuring out the installation procedure. Since the Tape Vista is an external unit, as is the Trantor T-338, there's no need to open the computer's case, and this expedites installation as well. You don't need any technical prowess or special skills, and even if you're a total novice, you should be able to install the hardware and software completely in under 20 minutes.

The supplied Tape Mate backup/restore/utility software runs in DOS, and I could not find in the documentation any mention of using the software or hardware with Windows. The Tape Mate software creates a text file log for recording error messages as well as additional files for backup, restore, and verify history.

The software's online help text isn't aligned properly in the help window (it scrolls off the right side of the display), which makes it difficult to view the help text. However, since the manual is very well written and organized, this doesn't present a major obstacle, and the online help would probably be seldom used in real-world circumstances.

I particularly like the directory track, which the software uses when backing up files. This track, along with Tape Mate's file manager (which displays the contents of the tape in tree format), makes file management easy from the tape itself. To restore files from a tape, for example, simply tag them; once you've tagged them, hitting the F10 key begins the restoration process.

The Tape Vista's published specifications boast a restoration time of 42 minutes for a full 600MB of data; in actuality, however, it took nearly two hours to restore only 241MB of data during the review and benchmarking. The slower speeds we experienced were probably owing to the external SCSI interface, since all parallel-to-SCSI adapters have significantly slower data transfer rates than dedicated, internal SCSI adapters.

Overall, the Relax 600 Meg. Tape Vista installs easily, performs without a hitch, and provides a very user-friendly means of backing up and restoring massive amounts of data. It's also ideal for laptop or multi-PC use.

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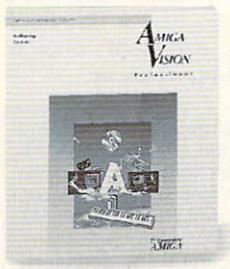

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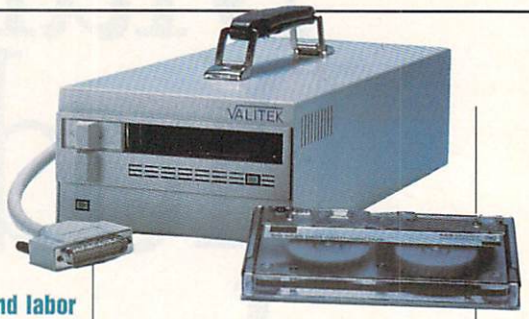
VALITEK PST-250F



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As soon as you open the box and see the carrying handle mounted atop the Valitek PST-250F, you realize that this isn't going to be a run-of-the-mill device. And this first impression is borne out as you remove the monstrously large (compared to other units covered here) PST-250F from the shipping carton. Tipping the scales at 9.5 pounds, it's certainly the heftiest drive reviewed as well.

The large physical size of the PST-250F is understandable, since it uses a DC6250 tape cassette capable of holding up to 250MB of data without compression. DC6250 tape cassettes, measuring approximately 4.25 inches × 6.50 inches, are also considerably larger than the DC2120 cassettes used with most other tape backup units. Remember: This drive can back up as much as a quarter of a gigabyte without compression on a single tape.

Another noteworthy feature is the drive's ability to connect externally to either the PC's serial or parallel port. This flexibility of I/O connection, coupled with the handy carry handle and large tape capacity, makes this drive ideal for backing up multiple PCs, as in a network or work group scenario. You can attach the drive to a PC and have a backup underway within five minutes, making this one of the faster and easier to install and use of the tape backup units reviewed here.

You don't have to install the backup software on the PC's hard drive in order to use it; however, if you prefer to install it on your hard disk, it will be a manual installation, requiring you to use DOS commands to make a directory and copy the files. While this isn't a difficult or time-consuming task, an automated installation batch file would have been a nice touch to include.

I found the software manual well written and appreciated the screen shots used to illustrate points in the text. The very easy software provides a directory tree interface for file selection. A handy Select All command simplifies complete system backups.

I found the constant feedback of the software to be a particularly nice feature. Whenever the tape drive is active, the software provides you with lots of information about the current activity. The software's status window includes a list of terms *(rewind, searching, write tape, read tape, write disk, read disk, send data, recv data)*; the program highlights the appropriate words to describe the current activity and status of the operation. The elapsed-time indicator is also particularly noteworthy for its accuracy. Trailing a mere five seconds behind the actual elapsed time, it is the most accurate of any of the timers covered in this month's Test Lab.

The PST-250F's tape head is a three-gap head as opposed to the usual single-gap head found in other drives. There's one gap for reading, another for writing, and a third for erasing. While other tape drives require three passes to erase, read, and/or write, the PST-250F needs only one, performing all three operations in a single pass. This results in very speedy backup and restore times.

For the discriminating user with high-volume archiving demands, the Valitek PST-250F makes an excellent choice.

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Valitek software

Benchmark/performance testing was conducted by Computer Product Testing Services, Inc. CPTS is an independent testing and evaluation laboratory based in Manasquan, NJ. Every effort has been made to ensure the accuracy and completeness of this data as of the date of testing. Performance may vary among samples.

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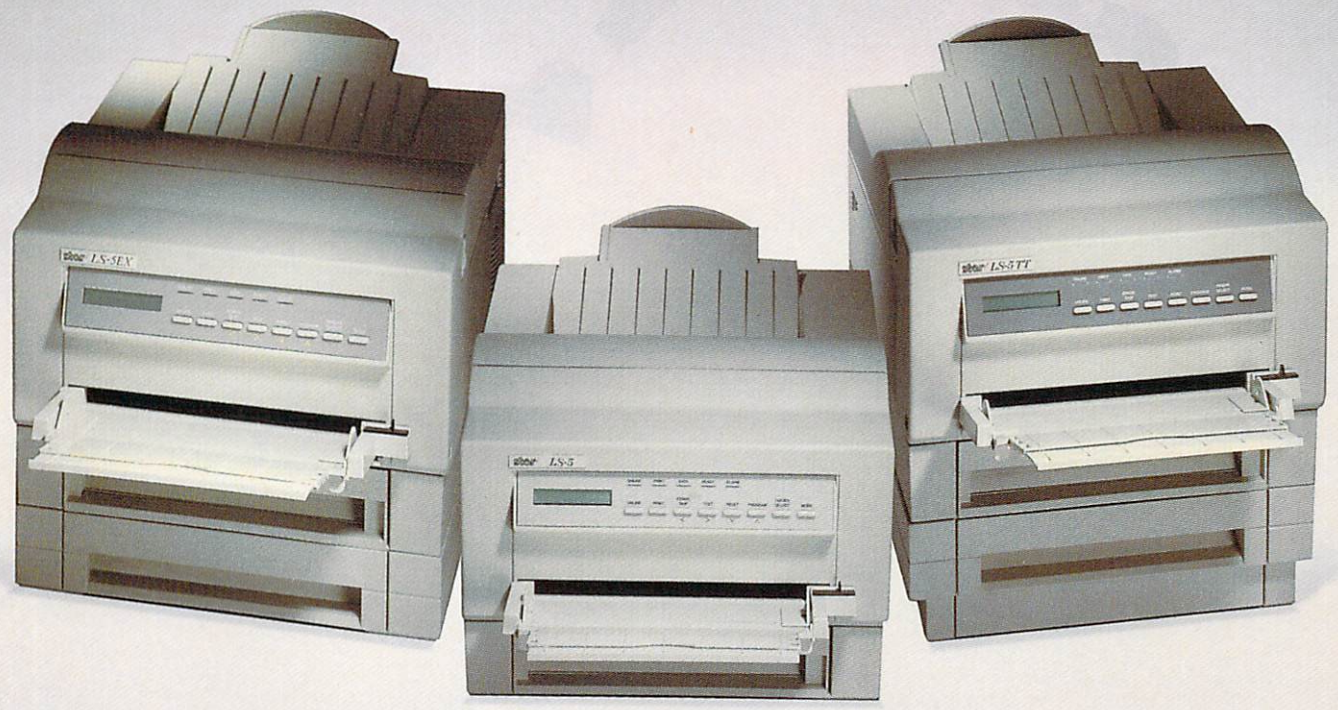

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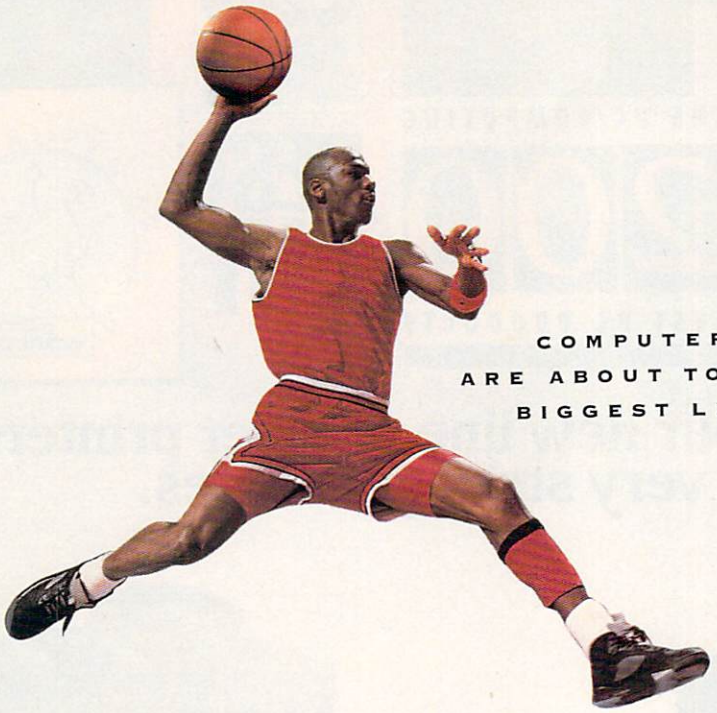

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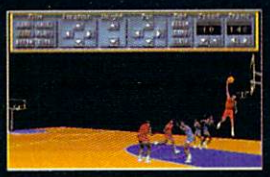

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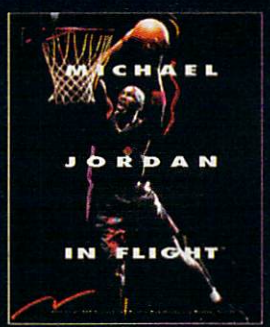

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Circle Reader Service Number 281

NEWS & NOTES

Jill Champion

A New Standard

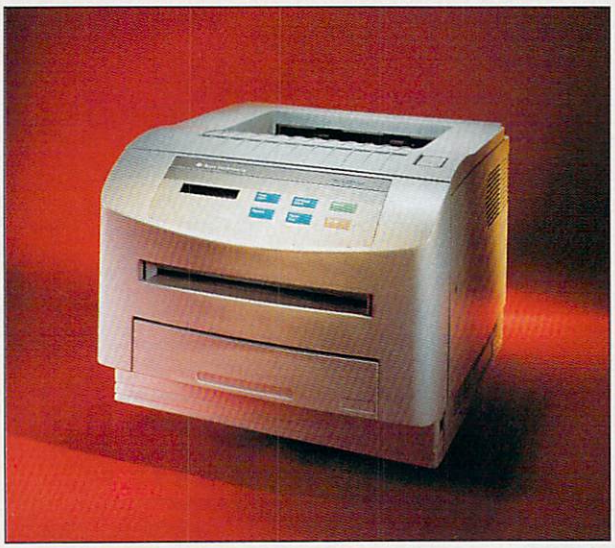
Texas Instruments is touting its new microWriter LED printers as "superaffordable personal page printers." The microWriter family consists of three models: the PS17, with 17 Adobe PostScript fonts; the PS35, with 35 PostScript fonts; and the basic microWriter, which offers HP LaserJet II compatibility.

The printers are powered by an LED (Light-Emitting Diode) print engine that delivers a resolution of 300 dots per inch at five pages per minute. Since the print engine—the "heart" of the microWriter design—has few moving parts, you can expect longer life and consistently dependable performance. Designed to expand as your work expands, the standard 2MB of RAM on the PS17 and PS35 models can be increased to 4MB in 1MB or 2MB increments, while the 0.5MB of RAM on the basic microWriter can be expanded to 4.5MB. Also, with a simple board upgrade, the basic microWriter can be made a PostScript printer.

TI's microWriters print letter, legal, executive, invoice, and A4 and B5 paper sizes, as well as envelopes, labels, and transparencies. Your paper configuration is easily changed using standard software in either the Windows or Macintosh environment, without having to change the configuration at the printer control panel. All microWriters include a Windows driver for full Windows compatibility, which means you can print Windows' resident TrueType fonts. Standard for the microWriters are free AppleTalk and automatic emulation switching on the PostScript models, easy-to-use control panels, and numerous expansion options for each model, along with a compact, contemporary design that makes them ideal desktop printers.

The microWriter lineup is very competitively priced at $729 for the microWriter, $999 for the PS17, and $1,299 for the PS35 model. For more information, contact Texas Instruments, Information Technology Group, P.O. Box 202230, ITG-303, Austin, Texas 78720-2230; (800) 527-3500 or (810) 771-5856.

Superior page-printing performance at an affordable price: TI's new microWriter printers



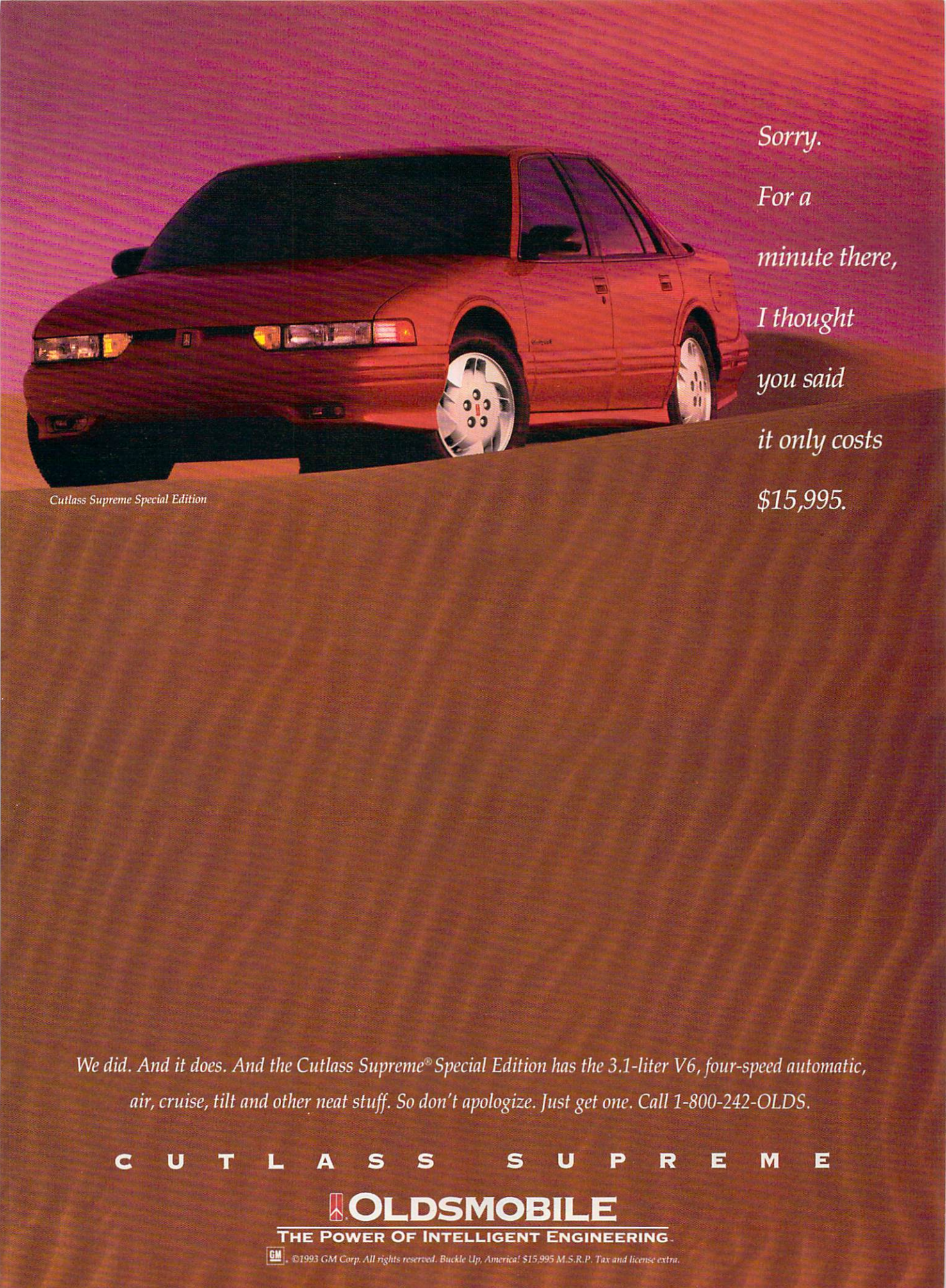
Sound Advice

If you own a PC, adding sound will enhance your experience. People who have sound report that it adds excitement and humor to using their computers. A few special sound effects can take the edge off your most serious applications. And adding sound doesn't have to break your bank: Some of the newest products retail for less than $100.

If you don't own a sound card and aren't yet ready to spend the money for one, try Sound Explosion from Programmer's Warehouse. It's software that lets you customize any Windows-compatible program by adding giggles, squeaks, footsteps, explosions, or any of more than 500 sound effects, whether or not you have a sound board. Add the clicking of an electric typewriter to your keyboard, set an alarm clock to ring as a reminder, or customize your word processor to play a motion picture theme. Machine noises, crashes, horns, buzzers, human noises, animal sounds, bells, swishes, zooms, whistles, laser zaps, creaks, splats, dozens of movie themes, and many more effects are included in the Sound Explosion library. Available directly from Programmer's Warehouse, the software is priced at $49.95. Contact Programmer's Warehouse, 8283 North Hayden Road, Suite 195, Scottsdale, Arizona 85258; (800) 323-1809, (602) 443-0659 (fax).

If you're considering adding a sound card, the new SoundMaker and SoundMaker Plus digital sound cards from Best Data Products offer top-quality sound for digital composing, arranging, voice-control applications, and any use requiring high-fidelity sound. Both models of SoundMaker can vocalize in up to 32 synthesized stereo voices simultaneously. SoundMaker Plus is equipped with a powerful voice recognition capability for voice controlling your PC and features an isolated word recognizer and speaker-independent vocabulary. You can have 50 to 125 active words or phrases and create your own vocabulary that's limited in size only by disk space. Suggested retail prices are $169 for SoundMaker and $197 for SoundMaker Plus. For more information, contact Best Data Products, 9304 Deering Avenue, Chatsworth, California 91311; (818) 773-9600, (818) 773-9619 (fax).

Aristosoft's new version of Wired for Sound Pro system-enhancement software is designed to take full advantage



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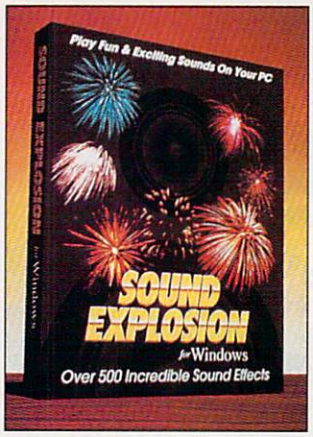
of your current sound card. Using the new talking applications, sound effects, icons, and cursors, you can personalize your desktop visually *and* audibly. The new release adds 200 sound effects, 100 MIDI music files, eight movie screen savers, 400 designer icons, and 100 easy-to-see cursors that improve the look and clarity of any Windows desktop. New sound applications include Talking Calendar, Talking Clock, Talking Calculator, Sound Editor, Talking System Monitor, Talking File Graveyard, Intruder Alert alarm, and add-ins that make talking games of Minesweeper and Solitaire (the games that come with Windows 3.1). For those who like to take extra-long work breaks, the Job Saver gag feature re-creates the sounds of someone hard at work by faking keyboard typing, coughing, and other work-related noises. Suggested retail price is $79. For a product demo and more information, call (800) 551-4547, or contact Aristosoft, 7041 Koll Center Parkway, Suite 160, Pleasanton, California 94566; (510) 426-5355, (510) 426-6703 (fax).



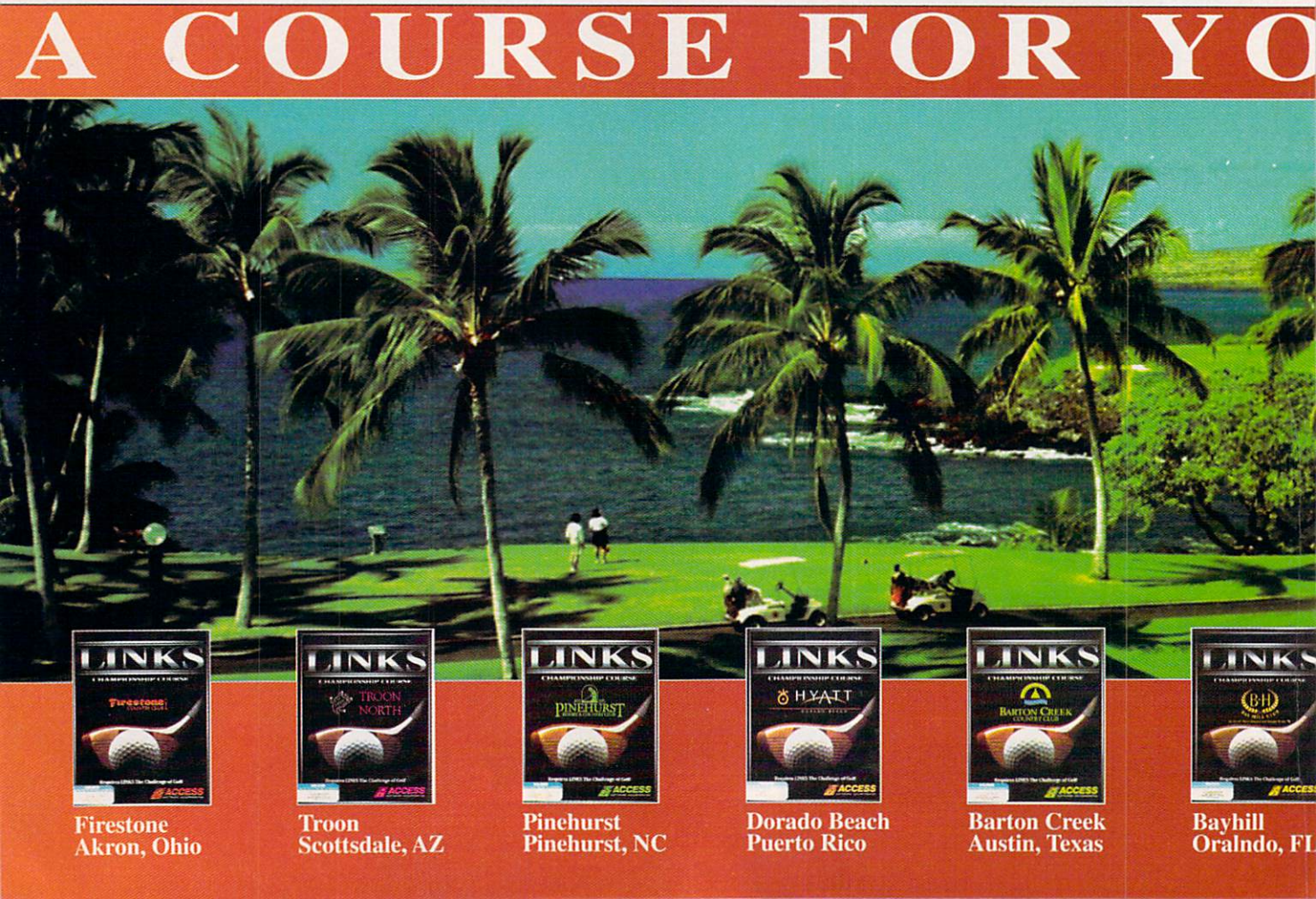
Sound Explosion from Programmer's Warehouse

Breaking NewGround

With the introduction of M.O.S.T., Compton's NewMedia is eliminating one of the major drawbacks of CD-ROM–based software—hardware format incompatibility. M.O.S.T. (Multiple Operating System Technology) will allow the same CD-ROM disc to operate in a variety of platforms, including DOS, Windows, Macintosh, and even Sony's new multimedia player format, MMCD.

"Our main objective with M.O.S.T.," says Tom McGrew, sales and marketing vice president for the company, "is to make compatibility a nonissue." A title on a Compton's NewMedia CD-ROM disc will run in several different operating systems—and that also frees up space on retailers' shelves, allowing them to offer a greater variety of titles instead of numerous formats of one title. Dozens of M.O.S.T. CD-ROM titles from Compton's extensive library of education, entertainment, and information software should be appearing on retailers' shelves *now.*

There's more groundbreak-



ing news from Compton's: It's challenging the tradition of publishing for-sale-only software. The company recently entered into an agreement with Major Video Concepts to distribute more than 20 of its CD-ROM–based multimedia titles *for rental* in select video stores—a first in the software industry. Major Video Concepts will receive special discs and packaging earmarked for rental only. Titles will include consumer interests, children's books, education and reference software, entertainment, music, and art. If you would like more information, contact Compton's NewMedia, 2320 Camino Vida Roble, Carlsbad, California 92009; (619) 929-2500, (619) 929-2511 (fax).

Mystery for Young Sleuths

There's mayhem at the Smithsonian: Priceless treasures have disappeared, a strange 3-D design rotates in the sky, and what was once a famous painting is now a jumbled-up mess. Calling all young detectives to help Investigator Edison put the pieces back together, decode messages, and visualize concepts to solve the mysteries in Smithsonian Mystery at the Museums from Binary Zoo.

In extraordinarily detailed 3-D graphics and digital audio, young sleuths search with Edison through 12 of the world's most exciting museums, thinking their way through games, puzzles, and conceptual challenges, and developing and enriching problem-solving, creative-reasoning, memory, and logic skills. The game's unique construction allows players to shape their own explorations through the Smithsonian's extensive collection of artifacts and exhibits by setting their own levels of difficulty and investigating the museums that most interest them.

"Because so many elements can be adjusted and the collection of possible explorations is so vast," says Binary Zoo president Henry Karp, "the program is inexhaustible. It's constantly stimulating and challenging to virtually everyone."

Recommended for ages 7 through 14 (but fun for adults, too), Smithsonian Mystery at the Museums has a suggested retail price of $59.95. To find out more, contact Binary Zoo, 4119 Sherbrooke Street West, Montreal, Quebec, Canada H3Z 1A7; (514) 846-4059, (514) 846-1171 (fax).

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

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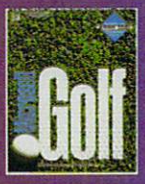

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Great Britain - White Cliffs of Dover

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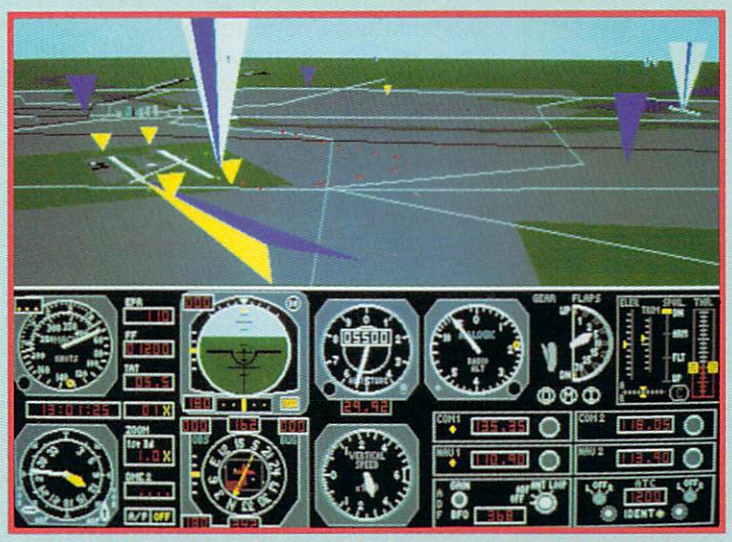

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FEEDBACK

Taking the wrong bus, substituting characters, dropping your caps, sorting out CPU terminology, translating GW-BASIC to QuickBASIC, and more

Return of the Data Bus

Dan Gookin's article, "The Ultimate Windows Machine," in the February 1993 issue contains a mistake. The article says that the 486SX is 16 bits externally, but in fact it's 32 bits. The 386SX *does* have a 16-bit external data bus, but the 486SX is a full 32-bit chip.

MICHAEL PRATT
SASKATCHEWAN, CANADA

The editors were asleep at the wheel of the data bus on this one. You're exactly right, of course. The 486SX is a full 32-bit CPU with a 32-bit internal data path, 32-bit external data bus, and a 32-bit address bus. We apologize for any confusion we've caused.

It's interesting to note that the SX designation, which was originally applied to the 386SX, is an acronym for sixteen, because the 386 has a 16-bit data bus instead of the 32-bit data bus found on the 386DX. Intel must have decided that SX really meant "low-cost" before introducing the 486SX with its 32-bit data bus.

Return from a Comma

I'm looking for a QBASIC program that would allow me to substitute a carriage return (Enter key) for every comma in an ASCII file. Many word processors have search and replace, but I haven't found any that will allow a carriage return to be substituted. Do you know of any?

DENNIS EKSTEN
LOVES PARK, IL

Actually, most word processors will allow you to make this substitution, but the Enter is usually replaced by some special character such as Ctrl-M or Ctrl-Enter. Similarly, most word processors allow you to replace tabs with spaces and so on. You might check with technical support at the company that published your word processor. But here at "Feedback," we're always looking for an excuse to write a quick, simple BASIC file, and we couldn't resist this one. Here's a program that replaces each comma with a linefeed and a carriage return. Many word processors insert both of these characters when you press the Enter key. If your word processor prefers a simple carriage return, remove + CHR$(10) from the seventh line.

```
INPUT "Name of file to convert ";
 file$
OPEN file$ FOR INPUT AS #1
file1$ = "temp__.__"
OPEN file1$ FOR OUTPUT AS #2
WHILE NOT EOF(1)
byte$ = INPUT$(1, #1)
IF ASC(byte$) = 44 THEN byte$ =
 CHR$(13) + CHR$(10)
PRINT #2, byte$;
WEND
CLOSE
```

If you want to automatically replace the original file with the changed file, add these lines to the end of the program (be very sure you know what you're doing, though; this is a lot of power to give to an automatic process).

```
SHELL "DEL " +file$
SHELL "REN TEMP____.__" +
 file1$
```

Remember to leave a space between the last letter and the quotation mark in these SHELL commands.

This simple program could be used to replace any single character in a file with any string of characters. For example, if you're writing a paper about pneumonoultramicroscopicsilicovolcanoconiosis and you don't want to type the word two or three times in each paragraph, you can use a symbol, such as @, that doesn't appear elsewhere in the piece. Then use your search and replace or this BASIC program to substitute the word for the symbol wherever it appears. Just change line 7 to read as follows.

```
IF byte$ = "@" then
 byte$="pneumonoultramicro
 scopicsilicovolcanoconiosis"
```

Many Questions

Ads often say, for example, that a computer has an 80MB hard disk and a 1.44MB floppy disk. What's the difference between the two, and why are both needed? Are all computers IBM PC compatible? Does that mean they're identical to IBM PCs? I've read that PRINT and INPUT have the same function. Is that true? Do fax machines use the same ASCII as computers?

WALT HERRMAN
ARLINGTON, TX

A hard disk is a permanently installed medium with a large storage capacity, and a floppy disk is a removable medium with a small storage capacity. You need both. Software publishers generally sell or license their programs on floppy disks, but you'll usually need to install these programs on your hard disk before you can use them. To install a program, you copy it from the floppies to the hard disk.

Not all computers are IBM compatible, though all PCs are. Amigas, Macintoshes, Atari STs, NeXTs, DEC VAX machines, and so forth aren't IBM compatible. Generally, if a computer can run MS-DOS, it's called IBM compatible, though it may not be identical or even similar to the original IBM PC.

Both PRINT and INPUT are capable of printing a message to the screen. Once PRINT has printed its message, the program moves on to the next instruction. After INPUT has

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Circle Reader Service Number 192

FEEDBACK

printed its message, the program stops and awaits user input. To see the difference, run this simple program.

```
PRINT "This is a PRINT command. As soon as it's finished printing to the screen, the program will move on to the next command."
INPUT "This is an INPUT command. When this message is finished printing to the screen, the program will pause and wait for user input. Type your name.";a$
FOR I = 0 TO 10:PRINT a$:NEXT
```

And finally, fax machines don't use any kind of ASCII. The information that comes over the line from one fax machine to another is strictly graphical information. One fax machine sends the shapes of the letters it sees on a page to another fax machine, which prints the graphical information on a sheet of paper. It doesn't send the letters themselves as ASCII or any other kind of code.

Software is available, however, that can interpret the shapes sent by a fax machine and turn them into ASCII code. This software is called optical character recognition (or OCR) software.

Boxing Revolution

I'm trying to create drop caps in Microsoft Word for Windows. I place a large letter in a frame and wrap text around it to create a large initial capital. Unfortunately, the box has an outline, which detracts from the appearance of my text. What can I do?

SUNNY SINGH
QUEENS, NY

The problem is that the frame has an outline. You can eliminate the outline of your frame quite easily. Click on the frame with your mouse to select it, pull down the Format menu, select Border, and click on the button marked None.

Terms of Estrangement

I'm confused about the terminology used in computer advertising, such as *386-40DX 64K Cache; 486-33 Cyrix; 486-33 EISA, 256K Cache;* and *486-66 DX2*. A short explanation of the significance of these terms would be appreciated.

FRED BELL
ARLINGTON, VA

Sure. Happy to oblige. The 386 is a 32-bit CPU. The 486 is a faster version of the same chip. If it's a 486DX, it has an operating floating-point math coprocessor, which helps speed up certain spreadsheets and CAD programs. A

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Circle Reader Service Number 307

486SX has no operating coprocessor.

A cache is a special area of RAM used for holding information frequently read from the hard disk. By retaining that information in RAM, the CPU can access it much faster than it could if it had to go back to the hard disk each time it needed the information. A large cache is generally better than a small cache, although, at some point, finding information in a cache is as time-consuming as finding it on a disk, so you don't want a cache that's too large.

Most CPUs are made by Intel, but competitors have recently entered the market, one of which is Cyrix. A Cyrix 486 is similar to an Intel 486.

EISA is a bus architecture. Most computers have 16-bit ISA (Industry Standard Architecture) buses. When the 386 appeared, it was a 32-bit chip, so two new kinds of buses emerged to take advantage of this: the EISA (Extended ISA) bus and the MCA (Micro Channel Architecture) bus. The EISA is compatible with the ISA, but the MCA isn't. Therefore, if you're planning to move any old cards into your new computer, you should look for an ISA or an EISA bus computer.

DX2 is a speed-doubling technology. It allows a 25-MHz CPU to operate internally like a 50-MHz CPU, and it allows a 33-MHz CPU to work like a 66-MHz CPU. Oddly, this doesn't really double the speed of the computer because all external functions must still be carried out at the CPU's rated speed (25 or 33 MHz in these examples). However, it will make a computer noticeably faster.

All You Have to Do Is ASC

I recently upgraded to QuickBASIC 4.5, and it's fantastic. What I need to do is load in some GW-BASIC programs. How can you save a GW-BASIC program so that QuickBASIC can read it?

JUSTIN CASCAGNETT
GRAWN, MI

QuickBASIC's editor reads and writes simple ASCII files. You could use its editor to write anything—not just BASIC programs, but letters, papers, and so on—simply by turning off its syntax checking (pull down the Options menu and select Syntax Checking; to turn it back on, pull down the Options menu and select Syntax Checking again). Because early computers had such limited RAM and disk storage capacities, GW-BASIC saves its files in a highly compressed tokenized format. To save a GW-BASIC file in ASCII format, simply type save "basicfil.bas",a *and press Enter. The BASIC program will be saved in a QuickBASIC-readable ASCII format.*

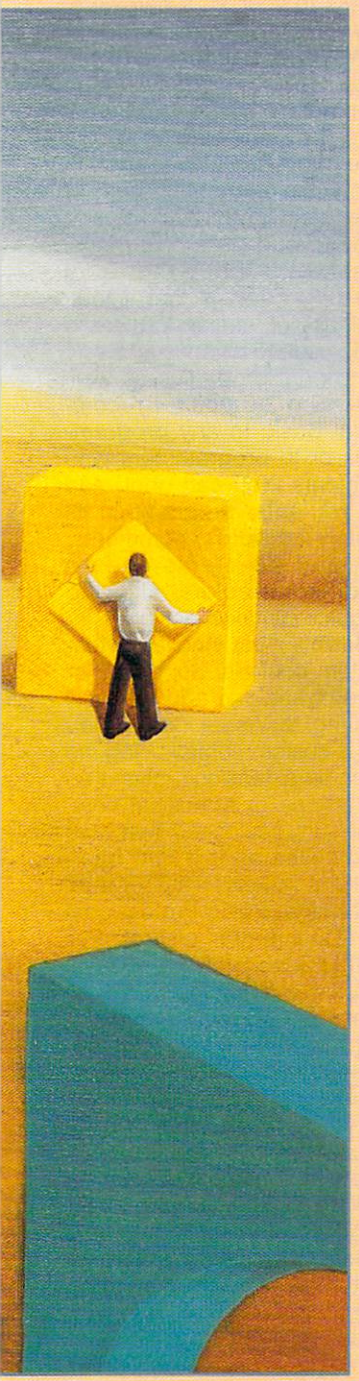
Zoned Again

Your cities are in reverse order in the program Zone ("Feedback," January 1993). They should start with the time zone you are in and proceed east, not west. Also, there are places in the world where time zones are separated by 45 minutes, 30 minutes, and 15 minutes.

WALTER W. WOLFE
WINSTON-SALEM, NC

You're right. Please reverse the order of the DATA lines in ZONE.BAS. As to the other, it's apparently true that some parts of the world don't separate time zones by the hour as we do here.

Readers whose letters appear in "Feedback" will receive a free COMPUTE's PC clock radio while supplies last. Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Write to COMPUTE's Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that we cannot provide personal replies to technical questions. ❐



WINDOWS PROGRAMMING: AS EASY AS PIE

EASY WINDOWS PROGRAMMING

Making the leap into Windows programming is much easier than it once was. Five years ago, when I first hired a Windows programmer, it was a given that the candidate would know C intimately and that I'd have to spend nine months training that programmer. Now, there's a middle ground: programming systems for the rest of us. Three new products, Visual Basic and Access by Microsoft and Borland's ObjectVision, make programming in Windows simple enough to be possible for the novice yet powerful enough to be used by professional consultants.

COMPUTE chose these three programs among many other capable, "easy" development environments because each one strikes the right balance in a complex mix of features, stability, price, documentation, raw power, and third-party support. Each is relatively open, and each can be extended in some way using C. All of them allow you to program the application's user interface visually, using the mouse to position controls such as buttons and scroll bars. All are programmable to some extent, and all allow you to place Windows bitmaps in your applications and to interact with the Clipboard, DDE, and OLE.

The price range is dramatic: $149.95 for ObjectVision and $199.00 for Visual Basic to $495.00 for Access. But that doesn't even tell the whole story. Borland offers generous runtime license terms for ObjectVision, allowing you to distribute, at no extra cost, a version of the program that can be used to execute but not create applications. You can also distribute your Visual Basic programs. But Access doesn't come with a runtime module; for that, you pay an extra $495.00 for the Access Developer's Kit—a total investment of $1,000.00 if you want others to use your Access programs without owning Access itself. On the other hand, Access is a much more powerful tool than ObjectVision, and while both programs emphasize (but are not limited to) database development, its price is in line with similar high-end database developer's tools such as FoxPro and dBASE IV.

There's a point at which all such "easy-to-use" solutions begin to resist you, a point at which flexibility must lose to ease of use. I call this the wall, because there is no way to get over this obstacle when you come to it. You can do anything in Windows with C. You can do almost everything

BY TOM CAMPBELL

you need to do in Windows with Visual Basic, but at some point you may need a custom control or DLL written in C to get over the wall. Access reaches that point sooner for nondatabase applications, but it never comes close to the wall in databases. ObjectVision hits the wall much earlier than the others, but it's a lot less expensive. When you are ready choose your next Windows programming tool, you'd better know just where the wall is.

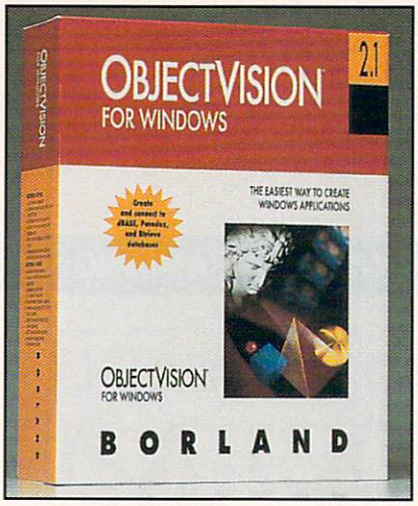
Visual Basic—For Just Plain Volks

Arguably the most famous of this trio of products is Visual Basic 2.0, the Volkswagen of Windows programming. After the release of the DOS classic QuickBASIC in 1987, Microsoft seemed to be floundering a bit. But the release of Visual Basic in 1991 wiped away any doubts skeptics might have had that Microsoft pretty much owned the BASIC market. Visual Basic wasn't very compatible with QuickBASIC 4.5, but the market responded appropriately, buying the product in droves because it made programming Windows easy and, well, fun. Programmers had used QuickBASIC by the millions, but they understood that Microsoft couldn't be expected to retain compatibility with the masterful DOS product without fatally crippling Windows hackers.

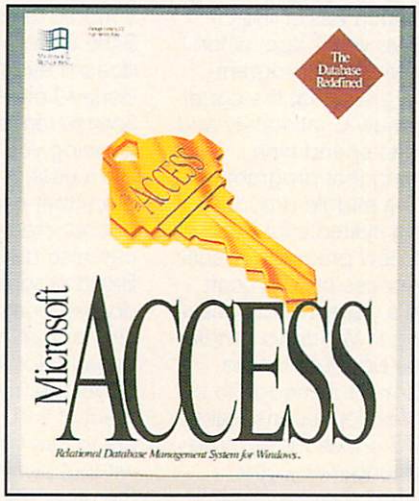
Visual Basic lives up to its name, being both visual and basic. Its biggest departure from traditional BASICs is that you create the shell, or user interface, of the program first, plucking such items as push buttons, text boxes, and scroll bars from a toolbox at the left of the screen (don't worry, northpaws, you can move the toolbox anywhere) and positioning them on a window. Inexplicably, Microsoft, the company that invented Windows, refers to these windows as forms, not windows. You can have hundreds of these forms—windows—in a program. Visual Basic knows how to redraw them and the objects on them, a skill that saves you untold hundreds or thousands of lines of code per application. But this skill comes at a price: Visual Basic programs that haven't been scrupulously optimized for memory usage can bring the system to its knees for several seconds at a time, neither warning you nor deigning to put up that informative, if reviled, hourglass icon while it sorts out its memory situation. You then add code to these objects—forms, buttons, edit fields, and so forth—to create your program.

Each control has a property list that appears automatically when you select the item at design time, and property lists can easily run into the dozens of items. They are very well organized and ruthlessly logical, to the point that you can often guess the name of the property even if you're only semifamiliar with Visual Basic. Controls can also fire events, and all the events you'd like or expect are there for you to attach code to. For example, not only can you write custom code for a mouse clicking on the object, but you can also distinguish between mouse up and mouse down. There are events for the mouse merely passing over the object, key-up and key-down events, and so on. There are controls for editing text, all kinds of buttons, combo boxes, list boxes, bitmap images, and even a spreadsheetlike grid control for displaying, but not editing, data.

Notably missing from the standard edition are equivalents of QuickBASIC's OPEN COM, graphics, and IN and OUT statements. The graphics system is replaced by version 2.0's more Windows-like graphics controls and statements, but communications support is nil. You'll have to buy a third-party library or the Pro edition. As for IN and OUT, forget it. Windows is not very amenable to direct access to your PC's hardware, but you'll almost never need it, because Windows has most of what you need built in. Still, be forewarned.



Objectvision: Create applications in hours.



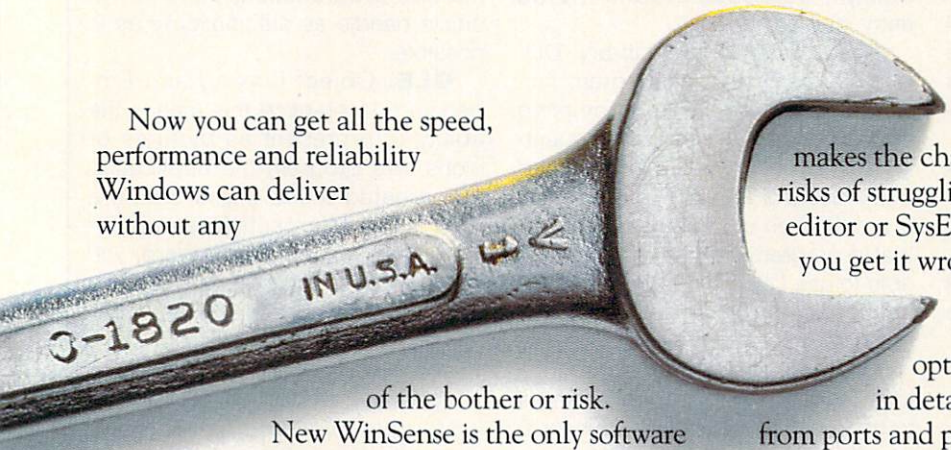
Access: Extensive database development.

Programmers of more traditional languages may suspect that this would appear to mean that a program can end up in the form of hundreds of little independent scraps of code and that a printout can be a real mess. You're right, and that's the good news! The bad news is that it took until the release of version 2.0 late in 1992 for Microsoft to give Visual Basic the ability to print properties as well. Not until version 2.0 could I recommend Visual Basic to any programming teams or to programmers who rely on printouts. You can print, and now when you enter programs in its built-in editor, keywords, comments, variables, and constants can be shown in different colors, allowing extremely quick syntax checking.

Visual Basic's most innovative feature is custom controls. Suppose, for example, you wanted to add low-level MIDI handling to Visual Basic. You could write a custom control using the new multimedia extensions, give it an icon in the shape of a musical note, and voilà! Users could add that note to their toolboxes as if it had been installed at the factory. That's pretty much what Visual Basic Professional Edition is, as a matter of fact. For $495 you get additions to Visual Basic for graphing, communications, three-dimensional controls, high-level multimedia (no low-level MIDI, darn it), funky animated buttons, spin buttons, electronic mail, and more. With the package, you also get the Control Development Kit, which lets you write new controls in C, utilities to let you add real Microsoft Help to your applications, and support for Microsoft's ODBC, which is an attempt at forging a standard for communications among disparate computer types and other brands of databases.

Of the programs mentioned in this article, Visual Basic is easily the most versatile and certainly the most fun. The sample applications range from crisply competent to mind-boggling, its evolution has been swift and sure, its popularity is unparalleled in the Windows world, and it has a gigantic aftermarket. Visual Basic is so modu-

GET A PRECISION TUNE-UP FOR WINDOWS WITHOUT CLIMBING UNDER THE HOOD.



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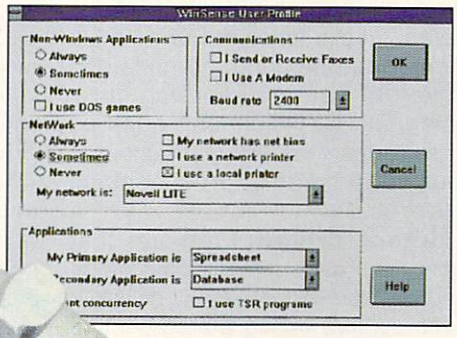
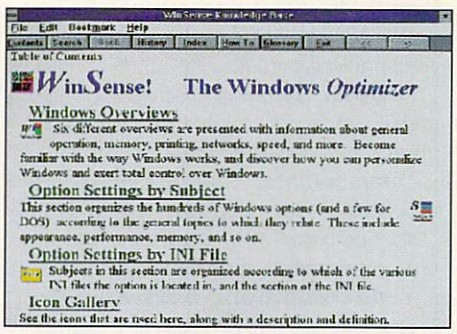


WinSense automatically configures Windows for the way you work.



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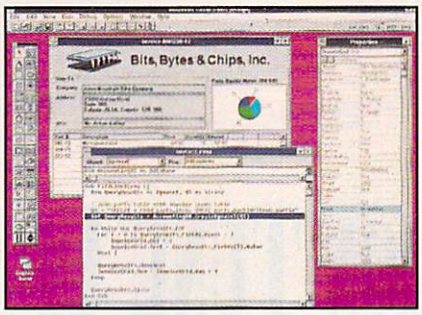
lar that the Pro additions were packaged in a separate, tragically unindexed manual and a couple of extra disks. I loved using Pro, but if you're on a budget, the standard edition of Visual Basic is the standout bargain of this group.

Access Makes the Heart Grow Fonder

Microsoft's star database program was years in the making and threatens to take firm control of the Windows market. That product is FoxPro 2.5 for Windows—no, wait! It's Sybase. No, wait! It's SQL Server. No, it's not any of those! It's Cirrus. At least that's the name you'll find on a few pages of the Access manual and one or two places in the online help. The product, of course, is Access, and I'll stick my neck out on this one. Access, code-named Cirrus during its turbulent six-year gestation, is by far the most significant microcomputer database product since dBASE II.



Visual Basic: Modular, versatile, and fun.

Glossary

Although the programming environments covered in this article are all pretty easy to use, sometimes the jargon gets to be a bit much. Here's a translation of some of the less obvious terms.

binary and source compatible. Visual Basic and Access Basic programs go from an English-like appearance, as in Printer.Print "hello, world", to a predigested form that BASIC can run more quickly. The first representation is called source, and the second is called binary.

custom controls. A function in Visual Basic. Custom controls let you draw buttons, combo boxes, and so forth on a form from a toolbox that C programmers can extend. Adhering to a relatively simple set of programming guidelines, C programmers can create custom controls that automatically appear on the toolbox, as if Microsoft had supplied them with Visual Basic, without changing Visual Basic itself.

DDE. Dynamic Data Exchange. DDE is the precursor of OLE and a way for Windows applications to communicate. This lets programs control other programs behind the scenes without the user's knowledge or interference. *See* OLE.

development environment. The overall set of tools a programmer employs to create Windows applications. For example, Access lets you design databases, enter data, create labels, program in BASIC, and so on, each in separate program modules. These modules are seamlessly integrated into the Access development environment. Likewise, ObjectVision's development environment consists of different modules for visual program design, database creation, data entry, and so on.

DLL. Dynamic Link Library. DLL is a standard form of program that virtually all Windows programming environments can use; consequently, a DLL written in C can be used from Pascal or BASIC. Windows itself is a collection of DLLs. It's important that a programming environment be able to use DLLs so that third parties can fashion solutions not possible in that environment.

easy to learn. Easy to acquire knowledge, as opposed to putting it to good use. It's easy to learn how to jog, for example, but it's not easy to run a marathon. *See* easy to use.

easy to use. Easy to put knowledge to work on a routine basis. If you're a good typist, then taking your hands off the keyboard to copy text to the Windows Clipboard is counterproductive, even though the Clipboard is easy to learn. But if you've learned the product and have discovered that you can also copy using Ctrl-C, which isn't quite as easy to learn as using the mouse, then you'll find that product much easier to use.

event driven. Programs that work according to menu commands and mouse clicks are event driven. It turns out that writing a program that can respond to a Cancel button at any time or that allows the user to choose Exit from the File menu at any time requires a much different perspective than writing a program which forces the user to do things in a particular order. Programming Windows in C requires an enormous amount of forethought because you have to account manually for every possible click and command, tasks that the programming tools in this article handle as automatically as is possible.

OLE. Object Linking and Embedding. In practice this means the ability to represent as pictures or icons in a program the application that created them. If you create a logo in the Microsoft Draw applet that comes with Microsoft Word, you can double-click on that logo, and OLE will automatically kick Draw into action, without your having to know what and where it is.

runtime distribution. Writing a program in a programming language doesn't necessarily mean you can give it away. That's because some languages require that the development system be present for the program to be run. Since you may not be able to afford to buy a copy of Visual Basic for everyone who uses your program, for example, you'll need to use its runtime module. The runtime consists of a version of the language that can be used to execute but not modify programs written in that language. When you purchase a programming environment, you must find out whether distribution is free; some companies charge a substantial amount for each copy you distribute.

text box. A tiny, stripped-down word processor that lets you enter up to 32,000 characters in a programmer-defined box onscreen.

VisiCalc. The first spreadsheet, a precursor to 1-2-3. VisiCalc is significant in that it allowed users to manipulate numbers instantly and through direct visual interaction, which was impossible before computers. It's considered a breakthrough product for that reason.

Access is a skillful blend of database manager, forms designer, reports designer, and BASIC dialect that makes every other data manager on the market pale by comparison. It uses Windows beautifully, always allowing you to do visually the tasks that ordinarily require laborious typing. In one memorable CompuServe exchange, a user bemoaned the fact that in dBASE he could copy a database in one line of code but that it took an unbearable number of operations in Access. He was unaware that all he had to do was copy and then paste using the Windows Clipboard! Truly, Access combines ease of use with extraordinary power in a way that no program since VisiCalc has been able to match.

Microsoft has made the mistake of marketing Access as an end-user tool, and it's certainly not that. Yes, a dedicated manual reader with a lot of time to spare could pick up Access, but it's not as easy as Microsoft claims. No program this powerful could be. If you're a database jock, you'll probably be simultaneously blown away by how easy some things are and stymied by tasks that a non-database user would find easy to accomplish. For example, Microsoft's FoxPro 2.5 for Windows does things in a very dBASE-like way. Adding a push button to your data entry form requires either the use of FoxPro's automated screen designer, which generates trillions of lines of code behind the scenes, or detailed knowledge of FoxPro's use of READ/GET (if you're not a dBASE or FoxPro user, you can —and should—safely ignore this sentence). The upshot of it is that dBASE users moving to Access will have difficulty coming to terms with the idea that a push button on an Access program requires no code at all and that the READ/GET idea has no place in the Access way of doing things. Windows users who haven't yet been sullied by dBASE experience will, on the other hand, be instantly comfortable with this paradigm and would no doubt be horrified at the thought of having to cope with dBASE's consistent, if twisted, READ/GET scheme. The same goes for Paradox users, and it seems to me that Microsoft would have done well to include short chapters on Access for dBASE users, Access for Paradox users, and so on.

Having warned you that Access is like no other product, I can tell you the best thing about it: It's like no other product. I became so productive in Access in such a short time that I decided to convert my entire business to Access, even though I was in the middle of coding it in another language. It's that good. If you're reading this article because you're thinking of learning a new Windows language, mark my words. Access is the best way imaginable for you to start making money as a consultant. The lion's share of real-life consulting gigs requires database work. Since Access is a new product, you'd be well served to learn it thoroughly now, while it's new and you have a chance to become the first Access guru in town. There are hundreds of books on dBASE and millions of lines of useful code written in dBASE and its variants, such as Clipper and FoxPro. It's also reasonably simple to learn dBASE dialects. Until now, I've advised the would-be consultant to learn FoxPro or Clipper for those very reasons, and I take tradition dead seriously—maintaining old code is usually a programmer's bread and butter. Clipper may not be state-of-the-art, but it supports an awful lot of freelancers. So when I tell you that Access is so much better than these trusted standards that you should make it your first database development system, you must realize that it's not a snap judgment on my part.

Buying Information

Access
Requires 2MB RAM (4MB recommended), hard disk with 8MB free, and Windows 3.0 or higher.
$495.00
Microsoft
One Microsoft Way
Redmond, WA 98052-6399
(800) 227-4679

ObjectVision
Requires 2MB RAM, hard disk with 2.5MB free, and Windows 3.0 or higher.
$149.95
Borland International
P.O. Box 660001
Scotts Valley, CA 95066-0001
(800) 331-0877

Visual Basic
Requires 1MB RAM, hard disk with 6MB free, and Windows 3.0 or higher.
$199.00
Microsoft
One Microsoft Way
Redmond, WA 98052-6399
(800) 227-4679

And to some extent, you can hedge your bets, because Access can use Paradox, dBASE, FoxPro 1.0, and BTrieve files as easily as its own proprietary format. This lets you audition Access while using the data files you're used to, quite possibly without disrupting daily operations at all. Once you get more committed to Access, it can convert them to its own format transparently. Microsoft once had a history of ignoring the market leaders when it came out with its own products and then wondering why people didn't go for an obviously superior solution. Excel started a new trend with its 1-2-3 macro and worksheet conversions, Word for Windows continued the trend by bending over backward trying to accommodate WordPerfect users, and now Access is going for the jugular by offering data file compatibility with all the current market leaders. This is good because it allows cautious users to make the transition at their own speed. (Ironically, Access won't handle FoxPro 2.0 or higher data files, even though FoxPro is a Microsoft product, but full version 2.0 compatibility will happen soon.) Access also surpasses every one of its competitors in its handling of multiple related databases, using an extension of the industry-standard SQL language that takes advantage of the standard while filling in its holes.

If you're still not ready to program, you can go a long way in Access with its macros. Much more than a keystroke-recording utility, Access macros are displayed in their own database grid and look a lot like English. You can create and edit them interactively to produce a turnkey application without ever knowing Access Basic. You can also start off by adding tiny snippets of Access Basic to formulas or user interface objects and working up from there, supplementing your macros with Access Basic as necessary.

When you're ready to go all the way and dive into Access Basic, you'll find it well documented in two of its four superb manuals. If you're a Visual Basic user, you'll find Access happily similar to it, but as Microsoft is wont to do with its wild profusion of BASICs, it's neither binary nor source compatible with Access. Unlike the switch from QuickBASIC to Visual Basic, which was painful but necessary, I'm on the fence about Visual Basic versus Access. The addition of a C-like SWITCH statement was fine, because there was nothing like it in Visual Basic, but incompatible handling of

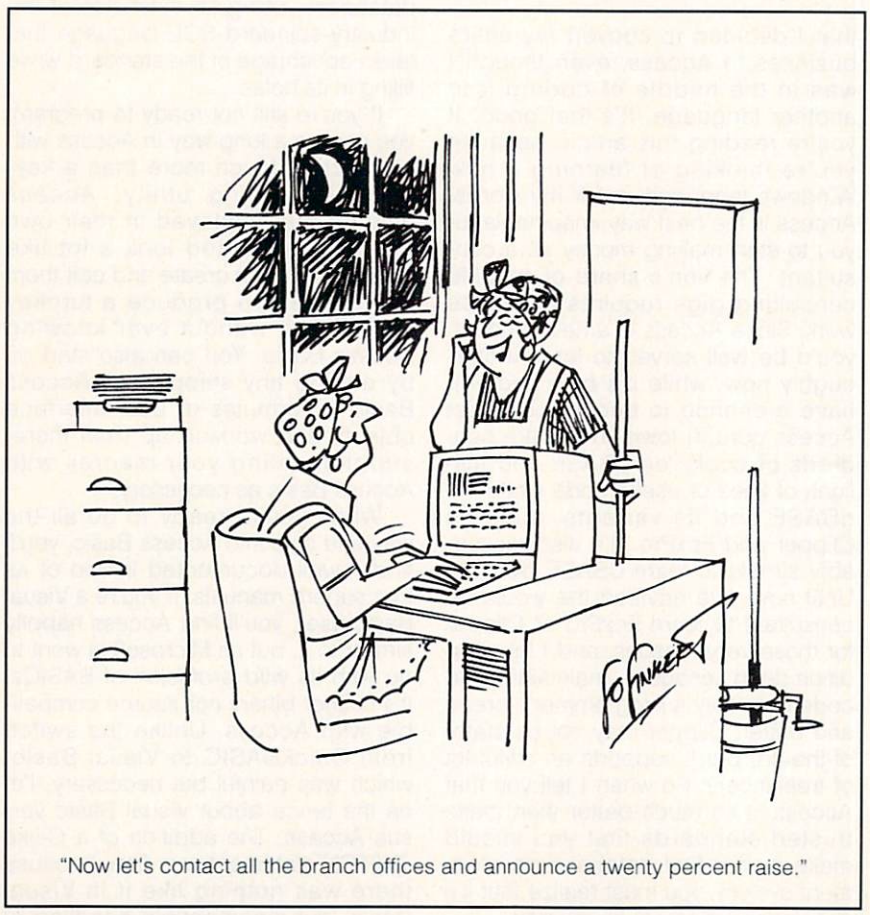
properties is much less forgivable.

My complaints about Access are so picayune that they serve only to illustrate how well conceived the product is in general. Access calls databases tables, which is fine, but it calls the entire application (which consists of tables, forms, reports, program code, macros, and queries) a database. Ouch! It also lacks a way to create databases—uh, tables—under program control, so if you're writing an application for someone else, you must include empty databases—that is, tables—to ensure they can get started. And as stated, distributing an application to someone who doesn't own Access requires the one-time purchase of Microsoft's $495 Access Developer's Kit, which contains nothing more than a chopped-down version of Access that can't be used to create programs. Given that this is only the first version of the product, I'm astounded I couldn't come up with more substantial problems.

ObjectVision—A Cloudier Picture

Borland seems to be stumbling a bit with ObjectVision, but it's still a worthy product. ObjectVision lets you design and use databases in dBASE, Paradox, and BTrieve format. You can make use of all the standard Windows controls such as list boxes, radio buttons, and so on. ObjectVision doesn't exactly sport a programming language, but you can build complete applications using what looks like a flow-chart designer. I have never felt entirely comfortable with this approach, but many other users took to it like ducks to water. More objectively, the program lacks certain classics such as loops, and you have to kludge substitutes.

Like Access, ObjectVision lets you create data-entry forms that simultaneously update databases in any or all of its supported database formats, and it makes database design and querying a snap. There's full Windows font support for its forms and reports; as long as your application remains simple, you can go from nothing to a ready-to-go application in a matter of hours. If you work for the kind of client who likes to hover around until every field is spaced just so, ObjectVision won't let you down. Better, it costs a mere $149.95—and that includes the rights to a runtime module that you can distribute freely with your applications. But it hits the wall earlier than Access or Visual Basic. Borland's solution is ObjectVision Professional, but I found it by far the most difficult to use of all these systems. ObjectVision Professional is a loose bundling of Borland's older C++ development system for Windows, and the documentation on extending ObjectVision with C is absolutely atrocious. At $495.00, it's simply too complicated, too expensive, and too badly documented to compete with Access at that same price.



"Now let's contact all the branch offices and announce a twenty percent raise."

Which Is Right for You?

It's not hard to find a constituency for each of these products.

Visual Basic is the hands-down winner for versatility, offering the best feature-per-dollar value. If you're a hobbyist or if you aren't quite sure which direction to go, you can't go wrong with Visual Basic. If money is no object or communications support is of utmost importance, get the Pro edition, but the standard edition is a tremendous value. You can distribute your programs free.

Access is your only choice if you plan to do extensive Windows database development. It took six years to write Access, and that care shows. Its BASIC, while not quite as rich as Visual Basic, makes it as capable as any other database now on the market. What pulls it past all its Windows and DOS competitors is a tightly integrated development environment second to none. Access is not simple to learn, but it is incredibly simple to use and will make you more productive than any other database product. Use it if you plan to develop inventory, accounting, PIM, or office automation programs. If you will want to distribute your programs to nonusers, you'll need to spring for the $495 Developer's Kit, so be sure to budget for both if necessary.

ObjectVision will get you in and out of simple database chores with the least trouble of any of these, but it will also get you into trouble faster because it's the least programmable. If you don't want to commit to a full development system, ObjectVision's seductive $149.95 price may be all the persuasion you need. Just make sure your programming needs will never go beyond simple, because you may not get past the wall.

All of these three new development environments are powerful, capable, well supported, and good investments. Be aware of your current needs, experience, and future needs. Then it will be clear which system is for you. Soon you'll find that programming in Windows is as easy as pie. ❑

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Circle Reader Service Number 296

INTRODOS

Tony Roberts

BATCH FILE RUNAROUND

Change the flow of your batch files, and you'll increase their power.

Most batch files are merely collections of DOS commands that run straight through from top to bottom. If you're adventurous, however, you can supercharge your batch files by interrupting the linear flow.

CALL (in DOS versions 3.3 and higher) is a batch command that allows you to create nested batch files. Normally, when one batch file is run from within another, full control is handed to the second file. Any commands in the first batch file that appear after activation of the second one are ignored.

The CALL command, however, suspends the first batch file until the second is finished. Then control returns to the first batch file, and processing continues. To achieve this, simply place the keyword CALL before the name of the second batch file.

How can you use this? I like my computer to make my network connections automatically when I boot up, but I'm not interested in cluttering up the AUTOEXEC.BAT file with a dozen network commands. So I include the command CALL GONET in the AUTOEXEC.BAT. When the program runs, AUTOEXEC.BAT temporarily gives control to GONET.BAT. When GONET.BAT is finished, AUTOEXEC.BAT picks up where it left off.

This setup is extremely helpful because I use a couple of TSR programs that don't work unless they're loaded *after* the network. If I weren't able to use CALL GONET, I'd have to either include all the network commands in the AUTOEXEC.BAT or manually install those TSRs after the network was initialized.

Another way to change batch program flow is to use the GOTO command. GOTO lets your batch programs move in different directions depending on conditions. For example, you could create a single batch file called START.BAT that contains startup instructions for several programs.

At the command line, you could type *start wp,* for example, and the batch file would jump to the WP section and start your word-processing program. Similarly, typing *start win* could activate Windows, or typing *start finance* could initialize your financial management software.

This is accomplished with the GOTO command and labels. A label is a batch file line that begins with a colon. Here's how the START.BAT program might look. You'll have to replace the REM lines with the appropriate commands for your system.

```
@ECHO OFF
GOTO %1
GOTO end
:wp
REM Insert word processor
 commands here.
GOTO end
:win
REM Insert Windows startup
 commands here.
GOTO end
:finance
REM Insert financial manager
 commands here.
GOTO end
:end
```

When the batch file is executed, the replaceable parameter (the %1 in the first line) is replaced with the first word you typed after the batch-file name. If you typed *start wp,* then the %1 would be replaced with wp, and the batch file would jump to the :wp label and begin its execution. Note the line GOTO end, following each section. This prevents the program from running away with itself and executing the commands in every section.

Now that you're getting used to the idea that batch files don't have to run in a straight line, let's create one that runs in circles.

To do this, we'll combine the GOTO command and replaceable parameters used in the previous example with the SHIFT command. Let's say you wanted to display three files on your screen, but you didn't want to type three separate commands. We'll create a batch file, called T.BAT, to do this. To execute this file, you'll type *t file1 file2 file3,* filling in the names of your own files for *file1, file2,* and *file3.*

As you can see, we've entered three replaceable parameters on the command line. The SHIFT command takes all of the replaceable parameters and shuffles them to the left. After SHIFT is executed once, *file1* is gone, and *file2* is at the head of the list. Each time SHIFT is executed, a new parameter is available to be substituted for %1 in the batch file. Here's the batch file:

```
@ECHO OFF
:start
IF (%1)==() GOTO end
TYPE %1 MORE
PAUSE
SHIFT
GOTO start
:end
```

In this program, the third line makes sure there's a replaceable parameter available. If so, the TYPE command is executed. Then the SHIFT command shuffles the replaceable parameters, and the GOTO command loops the program back to the beginning. As long as a parameter remains on the stack, the looping continues. ❐

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TIPS & TOOLS

Edited by Richard C. Leinecker

Calculate in DOS, extend your path, and share your machine.

Command Line Calculations

Everyone has a built-in calculator that works from the DOS prompt. All it takes is QBASIC, which comes with DOS, and a special batch file called CALC.BAT. Here's the batch file.

```
ECHO OFF
IF "%1" == "" GOTO ERROR
REM You must specify the correct
REM path to which
REM you want the CALC.BAS file
REM to be created.
SET CREATEDIR =
 C:\WORK\XY\CALC.BAS
ECHO 0 PRINT "The answer is ";
 > %CREATEDIR%
ECHO 1 PRINT %1 %2 %3 %4 %5
 %6 %7 %8 %9 >>
 %CREATEDIR%
ECHO 2 SYSTEM >>
 %CREATEDIR%
QBASIC /RUN %CREATEDIR%
REM Change the above line to
REM GW-BASIC %CREATEDIR%
REM or BASICA %CREATEDIR%
REM for older versions of BASIC.
SET CREATEDIR=
GOTO END
:ERROR
ECHO You must specify the correct
ECHO parameters!
ECHO Usage: CALC <expression>
ECHO For BASICA and GW-BASIC,
ECHO make sure there are no
ECHO spaces.
ECHO The allowed sign operators
ECHO are (+) for addition,
ECHO (-) for subtraction, (*) for
ECHO multiplication, and
ECHO (/) for division.
:END
```

This batch file works by first setting an environment variable to the path that'll contain the CALC.BAS file. Before leaving the batch file, it's set to NULL. If you have another environment variable named CREATEDIR, change this in the CALC.BAT file.

Next, the batch file saves CALC.BAS, a BASIC source code listing. The BASIC program provides an answer to the arithmetic problem written as arguments on the command line.

Finally, the SYSTEM command returns to DOS.

ILYA TROYCHANSKY
BROOKLYN, NY

Extending Paths

Sometimes I like to add directories to my path, but I don't want them permanently. Here's a handy batch file to do just that called PATHSET.BAT. This batch file should only be used once in a session. Since it only extends the existing path, you could easily create a dangerously long path if you used this program multiple times.

```
ECHO OFF
IF "%1" == "" GOTO ERROR
SET OLDPATH=%PATH%
PATH=%OLDPATH%;%1;%2;%3;%4;
 %5;%6;%7;%8;%9
GOTO END
:ERROR
ECHO Usage: PATHSET <appended
 path> <appended path> . . .
 <appended path>
:END
```

ILYA TROYCHANSKY
BROOKLYN, NY

Windows Variety

When you have to stare at the Windows screen for hours at a time, it's nice to have a change every so often. I'm constantly changing colors, screen savers, and most of all, wallpaper. This is the reason I developed a method of automatically rotating wallpaper when starting Windows. First, I turned off my wallpaper using the Control Panel icon and then the Desktop icon (this will avoid an error later). Next, I created a batch file called WIN2.BAT to run Windows and placed it in my path.

```
ECHO OFF
C:
CD \WINDOWS
REN FILE0.BMP FILE5.BMP
REN FILE1.BMP FILE0.BMP
REN FILE2.BMP FILE1.BMP
REN FILE3.BMP FILE2.BMP
REN FILE4.BMP FILE3.BMP
REN FILE5.BMP FILE4.BMP
WIN
```

Next, I renamed my five favorite wallpaper files to FILE0-.BMP, FILE1.BMP, FILE2-.BMP, FILE3.BMP, and FILE4-.BMP (remember to start with 0). You can easily change the number of wallpaper files. Finally, I entered Control Panel again and changed my wallpaper to FILE0.BMP.

There is one limitation to this system in that all of your wallpaper files must be tiled or centered.

To invoke Windows with the wallpaper-cycling system, I just type *win2* instead of *win*.

DUSTIN WINTERS
SAYVILLE, NY

Screen Dressing

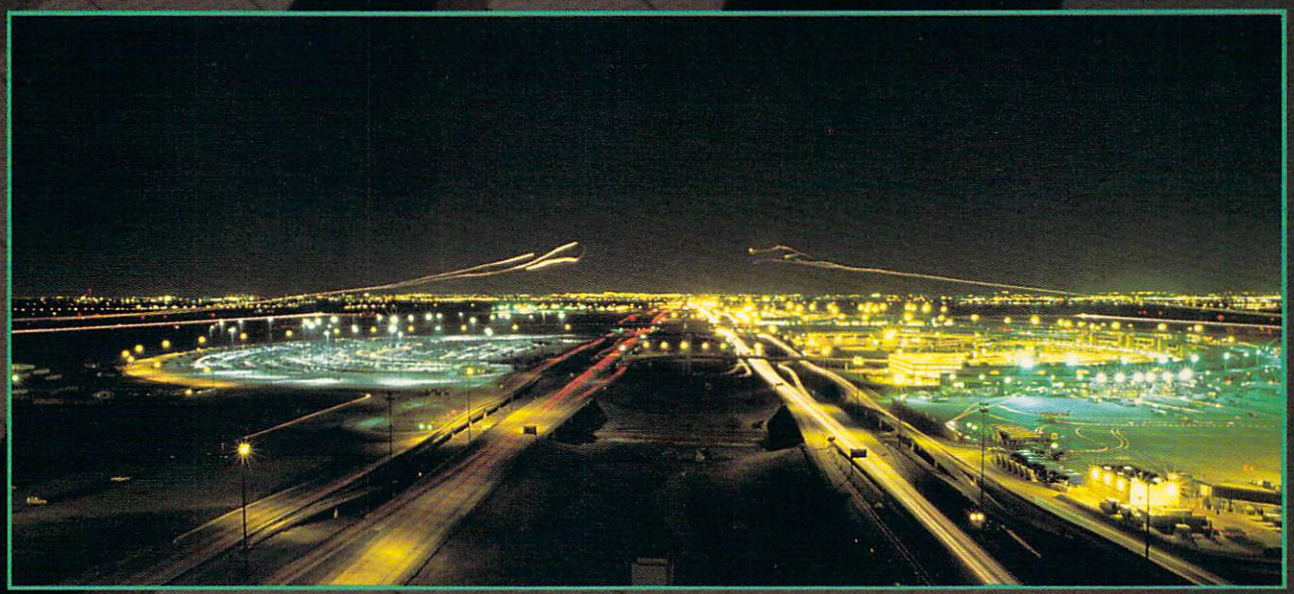
Here's a collection of three utilities that'll help you jazz up your text-based screens.

The first one is called Puts. It draws a text string in any DOS color on the screen. The next two are related. Savescrn saves a screen to disk for later use and Loadscrn loads it from disk and puts it on the screen.

You can type in these programs using the DOS Debug command. Make sure the DOS program called Debug is in your path or the current directory. In these examples, the italic text is what the computer prints; the roman text is what you should type.

One way to be sure you get these programs exactly right is to have someone read the numbers to you as you type them in.

You can also write a text file and pipe it into Debug (see "Tips & Tools" in the February 1993 COMPUTE to see



ETA, Summer 1993.

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Circle Reader Service Number 280

how this is done).

```
debug puts.com
File not found
-e 100 be 80 00 ac 0a c0 74 39
-e 108 e8 58 00 2b c0 8e c0 26
-e 110 8b 3e 4e 04 26 80 3e 49
-e 118 04 07 b8 00 b8 75 02 b4
-e 120 b0 8e c0 e8 1f 00 d1 e3
-e 128 03 fb e8 18 00 b8 a0 00
-e 130 f7 e3 03 f8 e8 0e 00 8a
-e 138 e3 ac 3c 0d 74 03 ab eb
-e 140 f8 b4 4c cd 21 2b db ac
-e 148 3c 30 7c 13 3c 39 7f 0f
-e 150 2c 30 2a e4 93 b9 0a 00
-e 158 f7 e1 93 03 d8 eb e8 e8
-e 160 01 00 c3 ac 3c 0d 74 d9
-e 168 3c 20 74 f7 4e c3
-RCX
CX 0000
:6e
-W
Writing 006e bytes
-Q
```

The checksum for this COM file is 062 (see "Tips & Tools" in the July 1992 issue). To use the Puts program, you'll need to give it three command line arguments. The first one is the column. These values start at the left side of the screen with a value of 0 and end at the right side of the screen with a value of 79. The second one is the row. These values start at the top of the screen with a value of 0 and end at the bottom of the screen with a value of 24.

The third argument is the color. It's made up of two parts, the foreground colors and the background colors. Both have values ranging from 0 to 15. The background colors will blink for colors greater than 7.

To combine both components into the correct number, multiply the value of the background color by 16 and then add the value of the foreground color.

If I want a dark blue background (color 1) and a white foreground (color 15), I'd calculate 1 × 16 + 15 and get a total of 31. Here are the DOS colors.

0 Black
1 Dark Blue
2 Dark Green
3 Dark Cyan
4 Dark Red
5 Dark Magenta
6 Brown/Orange
7 Light Gray/Dull White
8 Dark Gray
9 Light Blue
10 Light Green
11 Light Cyan
12 Light Red
13 Light Magenta
14 Yellow
15 White

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you can save it to disk for later use with the following utility.

```
debug savescrn.com
File not found
-e 100 be 80 00 ac 0a c0 74 44
-e 108 ac 3c 0d 74 3f 3c 20 74
-e 110 f7 8b d6 4a ac 3c 0d 74
-e 118 04 3c 20 75 f7 c6 44 ff
-e 120 00 b4 3c 2b c9 cd 21 72
-e 128 23 8b d8 2b c0 8e d8 8b
-e 130 16 4e 04 80 3e 49 04 07
-e 138 b8 00 b8 75 02 b4 b0 8e
-e 140 d8 b4 40 b9 a0 0f cd 21
-e 148 b4 3e cd 21 b4 4c cd 21
-RCX
CX 0000
:50
-W
Writing 0050 bytes
-Q
```

The checksum for this COM file is 062.

Just tell the program the filename you'd like to use. If you want to save a screen to a file called MYSCREEN, you'd type *savescrn myscreen*.

The opposite program that loads your screens in follows. To use it, just specify the filename to load as a command line argument.

```
debug loadscrn.com
File not found
-e 100 be 80 00 ac 0a c0 74 43
-e 108 ac 3c 0d 74 3e 3c 20 74
-e 110 f7 8b d6 4a ac 3c 0d 74
-e 118 04 3c 20 75 f7 c6 44 ff
-e 120 00 b8 00 3d cd 21 72 23
-e 128 8b d8 2b c0 8e d8 8b 16
-e 130 4e 04 80 3e 49 04 07 b8
-e 138 00 b8 75 02 b4 b0 8e d8
-e 140 b4 3f b9 a0 0f cd 21 b4
-e 148 3e cd 21 b4 4c cd 21
-RCX
CX 0000
:4f
-W
Writing 004f bytes
-Q
```

The checksum for this COM file is 062. Armed with these three utilities, you'll have no trouble making fancy screens for your computer.

RICHARD C. LEINECKER
MIAMI, FL

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

WINDOWS WORKSHOP

Clifton Karnes

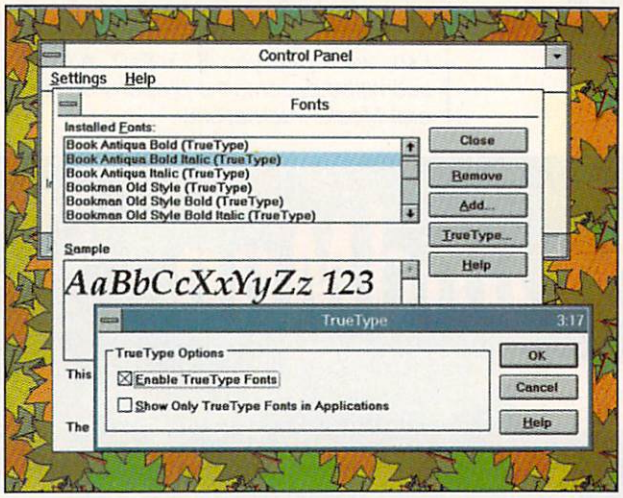
TRUETYPE AND BEYOND

Before discussing TrueType, we need to run through a little of the vocabulary we'll be using when we talk about fonts.

First, in traditional typesetting lingo, a typeface is a collection of fonts that share a common design. Times Roman and Helvetica are both typefaces, for example.

In this same traditional lingo, a font is a single collection of characters (usually upper- and lowercase alphabets plus some symbols) in one point size and style. Thus, 12-point Times Roman italic is a font. It's one of the fonts that make up the Times Roman typeface.

To turn TrueType on, run Control Panel, double-click on Fonts, click on TrueType, and click on Enable TrueType Fonts.



In modern terminology, *font* and *typeface* are used as synonyms, and they share both of the above definitions. I'll follow the modern terminology.

Style, which I just mentioned, is another attribute of a font. Style can be roman (also called normal), bold, italic, bold italic, or underlined, to name the most popular.

Fonts can be categorized in various ways, but the most usual way is to separate fonts into serif and sans-serif groups. Serifs are the finishing strokes on fonts, and fonts that lack these strokes are called sans-serif. Serif fonts are generally easier to read in small point sizes. Sans-serif fonts are bold and simple and are often used for display type (subheads, headlines, and titles).

We're not out of the word woods yet. Points are normally used to measure the height (and sometimes the width) of a font. One point is approximately 1/72 of an inch. Thus, a 72-point font is one inch tall. It's worth noting that the size is measured from the top of the tallest letter in the font to the bottom of the lowest.

With Windows 3.1, Microsoft introduced TrueType and revolutionized the font business. TrueType is an outline technology, which means that each font is stored as an outline rather than a bitmap (screen fonts, we learned in last month's column, are bitmaps).

Windows takes these outlines and scales them to produce type of any size, so one TrueType font can be used to produce a huge range of point sizes. Better still, the same TrueType font is used for both screen and printer, so what you see on your screen is very close to what you'll see in print. What you see on screen isn't exactly like what you'll see in print because your screen is a 96-dot-per-inch (dpi) device and most printers are 300 dpi or higher. But the correspondence is still very close.

Windows comes with several TypeType fonts: Ariel (roman, bold, italic, and bold italic), Times New Roman (roman, bold, italic, and bold italic), Courier New (roman, bold, italic, and bold italic), and Symbol (roman).

Ariel is a sans-serif font very similar to Helvetica, Times New Roman is a serif font similar to Times, and Courier New bears a striking resemblance to Courier. It's worth mentioning here that in the U.S., fonts themselves can't be copyrighted. But the font names can. So if someone owns the name *Helvetica,* no one else can use it unless they license it from the owner. That's why we see so many different names for what appears to be the same font.

Should you use TrueType? There are other programs available that do basically the same thing as TrueType, the best known being Adobe Type Manager (ATM) and Bitstream's Facelift, but although these are excellent products, TrueType has much to recommend it.

First, it's free. It's part of Windows 3.1 and ready to run when Windows is. Second, because of the way TrueType downloads characters, it's faster than ATM. Last, although all of these outline technologies give you WYSIWYG display, TrueType is more accurate.

The big exception to this advice that you use TrueType comes if you're doing desktop publishing and working with a service bureau that must have PostScript. If that's the case, then you'll need to use ATM, which supports PostScript fonts.

To run TrueType, the only thing you need besides Windows 3.1 is a dot-matrix, inkjet, or laser printer. TrueType is built into Windows, so to access TrueType fonts, you simply need to turn TrueType on. To do that, run Control Panel and double-click on Fonts. Next, click on the TrueType button and in the dialog box that follows, click on Enable TrueType Fonts. That's all there is to it.

Now your TrueType fonts will be available in all your Windows applications that use fonts, so fire up Write and take TrueType for a test drive. ❐

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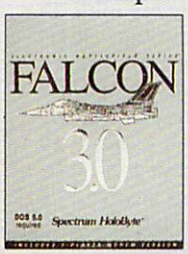

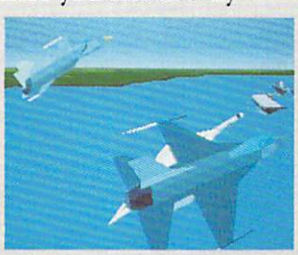

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HARDWARE CLINIC

Mark Minasi

DOS NT: A PLEA

Some thoughts on the eve of DOS 6.0

By the time that you read this, either DOS 6.0 will be out, or it will be out soon. Of course, it's just one more step forward; DOS could use a lot more growth.

As I see it, DOS needs to change in four ways:

- DOS must provide reason and incentive for PC software developers to move away from direct hardware access and move toward greater use of the operating system as an operating system. Once that happens, DOS will have a clear pathway to growth and improvement that could make it the standard operating system of the desktop into the mid twenty-first century.
- DOS must offer a command line–based, protected-mode multitasking facility that doesn't rely on a graphical user interface (GUI). GUIs don't make sense for much of what PC users do, and they require advanced hardware to run properly. There must be a better way to offer secure multitasking than with an operating system that recommends 16MB of RAM, a 33-MHz 486 processor, and a CD-ROM to load the operating system, as Windows NT does.
- DOS needs an optional new file system that supports long names, automatic file-system fix-ups, faster access, and more information about how files are being used.
- DOS must provide better power-user tools. QBASIC can't interface with DOS or BIOS functions directly, and there are none of the tools (such as awk, grep, and sed) that make working with UNIX a pleasure for toolmakers.

Supercharging DOS

PCs with 286-, 386-, and 486-level CPUs have a processor mode, called protected mode, that allows access to 16MB or more of RAM. Protected mode not only supports more memory, it also provides much of the behind-the-scenes support for multitasking operating systems. Protected mode makes it possible for an operating system to load multiple programs.

Unfortunately, DOS and DOS programs don't use protected mode, which is why they're generally trapped in the bottom 1088K of your PC's RAM. OS/2 and Windows NT are built in protected mode and can access megabytes and megabytes of RAM. That points out a real problem with the Microsoft and IBM operating system offerings since 1986—that is, OS/2 and Windows NT. In order to get to the indisputable benefits of protected mode using OS/2 or Windows NT, you must accept the intrusion of a GUI.

Don't get me wrong—GUIs are good things. But they are processor hungry. Windows 3.1, which is probably less CPU intensive than either OS/2 or Windows NT, really needs a 25-MHz 386DX with 8MB of RAM to be useful. But if all I want to do is run a big spreadsheet program or sort a huge mailing list file, then I don't want a GUI. It slows me down and burns up precious RAM.

Instead, why not offer a DOS NT? In its simplest form, Microsoft could easily offer a text-based, command line–driven operating system that looks just like DOS and supports old DOS programs but could also run *new* DOS programs—programs written specifically for DOS NT. By its nature, DOS NT would live in protected mode. But any time that it needed to shift back to real mode—the alternative to protected mode—it could do that. There's no rocket science involved in doing that, as operating systems such as OS/2, Windows, and Windows NT have been able to support real mode programs for years. Existing DOS programs would continue to run whenever you started them up.

New DOS programs would be built in protected mode, so they would have access to tremendous amounts of RAM.

Other Benefits

Additional RAM wouldn't be the only benefit of a protected-mode DOS NT:

- It would bring about the timely death of memory management. You'd never have to worry about extended, expanded, or conventional memory again.
- It would provide an easy upgrade path to future operating systems. Once a program is written to work under protected mode, it's basically tamed. It no longer does things behind the operating system's back, mainly because it no longer can. As a result, making the program work under any new protected-mode operating system, or even a completely different processor and operating system, is significantly easier than converting from a current DOS real mode to another operating system.
- It would be less expensive and have a broader appeal than Windows NT or even Windows. Windows NT is a monster operating system that loads only off a 300MB+ CD-ROM. Windows uses as many as eight installation disks. Many people don't want to deal with that much stuff. They just want to run the programs that they're already using; they don't want to learn a pile of new stuff, particularly when the new stuff is often a bad adaptation of the old stuff.

One thing that Windows really needed was a good implementation of each of the

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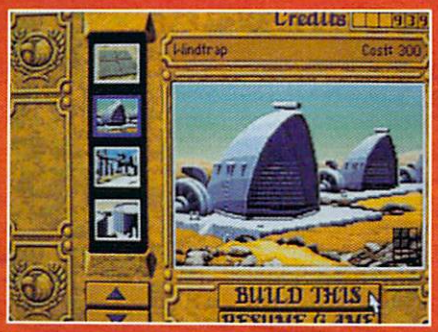

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Circle Reader Service Number 183

most popular DOS programs: 1-2-3 in the spreadsheet category, WordPerfect in the word-processing category, and dBASE, Paradox, FoxPro, or Clipper in the database category. Unfortunately, 1-2-3 for Windows and WordPerfect for Windows suffer from serious problems, and, at this writing, there isn't a Windows version of dBASE, FoxPro, or Clipper, despite years of promises.

Why has there been so much trouble converting major DOS applications to Windows? I think that it's largely because the most successful DOS applications are often the fastest applications in their categories; that's certainly the case with 1-2-3 and WordPerfect. The way to make a DOS application fast is to break all the rules about working within an operating system and directly control the PC's hardware. That doesn't work in Windows. So software companies have to either retrain the lead programmers on their products or bring in green programmers and direct them in building a Windows program that acts like the big-selling DOS version. And sadly, it hasn't worked.

The next PC operating system will probably be the last.

A conversion to DOS NT would certainly retain some of those problems, but not all of them. Conversion from a command line, text output, real-mode operating system to a command line, text output, protected-mode operating system is much easier than conversion to a GUI-based, graphical, protected-mode operating system such as Windows, Windows NT, or OS/2. And that means there's a better chance that the DOS NT versions of the major PC applications would appear on time at a reasonable price and look perhaps exactly like the familiar, popular DOS versions—except without any of the memory constraints and with multitasking possible.

This is perhaps the most important reason to create a new protected-mode version of DOS—because the software world can't move on until real-mode DOS fades away, and DOS ain't goin' nowhere until there's a decent mass market alternative. A DOS NT could run credibly on a 386SX computer with 4MB of RAM, even on a pen-based computer; that can't be said of Windows, Windows NT, or OS/2.

- It would easily support multitasking. Most of the pain and suffering of supporting DOS in a multitasking framework comes from the problem of having to keep track of several programs that are all trying to control the PC hardware directly.
- This could be the last new PC operating system, so it had better be good. Computing platforms are born; then they go through a period of rapid growth and change. Problems turn up, and workarounds appear shortly thereafter. Then applications follow that are built upon those workarounds.

Each change in the operating system brings with it costs and benefits. The benefits are the potential to create new applications that can do things that the old applications can't. The costs, on the other hand, are incompatibility or reduced compatibility with the older applications—the growing number of applications that we've already paid for.

At some point in an operating system's life, the sheer investment in machines and applications becomes so great that the potential benefits from any new operating system would have to be stupendous in order to justify a move to the operating system, whether it be OS/2, Windows NT, UNIX, DOS NT, or whatever. The designers of operating systems understand this, so they tend to overpromise features and underestimate development time.

Eventually, the computing public sees that the promises were unreasonably optimistic, and that, in turn, lowers user confidence and the perceived future value of the operating system. The public figures that the hardware and software that are currently in place are solid enough and well understood, warts and all. "Better the devil you know . . . ," we'll all say.

- At some point, it will be economically unacceptable to use anything but the most incremental of changes from the current operating system.

This isn't science fiction; it's already happened in the mainframe and minicomputer worlds. For all its power, the core of IBM's MVS/ESA operating system looks an awful lot like OS/MVT, the mainframe operating system of over two decades ago. IBM tried to overhaul the mainframe's operating system in the late seventies with the Future Systems project, but IBM's customer base said, "A new, better operating system that my existing programs won't work with? Thanks, but no thanks."

All of that is just a supporting argument to one of my premises here—we'll have maybe one more major operating system changeover and then the microcomputer world will be encased in amber forever after.

My nightmare is that the once-and-future operating system in the PC world will be a real-mode DOS. The jump to some kind of protected-mode DOS would be the last big jump necessary for DOS to continue to grow and change. Let's make it soon before it becomes impossible. ❐

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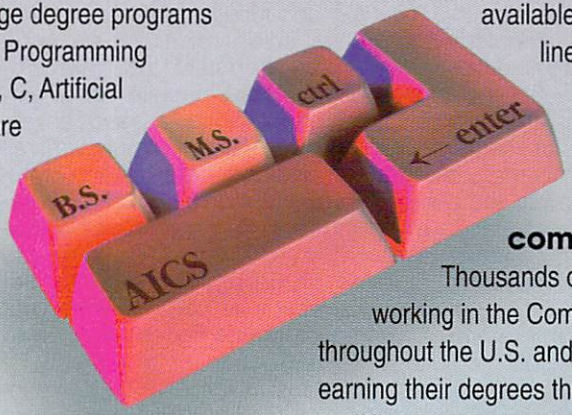

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PROGRAMMING POWER

Tom Campbell

BORLAND C++ 3.1: IS IT AN UPGRADE FOR YOU?

Borland C++ 3.1 & Application Frameworks is a fabulous package, priced (street price, $500) and positioned for the professional developer. I use Borland C++ (BC++) to develop applications in C, C++, and assembler. This is a report from the front that should help you decide whether to upgrade or switch to Borland.

If you've been developing C applications, you'll be pleased to know that the Windows environment now handles all the options—it's not the crippled Turbo C++ for Windows that came with 3.0 but a full BC++ implementation. You can create project files automatically, but they're somewhat limited. There's no longer a transfer menu, and you can't run anything but the C/C++ compilers and assembler from a project. Since I use other program generators, I'm unable to automate my program development completely. Many C programmers won't have this problem, but it didn't make me happy.

You'll wind up hunched over printouts with the same dedication with which a rabbi studies the Talmud.

One of the most widely publicized additions is a syntax-directed editor, which shows comments, keywords, identifiers, and so on in user-definable text attributes. This isn't a gimmick—it really does make your code easier to follow, especially in the case of mismatched comment braces.

The Windows documentation has been expanded and comes with a short, much-needed reference guide that documents, finally, a number of heretofore mysterious aspects of Windows programming. There's a chapter on the printing codes for the Escape() routine, which is necessary for using a printer from Windows. File formats for bitmaps, icons, the Clipboard, and Windows Metafiles are described. And there are finally "see also" sections in the API docs. If you've been stumbling through Windows programming and know only enough to be frustrated by the lack of cross references in Borland's API manuals, this subtle difference alone may be worth the upgrade.

Lack of context is still the biggest problem in Windows API manuals. Sadly, there are no example programs or even fragments in the API documentation. Save yourself months of heartbreak by purchasing the Waite Group's superb *Windows API Bible,* which has an example for every message and function call.

Turbo Vision (TV) is a useful development tool that provides a complete set of programming libraries and conventions, much like Windows itself (hence the *Application Frameworks* moniker). Make no mistake: You can develop top-notch, commercial-quality DOS programs with TV, but you must use it to write your programs from scratch—and expect to spend plenty of time in the BCPPDOS forum on CompuServe. You'll also wind up hunched over printouts of the example programs with the same dedication with which a rabbi studies the Talmud. The libraries are complete but tough to follow. One of TV's advantages is that its high degree of modularity allows you safely to lift whole sections of code out of the sample apps and into yours, but only after you know the ropes. Thankfully, a lot of bugs have been eliminated, but code size is still a problem.

Borland Pascal TV apps are often 100K smaller than their C++ counterparts because the C++ linker can't strip out unused code as efficiently as Pascal's. TLINK is quicker than greased lightning but needs improvement in smart linking and overlay management.

Horrifyingly, Turbo Debugger for Windows is still character based. Although technically a Windows program, it acts like a DOS app and suffers from the resultant graphics mode switching every time you step over a function call. Apart from that egregious flaw, TD remains one of the best debuggers known to humankind, far surpassing Microsoft's CodeView.

Another surprising omission is that you can't create DPMI programs that use true 386 protected mode without buying a third-party DPMI DOS extender, although you can do so with Borland Pascal 7.0. I imagine it's just a matter of scheduling and that BC++ 3.5 or 4.0 or whatever will indeed include the extender.

Turbo Assembler was upgraded a couple of versions ago to create Turbo Pascal and C++ classes; TA, TLINK, and the TLIB librarian are astoundingly fast. They don't seem to have changed since BC++ 3.0, however. Turbo Profiler is still the best profiler around and one of the least expensive, fastest ways to improve your code. TPROF doesn't seem to have changed since 3.0.

Should you upgrade from BC++ 3.0 to 3.1? Yes, if you need proper Windows 3.1 support, the full integrated environment running under Windows, or the incremental but significant improvements in documentation. But if you're expecting improvements or better documentation for OWL, the BIDS class library, or TV, save your money. Likewise for Turbo Assembler, Turbo Profiler, and Turbo Debugger, which are already extraordinarily good products and already pretty well documented. ❐

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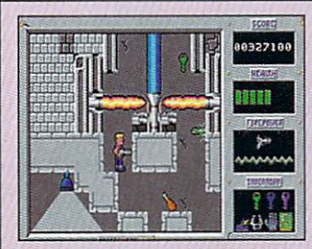

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HIGH-SPEED TELECOMMUNICATIONS

BY ROSALIND RESNICK

In the beginning, modems were slow but steady, the Volkswagens of the computer world.

Simple devices that converted the digital signals from your computer to analog signals capable of traversing the telephone net, early modems performed the basic tasks of transferring files and dialing up online services in a plodding but workmanlike way. If you wanted data compression, error correction, flow control, or any other bells and whistles that might make your data go faster, you had to look to your communications software. As a result, most early modems chugged along at the snaillike pace of 300 bits per second.

For a while, 1200 bps was the standard. Just a few years ago, modems that transferred files at 2400 bits per second became the mainstay of the personal computing world.

Not any more. Thanks to computer users' clamor for faster and less expensive downloads and file transfers, modem manufacturers have been slashing their prices. While some high-speed (V.32bis) modems still cost $500 or more, you can now pick up a reliable one with all the desirable features for under $200. In fact, the price differential between a V.32bis (14,400 bps) modem and a V.32 (9600 bps) modem has shrunk to less than $100.

Dataquest, the San Jose, California, market research firm, says it's only a matter of time before high-speed modems take over the marketplace, making today's 2400-bps modems virtually obsolete. The reasons: the need to transfer large graphics and database files, remote file server or LAN-to-LAN connections, and general sensitivity to connect-time charges.

Here's how Dataquest sees things shaping up.

Back in 1987, 716,400 of the modems on the market were 2400-bps modems; only 20,000 were capable of transmitting data at a rate as high as 9600 bps. But the 2400-bps standard couldn't hold its ground for long. Last year (1992), 2400-bps modems peaked at 950,000 units, while sales of 9600-bps modems rose to 400,000 units and

sales of 14,400-bps modems, introduced in 1991, more than doubled to 220,000.

By 1996, Dataquest predicts, the V.fast modem—not even on the market today—will account for 350,000 units sold, with 9600-bps and 14,400-bps modems chalking up a total of 750,000 units sold. By contrast, sales of 2400-bps modems are expected to sink to 480,000.

"The marketplace has possessed a voracious appetite for higher-transmission-rate modems," says analyst Joe Noel, "and Dataquest does not anticipate this changing."

Today's modems are light-years ahead of their predecessors of a decade ago. Swift, smart, and powerful, the new breed of turbocharged modem is loaded with cutting-edge features capable of speeding your data across the country in the blink of an eye—as fast as 57,600 bps—saving you vast amounts of time and money.

Consider: With a 14,400-bps modem, the fastest one on the market today, it's now possible to send a 1MB file from Los Angeles to Boston in 3.05 minutes for just $0.73; sending the same file the same distance at 2400 bps would take 72.82 minutes and cost $17.48. At 9600 bps, the fastest speed available on a major online service, you can download a 1MB file from CompuServe in only 17 minutes for $6.46—less than half the $14.50 you'd pay to download the same file at 2400 bps and a fraction of the 68 minutes you'd have to tie up your computer.

And there's a bonus: Virtually all of today's high-speed modems are fax/data modems. This means there's no longer any need to print out a hard copy of your document and stuff it into your fax machine—or drive over to your neighborhood copy shop and pay exorbitant prices. You simply press a hot key, and your fax transmission is on its way.

Best of all, the new modems are relatively inexpensive. For example, U.S. Robotics offers a 14,400-bps fax/data modem for as little as $499 and AT&T Paradyne's DataPort internal 14,400-bps fax/data modem lists for $505 (at the time of this writing, the internal and external DataPorts are on sale for $399 and $439, respectively). Street prices for these products are even less, and competition is driving prices lower virtually every day. Just two years ago, modems like these cost $1,000 or more. Be sure to shop around for the best price before you buy a high-speed fax/data modem.

Ah, but just like those sexy little Ferraris that

burn up the tracks on their good days but seem to spend most of their time in the shop, today's high-speed modems are riddled with technical glitches that can sap their power, at times forcing them down to a speed as slow as 1200 bps, and at other times preventing them from functioning at all.

The reasons are numerous: everything from the inevitable hardware and software incompatibilities to overtaxed communications ports and busy networks.

The glitches result in modems that can't talk to other modems, modems with fax capability that won't send faxes unless you reboot your computer, data modems that can't upload files to a bulletin board, and front-end programs that won't let you go online unless you first shut off all of your modem's special features.

In short, these high-speed modems are creating a veritable Tower of Babel that leaves many home computer users, even those who are knowledgeable about computers, frustrated and confused.

CompuServe member Steve Ringley, an electronics technician who works for the Ohio National Guard, bought a high-speed modem in October to help cut his long-distance phone bills. Because Ringley lives in McConnelsville, a small town about 100 miles southeast of Columbus, there aren't any local access numbers he can dial to log on to his favorite online services.

The new modem managed a connection to CompuServe, Ringley recalls, but wouldn't connect with two other popular services, GEnie and America Online. Finally, after numerous calls to technical support staffers and hours of trial and error of his own, Ringley hit upon some modem initialization strings that worked.

"The lack of standardization is the real culprit," Ringley says. "The modems need to figure out what language they're going to use to negotiate with one another."

Asked about the problems, the modem manufacturers and the online services readily acknowledge the trouble but disagree on who's to blame.

"It takes two to tango," says Paul Hansen, vice president of technology and marketing services at Practical Peripherals, a leading manufacturer of high-speed modems. "There is no possible way, with all of the backward compatibility that the marketplace demands, to cover every sort of thing. Why should we as a modem manufacturer do what the software people should be doing?"

The online services, for their part, say they'd like to see the manufacturers get their act together. Les Briney, Prodigy's director of development, says the service offers roughly 35 different modem initialization strings in a downloadable text file and keeps adding new ones every day to keep up with the hundreds of different high-speed modems as they come into the marketplace.

"The problem," Briney says, "is that no two modem vendors have identical modems. The standards are not as strong as they used to be."

Making Peace

If you can't get your modem up and running, it doesn't really make much difference who's to blame. Here's a quick guide to some of the common problems involving high-speed modems, along with some practical solutions suggested by computer users and modem experts.

Problem: With my old 2400-bps modem, I had no problem dialing up my favorite online service. With my new high-speed modem, all I get are error messages.

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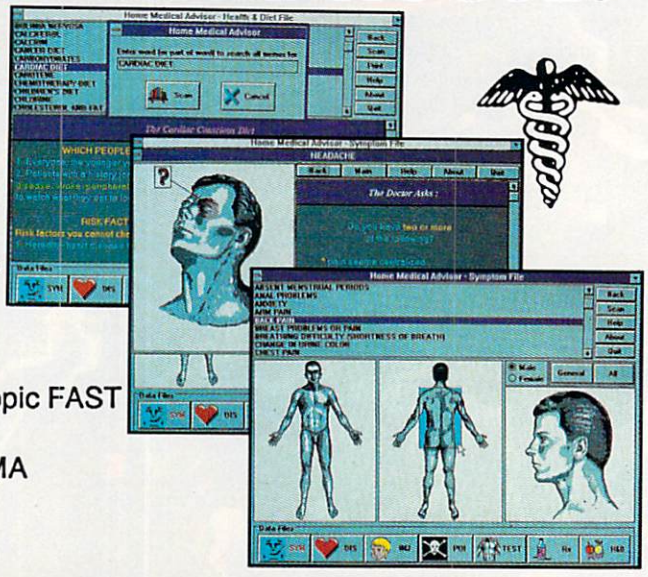

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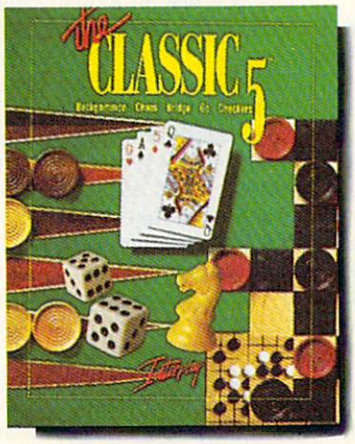

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Solution: If your online service is Prodigy or America Online, there's a reason for that. Both services use proprietary front-end programs developed back in the days when modems were a lot less powerful than they are now. To speed data flow, the two companies built things like data compression and error correction into the software itself. Unfortunately, even when you dial up an online service with a smart modem that has all the latest features, the software still wants to take control.

Change your modem initialization string (the set of commands that begins with AT) to turn off your modem's data compression, error correction, flow control, and other special features. This way, your front-end software will be able to call the shots, letting you dial up and log on with no problem.

Unless you enjoy reading modem manuals (and have the technical savvy to make sense of them), the fastest way to find an initialization string that works with your modem is to call the technical support department of the company that manufactured your modem or the online service you're trying to reach.

Problem: I've changed my modem initialization string, but I keep getting error messages anyway.

Solution: Maybe it's a hardware problem. Before two modems can talk, they must first shake hands, deciding which signaling, error-correction, and data-compression protocols to use in their conversation. However, each modem manufacturer uses its own slightly different method for conducting the protocol handshake. Some even use proprietary protocols that aren't compatible with those of other modem vendors.

To find out if you have a hardware compatibility problem, call the technical support staff at your online service and explain exactly what kind of modem you have. Unfortunately, some of the earlier high-speed modems, such as the V.29 series, aren't supported by online services such as Prodigy. If you have one of these earlier models, you may have to make a choice between logging on to your favorite online service or scrapping your old modem and buying a new one.

Problem: Most of the time, my high-speed modem lets me go online at 9600 bps, but other times when I log on, communication is really slow.

Solution: The problem may be the communications network. If lots of people log on at the same time, the network may slow to a crawl—the same way it takes twice as long to drive home from your office during rush hour. That's why it makes sense to log on early in the morning or late at night when CompuServe and the other services aren't so busy.

Problem: When I try to use the modem, my computer locks up and I have to turn off the computer and reboot it.

Solution: The problem may be an interrupt conflict on your serial port, especially if you've already installed a mouse, an optical scanner, a tape backup, or other serial devices in your PC. Because of the way IBM originally designed the PC way back in 1981, communications ports 1 and 3 use interrupt 4 and communications ports 2 and 4 use interrupt 3. That's why, if you assign both a mouse and a modem to COM1, you're going to have to open up your computer and reset the DIP switch on your modem. Check your modem manual for instructions.

Problem: With my high-speed modem, I keep losing data when I try to transfer files with my Windows-based communications program.

Solution: Maybe it's your UART (Universal Asynchronous Receiver/-Transmitter) chips, the chips that control the serial port of all personal computers. During modem communications, your computer's UART and the CPU transfer large amounts of data. When you run your communications program through a multitasking environment such as Windows, DESQview, or OS/2, especially at high speeds, the CPU can't juggle it all and bits of data start falling out along the way.

To fix this problem, you may need to invest in a new piece of hardware. If your computer has an 8250 UART, try replacing it with a 16550A UART that creates a buffer stack that allows the UART to save any incoming data while waiting for the CPU to catch up. Another option is Hayes's ESP Communications Accelerator for Windows, an add-on serial card with a dedicated coprocessor capable of supporting data transfers as fast as 57,600 bps.

Problem: The communications program I've been using for years won't run my new modem at its highest speeds.

Solution: Much of the communications software that came out in the late 1980s won't support modem speeds faster than 9600 bps. You'll need to buy a new program (or an upgrade to your old one) that lets you dial up at 14,400 bps and higher. It's also important to get a program that can take advantage of the 16550A UART described above.

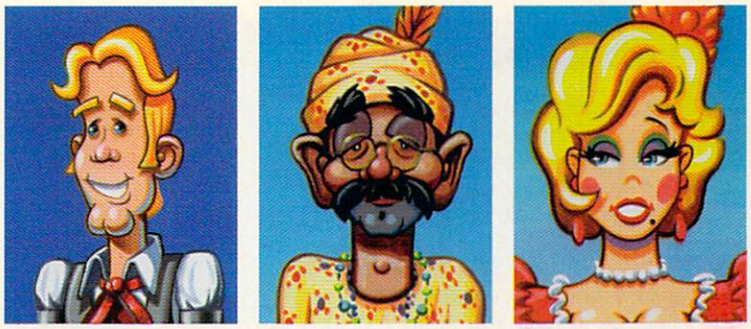
Modem Wars

Remember when *Hayes-compatible* sounded like *modem*'s first name? Most modems continue to be Hayes compatible, but there's been trouble in modemland. The fallout is incompatibility, consumer confusion, and bad blood by the gallon.

Unless you are an industry insider, you probably are unaware that telecommunications has been mired in a legal morass over the past half decade. The morass was created by a battle that tested the rights of the creators of intellectual property to protect that property even as the rest of the industry tried to make that property a standard. It was a situation simular to the one Lotus created when it sought to stop the publishers of 1-2-3 look-alikes by bringing lawsuits against them, but with important differences. Hayes, the creator of the industry-standard escape sequence used by most modems, was willing to share its property through licenses, and it found itself the target of lawsuits rather than the instigator.

What exactly is an escape

The Good...

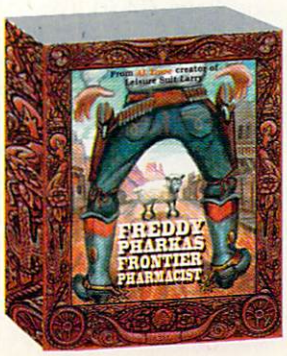


The Bad...

And The Butt-Ugly.

In the Old West, you couldn't tell the bad guys from the good guys by how ugly they were (you had to rely on the color of their hats). But in ***Freddy Pharkas, Frontier Pharmacist,*** even a scrawny, sissified, one-eared Pharmacist can be a good guy.

Al Lowe, creator of Leisure Suit Larry, spins a yarn of schoolmarms and chorus girls with hearts o'gold, cowboys and Indians, and varmints and heroes. It's the brand-new, age-old tale of Freddy Pharkas, a gunslinger who gave it all up for his love of pharmacology. Together with his faithful Indian companion, Srini Bagdnish, Freddy sets out to save bucolic, boring Coarsegold from a fate worse than Hollywood adaptation.



So don't just groan at all those old horse-opera clichés. ***Be one.*** Strap on your spurs for a saga that skewers every Western under the sun. Mosey on down to your software store and ask for ***Freddy Pharkas, Frontier Pharmacist,***

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MODEM LINGO

Back in the old days of low-speed communications, all you had to know about were the bauds and the bits. With today's high-speed modems, there's a whole new lingo to master—"V-dot-this," "MNP-that," "CCITT," "UARTs," and the like. Here's a pocket dictionary of the latest modem terms to help you swim your way out of this alphabet soup.

Bits per second. The rate at which units, or bits, of data are transmitted over a phone line or other communications channel.

Protocol. A set of rules that tells two modems how to communicate with each other.

CCITT (Comite Consultatif International Telegraphique et Telephonique). A European-based advisory committee established by the United Nations to recommend worldwide standards for modulation, data compression, and error checking.

CCITT V.32. The international modulation standard for modem communications at 9600 bits per second, with fallback to 4800 bits per second when phone line quality is impaired.

CCITT V.32bis. The international modulation standard for modem communications at 14,400 bits per second. (The *bis* doesn't stand for anything. It's a suffix used in French to designate an add-on.)

CCITT V.42. An international error-correction protocol that ensures the integrity of data transmitted from one modem to another.

CCITT V.42bis. An extension of the CCITT V.42 protocol that, together with CCITT V.32bis modulation, can boost throughput as high as 57,600 bits per second.

CCITT V.fast. The nickname for the generation of high-speed modems still under development. Because of its more sophisticated precoding and signaling features, the V.fast modem would be able to deliver speeds of 19,200 bits per second on telephone lines that are currently capable of transmitting data at only 14,400 bits per second.

MNP. Microcom Networking Protocol. An older proprietary standard of error control and data compression.

MNP 5. A Microcom data-compression protocol that lets a modem use fewer bits to transmit the same amount of information, dramatically increasing the speed at which a computer can send information to the modem.

UART (Universal Asynchronous Receiver/Transmitter). UART chips control the serial ports of all personal computers. An 8250 UART might need to be upgraded to a 16550A UART.

sequence? The escape sequence tells the modem to switch from data mode to command mode. In data mode your modem is sending information to the receiving modem, and in command mode it's ready to receive AT commands, the commands that tell the modem what to do (such as the command ATH, which tells your modem to hang up) or configure the modem. The guard time mechanism prevents the modem from going into command mode unless there's a period of silence before and after the escape sequence. The escape sequence consists of a period of silence, three plus signs (+), and then another period of silence. The purpose of the guard time mechanism is to ensure that if you're sending a file that happens to contain a series of three plus signs in a row, your modem won't accidentally go into command mode and wait for further instructions.

To make sense of the conflict, here is the recent history of telecommunications in brief. In June 1981, Hayes Microcomputer Products filed for a patent for its escape sequence and guard time mechanism. This patent

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was granted in October 1985. A year later, Hayes offered to license the technology to other makers of modems. Within a month a consortium of modem manufacturers was formed (called the Modem Patent Defense Group), and two of the members (U.S. Robotics and Prometheus Products) brought suit against Hayes, challenging its patent. Hayes countersued. Microcom, Multi-Tech, and Ven-Tel sued Hayes. Hayes sued Everex and OmniTel for patent infringement. Microcom and U.S. Robotics settled out of court and agreed to license the patent. Three of those companies—Everex, Ven-Tel, and OmniTel—ended up in court, where the Hayes patent was upheld. All of the remaining lawsuits were either settled out of court or adjudicated in Hayes's favor.

Where does that leave us? Hayes has licensed its escape sequence and guard time mechanism to two chipmakers, Rockwell and Silicon Systems. If you purchase a modem with one of these chip sets, you are legally allowed to use Hayes's patented technology. However, a competing standard called TIES (Time-Independent Escape Sequence) has emerged. TIES is not patented and is free for use by anyone who wishes to adopt it. The TIES sequence differs from the Hayes sequence only slightly. It consists of three plus signs, then the letters *AT*, and then a carriage return. Some argue that this sequence might be more prone to cause a shift into command mode in the middle of a file. The odds are still very slight that it will happen on any particular transmission. A Hayes white paper on the subject estimates that an individual computer user who transmits files for about an hour a day will encounter about six files per year that cannot be transmitted in full. Companies that send thousands of files a month might discover large numbers of files that can't be sent using TIES, and for reasons that would be a complete mystery to most computer users.

The international standard-setting organization CCITT is not likely to set a standard that incorporates the Hayes escape sequence. However, Hayes has established a de facto standard that has become so widespread that any competing standard will have difficulty prevailing over it.

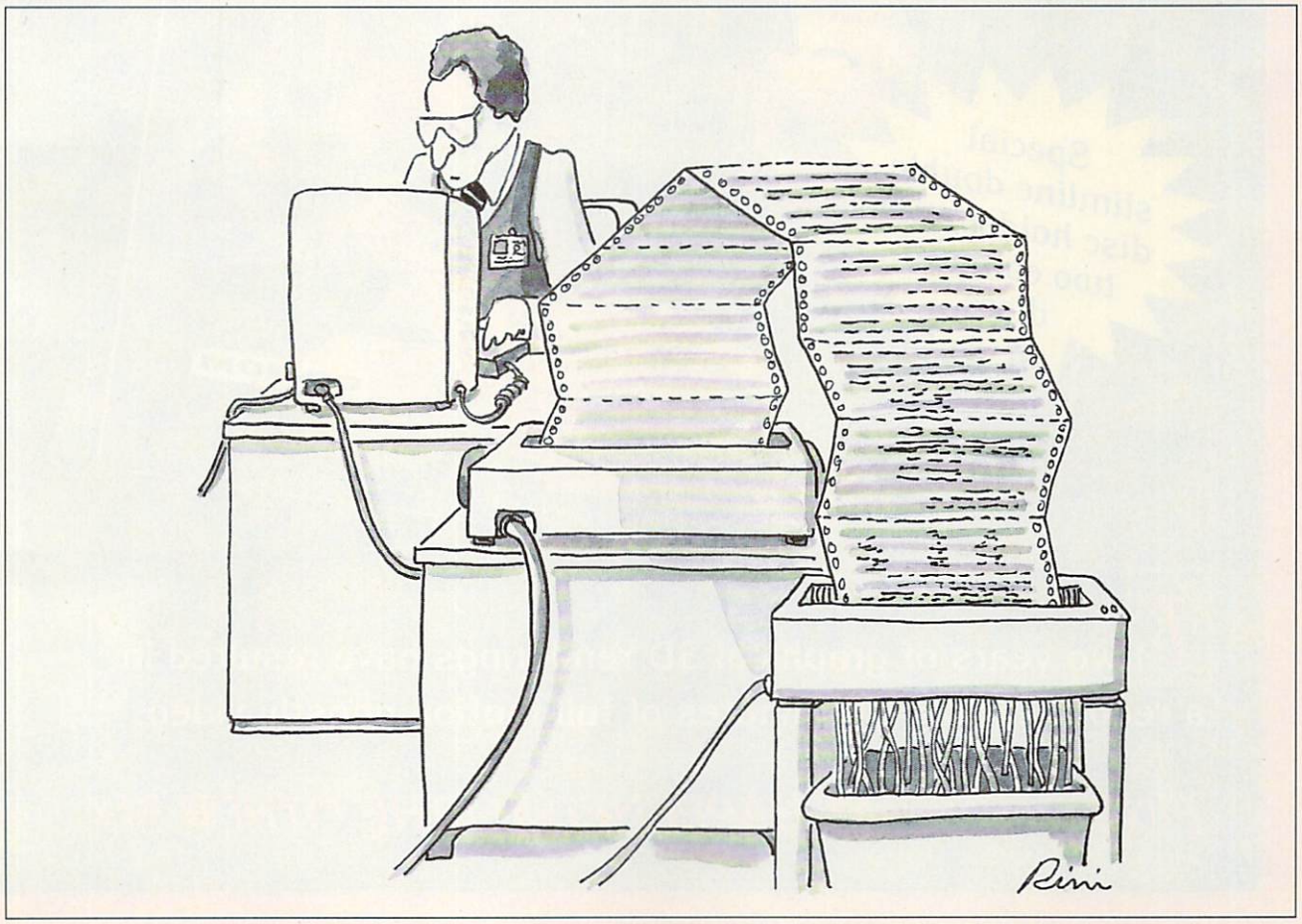
The Future's Here to Stay

Despite the many problems that currently plague high-speed modeming, one thing is clear: There's no going back to the days of 2400-bps communications. Modems are going in only one direction, and that's toward faster speeds. So, while fine-tuning your modem may not be anybody's idea of a fun time, it may be worth your while to invest a couple of hours learning a little about modem technology to save a lot of time and money later on.

The good news is that some day soon the nation's homes and businesses will be rewired with digital phone lines, making modems—and modem problems—obsolete. Unfortunately, it may be a long time before PC communications will be as easy as plugging a phone line into the back of your computer and dialing up your favorite online service. You'll still need to buy a terminal adapter and navigate your way through another host of technological issues.

"Hopefully, in another year or two, there will be a standard switch interface for the terminal adapter to talk to," says John Copeland, vice president of technology for Hayes. As for the adapter manufacturers themselves, "People are always going to want to differentiate their products and include some feature or enhancement that the rest of the crowd doesn't have."

That's just modem nature. ❑



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PRODUCTIVITY CHOICE

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Clifton Karnes

ASCEND 4.0

I can't imagine life without Ascend. There are very few programs I can say that about, but Ascend is definitely one. In fact, it's probably my most important tool.

Ascend is a Windows-based personal information manager, or PIM. And like most PIMs, it manages diverse types of information, including a prioritized daily task list, an appointment schedule, calendars, a master task list, a telephone and address book, a journal, a database, and much more. The program's newest version, 4.0, adds many state-of-the-art enhancements—like drag and drop and OLE—that quickly become addictive.

Before discussing Ascend's specifics, I want to talk about its background—there's more to Ascend than might be apparent immediately. It's based on a philosophy, and every module in the program relates to this philosophy.

Ascend was developed by Franklin Quest, a time management consulting company that has been teaching time management techniques and selling paper-based Franklin Planners for years. The Franklin method is based on a top-down approach to time and task management with the final goal being inner peace, something most of us feel is not only worthy and desirable, but seemingly unattainable.

In the Franklin system, you begin not with figuring out how to arrange tasks for the day or manage contacts, but by defining your most important lifetime goals. From these long-term goals, you construct midrange goals, and from these you begin to plan your daily tasks. Obviously, every task can't relate specifically to your long-term goals, but many can. And if they do, not only will you be more productive, but you'll also be at peace with yourself. This is the Franklin philosophy. Ascend's modules are well designed and general, so you can use them without buying into this philosophy. But then you'll lose some of the program's power. Now, on to the details.

Ascend sports a colorful multiple document interface (MDI). MDI applications, like Windows' own Program Manager and File Manager, let you have any number of modules open at a time, and you can size, maximize, and minimize each to get just the organization you want.

To make navigating these modules easy, there's a button bar with one button for each module. You can customize this button bar and determine which buttons go on the bar and in what order. You can place the button bar at the top, bottom, or side of your display; or you can let it float. If you'd prefer to use the shortcut keys instead, you can even hide the bar.

The first module we should discuss is the Productivity Pyramid. This module helps you build your long- and midterm goals and apply them to your daily tasks. You don't have to use the pyramid, but if you do, you'll keep focused on your most important goals.

Ascend's centerpiece is its Prioritized Daily Task List. Note that this isn't called a to-do list, and with reason. Ascend wants to emphasize that this is a *prioritized* list.

Ascend's task list uses a system, recommended by several time management experts, of grouping tasks into three categories: vital, important, and trivial. Then the tasks in each group are ordered by priority. This is clearly the way to construct a task list, but it's amazing how many PIMs fail to follow this recognized formula.

All this ordering and reorganizing is a snap with Ascend. There are special dialog boxes that make sorting as easy as double-clicking. And Ascend 4.0 lets you sim-

ply drag and drop tasks to change their order. If you follow your carefully prioritized list, you may not get to every task, but you'll always get the most important ones done.

In version 4.0, all of the modules have similar button bars. If you dislike them, you just double-click on the band that the button bar rests on, and the bar disappears. To get it back, double-click on the area where the button bar would rest. It's hard to imagine a slicker system.

One of the most useful new features is the ability to link tasks to contacts. You simply click on the Link button, and a list of your contacts appears. Select one, and the link is made. You can then view all the tasks and appointments associated with an individual.

To support the Prioritized Daily Task List, there's a Master Task List module, which actually holds several lists: one for work, one for home, and two for miscellaneous lists. You can move tasks between your daily lists and the master list. The Master Task List also displays the age of each task in days. This is a useful form of passive nagging.

Ascend boasts several calendars. You can display a weekly or a monthly view, complete with the amount of free time available each day. Ascend lets you place informative icons on special days (suitcases for travel days, palm trees for vacation days, and closed signs for days your business isn't open, to name a few), and these are visible in the calendar.

There's also a small monthly calendar that you can leave on your desktop all the time if you like. It's useful for quickly changing the date, and you can reschedule tasks and appointments by dragging them from their respective lists to the days on this little calendar. This is the easiest rescheduling system I've ever seen.

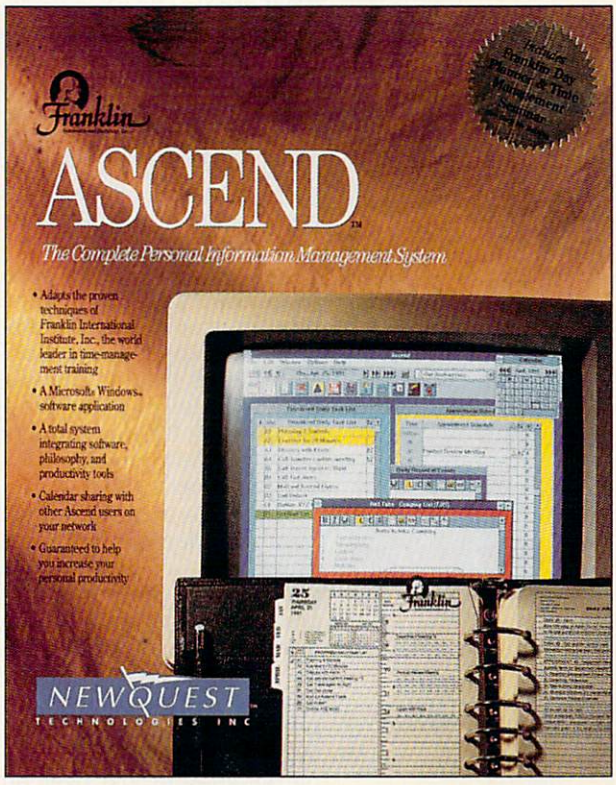
Ascend's Address Book was completely rewritten for version 4.0, and it's a terrific tool. It has fields for almost every imaginable aspect of a person, and you can link appointments and tasks to individuals in your Address Book.

Ascend 4.0 supports DDE and OLE, and it comes with Word for Windows macros that let you search your Ascend Address Book and insert names—all while you're in a Word document.

If you're looking for information that you know is hidden somewhere in Ascend, you can use the improved global search, which lets you select which modules to search in. And for taking notes, there's a journal, a record of daily events, and Red Tabs, which are special areas for storing information grouped by topic.

If you want to print your tasks and appointments and take them on the road with you, Ascend makes superb printouts on two sizes of Franklin Planner forms and on standard 8½- × 11-inch paper.

You probably realize that I'm enthusiastic about Ascend, and I am. I've found very little to complain about, but here are a couple of gripes. The program doesn't seem to respond to the standard Windows exit protocol, so if Ascend is open on your desktop and you exit Windows from Program Manager, the next time you run Ascend, it will tell you that its index is corrupt and it needs to reindex. I've never lost any data from this, but it's annoying.



Ascend 4.0 supports drag and drop all over the place (you can even drag and drop between appointments and tasks, which is pretty neat), but you can't drag a task from your Master Task List to your Prioritized Daily Task List, which is something most people would want to do every day. (You can drag tasks in the other direction, however.)

Both of these complaints are minor. And Franklin Quest has a history of quickly fixing bugs and relentlessly improving Ascend.

Should you buy Ascend 4.0? Yes. It won't solve all your problems, but if used conscientiously, it'll help you solve the most important ones.

Circle Reader Service Number 391 ❐

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"You don't have to wait for a bolt out of the blue; there are processes that will help you gather more ideas. And the more ideas you gather, the more likely you are to get a great idea," says Roy Nieremberg, creator of Idea Generator Plus (Experience in Software, 2000 Hearst Avenue, Suite 202, Berkeley, California 94709-2176; 800-678-7008 or 510-644-0694 [voice], 510-644-3823 [fax]; $195).

The Reverend Bernard J. Joy, of Memorial Baptist Church in Savannah, Georgia, needed help devising a program to help the families of soldiers overseas during the onset of Desert Shield. Mr. Joy and the program chairman brainstormed with Idea Generator Plus and developed a workable strategy in just over an hour. The plan enabled them to give assistance outside normal channels to families that might have been forgotten.

"American business is at a point where it needs new ideas, not the rehashing of old ideas," says Jan Saltzman, general manager of MindLink. "MindLink uses playful wishful thinking in a systematic way and helps make connections from dissimilar things . . . to create new innovative ideas."

MindLink Problem Solver (MindLink, Box 247, North Pomfret, Vermont 05053; 800-253-1844 or 802-457-2025; $299) is based on over 30 years of research. It has four independent parts: The Gym, for warming up and playing; Idea Generation, which helps define the problem; Guided Problem Solving; and Problem Solving. MindLink comes with a little bag of toys and sometimes asks you to do unusual things, like getting up and going for a walk or pretending an Indian leader is talking to you.

Kathleen Vick of TBA Architects in Waltham, Massachusetts, has used MindLink when teaching design students and in her own interior designs because it "takes away the obvious and catapults you deeper into an intellectual approach to design."

In a recent design for a consulting firm, where most of the consultants preferred to work at home, Vick used MindLink, which led her to the question, How do you make an office and not have it look like an office? MindLink helped her write down lists of associations and make parallel lists of associations about the qualities of a home.

Now that the design is complete, "everyone is showing up . . . people are more relaxed and speaking softly. The nature of colors, textures, lighting, and patterns creates a womblike feeling."

"IdeaFisher is a memory jogger," says Jess Fisher, project director for Fisher Idea Systems. "It's the only program with a database of over 705,000 idea associations and is useful for anyone who communicates."

Based on the concept that the mind works through association, IdeaFisher (Fisher Idea Systems, 2222 Martin Street, Suite 101, Irvine, California 92715; 800-289-4332 or 714-474-8111 [voice], 714-757-2896 [fax]; $495) uses the IdeaBank, a super thesaurus of ideas, to freely associate concepts. It also has a compare function to compare concepts and the QBank, which contains questions for planning.

"When I have to define a problem, the first thing I do is crank up IdeaFisher," says David Sonnel of Integrated Spatial Solutions, a Blaine, Washington, firm that creates marketing programs and is also responsible for global positioning of 25 satellites.

Sonnel uses both the IdeaBank and QBank when developing marketing plans, while interviewing clients, and especially for creating crucial business proposals. He remarks, "IdeaFisher structures the process and makes it harder to leave the important things out."

Other software available to help with ideas includes The Idea Savings Bank (Micro Computer Resources, Division of MCR Agency, 6116 Merced Avenue, Suite 81, Oakland, California 94611; 800-767-6797 [voice], 510-444-6561 [fax]; $129.00), a ready-made database for storing and publishing ideas; Wisdom of the Ages (Micro Computer Resources, $79.00), a collection of 6500 quotations from the greatest thinkers of all time; and Idea Tree (Mountain House Publishing, Route 100, Waitsfield, Vermont 05673; 800-639-5044 or 802-496-5000 [voice], 802-496-4320 [fax]; $69.99), which helps chart and outline ideas.

All the people interviewed for this article adopted the techniques from the programs and used them even when not using the software. The software programs and methods don't create the ideas themselves and aren't the only ways to stimulate creativity. Beethoven stimulated ideas by pouring ice water over his head. Any method may be worth trying if it works. (Be careful not to spill the water on your keyboard!)

Lynn Walford, a computer consultant and author in Los Angeles, is the author of Make Money with Your PC!, *published by Aproprose.* ❐

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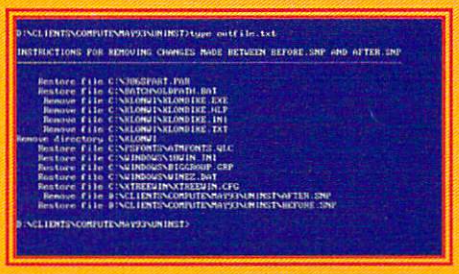

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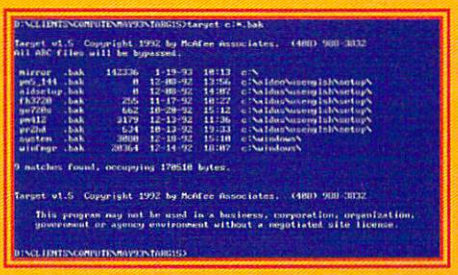

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ART WORKS

Robert Bixby

PRESENTATION AND PROJECTION

Last month, I opened with a brief discussion of presentation software. This month, I'd like to cover a little bit of presentation hardware before turning to a look an an interesting entry-level graphics program.

WatchIT!$_{TV}$ has received some attention over the past couple of issues. I've had the opportunity to use it, and my observation is that it might be a good product for entertainment, particularly if you have cable service or rooftop antenna access in your computer room, but that for presentations and desktop publishing, it's not very useful. The quality of a broadcast television picture is poor when compared to VGA graphics. And pictures captured electronically from a videotape or off the air will not be of a high enough quality for publishing use (images from these sources have to be fed to the board in RF mode—there's no composite input). For the same price as the WatchIT!$_{TV}$ unit ($299), Circuit City has been advertising a 25-inch color television. What would you pay for a 25-inch VGA monitor? I liked the idea of WatchIT!$_{TV}$, but while it might serve for pure entertainment, it won't be of much use in desktop publishing.

Scenario comes with simplified tools and a collection of the clip art that made Computer Support famous. And best of all, it's the first step on an upgrade path that includes Graphics Editor.

Recently, I've been hearing from several companies that make translucent LCDs for use in conjunction with overhead projectors for presentations. The idea isn't new, but there's a lot of competition in the area, and some of the hardware is exciting, though it's all fairly pricey. For picture quality, I still think a VGA projection monitor would be preferable for a large group and an oversize monitor would be preferable for a small group.

A VGA projection monitor can provide a display about as good as a slide projector's. A translucent LCD screen with an overhead projector delivers an image about as good as the overhead projectors you remember from school—grainy and washed out. I suspect that the difference is that a VGA projection monitor has three light sources converging on a single screen while an overhead projector has just one light source. In many presentation situations with a captive audience (school classrooms, for example), a grainy picture is not a drawback.

One translucent LCD maker is nVIEW (860 Omni Boulevard, Newport News, Virginia 23606; 800-736-8439). Its SpectraMini screen costs a mere $2,795. It's passive matrix and displays only 512 true colors. Also offered by nVIEW are the nSIGHT and Luminator self-contained projectors. The nSIGHT provides passive matrix LCD projection in 16 shades of gray for $2,495, and the Luminator offers an active matrix LCD with 262,000 true colors, multiple input, and audio for $9,995.

If you're into software publishing, you might be interested to know that CD-ROM publishing has jumped onto the desktop. Philips offers the CDD521 CD-ROM recorder for a list price of $5,995 ($7,995 with required software). Recordable CD-ROMs cost $40 each (with a minimum of ten per order). That may seem like a lot of money, but it's in line with the cost of a Macintosh and LaserWriter in the mid 1980s, when desktop publishing fell within the reach of the individual computer user. While the machine is designed for archiving and premastering work and takes at least four hours to fill up a 690MB CD, the capability is there for anyone to use. According to Philips, most customers are lawyers, doctors, and accountants, who use the machine to make copies of legal and financial records. Unlike disk files, documents stored on a CD-ROM can't be altered or overwritten, which makes a CD-ROM a compact yet secure storage medium. To find out more about the CDD521, call Philips at (800) 722-6224.

Arts & Letters Graphics Editor has a new little brother: Scenario. It's the perfect way to get started in computer graphics. All of the tools are highly simplified and highly intuitive. For example, there's a grid that can be displayed on the screen, but the program lacks snap. The menus are simplified versions of the Arts & Letters interface. The program comes with a small collection of the clip art that made Computer Support (Scenario's maker) famous, including landscapes, animals, and airplanes. And best of all, it's the first step on an upgrade path that includes Graphics Editor. But most people (and kids in particular) will find everything they need in Scenario. ❐

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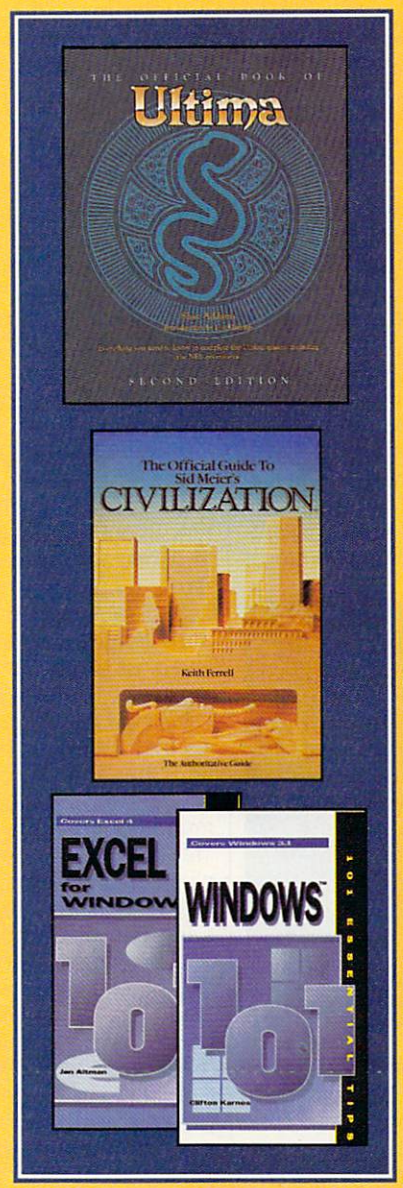

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PATHWAYS

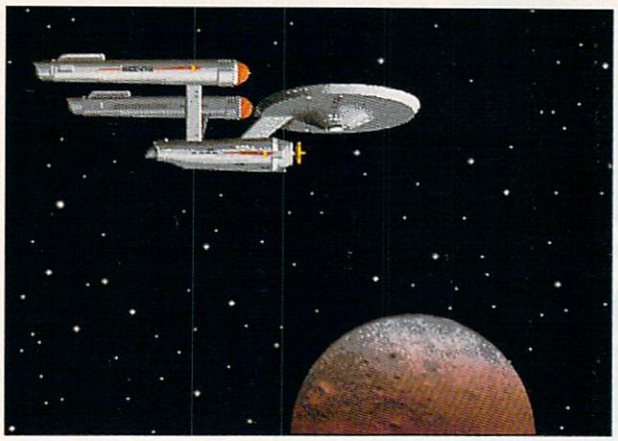
Steven Anzovin

LIVE LONG AND PROSPER

On a cool September night in 1966, I curled up in front of the tube to watch the first episode of a new show that promised to be like no other ever seen on network TV.

As the now-famous saucer section appeared on the TV screen, I was immediately and permanently hooked. The show was, of course, the original "Star Trek."

Not only did I wait impatiently for each new adventure of the *Enterprise* and its intrepid crew, but I also built Star Trek model kits, read Star Trek books (even one on how to submit a script to the producers, which I dreamed of doing right up until the show went off the air three years later), and argued over the deeper meaning of each episode with a small circle of like-minded, starry-eyed friends.



The key to Star Trek's longevity is not in the hardware or in the writing but in how fans feel about the characters.

Almost twenty-seven years later, the longevity and popularity of Star Trek is something of a mystery to me. Older and not so starry-eyed, I find that the old "Star Trek" is painfully, predictably, laughably bad. Sure, the old series now qualifies as vintage cheese, but there's only so much cheese most people can take.

Nor is Star Trek's popularity a matter of great art triumphing over the marketplace, since nobody (except maybe the late, great Gene Roddenberry and a few truly intense fans) could claim that the hilarious old "Star Trek," the wildly uneven Star Trek movies, the deadly dull "Star Trek—The Next Generation," or "Deep Space Nine" are anything like masterpieces.

Maybe the key can be found in how Star Trek fans feel about the characters. Kirk, Spock, Bones, Picard, Data, Worf, and the rest are like family members whose every action is now familiar—and perhaps laughable—but no less loved for all that.

Guiltily, I have to admit that I still enjoy the hammy histrionics, the sophomoric bridge banter, the wonderfully tacky sets, and the thrillingly melodramatic score of the old "Star Trek." My brother and I, not close in other ways, can tune in to a "Star Trek" rerun, recite each line of awful dialogue, and feel closer than we do at any other time. I even watch "Star Trek—The Next Generation," maybe because I feel that I owe it to the Federation. Compared to the perilous, unpredictable real world, the universe of Star Trek, with its simple heroic values, consistent characters, and happy endings, is, well, comforting.

Whatever the reason for Star Trek's success, marketeers have jumped on the bandwagon. Today, there are scads more Star Trek goodies available than there were when I was a kid. And, as befits a show that inspired many viewers to get into computing, several Star Trek–themed products are now offered on disk.

There've been computer games based on Star Trek concepts since the dawn of personal computing.

One recent authorized entry is the Star Trek: 25th Anniversary game, from Interplay Productions (17922 Fitch Avenue, Irvine, California 92714; 714-553-6655). This RPG lets you maneuver Kirk, Spock, and Bones (rendered in the hobbit-proportioned bodies apparently required in such games) around the *Enterprise* and on a variety of alien worlds.

Digitized scenes and sounds from the original series add the necessary authenticity, and you can even kill off a nameless ensign on every mission, just as happens in each episode.

Star Trek–flavored utilities are a new development. Berkeley Systems (2095 Rose Street, Berkeley, California 94709; 510-770-8787) has released Star Trek: The Screen Saver, a collection of modules for the company's popular After Dark Windows screen saver. Sound Source's Logical Collection is a set of audio clips from the original series for use with Windows. (Contact Sound Source at 2985 East Hillcrest Drive, Suite A, Westlake Village, California 91362; 805-494-9996.)

The final frontier of Star Trek fandom may be coming soon to your local mall. The people who brought you Virtuality, the virtual reality (VR) arcade game, are developing a new role-playing VR game based on "Star Trek—The Next Generation."

Up to 50 players at a time will supposedly be able to play various roles on each installation, manning (or womanning) the bridge, holodeck, and other stations while fighting off the Borg and repairing the hull integrity latching system.

Do we want to live Star Trek, not just watch it? Will overexposure finally kill our love for the *Enterprise* and its crew? Those are questions that even Spock couldn't answer. ❐

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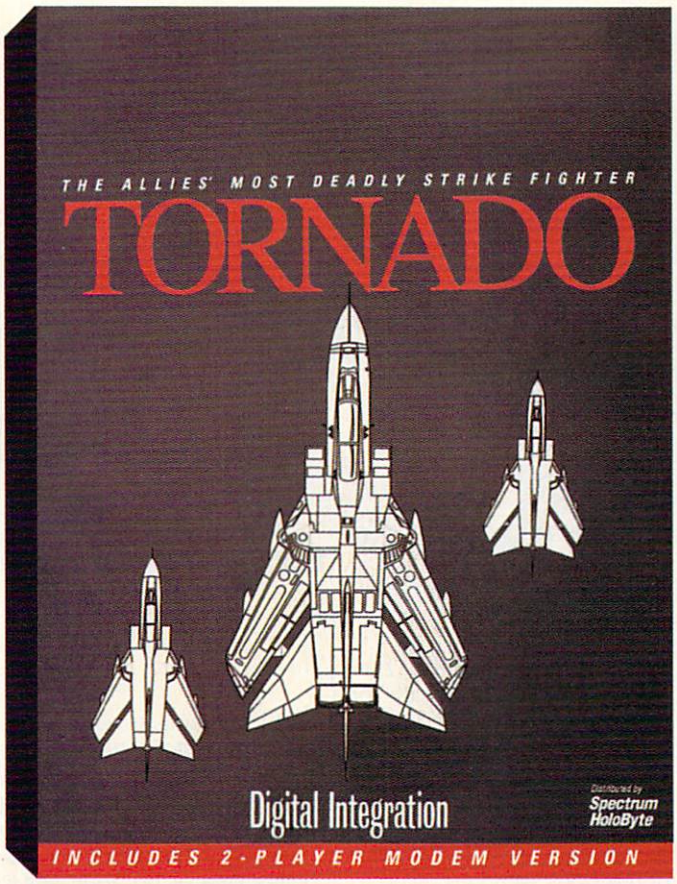

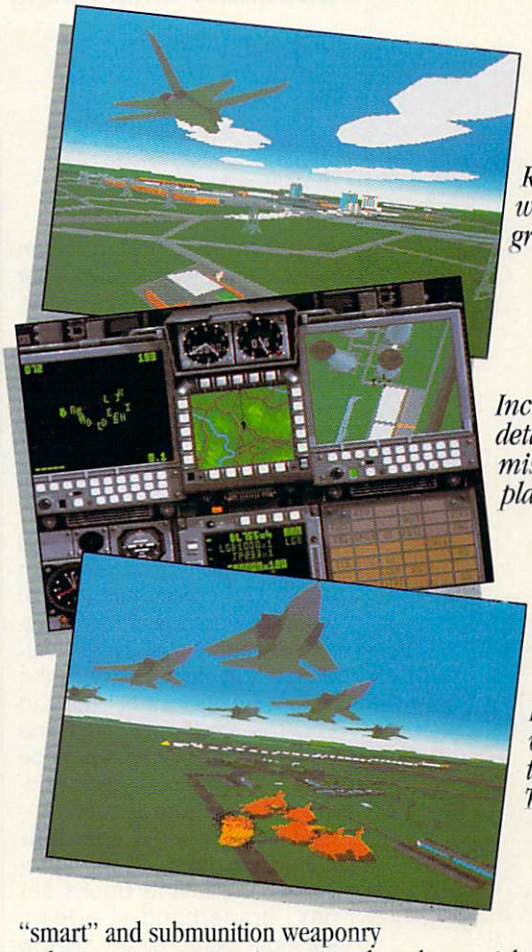

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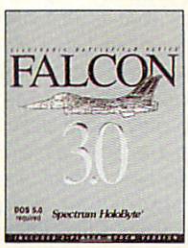

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DISCOVERY CHOICE

You'll find yourself peeking over your children's shoulders as they explore this powerfully entertaining story.

Clayton Walnum

JUST GRANDMA AND ME

If you've been looking for an entertaining way to help your children learn to read, Brøderbund has the program for you. Just Grandma and Me, the first title in the company's new Living Books series, will captivate your child. It's an interactive storybook that fully uses the multimedia capability of your computer.

Children's software and Brøderbund go hand in hand. Over the past several years, the company has created perhaps the best children's software library in the business. Programs like Kid Pix, The Treehouse, and The Playroom, all of which provide an interactive learning environment, are adored by kids—and, of course, by their parents. Now, with the introduction of the Living Books series, Brøderbund is adding yet more extraordinary titles to an already superior product line.

Just Grandma and Me, based on a book by Mercer Mayer, is a delightful romp through a storybook come to life. From the first page to the last, readers will be enthralled with this new style of storytelling that is just a hop away from a fully interactive cartoon.

When the program begins, the story's main character, Little Critter, guides children through the process of selecting options and getting the story going. For example, using full animation and digitized sound, Little Critter tells your child, "To have the story read to you, press this button. To play inside the story, press this button." As he speaks, he points to the appropriate button onscreen. It's a cinch for even very young children to run the program without adult assistance.

The first option, Read to Me, lets children sit back and enjoy a fully animated reading of the book without having to interact further with the program. One after another, the program displays and reads each page of the story, highlighting the words as they are read—an invaluable learning aid for early readers. After the program reads each page, a minicartoon takes over, filling out the current scene. For example, on the first page, Grandma and Little Critter hold a short conversation about their upcoming trip; then a bus trundles down the road, stops before them, and allows them to climb aboard.

Although Just Grandma and Me is targeted at children, you'd have to be a cold adult indeed not to be affected by its delightful story and sharp sense of wit. The cartoon sequences range from charming to hilarious. In fact, adults, just like children, will find it difficult to quit before the entire story has run its course. Also like the kids, most parents will enjoy seeing the story again and again. So although the program requires little or no adult assistance, it's likely that the "big people" will linger once the program has started, looking over their offspring's shoulders as the story unfolds.

In typical Brøderbund fashion, Just Grandma and Me goes way beyond being a simple storytelling program. When children choose the Let Me Play button, they can interact with virtually any element of any page in the book. Such interaction leads them into a wonderful, witty world of zaniness that is not only fun but also—dare I say it?—educational. And while children can choose the Let Me Play option to play in the story starting from page 1, a separate option screen allows them to choose, by picture, the page to which they'd like to go, immediately jumping them to favorite scenes and eliminating

any need to wait for preceding pages to flip past.

Some examples of the silliness to be found in the Play mode include beach umbrellas that snap shut and rocket into the sky; clams that sing in perfect three-part harmony; a dog that scratches furiously as fleas leap from his fur and escape into the ocean; a starfish that dons a top hat and cane and performs the old soft-shoe; a raccoon that steps off her beach blanket and jumps around, yelping, on the hot sand; fish that spray unsuspecting characters with sea water; a fence that can be played like a xylophone; and crabs that bother nearby fish. Children can easily activate dozens and dozens of other similar objects with single mouse clicks.

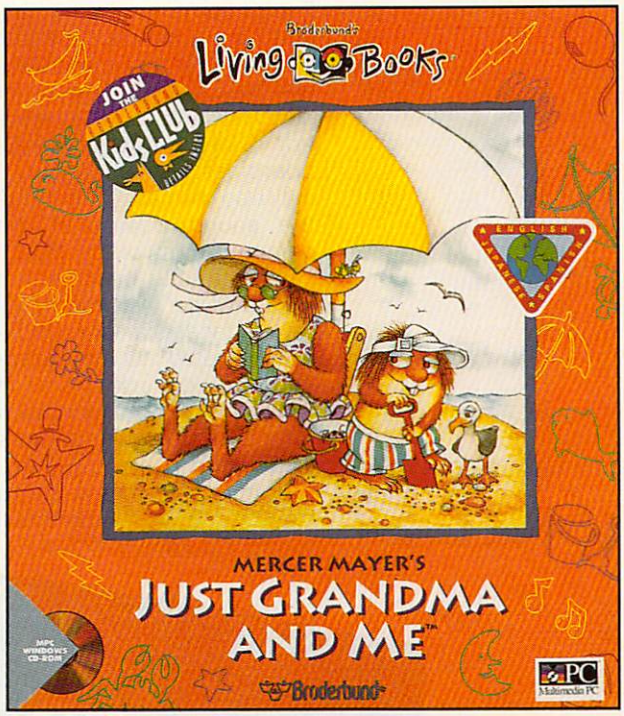
On the educational side, each page's text is also interactive. When a child clicks on a word, the word is highlighted and pronounced. This is a perfect way for children not only to learn to read new words but also to discover the way in which sentences are constructed from the words.

Just Grandma and Me's graphics, which are displayed in 256-color, 640 × 480 Super VGA, are colorful and detailed, drawing readers irresistibly into the cartoon fantasy. As already mentioned, every scene features topnotch animation sequences, scenes so good that they approach cartoon quality. And the careful attention the designers paid to facial expressions adds much to the characterization. Hundreds of digital voices and sound effects further enhance the story: Waves splash, breezes blow, birds chirp, cows moo, helicopters clatter overhead, telephones ring, chimneys chuff, dogs bark, radios play music, and on and on.

As if this weren't enough, Just Grandma and Me can read the story to your child in three languages: English, Spanish, and Japanese. While the main goal of developing a multilingual program was more than likely an effort to increase its market share, doing so also enhances the story's educational value. Not only is it fascinating to see and hear the story in another language (especially in an exotic language like Japanese), but older children can also get some valuable lessons in what it's like to speak a different language. Unfortunately, the package doesn't include a multilingual dictionary that cross-references the words used in the book, an option that would've been helpful to parents and older children.

For those who savor traditional storytelling, Just Grandma and Me includes the original book by Mercer Mayer. Children can follow along in the book as the program reads the story. And, more important, parents can sit with their children and read the story the old-fashioned way. There's probably not a better way for parents to share quality time with their children than sitting close, reading a book together. In fact, many child experts say that young children should be read to several times a day.

Just Grandma and Me is superb, but it's a rare piece of software that doesn't suffer at least a minor flaw or two. However, if you try to find a fly in this ointment, you'll have to dig deep indeed. In fact, if Just Grandma and Me has a negative side, it's only that it has high hardware expectations: an 80386SX or compatible with Windows 3.1, a CD-ROM drive, a sound card, a Super VGA monitor, and four megabytes of RAM. Still, it's programs like Just Grandma and Me that encourage people to upgrade their machines, and Brøderbund is to be applauded for taking the lead in advancing the state of the art of educational multimedia software.



In short, this is a virtuoso performance from a company dedicated to excellence in educational software. An electronic storybook overflowing with one enchanting discovery after another, Just Grandma and Me truly demonstrates the power of multimedia computing. It's also the perfect babysitter.

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MULTIMEDIA PC

David English

MUSIC FOR THE MASSES

User-friendly synthesized sound has finally arrived for the PC.

Even if you're not a musician, you'll soon hear a lot about General MIDI. Not only is General MIDI making it easier for nonmusicians to control electronic keyboards and keyboardless MIDI modules, it may also dramatically improve the sound quality of the games we play on our PCs.

First, a little background. MIDI (Musical Instrument Digital Interface) is a communications standard that allows electronic musical instruments to talk to computers and to each other. Mostly, it communicates which note is being played, how long the note is being played, and which instrument sound is playing it. When you record a musical performance with MIDI, you're not recording the music itself. You're recording the least amount of information that will enable a synthesizer or MIDI module to re-create the original performance.

Unfortunately, a MIDI recording made on one synthesizer usually doesn't sound very good on another synthesizer. The note on/off and duration data usually matches, but the order of the instrument sounds is different. Because a Korg 01/W might have a steel guitar in the same position that a Roland D-50 has a church organ, that Bach fugue you recorded on your D-50 might come out sounding like a Willie Nelson tune on your 01/W. General MIDI is the industry's attempt to set the order of the first 128 sounds so that you can count on a grand piano being in position 1, a choir pad being in position 92, and MIDI note 54 always calling up a tambourine.

The first General MIDI device was the Roland SC-55 Sound Canvas. Because of its excellent sound and great price ($795), many professionals use it to supplement their professional MIDI equipment. The Sound Canvas has also proved to be popular with multimedia developers who can simply plug it into a MIDI-compatible sound card and drive it with any MIDI-based music program. Other General MIDI devices that have entered the market over the last 18 months include Roland's SCC-1 (a PC-card version of the Sound Canvas), Turtle Beach's MultiSound (a sound card that includes the chip set to the popular E-mu Proteus/1 synthesizer), and Creative Labs' Sound Blaster 16 ASP (a sound card that offers an optional General MIDI daughter board).

One by one, the major keyboard manufacturers are taking their high-end synthesizer technology and creating low-end General MIDI boxes. These keyboardless MIDI boxes contain the kinds of sounds that would've cost thousands of dollars just four or five years ago. A good case in point is Yamaha's new TG100 (Yamaha, P.O. Box 6600, Buena Park, California 90622-6600; 714-522-9011; $449). It weighs about two pounds, has 192 instrument sounds and ten drum kits, lets you play as many as 15 instrument sounds and one drum kit simultaneously, and contains its own digital reverb and delay effects. It also includes a special port—in addition to the standard MIDI connectors—that connects it to the serial port of a PC or Mac. This lets you use the unit with a laptop or other computer that lacks a MIDI interface. Best of all, the TG100 sounds great. It has a rich, full sound with especially strong strings and pianos. It uses the same AWM (Advanced Wave Memory) technology that's used in Yamaha's professional-quality SY99 and SY85 synthesizers.

Speaking of Yamaha's professional-quality synthesizers, I was also able to try out the new SY85 ($1,995). If you want to go beyond General MIDI and design your own complex sounds, this is one killer machine. It includes 6MB of ROM-based sounds that sound as good as anything you'll hear on a record or movie soundtrack. In addition to the usual array of buttons and knobs for editing and storing your sounds, the SY85 includes eight slider controls that let you quickly alter your sounds in realtime. The SY85 also includes a 61-key, 30-note polyphonic keyboard; 512K RAM (expandable to 3.5MB); its own disk drive; great-sounding programmable effects; and an on-board sequencer. (For even more terrific sounds for the SY85, TG100, Sound Canvas, and other MIDI synthesizers, contact Sound Source at 800-877-4778 and Pro-Rec at 212-675-5606.)

As for the game connection I mentioned earlier, there's a movement to establish General MIDI as a replacement for the tinny FM technology on the sound cards. Imagine hearing a real trumpet or organ when your hero enters the villain's castle for the first time. ❐

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ENTERTAINMENT CHOICE

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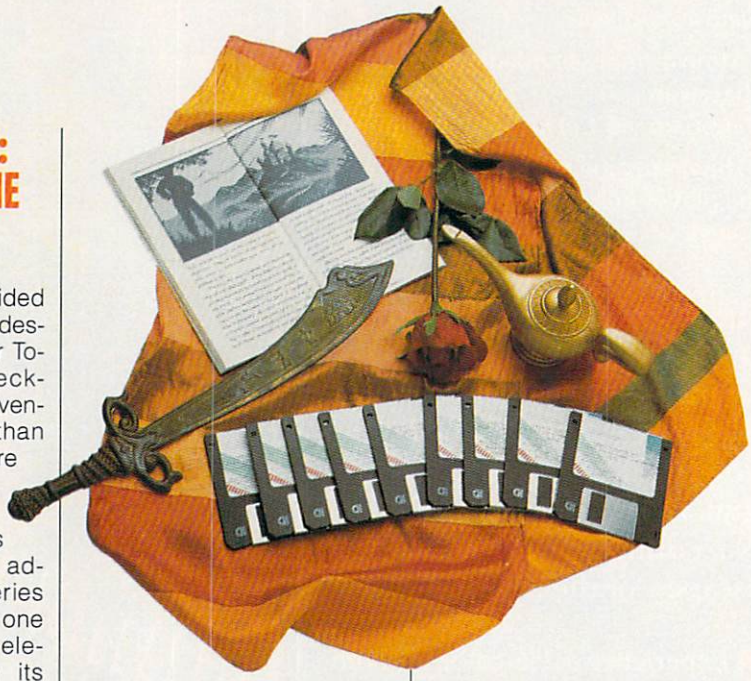
KING'S QUEST VI: HEIR TODAY, GONE TOMORROW



Sparked by love and guided by an enigmatic sense of destiny, King's Quest VI: Heir Today, Gone Tomorrow beckons all to join its noble adventure. Bigger and bolder than ever, this is an adventure few can resist.

The sixth installment in Roberta Williams's award-winning graphics adventure leads the series down a familiar path, but one emblazoned with story elements far richer than its predecessors. Aided by some of the most creative minds in the business—writer Jane Jensen, art director William Skirvin, and composer Chris Braymen—Williams has assembled her most ambitious work to date.

Fans of the series will sink comfortably into the continuing saga of the adventure-prone first family of Daventry: King Graham, Queen Valanice, and children Alexander and Rosella. Newcomers needn't feel left out: As in earlier games, the story is completely self-contained. A marvelous introductory sequence sets the stage while establishing a link to the previous episode, Absence Makes the Heart Go Yonder. In that story, Daventry's royal family is kidnapped by the evil wizard Mordack. King Graham journeys to the warlock's island stronghold and rescues his family along with a beautiful girl, who turns out to be Princess Cassima. She takes a fancy to Alexander, and he, deeply smitten, wonders if he'll ever hear from her again.

At long last, he's given a sign. He sees the image of Cassima in his father's magic mirror. Seeing her cry out in sorrow, Alexander sets sail for her home. Sadly, his journey ends in disaster when his ship breaks apart in a violent storm. He awakes on the Isle of the Crown, home to his beloved Cassima.

Assuming the role of Alexander, you now begin your adventure. Among your first tasks: Seek out the royal palace, where you'll meet the suspiciously belligerent vizier, Alhazred. He claims the princess is in seclusion, mourning the recent deaths of her parents, and has requested not to be disturbed. You also learn that Alhazred and Cassima are soon to be wed. The vizier gives you a stern warning to leave the Land of Green Isles. Saddened and confused, you begin to doubt the image cast in the magic mirror. Still, you can't shake the ominous feeling that something is terribly wrong.

Although the game's central theme is readily apparent, your direction and goal are purposely vague. Through hundreds of locations in the Land of Green Isles, Williams has cut many paths, each crisscrossing to one of several different endings. Ultimately, the course you follow determines your difficulty level, opening the game to newcomers and seasoned veterans alike. This flexible, open-ended design also means that you can reach the end and yet still experience only a small portion of everything the game has to offer. Replay value in a graphic adventure? What a concept!

The game unfolds in a world significantly larger than those of its predecessors. Initial investigation reveals four main regions, each with unique geography, inhabitants, and puzzles.

One of the game's main assets is Sierra's evolving player interface. Gone is the traditional text parser; it's been replaced with a more intuitive graphical cursor. By simply clicking the right mouse button, you cycle through four all-

purpose actions: Walk, Talk, Look, and Touch. Select the object to be acted upon and then press the left mouse button. Manipulating the hundreds of interactive screen elements quickly becomes second nature. A hidden top-down menu offers additional control of inventory items and game mechanics such as Save, Restore, Speed, and Graphic Detail.

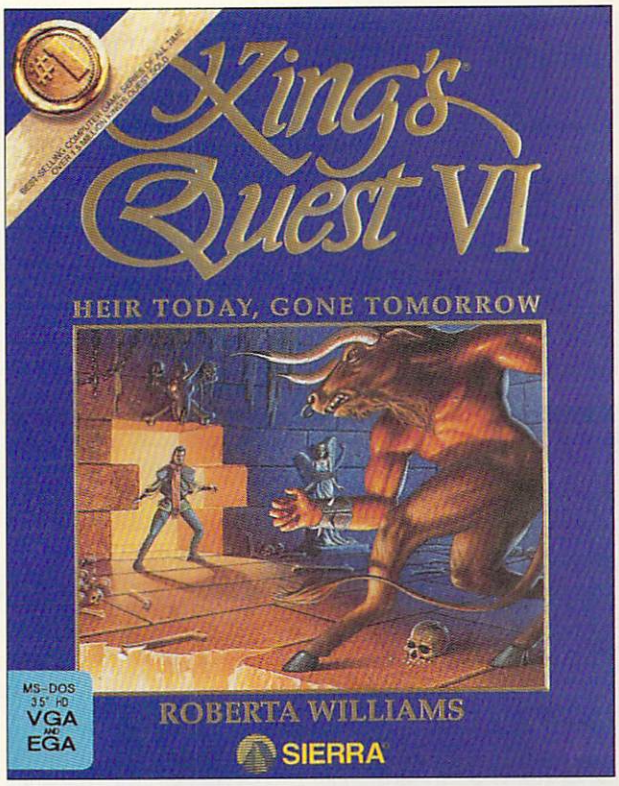
How grand is your crusade? To put it in rather outrageous historical perspective, the first King's Quest, released in 1985, weighed in at a mere 128K. By contrast, this truly king-sized adventure tips the scales at 18MB. Nothing goes to waste, however, as Sierra pushes the envelope of disk-based programming. The package contains both 256-color VGA and 16-color EGA versions, although viewing the game's exquisite scanned artwork at anything less than its full-color palette would be a waste.

Typical of Sierra's commitment to cutting-edge graphic quality is the introduction, based on a 1.2-gigabyte animation by Kronos, the Hollywood special effects wizards known for their work in *Batman Returns* and *Lawnmower Man*. Like all of the game's minicartoons, the introduction showcases extraordinary cinematic finesse with its unique camera angles, 3-D panning, long tracking shots, and video-quality animation. Although the sampled speech is clear, it's rather stilted. Sierra would do well to hire professional actors for its next endeavor. For those who are concerned with hard drive space, this space-hogging introduction can be easily deleted.

Other graphic innovations include use of "pather" technology, a type of collision-detection system that ensures more realistic movement of on-screen characters. Instead of getting stuck or walking through props, your character automatically chooses the most intelligent path when moving from point A to point B. The game also boasts improved depth of field, accomplished by scaling animated characters as they move from foreground to background and vice versa. Finally, subtle use of spot animation and peripheral sound effects greatly enriches the story's ambiance. On the beach, waves lap the shoreline while gulls squawk overhead. As you move slowly through a cave, shadows cast by the flickering light of your candle dance on jagged walls. All of these techniques help suspend disbelief—one of the most important requirements in any fantasy—and further the illusion of reality.

The bulk of the game's puzzles merely require knowing which items to use when. Along the tenderfoot trail, most puzzles are painfully obvious. Players are helped along with telltale hints from not-so-subtle character dialogue and glaring onscreen clues. The further you stray from the beaten path, the more intricate and challenging the puzzles become, including spell casting, arcade-style interaction, and occasional timed events. Particularly interesting are the Logic Cliffs and deadly catacomb floor traps, although solutions to both are spelled out in the 50-page guidebook.

One of the game's few shortcomings is common to the genre: Many solutions require tedious backtracking to pick up and deliver items, making you feel less like a brave adventurer than an overworked courier.



Williams and Jensen carefully balance the story line to attract players of every age, gender, and skill level. Those who love action will find plenty to pump their adrenaline, yet they won't be put off by the game's gentle, romantic side. Likewise, this tale of unrequited love will inspire the usually timid to complete its challenging quests.

Sierra describes King's Quest VI: Heir Today, Gone Tomorrow as an adventure so vast you may never experience it all. You'll have the time of your life trying to prove this claim wrong.

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GAMEPLAY

Paul C. Schuytema

SPAGHETTI POLITICS

Now there are tools for those of us who want to test the waters of superpower governance, to dabble in despotism or delve into democracy. D. C. True has developed Shadow President, a simulation of presidential foreign policy. Spectrum HoloByte offers Crisis in the Kremlin, a simulation of domestic policy in the former Soviet Union.

Shadow President places you in the Oval Office and

Power—getting it and keeping it—drives political simulations.

hurls the world in your face. You're presented with a map of the world, and selecting countries allows you to examine the influence, ambition, and ethical levels of their governments. You also have access to a wide range of advisers, from the chief of staff to the director of the CIA.

Shadow President is a flexible simulation that allows you to set your own agenda: world peace, ending hunger, or total world domination. You start out on June 1, 1990.

This game made me appreciate how complex and convoluted the world order is. Even my best intentions were stymied by opposing ideologies. When I took office, I wanted to do right by the world, and I thought I would start with the war between Ethiopia and Somalia. But neither side wanted my help—no troops, no peace envoys, no money, nothing. I was Don Quixote with no windmills to battle.

Beyond being a fascinating game, Shadow President is quite an education in international politics.

When Robin Antonick and Brad Stock were tossing around their ideas for a presidential simulation back in 1984, they had no idea what an effort it would be. After doing some research, Stock came to the conclusion that *some* research just wasn't enough.

He enrolled in the doctoral program in political science at Tufts University and spent seven years studying international politics.

After years of study, he had learned enough about international relations to be asked to brief the State Department before a NATO meeting.

By converting Stock's studies into a complex array of algorithms, the programmers at D. C. True were able to blend the formulas with the comprehensive world data from *CIA World Factbook* to create a dynamic, living world.

And they expect *me* to be able to run the thing?

Shadow President is great for kids. It will provide them with a window on the mysterious connections and relations they hear about on the news.

Beyond the borders of the United States, the Soviet Union was once the most powerful nation on earth, and Crisis in the Kremlin by Spectrum HoloByte puts you at the helm of that late, great superpower. In the early summer of 1985, you, as president, can elect to govern as a Hard-liner, a Reformist, or a Nationalist.

The objective is simple: stay in power. But the means are much more difficult. Historical events unfold in much the same way they did in those years: Republics attempt to secede, Chernobyl nearly melts down, and the U.S. urges weapon reductions.

Larry Barbu, the designer of Crisis, not only wanted to make the simulation real but also wanted an end product that didn't look like a model. As you attempt to find a safe path through the domestic and international crises, information comes at you in a myriad of ways: jokes, phone calls from foreign ministers, and television broadcasts.

What I learned in Crisis was that compromise is the only tool that allows any progress but that sometimes it isn't enough.

I held the Soviet Union together for 12 years (actually, a handful of republics had seceded), and all of the indicators showed that things were improving: health, education, food, exports, and foreign relations. I was even able to survive a popular election, but I made one fatal mistake: I cut the military budget too deeply, and there was a backlash. Even popular support is useless against an assassin (but the state news reports fabricated a natural demise).

So after 12 years of hard work, I was out of the picture.

I learned something from these games. The political world is much murkier than I had ever imagined, and rational thought is not the panacea I once believed it was. Maybe if political malcontents the world over could cut their teeth on these simulations, they could get a good feel of this global spaghetti bowl we live in. As for me, I'm going to dole out another packet of humanitarian aid before I get really mad and throw some missiles at the problem. ❐

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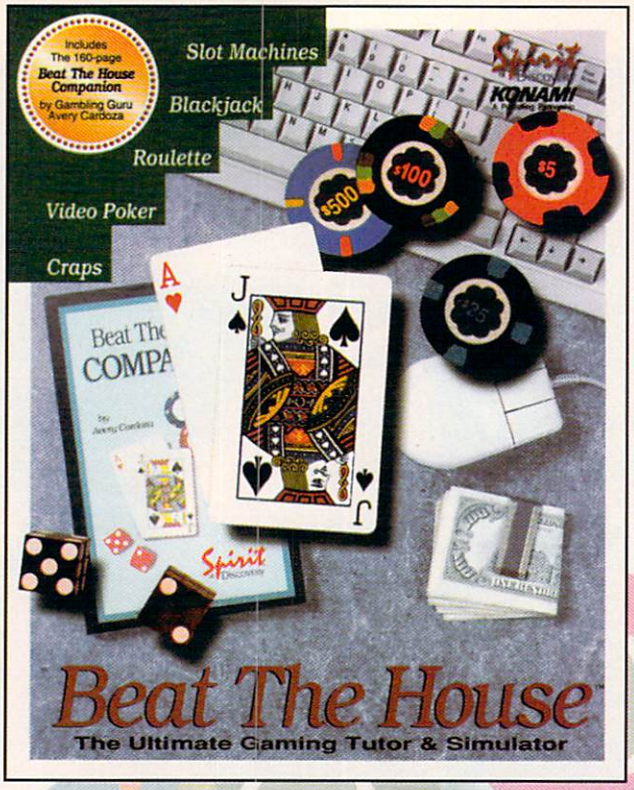
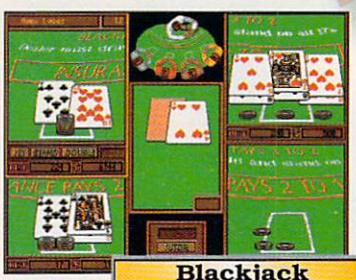
Some play for fun...



Others play to win!



Blackjack
Learn to count cards and win!

Video Poker
Learn what to hold or when to draw!

Roulette
Learn money management!

Beat The House makes learning fun!

Intimidated by casino gaming because you're unfamiliar with the rules? Ever wondered why the word "seven" is met with glares at a craps table? Is the guy next to you at blackjack just lucky, or is he on to something that you don't know?

Learn to Count Cards and more

Beat The House is the ultimate gaming tutor and simulator for your PC. With a 160-page study guide by gambling guru Avery Cardoza and an on-line "pop-up" tutor to make recommendations and offer suggestions, you'll be shooting the die and slinging the lingo like a pro in no time.

Feel like part of the action

Dazzling VGA graphics and realistic sound put you right on the casino floor where the chips are flying and the competition is fierce. Play against your friends or let the computer fill the empty seats– watch out...*they play to win!*

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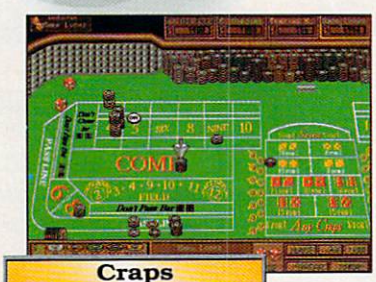

Craps
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Lady Luck

By Paul C. Schuytema

A deck of cards is unimposing all by itself, but put those cards in the hands of a dealer, and they seem to come alive. Fifty-two cards. That's all there are. And yet that finite number yields an almost infinite array of games. One of the most popular of these permutations is poker, a game of posturing and anticipating, all to create a hand of cards numerically superior to the others.

Poker has been with us for centuries, evolving from the French game of Gilet in the sixteenth century. During the French Revolution, the first serious betting techniques were applied to the game, and later, the English added the skill of bluffing. Poker, almost more than any other card game, is focused on a system of wagering which adds interest and financial reward to the game. Close on the heels of poker in terms of sheer popularity is the game of blackjack, or twenty-one, a fast and simple game that draws crowds at nearly any casino.

Since the very earliest days of computers, the electronic world has been simulating the world of the 52-card deck. Now, these games have advanced far beyond just a good play, providing instruction, statistics, and advanced theoretical problem solving.

Video Poker

Because of the universal popularity of games like poker, casinos have recognized a huge potential in their slot halls, and slot manufacturing companies such as Sigma and International Gaming Technology (IGT) have answered the call by marrying the game of poker to the traditional slot machine to produce the most popular casino game machine to date: video poker.

Video poker is basically a five-card draw hand (with many house variations) which is played on a betting machine in a casino (or in a pub or tavern). The player drops in quarters to place a bet, five cards are presented on the color monitor, and the player decides which cards to hold and which to throw. Then the draw is made, and if the hand comes up a winner, coins fall into the lucky patron's lap. Otherwise (and most often), the video poker machine deals a losing hand and prompts the player to drop in more quarters to bet again.

Video poker is an entirely different animal from real face-to-face poker, full of its own frustrations and enjoyments. While real poker is an interpersonal game, video poker is a statistical game, pure and simple, and there is no posturing or bluffing. The best payoff is the royal flush, which is destined to occur about once in every 2½ million hands. The trick is to be ready for it.

The popularity of this game has spawned an entire industry of help products, and the video poker games available for the PC are the most exciting of the lot. Video poker games on the PC serve two purposes: entertainment and training. Video poker is fast paced and exciting, and nearly every package allows a different array of games to be played. The video poker games also act as training grounds for the Las Vegas–style coin eaters, and careful attention to the PC tactics can mean a payoff in real casino play. Many claim that with solid practice, 100-percent payback rates are possible.

Here is a selection of major players in the video poker game.

Video Poker for Windows. Masque Video Poker for Windows is as much a tutorial as a game. The first 48 pages of the manual take you through the ins and outs of the main video poker machines in the casinos, teaching you which machines to look for and what sort of payback you can anticipate. Full of stats, the manual teaches you what to expect from any given hand (there are roughly 2½ million possible hands in video poker).

The game itself is extremely intuitive, keeping all of the statistics in the background until you really need them. The look of the game is similar to the look of the casino games, complete with payback tables and the large square buttons.

Masque Video Poker provides a comprehensive array of statistical tools. At any moment, the player can pull up a chart showing the results of play, including payback rate, the percent of expert plays, and the number of hands dealt. You can also run computer simulations (in which the computer plays the hands) to quickly evaluate a certain game's characteristics. For example, using this tool will give you an idea of how many coins you will need to have in your bankroll to sit down at a particular casino machine and have a chance at winning.

The tutor will recommend expert plays on each hand. However, if you remove the tutor window from view, the tutor will only alert you when you're making a play which it considers wrong.

The basic strategy inherent in Masque Video Poker is to get your payback level as close to 100 percent as possible. If you can play expertly, you can keep your losses and gains nearly equal and hope that luck will send a jackpot your way.

Stanford Wong Video Poker. Villa Crespo's video poker is a DOS product based on the statistical work of Stanford Wong. Wong is a mathematician who has spent countless hours working through the myriad of permutations of video poker. Villa Crespo's video poker is a slick front end for Wong's original BASIC language program (the program has been completely rewritten in C), which allows on-the-fly computation so you can adjust the various payback levels to make the program play like any machine you find in a casino.

Like Masque's Video Poker, Villa Crespo's game can run simulations that will give the long-term payback of any machine. There is also a tutor that can be set either to recommend the correct play for every hand or to warn of a bad play. Each hand can be analyzed according to value and possible payback. Gaming sessions can be saved to disk and resumed at any time.

Stanford Wong Video Poker differs in strategy from Masque's Video Poker in that it targets its advice at the higher payoffs, favoring the potential for a straight rather than merely holding any high cards.

The manual is clear and concise, but it offers very little in the way of a tutorial. The game assumes a player will know video poker games.

Strategic Video Poker. If you're looking for a very fast and flexible package, Strategic Video Poker is for you. While you can't completely custom-configure a game, all of the games I've encountered are supported in this product, and payoff schedules can be easily modified.

Like the other two, Strategic Video Poker attempts to teach expert strategy for playing the video poker slot machines, and it offers many options, from a tutor to a simulator. It can even generate printed reports.

While the game doesn't have quite

How Do Casino Operators View PC Casino Games?

With all the assurances of computer gambling simulations that, if you learn the games, you can break even, how do casino managers feel about customers training on PC games? They're all for it. An educated player will not get frustrated as easily and will become a repeat customer. Besides, an uneducated player is dangerous to a casino's profits (someone blindly putting a pile of money down on 30-to-1 odds and hitting costs a casino far more than an educated player who plays the statistics and wins steadily).

Ron Moore, computer manager of The Par-A-Dice, a riverboat casino home-ported in Peoria, Illinois, says that he plays PC blackjack to get himself ready for a trip to Reno or Las Vegas. According to Moore, an uneducated player will ruin the play on a blackjack table. Players need to realize that whether or not they hit will affect everyone else's play (everyone to the left, that is). The Par-A-Dice even uses PC blackjack programs to train its dealers for handling the tables.

Here is some gambling advice from the pros.

- If you're playing a slot game, like video poker or video blackjack, always make the maximum bet (generally five slugs, or $1.25). The payoffs are higher, and you'll kick yourself if you get a flush with only a one-token bet.
- In video poker, the big jackpot is in the royal flush, which generally pays 4000 coins for a 5-coin bet. Keep that goal in mind when you're playing a hand.
- Make three maximum bets on every machine, and no more. If a machine is close to hitting in its cycle, then it will. Otherwise, you could be there all day with nothing but an empty coin bucket to show for your time.
- Pick a machine with some control, like video poker, and play smart and long on the same machine for the big hands. Moving from machine to machine only decreases the odds of a win.

So which is it? Stick with a machine or move on? Another expert, one who has the privileged knowledge of the slot machine's weights and cycles, told me that it's all luck. You can twist the odds in your favor in games like video poker and win back nearly everything that you put in, but as far as winning the big one goes, that's just luck.

the look of a casino poker machine, the mouse-based left- and right-button commands make playing and spending artificial cash as fast and as intuitive as possible.

The manual provides a solid tutorial, mixing the statistics with examples from the program and providing a well-rounded experience that is fun and educational.

Blackjack

One of the fastest and most popular casino games is blackjack, or twenty-one. The tables are small, the rules are simple, and there are no convoluted codes of etiquette to follow. Another feature of blackjack that makes it so popular is that an educated player stands a good chance of having a winning edge over the house. Forget breaking even. If you know how, you can make money at the blackjack table.

But blackjack can be just as arcane as the other casino games if you want; from elaborate hand signals to scraping your cards on the felt, you can indicate your plays to the dealer in many ways. Also, making a small bet for the dealer, known as tipping, can possibly convince the dealer to hold off on a reshuffle if you tip at just the right time.

Here are two of the best computer blackjack games.

Blackjack for Windows. Masque Blackjack for Windows is an elaborate blackjack game that allows the player the options of recreational play, strategy training, or a by-the-hand tutorial.

Like the manual that comes with Masque Video Poker, the Masque Blackjack for Windows manual goes to great lengths to explain the game of blackjack before it addresses the program itself. Nearly 40 pages cover basic strategies, as well as an overview of counting strategies, including an exploration of Dr. Edward Thorp's ten-count system.

Masque Blackjack for Windows plays very well. The game allows you to point and click your hit and stand options, or you can use the hand-shaped cursor to practice the standard hand signals to indicate your choices.

The program keeps extensive statistics to help you keep track of your progress, and you can even run computer simulations, in which the computer plays the hands at expert levels, allowing you to explore various house rules and betting strategies.

Dr. Thorp's Mini Blackjack. In Villa Crespo's blackjack simulator, Dr. Thorp's Mini Blackjack, play is emphasized over computer simulation. It offers the interesting option of playing as many as six hands at once, allowing the player to simulate an entire table and try out different strategies in different simulations on the fly.

Dr. Thorp's also provides a tutor based on the counting tables created by Dr. Edward Thorp in the 1960s. You can even access the actual counting tables during play, to study the probabilities without the intervention of a tutor.

The game plays very well, and the speed of play is user-selectable. Even a six-player-plus-dealer game can move along at quite a clip. Of course, you can access a statistics table at any time to gauge progress.

Dr. Thorp's Mini Blackjack is a complete but abridged version of Dr. Thorp's Blackjack; it's a part of Villa Crespo's Coffee Break series.

Product List

Trump Castle 3—$29.95
CAPSTONE
A Division of Intracorp
7200 Corporate Center Dr.
Ste. 500
Miami, FL 33126
(800) 468-7226

Strategic Video Poker—$49.95
LWS SOFTWARE
714 S. Roberts Rd.
Bryn Mawr, PA 19010
(800) 828-2259

Masque Video Poker for Windows—$54.95
Masque Blackjack for Windows—$54.95
MASQUE PUBLISHING
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Englewood, CO 80155
(800) 765-4223

Beat the House—$49.95
SPIRIT OF DISCOVERY
Distributed by PC Connection
6 Mill St.
Marlow, NH 03456
(800) 800-0003

Stanford Wong Video Poker—$29.95
Dr. Thorp's Mini Blackjack—$12.95
Amarillo Slim Dealer's Choice—$29.95
VILLA CRESPO SOFTWARE
1725 McGovern St.
Highland Park, IL 60035
(708) 433-0500

Poker

Played around a smoky table in a dark basement, poker is a mysterious game that has become entrenched in our culture. The game is a true social event, and the social nature of the game has evolved because of the systematic way wagers are made. Because of this, many a paycheck has been lost in friendly play.

Poker can be most easily learned when played with seven players, since a great majority of the cards are drawn and dealt, and the odds can then be calculated. But what if there aren't seven players around? A poker simulator can give the needed practice, as well as coaching.

Amarillo Slim Dealer's Choice. This game simulates play around a table. You can select from one to six opponents at three skill levels, and the games vary each hand as the computer players select the game, from seven-card stud to some of the more eclectic games.

The program is extraordinarily simple to set up and play, but the games are strong, and the expert players truly play at expert levels. I showed the software to a local poker expert. Against a table of expert players in Amarillo Slim, it didn't take long for his pot to empty. He was stunned at the skill of the computer players.

Daniel Sejzer, president of Villa Crespo, says that the players were programmed with a little bit of random play so that a player couldn't just find out their computer preferences and beat them consistently.

In Amarillo Slim, you can call up the tutor to ask for advice at any time. You can also see a selection of statistics and odds. The game is fast paced and enjoyable, and it can teach you to read the table, from the bets laid out by the other players to the cards on the table.

Multiple Games

In the spirit of casino gambling, some programs give you a choice of games.

Beat the House. Spirit of Discovery offers Beat the House, a game package that includes an entire casino, from slot machines to roulette. The graphics in Beat the House set this package apart; crisp Super VGA screens filled with dark greens and rich colors contribute to the feel of casino play, and the main menu level is a bird's-eye view of the casino floor. Beat the House simulates the whole casino experience. When you check in at the front desk, your name will be registered and you'll be issued chips (and a line of credit); the chips and

winnings can then be taken from game to game. The attention to detail is impressive: When you're playing blackjack, the hands are dealt in three-dimensional views, and when you're playing craps, a digitized stickman calls the dice.

Beat the House doesn't offer the statistical depth of the games discussed in the preceding sections, but every game in this package offers some sort of tutor that will recommend an expert play. Calling up the tutor for a recommendation is an extra step which involves bringing up two levels of screens, but for the serious player, this infringement will seem negligible. Also available is a coaching option, which alerts you with a digitized voice when it detects a poor play decision.

Beat the House includes the most complete manual I've seen. It's more like an in-depth tutorial for casino play than a software manual. I think Spirit of Discovery knows this, because it offers the customer a chance to purchase an additional manual as well.

The manual takes you through each game, providing clear and accurate rules and offering counting tables and suggestions for expert plays. This package aims to bring you a complete casino experience.

You can't run simulations or massive computer projections with Beat the House, but this solid package would make a good addition to some of the more specialized packages discussed above. Use the statistic-intensive products to hone your game, and use Beat the House to test your skills in some of the most beautiful, playable renditions of casino games anywhere.

Beat the House offers blackjack, craps, slot machines, video poker, and roulette, with several rule variations for blackjack and a number of video poker and slot machines to choose from.

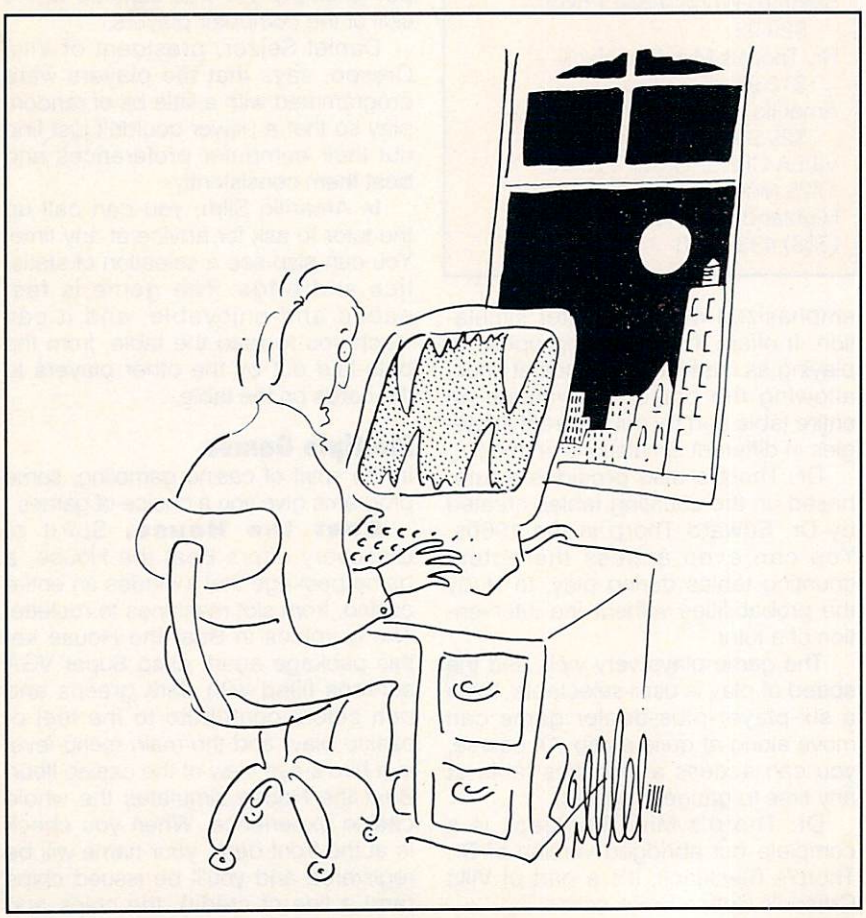
Trump Castle 3. Capstone's Trump Castle 3 is a multigame casino package based on Donald Trump's Atlantic City casino. Trump Castle 3 offers baccarat, blackjack, craps, poker, video poker, roulette, slots, and even a wandering keno girl. The graphics are Super VGA, and while not quite as slick and photorealistic as the graphics in Beat the House, they are far and above those of many of the other casino games.

You command an onscreen character to any of the gaming rooms. You initiate a game by stepping up to the table or machine you'd like to play. You can then customize your poker face (right down to facial hair and sunglasses) and save the attributes (and the cash) for later gaming sessions. Trump Castle 3 is unique in that it supports network and modem play, allowing several players to sit at a table together and play against the house dealer, while viewing the other players' faces and engaging in cross-table chatter.

The games play very well, and the graphics fill the screen. The play options pop up as small buttons near the bottom of the display. There is no tutor of any kind, and the game offers no statistics. The instruction manual is geared more toward the program than toward providing detailed rules for the many house games. Trump Castle 3 does offer online help with rules of the game, but you're on your own when it comes to making play decisions.

Like Beat the House, Trump Castle 3 allows you to carry a bankroll from table to table, and the Castle even offers an ATM for those necessary cash infusions.

While offering the least depth of all of the packages mentioned, Trump Castle 3 comes as close as possible to simulating a real casino on the PC screen. If you want to learn a game, I'd suggest looking into one of the more specialized packages mentioned above; but if you want to test your skills or merely play for fun (alone or with friends), then you'll find that Trump Castle 3 has the odds stacked in its favor.



Laying Your Cards on the Table

Advanced statistics and training options are available in nearly every product currently on the market, taking advantage of a computer's inherent number-crunching ability and giving the player the tools to plumb the mathematical depths of nearly any card game.

Casinos are becoming more and more popular, with states recognizing the advantage, in both tourism and tax dollars, that a casino can bring. By experimenting and practicing with gambling simulators, you can learn and explore the games being played in the casinos even before setting foot in those carpeted and mirrored meccas of cash flow. Having that experience will give even the novice casino-goer a more enjoyable (and possibly more prosperous) night at the slot machines and tables.

Now, all we have to do is to get these PCs to pay out the money we rightly win. After all, *our* house rules are the ones that count. ❑

64/128 VIEW

Guess what, GEOS fans! You've got your own magazine—again!

Tom Netsel

Computer publications have a way of appearing and disappearing faster than a magician's rabbit. But when one pops up for 64 and 128 users, I have this reaction to wish it well—despite the fact that it's a potential competitor. After all, it's nice to see someone else taking a serious interest in our machines.

Rather than trying to cover the whole Commodore 8-bit spectrum, publisher and managing editor Grady Brown is focusing his attention on GEOS with his new journal, *geoVISION International*. The premier issue has just arrived, and it looks impressive—and the typeface is clear and legible. Too many GEOS publications are tough to read.

A bimonthly publication of 28–32 laser-printed pages, *geoVISION International* plans to print columns once found in other Commodore and GEOS magazines in addition to new articles. Brown states in his editorial that the philosophy behind his new publication "is to bring all GEOS users and programmers together, spreading the knowledge, experiences, and information of GEOS users worldwide, and to give you the best GEOS support possible."

That's quite a goal for any publication, but Brown offers a good selection of articles and information. Articles in the first issue include what's hot and what's not on the big telecommunication networks, a tutorial on geoPaint by Australian artist Jane Voskamp-Jones, a geoWrite tutorial, and a roundup of the four GEOS programming languages.

There are reviews of several GEOS products, including geoCanvas, Perfect Print LQ, Dual Top, and Collete Utilities. (For more information about Collete Utilities, see Steve Vander Ark's "GEOS" column in this issue.) There's a list of bulletin boards, publications, and user groups that offer GEOS support. There are even several Australian newsletters and groups mentioned.

In his editorial, Brown addresses questions that are bound to be asked by people who have subscribed to magazines only to have them cease publication without honoring their obligations. "We cannot guarantee we'll be around forever. No one can. But we do promise to follow through with all our commitments to each and every subscriber."

In addition to the magazine, Brown offers six GEOS disks per year. They include programs and utilities covering fonts, desk accessories, applications, drivers, geoCalc and geoFile templates, and clip art.

To give *geoVISION International* a try, U.S. subscription rates are $21 for six issues or $4 for a single issue. Washington residents must add local sales tax. Canadian and Mexican subscriptions are $27 per year, $5 for a single issue. International subscriptions (via air mail) are $33 per year, $6 for a single issue.

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GAZETTE

64/128 VIEW G-1
Announcing a new magazine for GEOS fans.
By Tom Netsel.

SCREEN GEMS G-2
Try these nine programs on your 128 to see what BASIC 7.0 can do to brighten up a screen.
By Henning Vahlenkamp.

REVIEWS G-8
The Lost World and Video Digitizer.

FEEDBACK G-12
Questions, answers, and comments.

BEGINNER BASIC G-16
Readers reply with random-number generators.
By Larry Cotton.

MACHINE LANGUAGE G-18
Create an array with BASIC, and then use machine language to modify it.
By Jim Butterfield.

PROGRAMMER'S PAGE G-20
The 64 has a number of interesting quirks.
By Randy Thompson.

GEOS G-22
Additional sources of great GEOS programs.
By Steve Vander Ark.

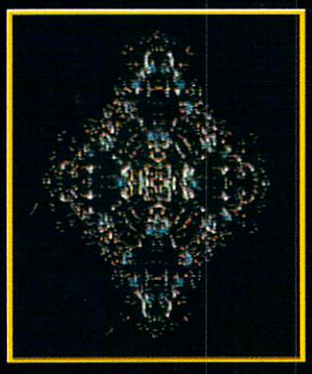
D'IVERSIONS G-24
Imagine flipping through 1500 television channels.
By Fred D'Ignazio.

PROGRAMS

Drop-Down Macros (64) G-25
Mailing List (64) G-28
Utility Plus (64) G-31
Director-Ease (64) G-33
Cross Ref 128 G-35
Your Own Database (64/128) G-36
ML Macros (64) G-39
The Automatic Proofreader (64/128) G-40

Screen

TRY THESE NINE PROGRAMMING GEMS TO



One of the biggest advantages the 128 has over its little brother, the 64, is its powerful built-in BASIC 7.0 language. This language's rich array of 165 different commands (not counting OFF and QUIT which were planned but never implemented) allows you to do many things more easily than you can on the 64, not the least of which is graphics. Consequently, you can create interesting graphic displays on your 128 with a minimum of effort and without using complex machine language.

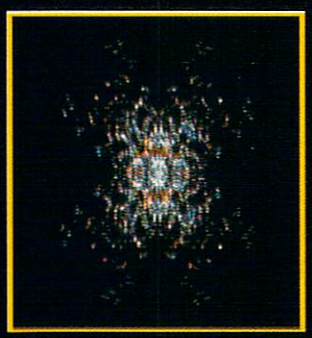
That leads me to the subject of this article. Following are nine concise programs that show off some of BASIC 7.0's graphical talents. These hacks, or screen gems, do a variety of fascinating things on both 40- and 80-column screens. I did my best to write them in clear, straightforward code so you can modify or incorporate them easily into your own programs. Experimenting with programs is one of the best ways to learn to harness BASIC 7.0's power for yourself.

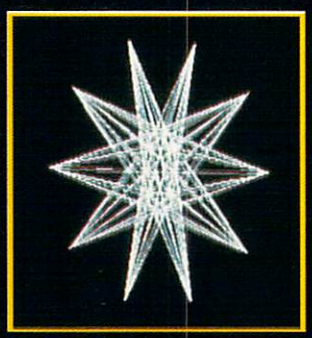
Now on to the gems. Let's first look at some colorful sparklers that work on 40-column screens.

Sprite Chaos

Sprite Chaos is a short sprite demonstration program. First, all eight sprites, depicted as colored spheres, are set in motion at random angles and speeds. Here's the twist. Once they're moving, the process is repeated, but with new random angles and different speeds. This occurs continuously, resulting in sprites that fly around the screen in unpredictable and interesting ways. You might want to use the effect as an eye-catching backdrop for a title screen in your own programs.

```
1 REM SPRITE CHAOS
10 COLOR 0,1:COLOR
   4,1: COLOR 5,13:
   GRAPHIC 0,1
```



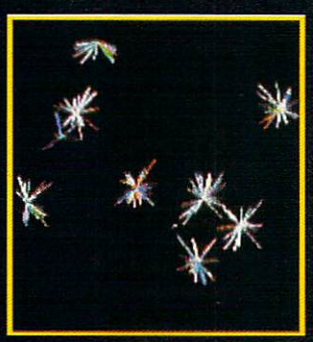


Gems

WRITTEN BY
HENNING
VAHLENKAMP

SEE JUST WHAT BASIC 7.0 CAN DO IN A 128.

```
20 CHAR ,13,10,"SPRITE
   CHAOS!"
30 FOR D=0 TO 63:READ
   V:POKE3584+D,V:
   NEXT
40 FOR I=2 TO 8:SPRSAV
   1,I:NEXT
50 SPRCOLOR 16,16
60 FOR S=1 TO 8:MOVSPR
   S,0,0:NEXT
70 FOR S=1TO8:SPRITES,
   1,S+1,1,1,1,1:NEXT
80 DO:FOR I=1 TO 8
90 A=INT(RND(1)*360+.5)
```

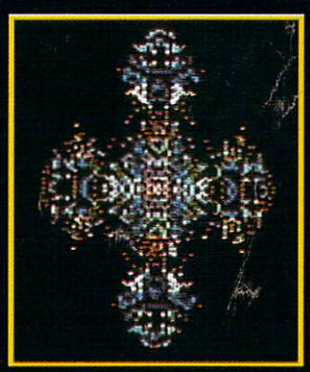


```
100 S=INT(RND(1)*15+1)
    :IF S<5 THEN 100
110 MOVSPR I,A #S
120 NEXT:LOOP
130 DATA 0,170,0,2,90,
    128, 9,106
140 DATA 160,9,170,160,
    37,170,168,38
150 DATA 170,168,38,170,
    168,150,17 0,170
160 DATA 154,170,170,
    170,170,170,170,170
170 DATA170,170,170,170,
    170,170,170,170
180 DATA 170,170,42,170,
    168,42,170,168
190 DATA 42,170,168,10,
    170,160,10,170
200 DATA 160,2,170,128,0,
    170,0,0
```

Curve Explosion

Picture an infinite number of different parabolic curves streaming out like a fountain from a central point on the screen. That's what Curve Explosion does with its short plotting routine. The program works like a circle algorithm, but it draws only half a circle. Each curve has a common starting point. Run this one on your 128 to see the intriguing display.

```
1 REM CURVE EXPLSION
10 COLOR 1,2:COLOR
   0,1:COLOR1,4
20 GRAPHIC 1,1
30 DRAW ,0,199 TO 319,
   199
40 DO:A=INT(RND(1)
   *70+10)
50 B=INT(RND(1)*150+10)
60 C=INT(RND(1)*2+1)
70 IF C=1 THEN BEGIN
80 D=3.14:E=-.1:F=-.2:
   G=A:BEND:ELSE
   BEGIN
90 D=0:E=3.3:F=.2:G=-
   A:BEND
100 LOCATE 160,199
110 FOR R=D TO E STEP F
```



```
120 X=INT(A*COS(R)):
    Y=INT(B*SIN(R))
130 DRAW TO 160+G+X,
    199-Y
140 NEXT R:LOOP
```

String Bounce

Are you looking for a new way to display a message on your 128? If so, try String Bounce. Just put any message into A$, and this program will move it around

the screen. If the message hits a border, it bounces off and continues in the opposite direction. Your message will leave a trail as it moves if you change the color in line 90. Change the 39 in lines 30 and 120 to 79 to make the program work on the 80-column screen. Keep the message reasonably short, or it will move down excessively.

```
1 REM STRING BOUNCE
10 SCNCLR:A$="COMMODORE!"
20 COLOR 5,2:COLOR 0,1:COLOR
   4,1
30 X=INT(RND(1)*39-LEN(A$)+.5)
40 IF X<0 THEN 30
50 Y=INT(RND(1)*23+1)
60 CHAR ,X,Y,A$:DX=1:DY=1
70 V=INT(RND(1)*3-1)
80 IF V=0 THEN 70
90 DO:XO=X:YO=Y:COLOR 5,1
100 CHAR ,XO,YO,A$:X=X+V*
    DX:Y=Y+V*DY
110 IF X<1 THEN DX=-DX:X=XO
120 IF X>39-LEN(A$) THEN DX=-
    DX:X=XO
130 IF Y<1 THEN DY=-DY:Y=YO
140 IF Y>23 THEN DY=-DY:Y=YO
150 COLOR 5,2:CHAR ,X,Y,A$
160 LOOP
```

Star Shapes

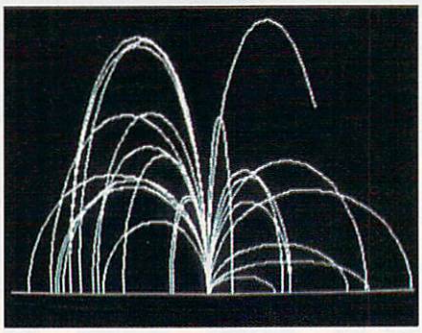
Star Shapes puts simple trigonometry to use so you can create an infinite variety of star-like designs. When you run the program, it asks you for an x and y radius. These are the radii of two circles. Lines are drawn from each of ten points arranged in a circle to each of ten points around your circle. The results produce elaborate symmetrical star shapes. Run it to see what I mean. These programs have few frills, so you'll have to hit Run/Stop–Restore and type RUN again to get this one to repeat.

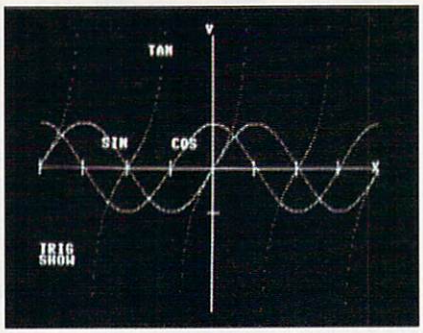
```
1 REM STAR SHAPES
10 COLOR 1,2:COLOR 0,1:COLOR
   4,1
20 INPUT"[SHFT CLR][CRSR DN]
   ENTER X RADIUS: ";X1
30 INPUT"ENTER Y RADIUS: ";Y1
40 FOR D=1 TO 10:READ A(D),B(D)
   :NEXT
50 GRAPHIC 1,1
60 FOR L=1 TO 10
70 FOR R=0 TO 6.28 STEP .628
80 LOCATE A(L),B(L)
90 X=INT(X1*COS(R)):Y=INT (Y1* SIN
   (R))
100 DRAW TO X+160,Y+100
110 NEXT R,L
120 DATA 249,100,232,147,187,176
130 DATA 132,176,87,146,70,99
140 DATA 87,52,132,23,188,24,233,53
```

Brownian Symmetry

This little hack differs from typical kaleidoscope-type programs by simulating Brownian motion, the random movement of microscopic particles in a fluid. I won't attempt an explanation of this phenomenon here, but it can produce eye-catching designs.

The program works by displaying a pixel influenced by Brownian motion and copying it across four lines of symmetry, resulting in eight reflections. You can choose hi-res or multicolor mode for the display as well as whether to erase the points after they're plotted. I think you'll find that Brownian Symmetry shows that there can be beauty in scientific phenomena.






```
1 REM BROWNIAN SYMMETRY
10 V=1:COLOR 0,1:COLOR 4,1
20 INPUT"[SHFT CLR][CRSR DN](H)I-
   RES OR (M)ULTI ";GR$
30 IF GR$="H" THEN SC=1:ELSE SC
   =3:V=2
40 INPUT"[CRSR DN]ERASE POINTS
   (Y/N)";ER$
50 X=0:Y=0:P=2:GRAPHIC SC,1
60 IF SC=3 THEN P=INT(RND(1)* 15
   +2)
70 COLOR 1,P
80 D=INT(RND(1)*15+1)
90 MX=INT(RND(1)*(D*2+.5)-D)
100 MY=INT(RND(1)*(D*2+.5)-D)
110 X=X+MX:Y=Y+MY
120 IF X<-100 THEN 80
130 IF Y<-100 THEN 80
140 IF X> 100 THEN 80
150 IF Y< 100 THEN 80
160 FOR L=1 TO 2
170 DRAW ,(160-X)/V,100+Y
180 DRAW ,(160-Y)/V,100+X
190 DRAW ,(160-X)/V,100-Y
200 DRAW ,(160-Y)/V,100-X
210 DRAW ,(160+X)/V,100+Y
220 DRAW ,(160+Y)/V,100+X
230 DRAW ,(160+Y)/V,100-Y
240 DRAW ,(160+Y)/V,100-X
230 IF ER$="N" THEN 60
240 COLOR 1,1: NEXT L: GOTO 60
```

Star Bursts

Your monitor screen goes black and then slowly fills with an infinite variety of distinct, colorful explosions or star bursts. That's what the following program will do on your 128. Each star burst consists of 25 randomly selected and colored rays emanating from a central point. Try it; I think you'll find this one is a real eye-catcher!

```
1 REM STAR BURSTS
10 COLOR 0,1:COLOR 4,1
20 GRAPHIC 3,1:DO
30 X1=INT(RND(1)*159)
40 Y1=INT(RND(1)*199)
50 FOR RP=1 TO 25
60 CS=INT(RND(1)*3+1)
70 CO=INT(RND(1)*7+2)
80 X2=INT(RND(1)*24-11.5)
90 Y2=INT(RND(1)*40-19.5)
100 COLOR CS,CO
110 DRAW CS,X1,Y1 TO
    ABS(X1+X2),ABS(Y1+Y2)
120 NEXT:LOOP
```

Trig Show

Beginning math students often have trouble remembering the six basic trigonometric curves: sine, cosine, tangent, cosecant, secant, and cotangent. Trig Show helps by drawing each curve one at a time from -2 times pi to 2 times pi along the x-axis. It also shows each curve's relationship to another curve since all of them appear and overlap on the same screen. When one curve finishes its plot, press Return to see the next one. Try this useful visual aid to increase your understanding of these trigonometric fundamentals. When typing this one in, remember that to enter pi in line 250, hold down the Shift key while simultaneously pressing the up-arrow (↑) key.

```
1 REM TRIG SHOW
10 COLOR 0,1:COLOR 4,1:COLOR
   1,2
20 GRAPHIC 1,1
30 CHAR ,0,19,"TRIG"
40 CHAR ,0,20,"SHOW"
50 DRAW ,0,100 TO 319,100
60 DRAW ,159,0 TO 159,199
70 FOR X=0 TO 319 STEP 39.75
80 DRAW ,X,95 TO X,105:NEXT
90 DRAW ,155,70 TO 165,70
```

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```
100 DRAW ,155,130 TO 165,130
110 CHAR ,39,12,"X":CHAR ,19,0,"Y"
120 BB=0:DEF FNY(X)=SIN(X)
130 CHAR ,7,10,"SIN":GOSUB250
140 BB=0:DEF FNY(X)=COS(X)
150 CHAR ,15,10,"COS":GOSUB250
160 BB=1:DEF FNY(X)=TAN(X)
170 CHAR ,12,2,"TAN":GOSUB250
180 BB=1:DEF FNY(X)=1/SIN(X)
190 CHAR ,30,22,"CSC":GOSUB250
200 BB=1:DEF FNY(X)=1/COS(X)
210 CHAR ,12,22,"SEC":GOSUB250
220 BB=1:DEF FNY(X)=1/TAN(X)
230 CHAR ,30,2,"COT":GOSUB250
240 END
250 FOR X=.05 TO 4*(π) STEP .05
260 IF BB=1 THEN IF FNY(X)*30>=-
    100 AND FNY(X)*30<=100 THEN
    DRAW ,X*25.5,100-FNY(X)*30
270 IF BB=0: THEN DRAW ,X*25.5,
    100- FNY(X)*30 280 NEXT:WAIT
    212,1:RETURN
```

Now let's shift our attention to some 80-column gems.

Close and Open

Over the years, many routines have been written to clear the 40-column text screen in different ways. The following short routine demonstrates an interesting screen clear for the 128's often neglected 80-column text screen. First, text is displayed, and the program waits for a keypress. Then the left and right sides of the screen come together, squeezing out the text. The screen is cleared, new text is printed, and the screen expands again to reveal it. Try this one in your own programs instead of a boring SCNCLR command.

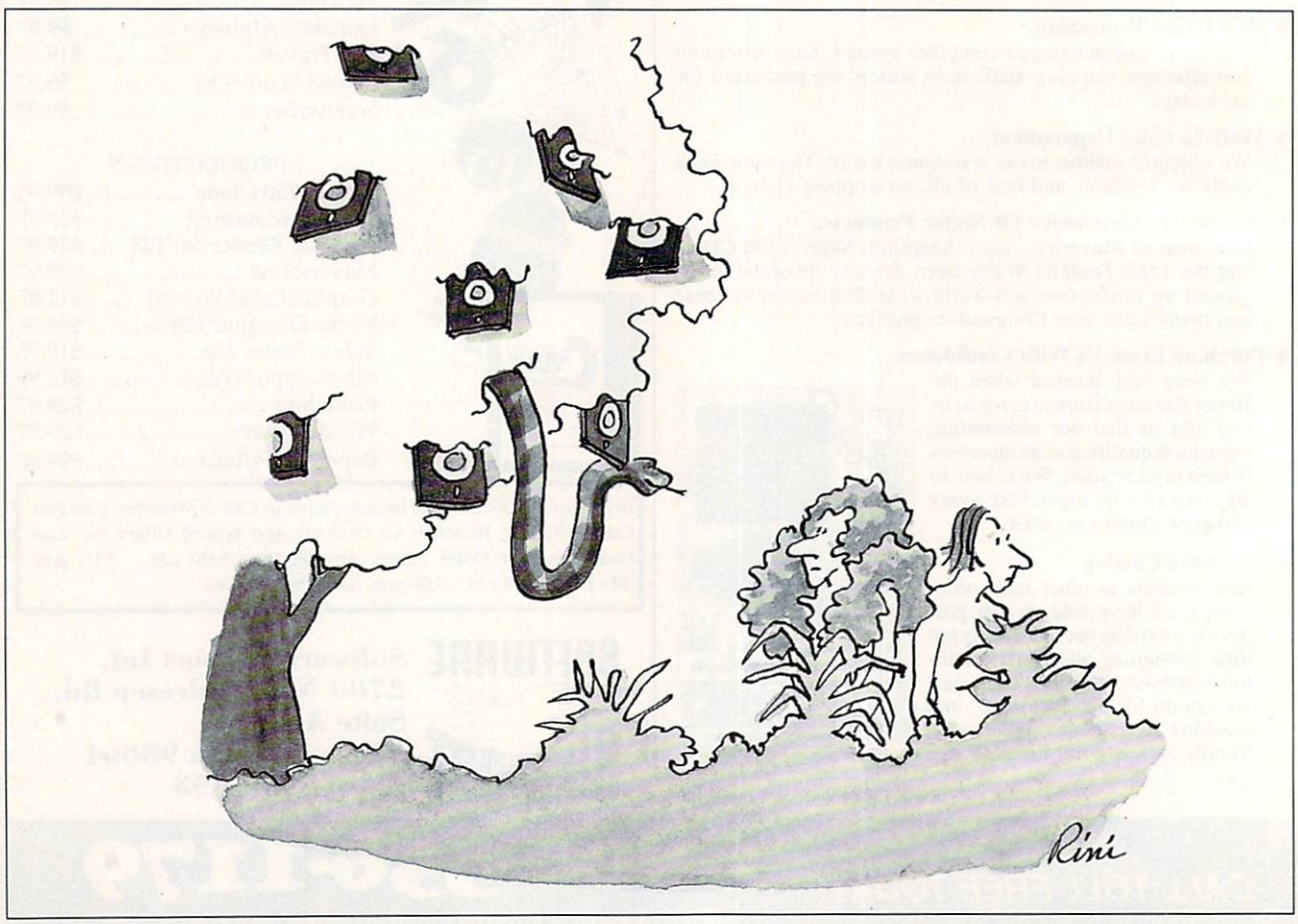
```
1 REM CLOSE & OPEN
10 SCNCLR:PRINTCHR$(27)CHR$
   (82)
20 CHAR ,26,10,"HERE IS THE
   [CTRL 9] F I R S T[CTRL 0]
   SCREEN"
30 GETKEY K$:IF K$=" " THEN 30
40 R=86:L=6:DO
50 SYS 52684,R,35:SYS 52684,L,34
60 R=R-1:L=L+1
70 LOOP UNTIL R<L:SCNCLR:SLEEP1
80 CHAR ,25,10,"HERE IS THE [CTRL
   9] S E C O N D[CTRL 0] SCREEN"
90 DO:R=R+1:L=L-1
100 SYS 52684,R,35:SYS 52684,L,34
110 LOOP UNTIL L<6
```

Shaker

Shaker does for the 128's 80-column screen what many routines have done for the 40-column screen: It shakes it back and forth. This hack takes advantage of the VDC chip's little-known smooth-scrolling feature. By repeatedly moving the screen eight pixels to the left then eight to the right in increments of one, it produces this smooth effect. Try it and liven up dull text displays.

```
1 REM SHAKER
10 GRAPHIC 5,1:COLOR 5,5
20 FOR I=15 TO 64:CHAR ,I,6,"*":
   CHAR,I,16,"*":NEXT
30 CHAR ,36,8,"SHAKER"
40 CHAR ,31,10,"COMPUTE'S
   GAZETTE"
50 CHAR ,30,12,"324 WEST WEN
   DOVER AVENUE"
60 CHAR ,29,14,"GREENSBORO, NC
   27408"
70 FOR L=7 TO 0 STEP -1
80 SYS 52698,,25:RREG AC
90 SYS 52684,(AC AND 248)+L,25
100 NEXT L
110 FOR R=0 TO 7
120 SYS 52698,,25:RREG AC
130 SYS 52684,(AC AND 248)+R,25
140 NEXT R:GOTO 70
```

I hope you take a few minutes to type in these little gems and see what a 128 can do. Feel free to modify and embellish these programs and use them as a basis for your own programming ideas. ❑



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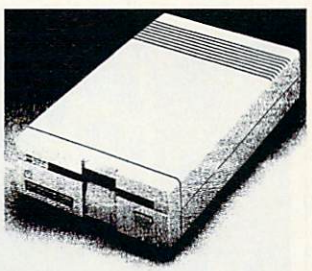

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THE LOST WORLD

Does this sound familiar? You're tired of shoot-'em-up computer games that do nothing for a child's mind, but your child shuns educational games in favor of action and adventure. If that's the case, then Free Spirit Software has the answer for both of you in an adventure program it has just imported from the land down under.

Based on a Sir Arthur Conan Doyle novel published at the turn of the century, The Lost World is an offering from Satchel Software, a company that promotes the use of computers and computer text games in the school systems throughout South Australia. This particular program, geared toward junior high students, ties in nicely with the study of fossils, dinosaurs, and natural history. The game also helps students by encouraging reading, increasing vocabulary, widening thought processes, developing concentration, and developing problem-solving strategies.

With these goals in mind, you would probably expect The Lost World to be boring. It's not! The game is great fun! It combines text commands with colorful graphics in a rollicking adventure that can be played alone or solved as part of a group effort. You'll find yourself facing quite an array of obstacles and many unique elements. In fact, if you don't use your head, you might end up as a tasty tidbit for a hungry dinosaur.

The game's text commands are relatively simple. Directions (north, west, up, down, and so on) can be abbreviated by typing the first letter of the word. Youngsters who aren't familiar with a keyboard won't be put off by having to type in a lot of text. Action commands are kept simple, too, using verbs such as take, cut, drop, make, and so on. This lets children with varying reading levels play and enjoy the game. You can also save your adventure—a nice feature if you've just had an unfortunate encounter with an Allosaur.

Players will have fun finding treasure, discovering fossils, and meeting dinosaurs in The Lost World, but they'll also be learning.

Satchel wants its software to be challenging but not frustrating. The programmers have found that a little help goes a long way, so they've included a 176-page manual that is divided into two parts. The first 67 pages are for the teacher, and they offer suggestions and possible solutions for the game. This section should be used sparingly. Children in the appropriate age range should be able to solve the game with just a few hints to steer them in the right direction. The remaining 109 pages of the manual are a bonus. They are crammed with games, crossword puzzles, and short articles that will pique a child's curiosity and offer hours of related activities. There's lots of good information here for students who want to do some reports for extra credit, too.

The Lost World is far more than a text game and activity book. In fact, this three-disk package outdistances any game program I've ever seen. Satchel actually gives you an incredible resource disk in this program that includes a basic database, a simple-to-use word processor called Easy Word, and several disk utilities—all designed for junior high students.

The database is already set up with five files that pertain to dinosaurs, explorers, and imaginary lands. Users can choose to view, edit, search, or sort the files. They can also add, delete, and print records. While the users can't create their own files, this program helps familiarize them with ways to work within databases and access information.

The people at Satchel Software realize that novices often inadvertently erase portions of their projects while learning to use a new program. To reduce this frustrating possibility, some commands, such as DELETE, have safeguards built into them that prevent a user from erasing the entire database. Speaking from personal experience, there've been many times when I've wished for this feature on my own database.

The word processor included in The Lost World is called Easy Word, and it lives up to its name. It's a practical, 40-column word processor that is so simple to use that kids will enjoy using it for reports and other writing tasks. Satchel has built several safeguards into the word processor program, too. For example, function keys handle most commands within the program (LOAD, CLEAR, SAVE, ERASE, CENTER, PRINT), and these commands stay onscreen throughout the program. That way users won't lose any work trying to remember the right command.

Another safeguard built into the program restricts access to the Erase option. When you press f8 to erase files, you get a message informing you that Erase is a restricted option. You then have to go through several more steps, including entering the full name of the file you want to erase. After all these steps, it's rather unlikely that you'll accidentally delete an important file.

I think you're going to be very surprised when you check out The Lost World. This package delivers everything that its developers promise and more. I for one am going to be watching for more programs bearing the Satchel Software name.

MARTI PAULIN

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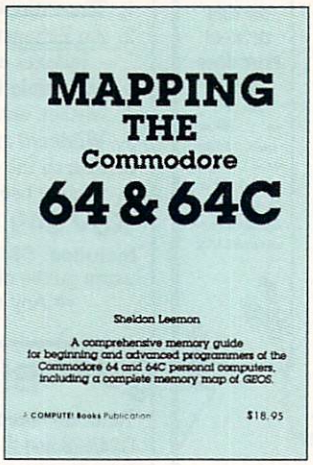

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VIDEO DIGITIZER

There's a new digitizer on the market. This German import, called simply Video Digitizer, is distributed in the U.S. by RIO Computers. Video Digitizer does far more than simply replace ComputerEyes, which has been discontinued—it leaves it in the dust!

The screen image is limited to standard Commodore high-resolution, and you need a decent image and a stable source signal if you hope to accomplish anything. But this little gem manages to find a clean image where ComputerEyes could see only black-and-white streaks. I ran the cable from my new VCR (which I bought only after making sure it could produce a nearly perfect freeze-frame) to my Commodore 128 (in 64 mode) and compared Video Digitizer with ComputerEyes on the same video image. Video Digitizer created a perfectly presentable picture of Captain Kirk, while ComputerEyes covered the poor captain with streaks. I was impressed!

Of course, any digitized image needs at least a little touching up. With ComputerEyes this always meant loading a third-party conversion program such as Icon Factory and porting the image over to Doodle or geoPaint for touch-ups. Video Digitizer, on the other hand, has a drawing program called Eddison that's built right in! As a matter of fact, Eddison is a full-featured, sophisticated graphics tool in its own right. In a sense, Video Digitizer is an add-on accessory to Eddison, not the other way around. After all, the digitizer is controlled from an icon that's a selection on Eddison's menu, just like the pencil or brush choices.

Video Digitizer scans an image in black-and-white or gray scale. The former requires less time to scan and is considerably more forgiving about the picture you choose. It creates a very recognizable scan of a person's face, for example, even if it's not a close-up. The downside is that the image is comprised of areas that are strictly black or white. There are no shades of gray between the two. You can manually set the threshold level (the darkness level at which the software chooses to make a pixel black instead of white), which greatly alters the look of the scan. This high-contrast image is great for many things. If you plan to resize the image later in a program like geoPublish, it's the only way to go.

Gray-scale scans are created with a myriad of dots in patterns to create levels of gray. This sounds great in theory, but when it comes down to practice, there usually isn't sufficient contrast in the source image to give you a

well-defined image. This isn't a flaw in the Video Digitizer, however; ComputerEyes does the same thing. A live video image from a video camera with good lighting to create sharp contrast can be scanned successfully this way. A video tape image, on the other hand, will usually wash out. Fortunately, it's a simple matter in Eddison to scan and rescan using various methods until you come up with an image you like. This is perhaps the single most impressive feature of the Video Digitizer system. You not only have the choice of repeating your scan quickly and easily, but you can also immediately use Eddison to alter each image to see if it fits the bill. This little unit, barely the size of a standard cartridge, is a joy to work with.

This is not to say that everything is perfect. Probably the biggest drawback to Video Digitizer is its price. The competition (now limited to VideoByte and its companion cartridge, VideoMate) retails for less than half Video Digitizer's price. Granted, Video Digitizer runs circles around VideoByte's converted multicolor images if you want a high-resolution scan and can justify the price.

Another major disappointment is Video Digitizer's documentation. Like VideoFox and other products in this line, the manuals for Digitizer and Eddison are poor translations of the original German, with sentences running from comical to unintelligible. A number of features are so poorly described that I was forced to give up when I couldn't figure them out by trial and error. Richard Ollins, president of RIO Computers, assures me that a new comprehensive set of manuals are available. With the new documentation, all the products in this line, including VideoFox, PageFox, and the new genlock that RIO plans to release, will be integrated into an impressive set of graphics and video tools for the 64.

If you're a "Star Trek" and a graphics fan like me and dream of using great pictures on your computer of Spock, the *Enterprise*, and maybe your brother, then Video Digitizer is worth the cost. I know I'll gladly earmark $250 for one when my strained budget allows. I've never been so sad as when I had to pack up this review unit of Video Digitizer and ship it back to the company.

STEVE VANDER ARK

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FEEDBACK

The 64's missing memory, loading the first file in a directory, and more

Why Only 39K?

If the 64 has 64K of memory, how come only 39K is available to BASIC programming?

A. MARIE
SAN ANTONIO, TX

At the heart of all personal computers is the microprocessor. In the 64, this processor is the 6510, a variation of the 6502 used in the Apple. One characteristic of this chip is that it can access only 64K of memory at a time.

If the designers of the 64 simply filled the computer with 64K of empty memory, the machine would be helpless. Computers need certain built-in programs to function. Don't confuse these built-in programs with the programs you write yourself or load from disk. The built-in programs are stored in special memory chips called ROM (Read Only Memory). Unlike other programs, they remain safe in their ROM memory chips even when power is turned off. The BASIC language itself is one of these programs. Another program is the computer's operating system, which performs housekeeping duties.

These internal programs need some of the 64K of space that the 6510 microprocessor chip can address. To make room for them, the 64 designers used some of the RAM area. That's why, when programming in BASIC, you have only 38,911 bytes of memory. The 25K of RAM that appear to be missing are taken up by the BASIC interpreter program, the operating system, and other things. The designers did make it possible, however, to switch off the 64's ROM, thus freeing the full 64K of RAM underneath.

Unfortunately, when you switch off BASIC and the operating system, you are left with what amounts to an unconscious computer. You must replace the operating system software with some of your own that takes care of the necessary housekeeping tasks. Since BASIC is gone, this replacement must be machine language. Therefore, the full 64K of RAM is available, but only to advanced programmers fluent in machine language.

Load Me First

I have a question about making a menu program the first one on a directory. I have a disk of files, and no matter how often I save the menu program, it doesn't come first in the listing. I want to be able to load the menu by simply typing *LOAD"*",8* and *RUN*. How do I do that?

T. AIGHT
BOSTON, MA

You can load the first program on a directory listing with LOAD"",8 only if you're loading a program for the first time. After that, that command will load the last program loaded. To load the first program any time, use LOAD "0:*",8. Now let's address the real question.*

To make any program the first program on the disk requires that the program that is currently first be replaced. Here's how to do it.

Place the disk you want to rearrange into the disk drive. Load and list the directory. Note the program at the top of the directory list. (Press Run/Stop if necessary to keep the list from scrolling off the screen.) This first program on the disk is the one you'll have to move to make room for your menu program.

Use the COPY command to duplicate the first program with another name, for example, OPEN 15,8,15, "COPY0: newname=oldname*": CLOSE 15.* Newname *is the name of the copy, and* oldname *is the name of the original.*

Once you've copied the program elsewhere on the disk, you can safely delete the original with the SCRATCH command: OPEN 15,8,15, "S0: oldname*": CLOSE 15. As before,* oldname *is the name of the original. Now you can use the RENAME command to change the new name back to the original. Its format is OPEN 15,8,15, "R0:* oldname =newname*": CLOSE 15. Now you have two possibilities. If your menu program is already on the disk, you can use the COPY command, which will move the menu to the front of the disk. If the menu program isn't already on the disk, insert a disk that contains the program and load it in. Replace that disk with the one you've been working with and save the menu program to it.*

If you've done everything right, your menu program should now be the first program on the disk. Test it by by entering LOAD"0:",8.*

Underlining

I have a 64, Cardco + G interface, Star SG10 printer, and WordPro 3 Plus word processor. I can't get my system to underline anything. All four products claim to support underlining, so please tell me what to do in this regard. I'm not that knowledgeable about BASIC programming or the equipment. My main desire is to use the equipment for word processing.

PENNY CAESAR
FORT WAYNE, IN

One of the most common questions we receive is how to get a certain printer to work with a certain interface and a certain software package. Although the questions are similar, there are literally hundreds of answers, depending on what hardware and soft-

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Underlining from within a word processor, and making files impossible to load

ware are being used. Given three interfaces, five printers, and seven word processors, you could find 105 different ways to hook them up and possibly 105 different answers to the question of underlining. Unfortunately, we don't have access to much of the equipment or software mentioned, so it's difficult for us to find the specific answer.

There are three routes you could take: First, write or call the manufacturers of your printer, interface, and software. The worst that could happen is that you'd get no reply. If you bought your printer at a local Commodore dealer (very few of those, these days), someone at the store may be able to help.

Second, try contacting a local user group. You may find someone there who has similar equipment. Or perhaps someone with printer experience can help you find the answer through experimenting.

Third, check your printer manual for the codes that turn underlining on and off. In your case, the way to enable underlining should be ESC – 1, which means send an escape (ESC) character, a minus sign, and a CHR$(1). To disable underlining, you'd send ESC – 0. This is often called an escape sequence because you use the ESC character followed by a sequence of one or more other characters. The ASCII value of ESC is 27, and the ASCII value of the minus sign is 45. To test this, enter and run the following BASIC program.

```
10 OPEN 4,4
20 PRINT#4,CHR$(27); CHR$(45);
   CHR$(1);
30 PRINT$4,"THIS SHOULD BE
   UNDERLINED.";
40 PRINT#4,CHR$(27); CHR$(45);
   CHR$(0);
50 PRINT$4," AND THIS IS NOT."
60 PRINT#4:CLOSE 4
```

If the printer underlined the first sentence, but not the second, you have the proper codes.

If it didn't work, there could be several things wrong. Here's where it becomes a little complicated. You may have mistyped the program; check the spelling and punctuation. The interface may have intercepted the codes before they reached the printer. Escape sequences can sometimes be used to program interfaces as well as to set printer options. If you have such an interface, it may have seen the ESC and thought that it was intended to be an interface code and not a printer code. If that's the case, you'll have to send ESC twice. Usually, when a programmable interface receives two ESC codes, it sends the second one to the printer.

Another potential problem is that the DIP switches on the printer or interface might be in the wrong position. DIP switches control the way your interface or printer acts. These vary widely from brand to brand, so check the printer manual and the interface manual for guidance on the proper settings.

Finally, it may be that your printer needs a different escape sequence for underlining; again, it's necessary to check your manual.

Before you start experimenting with the word processor, try to underline from a BASIC program. When you know the proper escape sequence from BASIC, you'll be prepared to try it from the word processor.

Some word processors use printer files to keep track of various printer settings. When you place a generic underline command in the document, the proper escape sequence is sent when you print the document, providing you've previously loaded the correct printer file.

Other word processors require you to know the commands to enable or disable underlining and other features. You'll have to check the documentation for your word processor. If you need to use the commands, you'll have to define three format keys for CHR$(27), CHR$(0), and CHR$(1). Then, whenever you want to underline, place the defined key for 27, –, and the key for 1 in the text of your document.

Unloadable Files

I remember seeing a programming tip somewhere that protected files from being loaded by unauthorized people. It required a code to load. Do you know of such a way that I can protect my programs?

RAY FISHER
PALATKA, FL

There are a number of ways a programmer can "lock" his or her BASIC programs from prying eyes, but here's a simple way that won't force you to remember any exotic codes. Just remember the character string (CHR$) for a comma, which is CHR$(34).

*When you are ready to save your program, use this format: SAVE "*filename*"+CHR$(34),8. Use your own program name for* filename. *When you list the disk's directory, this program will appear normal. Try to load it, however, and you'll get a FILE NOT FOUND error. To load the program, you'll have to enter* LOAD"filename"+CHR$(34),8.

Send your questions and comments to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ❐

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BEGINNER BASIC

Larry Cotton

NONREPEATING NUMBERS RETURN

Readers respond with their own programs to generate 52 nonrepeating random numbers.

Last November, I challenged you to submit programs that would generate nonrepeating random numbers in either BASIC or machine language. Thank you for your responses. Appropriately, all of the responses were in BASIC. (I'd hoped for a few ML versions, but I suppose mine couldn't be improved. In my dreams!)

The object was to compare BASIC and ML speed by generating 52 nonrepeating numbers, such as you get when shuffling a deck of cards.

And the winner is Howard Monroe. (I'm sorry, Howard. I misplaced your envelope, so I don't know where you live.) Here's Howard's program.

```
5 PRINT"(CLR)(DOWN)PRESS
  ANY KEY TO RANDOMIZE 52
  NUMBERS"
6 PRINT"WITHOUT
  REPEATS.":PRINT
7 GETA$:IFA$=""THEN7
10 C=52:Q=RND(-TI/101)
20 DIM R(C),X(C)
25 REM INITIALIZE THE DECK
30 FORI=1TOC:X(I)=I:NEXTI
35 REM GENERATE 52 RANDOM
   NUMBERS BETWEEN 1 AND 52
   INCLUSIVE
40 FORI=1TOC:R(I)=INT(C*RND(1))
   +1:NEXTI
45 REM GENERATE THE RANDOM
   PERMUTATION
50 FORI=1TOC:A=R(I):B=X(I):
   X(I)=X(A):X(A)=B:NEXTI
60 FORI=1TOC
70 PRINT X(I),
80 NEXTI
90 PRINT:PRINT:PRINT"AGAIN?
   (Y=YES, N=NO)":PRINT
100 GETA$:IFA$<>"Y"THENIF
   A$<>"N"THEN100
110 IFA$="N"THENEND
120 GOTO40
```

Howard points out that the important lines are 10–50 and that in reshuffling the "deck," it's important to branch back to line 40, not line 30.

His program is unique in that the time it takes to generate the 52 numbers is virtually the same each time the program runs. This is not so of my primitive version or of any of the other submissions that rely on IF-THEN statements to test the random numbers.

Howard's program requires only 118 jiffies (I'll explain this term in a moment) to generate the 52 numbers. To time how long a routine takes, add a line like this where you want the timer to start.

```
1 TI$="000000"
```

A clock, based on the 64's CPU clock, measures time in jiffies (about 1/60 second). The jiffy clock can be set to 0 with a line like that above. From then on, that clock runs frantically until it's reset.

If you'd like to see the jiffy clock in action, just type *PRINT TI* in immediate (nonprogram) mode and press Return. Do this a few times and watch as the jiffies fly by. In program mode, you would add a line number to the command, such as *55 PRINT TI*.

The clock is set to 0 in line 1, and line 55 prints the number of jiffies that have elapsed since then. Everything that happens between line 1 and line 55 is timed in jiffies.

But I digress. My November program often took 4700 or more jiffies to generate the 52 numbers. Howard's speed-enhanced version blew mine away by a factor of almost 40. All other programs submitted beat mine by factors of 2–15. My next challenge was to see if I could squeeze any more speed out of Howard's program. Yes, I could—but not much. First, I changed his random statement in line 40.

```
40 FORI=1TOC:R(I)=INT
   (C*RND(.))+1: NEXT
```

The number inside the parentheses that follows RND can be anything, so I made it 0. Actually, by substituting a period for the numeral 0, it works even faster. This shaved 18 jiffies off Howard's time. Then I combined the last two FOR-NEXT loops into one and dropped the I variable. This eliminated a calculation and shaved another 14 jiffies.

I tried using DEF FN to define the RND function, but that actually slowed down the program. I also tried making the 1 in line 40 a constant; that didn't help either. So here's the speed-enhanced version. It times everything up to the actual printing of the numbers and also rudely strips away the program's user-friendliness.

```
10 TI$="000000"
20 PRINTCHR$(147)
30 C=52:Q=RND(-TI/101)
40 DIMR(C),X(C)
50 FORI=1TOC:X(I)=I:NEXT
60 FORI=1TOC:A=INT(C*
   RND(.))+1:B=X(I):X(I)=X(A);
   X(A)=B:NEXT
70 PRINTTI:PRINT
80 FORI=1TOC
90 PRINTX(I),
100 NEXT
```

An elegant (albeit slower) version by David Zammat of Summit, New Jersey, tests whether each new integer generated has been used previously. If it hasn't, the program prints it and generates another one. I received several variants of this program

```
10 D=52:DIM U(D)
20 FOR C=1 TO D
30 N=INT(D*RND(1))+1
40IFU(N)=0THENU(N)=1:PRINTN;:
   NEXT:END
50 GOTO 30
```

Again, thanks, Howard, David, and all the others for your input. I'll try to offer another challenge before long. ❐

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MACHINE LANGUAGE

Jim Butterfield

ARRAYS

Create an array in BASIC and modify it with machine language.

If you create an array in BASIC, that array can be used or modified by machine language programs. The start-of-arrays pointer tells where to find the first array. Using the pointer, the ML program looks for the array it wants and then goes for the data.

The first two bytes of an array give its name. The next two bytes give the array's size, which enables a program to leap ahead to the next array if desired. The fifth byte contains the number of dimensions. Following that, each dimension has a two-byte number that shows its size (including the 0 element). Thus, a one-dimensional array has seven bytes of header material, after which the data is stored. Integer arrays—which we'll use in our sample program—store each value in two bytes.

The start-of-arrays pointer may be found at addresses $2F and $30 on the VIC-20, Plus-4, and 64. The 128 sites the pointer at $31 and $32—but be careful, the values themselves are stored in bank 1.

Let's take a look at a sample program that uses BASIC to set up an integer array. We'll then ask a machine language program to calculate a Fibonacci series and place it in that array. A Fibonacci series starts with values 1 and 1 (or 0 and 1, if you like). Each new value is the sum of the two previous values. The series goes 1, 1, 2, 3, 5, 8, 13, and so on.

Our BASIC program creates only one array. To keep our program small, we won't check the array name, but we will check its size, since the calculated values should not overrun the array area.

The code starts by copying the start-of-arrays pointer into a work pointer at $22 and $23.

```
033C: LDA $2F: STA $22: LDA $30
:STA $23
```

Next, we extract the size of the array and add it to the array address. That gives us the address of the next array, the end of this one. We'll store it at $03C0/1.

```
LDY #$02: CLC: LDA ($22),Y: ADC
$22: STA $03C0
INY: LDA ($22),Y: ADC $23: STA
$03C1
```

Skip seven bytes to get past the header data.

```
LDA $22: ADC #$07: STA $22: BCC
$0360: INC $23
```

The array initially contains all 0s. Reaching beyond element 0, we'll change element 1 to a value of 1.

```
0360: LDY #$03: LDA #$01: STA
($22),Y
```

Now the program proceeds to set up a second pointer, with a value of the first pointer plus 2. These two pointers will reference adjacent values in the array.

```
CLC: LDA $22: LDY $23
ADC #$02: STA $24: BCC $0372:
INY
0372: STY $25
```

Here comes our main loop in the program. We add together the two pointed-at values and put the result temporarily on the stack.

```
0374: LDY #$01: CLC: LDA
($22),Y: ADC ($24),Y: PHA
DEY: LDA ($22),Y: ADC ($24),Y:
PHA
```

Now we bump the pointers to the next set of values.

```
CLC: LDA $24: LDY $25: STA $22:
STY $23
ADC #$02: BCC $0390: INY
0390: STA $24: STY $25
```

If we have moved beyond the array's end, we'll exit.

```
CMP $03C0: TYA: SBC $03C1: BCS
$03A9
```

Otherwise, we bring back the value from the stack and store it in the new array location. Then we loop back.

```
LDY #$00: PLA: STA ($24),Y
INY: PLA: STA ($24),Y
CLC: BCC $0374
```

If it's time to exit, we must remember to remove the two unwanted bytes from the stack.

```
03A9: PLA: PLA: RTS
```

You may change the size of the array as defined by the DIM statement in the BASIC program, but integer arrays can't hold a value greater than 32,767.

Don't forget that BASIC can move arrays to a new location to make room for new variables. Always work from the start-of-arrays pointer; its value may have changed since you last used it.

```
EG 80 PRINT "(64 ONLY) M/L ARR
      AY ACCESS"
XK 90 DIM A%(20)
EM 100 DATA 165,47,133,34,165,
      48,133,35,160,2,24,177,
      34,101,34
HE 110 DATA 141,192,3,200,177,
      34,101,35,141,193,3,165
      ,34,105,7
AA 120 DATA 133,34,144,2,230,3
      5,160,3,169,1,145,34,24
      ,165,34
XC 130 DATA 164,35,105,2,133,3
      6,144,1,200,132,37,160,
      1,24
CE 140 DATA 177,34,113,36,72,1
      36,177,34,113,36,72,24,
      165,36,164,37
SH 150 DATA 133,34,132,35,105,
      2,144,1,200,133,36,132,
      37
DK 160 DATA 205,192,3,152,237,
      193,3,176,12,160,0,104,
      145,36,200,104
MJ 170 DATA 145,36,24,144,203,
      104,104,96
PH 200 FOR J=828 TO 939
EJ 210 READ X:T=T+X
BP 220 POKE J,X
AE 230 NEXT J
PC 240 IF T<>10638 THEN STOP
GF 300 SYS 828
SB 310 FOR J=1 TO 20
MS 320 PRINT A%(J);
PP 330 NEXT J
```

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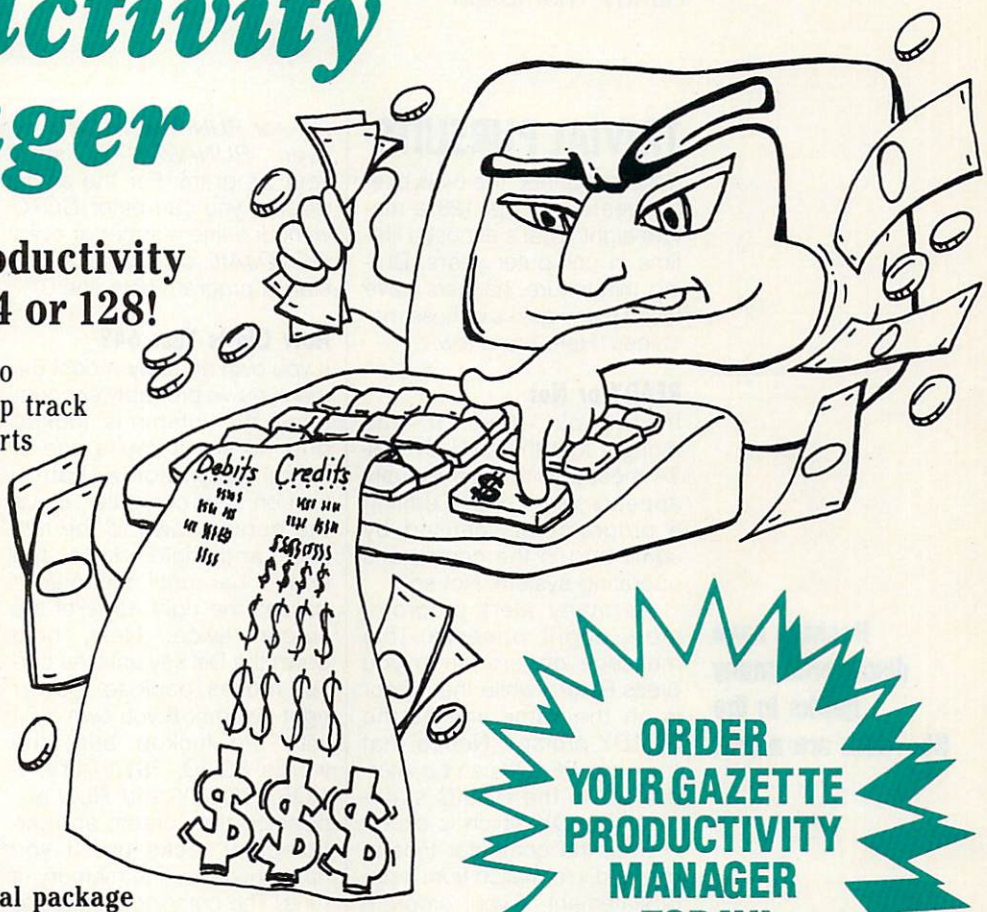

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PROGRAMMER'S PAGE

Randy Thompson

TRIVIAL PURSUITS

Believe it or not, the 64 is over ten years old, the 128 a mature eight. That's almost a lifetime in computer years. During this tenure, hackers have found many quirks in these machines. Here are a few.

Hackers have discovered many quirks in the 64—here are a few.

READY or Not

In the old days, it was thought that the *OUT OF DATA* message that spuriously appears when you're editing a program was caused by some bug in the computer's operating system. Not so.

As many alert programmers might observe, this message occurs when you press Return while the cursor is on the same line as the *READY* prompt. Notice that the word *READY* can be interpreted as the BASIC statement *READY*, which is exactly what the computer tries to do: read information from a data statement. If your program doesn't have any data statements, the computer replies with the cryptic but correct *OUT OF DATA ERROR*. If your program does contain data, your computer reads the value into Y and then responds with a more reasonable sounding *SYNTAX ERROR*, because the period (.) that follows *READY* is not a valid BASIC command.

Another common typing mistake is to type the command *RUN* on top of the *READY* prompt. This produces the word *RUNDY*, which your computer rarely accepts. In most cases, your computer complains with an *UNDEF'D STATEMENT* error because it cannot interpret the characters DY as a valid line number. However, whenever the BASIC interpreter is unable to find a line number, it tries to jump to line number 0. So by starting all your programs with line 0, you can enter *RUNDY*—or *RUNIT*, or *RUNNY*, or even *RUNAWAY*—to start your program. For the same reason, you can enter *GOTO* without a line number or even *GOTOJAIL* or *GOTOGO* to start a program from line 0.

How Old Is Your 64?

If you own an early-model 64, then you've probably encountered the infamous lockup bug. To see if you're one of these lucky people (I am!), turn on your computer, move the cursor down to the last line, and hold down the space bar until the cursor passes the right edge of the screen twice. Next, hold down the Del key until the cursor moves back to the far right column. If you own a 64 with the lockup bug, the words *LOAD*, *?SYNTAX ERROR*, *READY*, and *RUN* appear on the screen, and the computer locks up. If you have a program in memory, it runs. The cursor continues to flash, but the computer ignores your keypresses, even Run/Stop–Restore.

If you own a Datasette (remember them?), you can defeat the bug by simultaneously pressing the left Shift key and 3, or X and 5, or V and 7, and so on (every other key from left to right on the top and bottom rows). The screen will display *PRESS PLAY ON TAPE*. Press Play on the Datasette and then Run/Stop. Your computer will return to normal. Disk drive owners can avoid the bug if the first line in the program in memory is OPEN 15,8,15:INPUT#15,S$:CLOSE 15.

Interestingly, the lockup bug will occur only when your cursor color is red, cyan, blue, yellow, light red, dark gray, light blue, or light gray. Safe colors are black, white, purple, green, orange, brown, medium gray, and light green.

Beyond the Call of Duty

Although the widest Commodore screen is 80 characters, the number used in a TAB( ) function can be as large as 255. For example, on a 40-column screen you can use PRINT TAB(240) to move the cursor down six lines. Any number greater than 255 results in an *ILLEGAL QUANTITY* error.

As with the TAB( ) function, the ON *X* GOTO statement can't handle numbers greater than 255. This is contrary to early Commodore documentation, which states that negative numbers and numbers greater than 255 cause the 64 to fall through to the next program line. Negative numbers and numbers greater than 255 both produce *ILLEGAL QUANTITY* errors.

Keyboard Confusion

Plug a joystick into port 1, turn on your computer, play with the joystick, and watch your computer screen fill with seemingly random characters. This happens because the joystick port shares the same CIA chip and I/O lines as the keyboard.

If you're short a joystick and need to emulate one, try these alternatives. For example, just as pressing the joystick's fire button produces a space, hitting the space bar makes a program think that you've pressed the joystick's fire button. To simulate joystick up, press 1; joystick down, press back arrow (←); joystick left, press Ctrl; and joystick right, press 2.

Send your programming tips (or trivia) to Programmer's Page, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We pay $25–$50 for each tip that we publish in this column. ❐

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GEOS

Steve Vander Ark

MORE GREAT GEOS GOODIES

Last month I talked about some of the latest GEOS shareware/public domain programs on QuantumLink, but Q-Link isn't the only place to find GEOS applications. You can find some great programs in other GEOS collections.

These are disks that contain a number of GEOS files. You'll find a wide variety of goodies, from utilities and applications to clip art files and fonts. Some of the programs and fonts I use most often came on a collection disk. Here are some sources.

Try these disk collections for some great GEOS finds.

GEOS Powerpack

GEOS Powerpack, Powerpack II, and GEOS Companion are collections released by *RUN* magazine. The disks are still available, and they're probably the best GEOS collections ever released. You'll want to get all three.

Powerpack includes such gems as Write Hand Man, a writing and pattern analyzer, and PaintView II, a geoPaint viewer which includes an option to save part of a geoPaint file as a Doodle file. There's a card file database as well as Thumbnail, a utility that creates miniature versions of geoPaint documents to be used as clip art or printed by the page full for reference copies of your collection. There's also a version of Breakout for GEOS. The fonts, particularly those by Susan Lamb, and the scanned, high-quality clip art images are spectacular.

Powerpack II contains the updated version of geoTerm for the 64 and 128, games, and a simple word processor, which imports and converts text files in ASCII. An interesting utility on the disk creates a stand-alone documentation file from a geoWrite document. Unfortunately, all the documentation for the programs is included in that form on the disk itself, leaving little space for clip art files and fonts.

The GEOS Companion disk boasts a music editor and an animation program, as well as a 1581 boot disk creator and other excellent utilities, including a batch loader. There are more fonts, including one of my personal favorites, Smith Corona (regular and megafont versions), and still more clip art files. Thankfully, this disk has a separate manual instead of on-disk documentation files.

As of this writing, these disks are available from Tech Media, Special Products, P.O. Box 2151, Salisbury, Maryland 21802. You can order by calling (800) 824-5499. The two Powerpack disks are $19.97 each; GEOS Companion is $24.97. Add $3.95 shipping and handling to each order, not each disk.

Collette Utilities

Jim Collette is so well known and admired for his GEOS programming that Creative Micro Designs figures that his name on a disk is enough to get folks to buy this collection of his better utilities. This is CMD's most recent GEOS release. Included are updated versions of some of the finest GEOS programs ever written: geoWizard and the premier font creator, Font Edit. Also included are Mini-Desk, one of the more useful desk accessories; a utility which automatically places the current photo scrap into the first photo album on the disk; a set of PostScript utilities for laser printing; and a DOS wedge. As always, Jim's programs are user-friendly and user-proof. The $34.95 price is ridiculously inexpensive for these quality programs. You can order the collection from Creative Micro Designs, P.O. Box 646, East Longmeadow, Massachusetts 01028. To place an order call (800) 638-3263.

GeoPowerTools

The folks who publish Lodestar, the magazine on a disk for the Commodore, offer a collection of utilities by Scott Resh, a talented GEOS programmer. PowerTools includes several photo albums of excellent clip art and a number of fonts. For sheer number of files for your dollar, you can't beat this disk of 21 utility programs and games. You'll find BASIC 8-to-Amiga format conversion programs, directory and sector editors, a program which prints the contents of the Date Book that your GEOS Calendar uses, a nifty desk accessory that turns any part of the visible screen into a photo scrap, a fast formatter, a SID music player, and a utility that prints multiple copies of a geoPaint document. You can get this collection from Softdisk, P.O. Box 30008, Shreveport, Louisiana 71130. Or order by calling (800) 831-2694. The price is $9.95 plus $4.50 shipping and handling.

COMPUTE's GEOS Collection

COMPUTE also has a collection of GEOS programs, selected from the Gazette section of COMPUTE magazine. Included on this disk are a couple of nifty games—I like Skeet, myself—and utilities such as a word counter for geoWrite, a screen dumper, and a help file creator. The disk also includes a nice multidensity printer driver for Epson-compatible printers. This collection is available for $13.95 (shipping and handling included) from COMPUTE, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ❐

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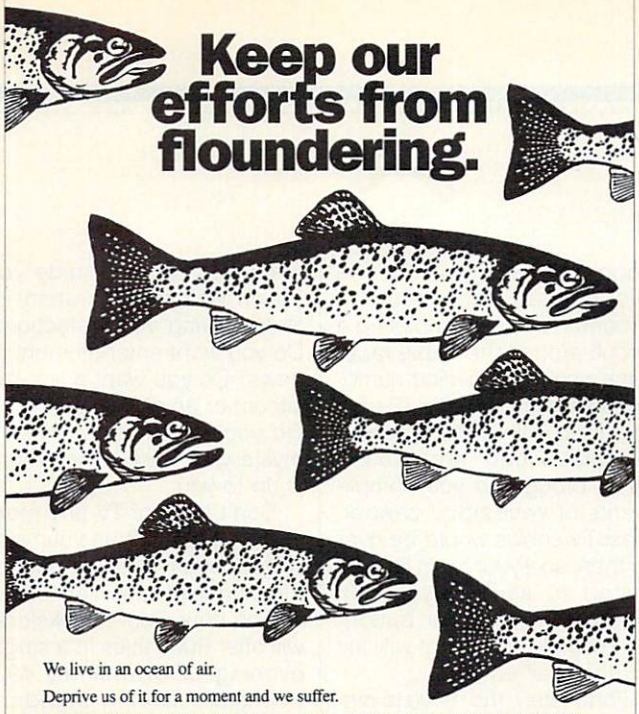

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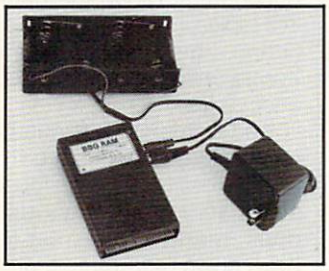

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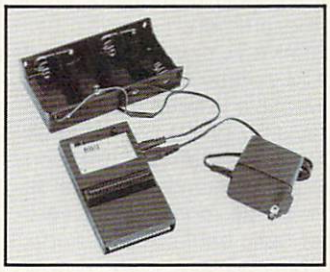

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D'IVERSIONS

Fred D'Ignazio

WHEN TELEVISION GOES DIGITAL

I opened the *Wall Street Journal* today, and a story jumped out at me. It described how TCI—Tele-Communications Incorporated—may soon offer 500 TV channels to its 11 million cable viewers. TCI is the nation's largest cable TV operator. It's now allying itself with two other cross-industry heavyweights, AT & T and General Instrument Corporation, to upgrade its analog cable system to a digital network. This new network, according to the *Journal,* will "open the gates for a vast sea of entertainment and information options for cable subscribers."

Imagine the TV-zapping cowboy in your family with a remote that accesses 1500 channels.

The conversion to digital is possible because of advances in video and sound compression. Complex mathematical algorithms hard-wired into special-purpose (digital signal processor) computers in TV programmers' studios will shrink a TV signal to one-tenth of its normal size. This will allow cable to carry ten times today's 50 or 60 channels. All this is possible without converting the standard coaxial cable to the more expensive fiber optic cable. As fiber optic cables replace coax, however, we'll see another threefold jump in cable capacity.

Backyard satellite-dish owners will see 30 to 50 new digital TV channels on their TV sets by next summer. The rest of us will come online sometime in 1994. Once the system is up and running, it's expected to carry 500 cable channels simultaneously. And if your local cable uses fiber optics, you might be seeing up to 1500 channels!

Does this sound like overchoice, or what? Can you imagine the TV-zapping cowboy in your family with a remote that accesses 1500 channels? It boggles the imagination! The average zap lasts about 1.4 seconds, so just completing a circuit around the cable racetrack would take a mind-numbing 30 minutes. That's 30 minutes filled with random, nonsequential video and sound bites, brought to you compliments of your zippy zapper. Most TV shows would be over by then, so if your brain isn't reduced to sludge, you can blast off into another button-pushing blitzkrieg that will last another half an hour.

Fortunately, the move to digital cable will result not only in more channels but also in a fundamental redefinition of the word TV. Fifteen hundred passive couch-potato channels offering video pabulum may sound like torture, but that's only if your resident zapper forces you to sit through an orgy of channel-hopping.

A more sane way to approach this new deluge of programs is to think of TV in a new way—not as disjointed programs, but as a multimedia library or bookstore. The key to this way of thinking will be offered to you at the time your TV is hooked up. It'll be in the form of a tiny black box that according to one cable-industry official "will be the most powerful piece of electronics technology" in your home. This box will feature the most advanced multimedia computer chips and programs on the market. The box won't look like a computer, so no one will panic. But it'll turn your TV into a computer monitor and your zapper into a tiny computer keyboard.

The transformation of TV to computer will happen just in time. Instead of randomly hopping through a confusing flood of 1500 programs, you'll have brightly colored computer menus that will allow you to pluck a single program out of the vast sea of choices. The menus will gently quide you (much like a good librarian) into narrowing your selections. Do you want entertainment or news? Do you want a first-run sitcom or an oldie but goody? Do you want nature, history, mystery, or trash? The choice is up to you.

Don't think of TV any more as TV. Think of it as your own private bookstore that houses thousands of titles. (At 1500 titles an hour, your "bookstore" will offer 6000 titles in a single evening of browsing.) Your bookstore isn't a standard print emporium but an electronic multimedia bookstore with books that spring to life when you open them; books that spill over with real people; and books that talk to you, play music, and captivate you with lifelike scenes of drama, suspense, murder, and intrigue. You can browse through all these myriad titles by casually pointing and clicking on menu buttons that group the books into topics such as fiction, nonfiction, biography, current events, animals, horror, and science fiction.

And, remember, this is not a commercial bookstore that you are visiting. It is *your* bookstore, so you can pick up a book, mark a page, set the book down, and ramble off to a different book or a whole new aisle. Later on, you can continue browsing where you left off. Or you can click on your VCR and make "photocopies" so you can review the books at your leisure. Or, you can place requests to the cable operators, and they will reprogram a channel and ship you just the books that you want to see again.

You'll get all this for only a small fee—or maybe a large fee. It'll be worth it. And it'll be a blissful break from the mad TV zapper who is prowling around the TV room of almost every American family. ❐

MAILING LIST

By Maurice Yanney

If you want to keep track of names, addresses, birthdays, and other information, you'll find Mailing List a flexible and useful program. You can easily store information for up to 500 people pertaining to names, addresses, phone numbers, or whatever else you desire.

Once the data is entered, it can be retrieved based on any of the fields. You can also print labels in any desired order by activating some or all of the fields.

Typing It In

Mailing List is written entirely in machine language, but it loads and runs like a BASIC program. To type it in, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts you, respond with the following values.

Starting address: 0801
Ending address: 2238

Be sure to save a copy of the program before exiting MLX.

Using Mailing List

When you begin Mailing List for the first time or start from a new disk, the program will create files to hold data and information on which records are available and which are occupied. So use a disk that has plenty of room on it. Once the files have been created, the program will look for a setup file and, if one exists, load it.

At the top of the screen are three pull-down menus: System, Printer, and Record. On the right side of the screen are five other options called buttons. The main part of the screen displays the names of all the fields and the information contained in those fields for a particular record.

To select an item, move the arrow-shaped cursor with a joystick, mouse, or cursor keys. When the cursor is over a particular item, it will be highlighted. Press the fire button, mouse button, or space bar to select an item.

To select one of the data fields, position the cursor over either the name of the field or the text area for that field. (Some fields are larger than others and thus have a larger area from which the field may be selected).

When one of the pull-down menus is selected, a menu containing five entries appears underneath. To choose one of the options from the menu, move the cursor to the desired option, highlight it, and press either the button or space bar. Moving the cursor out of the menu area will remove the pull-down menu.

Editing Data

To edit any of the fields, just move the cursor over either the field label or the text area and press the button or space bar. Once the field is selected, the arrow will disappear. The Home key positions to the start of the field, the Insert key will insert a character, and the Delete key removes the character under the cursor. The cursor keys can also move the cursor left and right. While editing a field, the Run/Stop key can be used to cancel the edit. Run/Stop also restores the field to the previous text in addition to exiting the current edit.

Adding Data

You can enter data by moving to a field, pressing the space bar or button, typing the desired text, and pressing Return. This approach is tedious and suited only for editing a few fields of a particular record. When adding several records, switch to the Add mode.

To enter Add mode, move the cursor to the right of the screen and click the Mode button. The mode will switch from Edit to Add, and the First Name field will now be selected. Proceed to enter the data. To leave any field blank, just press Return.

When you press Return on the last field (Ind 2), the record is written to disk, and the program advances to the next available record position. Note that the Rec # indicator is updated and the First Name field is selected.

Continue this process until you no longer wish to add records. To stop entering data, press the Run/Stop key. This will switch the mode back to Edit and return the arrow cursor. If any of the fields have data when the Run/Stop key is pressed, the data will not be stored unless the Write button is selected. When all 500 record positions are filled, you'll get a message telling you that no space is available.

While in Add mode, data in the fields remains preserved. If you notice a mistake after you've moved to a new field, press the Run/Stop key, which sets the mode to Edit and returns the cursor to the first field. Make the changes, set the mode back to Add, and continue entering data.

System Options

To change screen and cursor colors, use the System pull-down menu at the top of the screen. Highlight the desired option and then press either the space bar or fire button. Moving the cursor outside the menu box will remove the pull-down menu.

Once one of these options has been selected, the bottom portion of the screen will display an arrow pointing to the current value. Move the cursor left or right and press either the button or space bar to select the setting.

Printer Options

The options in the Printer menu are selected in the same fashion as those of the System. The printer options let you customize your printed labels. You can save the setup, load the setup, reset the default values, set the printer format, and print records.

The first three options are used to save, get, and reset the format that the labels are printed in as well as to save, get, and reset the system options. When the Save Setup option is selected, the current settings for the printer, screen colors, and cursor speed are stored in a file. If the file exists, it will be overridden. Load Setup will retrieve prior saved settings. Setting the default will reset the values to what they were the first time the program was run.

When the option to set the printer is selected, a new screen appears. Use this screen to set the printer device number, the printer secondary address, and the label format. To select a particular item, move the cursor to the desired item and then press the space bar or fire button.

Once an item has been selected, the cursor will change to either a minus, a vertical bar, or a plus. The new cursor signifies the direction the cursor keys, joystick, or mouse can be

moved to change the selected item. When the item is a number (such as the printer device number), moving up increases the value by one; moving down increases the value by ten.

If the item is one of the label fields, then the cursor will be either a minus or a plus. Moving left or right will go through the various fields, which are abbreviated by three characters: First Name (FST), Middle Name (MID), Last Name (LST); Address Line 1 (LN1), Address Line 2 (LN2), City (CTY), State (STA), Zip Code (ZIP), Phone Number (PHN), Other Information 1 (OT1), Other Information 2 (OT2), Indicator 1 (IN1), and Indicator 2 (IN2).

There is also a Numbers option for sending special ASCII codes and a series of spaces to separate items. (This does not result in any output to the printer. It is used to help improve screen readability.) This option is a number between 0 and 255. Moving the cursor left or right will change the selection. Moving it up will change the value by 1, and down will change the number by 10. (A value of 65, for example, would send a lowercase *a* to the printer.) Some special numbers to keep in mind are 10 (linefeed), 13 (carriage return), 27 (escape), 32 (space), and 44 (comma).

Once the desired option appears, press the fire button or space bar to select the item. When you've finished making changes to the printer, move the cursor to the Done option.

Mailing List is designed to be flexible. This means that carriage returns at the end of each line and spaces between the fields need to be explicitly specified. This is the default setting. Most labels require six lines. So if you will be printing many labels, make sure that there are exactly six carriage returns per label, or else they may not print properly. Care must be taken in setting the fields so as not to exceed the label width, since the program does not restrict the line width.

When the option to print the records is selected from the Printer menu, the bottom of the screen will display two choices. You can either print the current record or multiple records by selecting the Based-On-Get option. This second option works in one of two ways, depending on the Get mode. If the Get mode is Seq (sequential), then all the records starting with the current record will be printed. If the mode is Patt (pattern), then all records matching the selected Get pattern will be printed. The printing can be stopped by pressing the Run/Stop key, letting you abort or continue printing.

Customizing the Setup

Once the printer and screen settings are to your liking, save the setup under the Printer menu. The next time Mailing List is started, the setup file will be loaded, and your favorite colors, cursor speed, and label format will automatically be set.

Record Options

The Record options at the top of the screen are used to go to the next and prior records, set the Get condition, count the number of records, or delete the current record.

The Next and Previous Record option will obtain the next or the prior record. If the Get mode is set to sequential, then the next occupied record or the prior occupied record is retrieved. If the Get mode is set to retrieve based on the pattern, then the next record meeting the Get option or the previous record meeting the requirements of the Get option is retrieved.

To set the Get condition, a new screen is displayed. The screen contains three items which can be modified: Get Option, Get Operation, and Get String. Cursor to the desired option and press either the space bar or the button.

When Get Option is selected, the cursor changes to a minus. Moving left or right changes the current field. Any of the data fields can be used in adjusting how records are retrieved. Once the desired field has been reached, press the button or the space bar to make the selection.

The Get Operation has three alternatives: less, equal, and greater. To change the condition, move the cursor beneath the field, press the space bar or button, and then move left or right to the desired operator. Once again, press the space bar or button to make the selection.

The Get String is the string that the Get Option field is compared to. This option is selected by moving underneath the field and pressing the space bar or button. Once it is selected, enter the string and press Return when finished.

Move the cursor to Done and press the space bar or button to return to the main screen. The Get Option, Get Operation, and Get String will be displayed at the top of the screen.

The Get mode is useful when looking for records meeting a specific condition or for printing records matching a particular requirement. Note that although the Get condition may be set, the mode must be set to pattern (via the Get button) to take affect. If the mode is sequential, then retrieval of the records will be sequential regardless of how the Get condition is set.

If, for example, you want to print out all the names of people in the state of North Carolina, set the Get Option to STA, set the Get Operator to equal (=) and make the Get String NC. Set the Get mode to pattern, go to the Printer menu and select the Print Records entry, and then print on the Based-On-Get option.

Other uses of Get involve using the Indicator 1 and Indicator 2 fields. They can be used to keep track of people on certain lists such as Christmas card lists. Each Christmas just print out the records where IND1 = Y, or however you want to set it.

The Count Records option displays the number of records stored. To delete a record, first go to the proper record number and then select the Delete Record option. The record will still be displayed on the screen as a safeguard, but it will be marked as removed on the disk. If you change your mind after deleting the record, press the Write button while the information is still onscreen.

Buttons

The buttons are options that appear on the right side of the screen. A button is selected by moving the cursor to the item and pressing the space bar or fire button.

There are buttons to select a specific record number, set mode to Add or Edit, set the Get retrieval to sequential or pattern, Write a record, and Clear data from the screen.

Once the Record Number is selected, you must then input a number between 1 and 500. If the selected record number has data, that data will be retrieved and displayed. If no record exists, the record number is updated, and the data fields are cleared on the screen.

The Mode button toggles between Add and Edit. Its use is discussed in adding and editing records.

The Get button toggles the retrieval method to either sequential or pattern mode. Sequential mode is used when records will be retrieved sequentially while pattern mode indicates that retrieval will be based on the settings of the Get condition.

The Write button writes the contents currently displayed on the screen to the current record number. If, for example, you want to update the phone number of a friend, first select the proper record number, make the change, and then press the Write button. If the Write button is not pressed, any changes will be aborted.

The Clear button clears all the data displayed on the screen for a particular record. The data is not erased from the record on disk.

MAILING LIST

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0801:0B 08 70 17 9E 32 34 30 6E
0809:37 00 00 00 20 20 20 20 96
0811:20 20 20 20 20 A0 C4 B9 06
0819:3C 08 99 F8 00 B9 FD 08 F6
0821:99 33 03 88 D0 F1 A0 09 4C
0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 FF 85 2D A9 2A 85 E9
0839:2E 4C 00 01 1B E6 03 FF FD
0841:2A AD 20 B9 6E 09 99 E8 25
0849:07 C8 D0 F7 EE 02 01 EE 19
0851:05 01 C6 F9 D0 ED A2 03 23
0859:20 34 03 F0 33 C9 07 D0 95
0861:16 A2 01 20 34 03 D0 0A A0
0869:A2 04 20 34 03 18 69 07 65
0871:10 05 A2 0A 20 34 03 85 1D
0879:A8 A5 A7 85 A9 A5 FE 85 FB
0881:F7 A5 FF 85 F8 20 6C 03 73
0889:A5 F8 85 FF A5 F7 85 FE 72
0891:E8 20 34 03 D0 1E A2 08 21
0899:20 34 03 A0 02 84 A8 85 2A
08A1:A6 18 A5 FC 65 A6 85 F7 58
08A9:A5 FD 65 A7 85 F8 20 6C EF
08B1:03 4C 13 01 E8 20 34 03 FB
08B9:D0 1C A0 03 84 A8 E8 20 36
08C1:34 03 F0 08 A2 08 20 34 F4
08C9:03 4C 5C 01 A2 0F 20 34 CF
08D1:03 E6 A7 4C 5C 01 E8 20 AF
08D9:34 03 D0 0A E8 20 34 03 B2
08E1:18 69 04 A8 D0 D6 E8 20 37
08E9:34 03 D0 0A A2 02 20 34 21
08F1:03 18 69 06 D0 ED A2 08 A2
08F9:20 34 03 D0 E6 A9 00 85 F7
0901:A7 A4 FB F0 0C 06 FA 2A 37
0909:26 A7 C6 FB CA D0 F2 A8 D8
0911:60 48 B1 FE 85 FA A9 08 FE
0919:85 FB 68 A4 FE D0 02 C6 4A
0921:FF C6 FE C0 E7 D0 DE A4 B5
0929:FF C0 07 D0 D8 A9 37 85 BA
0931:01 58 4C 0E 08 A4 A8 F0 59
0939:22 A5 F7 38 E5 A8 B0 03 7E
0941:C6 F8 38 85 F7 A5 FC E5 8A
0949:A8 B0 02 C6 FD 85 FC B1 3A
0951:F7 88 91 FC 98 D0 F8 C4 42
0959:A9 F0 0A B1 F7 C6 FD C6 76
0961:F8 C6 A9 10 EC 60 78 E6 98
0969:01 4C 16 08 60 00 0C 08 75
0971:0A 00 9E 20 32 30 36 32 4F
0979:00 00 00 E7 FA 0F 82 A5 C8
0981:BA 81 D2 90 07 C9 0C B0 DC
0989:03 8D 79 85 9B 51 08 7A B4
0991:1B 20 76 1C B6 3E 03 60 DE
0999:70 46 11 29 19 70 E1 14 8C
09A1:1F 19 0A D6 CD FD 02 A3 46
09A9:13 40 58 2A AE 13 A8 E4 FA
09B1:01 28 99 98 97 3C C0 A8 E2
09B9:28 0E F9 1A 47 08 86 CA 76
09C1:80 61 25 F2 00 C0 D1 07 ED
09C9:D0 78 0C 3E 30 2E 00 37 39
09D1:0A CA AC A9 15 42 E9 67 B8
09D9:88 EF 0C 1C 5E 15 0C 7B 4A
09E1:F0 F0 05 AE C0 2A D9 38 CE
09E9:99 0B D2 78 B8 2A C6 1E 87
09F1:5A 09 19 A7 12 3E 9C 84 58
09F9:0D AE 0A BB 1F 16 1E 80 49
0A01:C0 67 10 0C 60 D7 20 EE A3
0A09:1E 44 46 04 C3 50 C8 35 6C
0A11:A0 07 A8 A6 05 1C 86 C2 1F
0A19:AD A0 08 41 99 06 E4 30 20
0A21:14 6A 0D A0 0B 8A 21 07 51
0A29:87 A1 30 6B 10 86 00 23 E3
0A31:86 08 41 18 0A B1 06 A0 F7
0A39:0D C5 90 09 C3 50 78 35 6D
0A41:A0 0E 20 0B 48 06 0A 61 AD
0A49:28 B4 1A A0 0F 20 17 25 38
0A51:C9 0B 04 67 28 AC 1A A0 CC
0A59:11 14 43 0C 0E 43 21 D5 B9
0A61:A0 12 A0 18 32 08 0B A2 4A
0A69:8C 53 83 A0 71 EC 15 06 82
0A71:0E 61 8C 68 18 0A 48 60 D6
0A79:0F D0 09 A2 8D A9 31 A0 AA
0A81:68 38 F8 23 C9 11 09 DA A8
0A89:40 F5 09 A8 6E 09 1C 8E 45
0A91:6E 3D 23 96 22 34 16 00 08
0A99:0E 62 44 A3 20 61 15 67 28
0AA1:4C BE 08 A2 56 A9 56 8B 48
0AA9:06 4B A3 46 0E E9 07 AD 40
0AB1:78 2D C9 3F AE F2 80 34 F0
0AB9:0A 02 1C 0C 1B 60 71 0F E3
0AC1:05 70 AA 35 05 38 76 03 16
0AC9:0C 28 3C 79 F0 09 26 20 25
0AD1:02 1C 63 B0 36 C0 F0 DE DA
0AD9:09 0A 55 60 B0 20 30 7C 88
0AE1:8A E7 02 85 47 4B 81 58 90
0AE9:C9 12 D0 13 40 6B 03 D1 3A
0AF1:A4 D0 60 C3 03 8E 3A 2B C6
0AF9:20 80 1D C9 13 60 F1 8E 0B
0B01:60 24 6A 22 63 10 5F D6 B0
0B09:07 1A 2D 0A 20 87 14 BD 74
0B11:84 C9 14 8A A9 05 1B 40 DE
0B19:95 1A 4C 72 08 B8 94 02 7F
0B21:C6 C3 08 0C 16 E2 0A 7D 1B
0B29:2D 40 65 01 30 BE 24 18 7F
0B31:8D 50 58 4C 1B 34 C4 01 26
0B39:04 4C A0 93 1A D1 B8 96 D1
0B41:10 04 1B 39 04 A0 1E 55 8B
0B49:48 81 68 20 F6 C0 EF A1 2F
0B51:AA E3 18 A0 40 2C 18 0C B1
0B59:81 07 06 0B 86 40 4C 0A 3B
0B61:4C 5F E0 21 C2 13 B0 40 A7
0B69:CC 81 B4 20 20 A2 09 A0 1D
0B71:17 CA 64 03 1C 79 0B 20 7F
0B79:CD BD 60 B1 FB FA F8 8A 55
0B81:C2 5C 1B 88 81 06 1D 18 72
0B89:71 64 14 1A C9 0A AC A0 06
0B91:30 88 88 AE C2 83 14 C4 EE
0B99:2C 83 48 03 CC 0A AA E8 AC
0BA1:55 3D 18 60 A0 1C 8A A5 EA
0BA9:22 E6 00 E1 4F 11 05 4E BF
0BB1:23 AE A5 0B 89 D0 EC D7 AB
0BB9:2C 99 94 2E 0A 70 7A A1 6A
0BC1:A4 40 01 68 BC 1E 30 04 A3
0BC9:0F 72 44 1E E8 60 99 A3 0E
0BD1:10 80 46 F1 00 6E 10 81 53
0BD9:38 43 C3 07 E7 3C 02 07 01
0BE1:47 80 10 80 7A 8A 8C C7 A4
0BE9:30 C3 8E 8B 09 31 CC D0 0B
0BF1:60 D9 0F 10 FD 09 82 D9 84
0BF9:01 E9 0F 0E D4 20 08 FA FF
0C01:06 3F 93 15 02 60 A0 DA 5D
0C09:0A 38 00 A2 10 6D 05 CF 6E
0C11:00 C3 23 2B 0B 61 C0 8F 20
0C19:8A 80 0E 0E 50 11 50 78 19
0C21:BC 08 30 3C 20 8A 05 80 19
0C29:D8 78 11 C8 D1 01 0E 4C 75
0C31:DB 0B AD 9B 08 F0 22 90 42
0C39:A7 27 01 4C 1A 0C 01 01 D7
0C41:04 B1 07 94 4B 50 23 3F 13
0C49:C1 D8 CF F7 8A 9A 21 A9 9C
0C51:2C 60 21 99 02 54 0D 53 24
0C59:CD 41 C8 0E 66 83 28 28 5C
0C61:7E 28 99 00 00 98 A2 00 9D
0C69:F4 9E 85 6C C9 33 10 06 5C
0C71:17 25 1C CF 00 86 1B 01 30
0C79:E3 E1 8D 56 42 21 40 F4 1F
0C81:82 C2 89 57 13 0E 58 2B DE
0C89:85 90 EC 66 10 0A 0F C2 16
0C91:D8 A0 51 97 F5 E3 0F 20 5F
0C99:2E 2C 1A 01 10 8D B8 8A D9
0CA1:AF 25 A9 BD 0F 35 19 84 EF
0CA9:B8 81 14 99 22 05 71 83 26
0CB1:A9 0A D6 C7 84 A9 0F 1A 7B
0CB9:95 10 AB 12 62 5A 90 C1 96
0CC1:08 C0 A4 82 00 04 48 05 70
0CC9:A9 04 8D DB 31 A9 07 8D F2
0CD1:DC 31 A0 47 B9 C3 29 99 F5
0CD9:93 31 D7 E5 0C 70 A8 04 D8
0CE1:08 18 A0 2A 6A A8 B9 5D 81
0CE9:2B CA 83 B9 57 2C 3D 23 5F
0CF1:00 22 0D C8 C0 FA D0 EB 40
0CF9:C1 E1 01 AA F6 D8 2B E0 88
0D01:78 3F 10 85 0A CD BD 8A 0F
0D09:0A 46 8C 15 A0 A0 50 99 5E
0D11:70 F0 B2 14 30 6E 0F 18 A8
0D19:56 17 0C FE 03 41 00 3B ED
0D21:0D 02 6F A0 14 B9 C1 31 76
0D29:15 39 0B A2 F6 AD 43 4D E9
0D31:40 CD 01 60 32 E0 AE A1 19
0D39:84 0A 2B A4 00 18 60 7D 66
0D41:8D C2 34 80 D6 03 AC 67 E4
0D49:C8 8C 80 3A 8A 03 18 6D 9C
0D51:B2 AA AC A0 06 BD E9 20 2A
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0D59:D0 04 CA 88 6B 49 8C 25 7D
0D61:04 54 07 C0 8C E8 42 BE CA
0D69:F0 26 C9 BC F0 40 83 87 A1
0D71:C4 D0 17 35 12 0D CF 48 05
0D79:0B CE 48 06 4C 8E DE 5E EE
0D81:81 80 B7 60 74 CC F2 D0 07
0D89:F3 F7 11 EC CF 47 E7 CE C6
0D91:47 DF 4C B0 0D B9 A3 30 A2
0D99:DD C4 30 90 D7 F0 02 B0 1A
0DA1:D0 C8 E8 20 EE 0D F0 CC CF
0DA9:CC C6 E0 27 F0 C4 CC EC 8B
0DB1:A2 C2 4C CE 0D AD 7D 80 DE
0DB9:05 08 07 AD 25 C9 21 C5 6C
0DC1:13 22 A1 C3 19 83 08 20 65
0DC9:98 38 ED BF C1 03 F6 39 39
0DD1:C8 A0 06 2E 08 63 10 0D 17
0DD9:01 22 27 F5 67 21 40 E4 66
0DE1:ED E4 04 4B 30 AA 02 32 C3
0DE9:4A 3E 60 20 10 0E F3 A9 11
0DF1:1E 88 AD 18 0F 09 D8 8A 4D
0DF9:2E 67 AB C2 83 67 AB 8E 46
0E01:A4 80 8F AB 4F 6D 31 0C DA
0E09:12 30 0F 90 13 67 1E 20 B7
0E11:07 39 28 F0 19 50 43 21 C4
0E19:AD C1 51 71 8A E7 28 C0 C2
0E21:38 80 F0 D0 B1 4C DF 0E 31
0E29:55 94 85 1C 64 C2 30 55 6B
0E31:CE 80 08 39 14 D4 E8 14 43
0E39:24 34 42 A9 16 B6 04 11 FB
0E41:18 04 00 8C D0 08 03 10 EF
0E49:94 05 22 86 B9 0D 71 89 0C
0E51:63 01 20 36 F8 0C E6 A9 36
0E59:9E 5C 47 86 43 4C 0B 0F 9D
0E61:AD 26 C9 9E 02 3D 18 88 BE
0E69:04 A4 49 00 4C 4A 0F 40 C3
0E71:B5 03 B0 03 B5 C0 18 82 D2
0E79:01 08 C1 8C DF 28 41 7E B9
0E81:8E C3 0E D4 E0 00 88 86 83
0E89:39 DC 77 0F 09 06 8D C0 95
0E91:1C 40 3D 98 17 A9 0D 39 AF
0E99:B8 C5 99 AE D4 02 EE 06 34
0EA1:7B 20 0E 58 1B 20 34 0D 99
0EA9:F0 16 B6 78 A1 36 0B 8F AD
0EB1:DA 03 4C 16 7C 4B 1F 22 58
0EB9:94 A1 34 8E 8F 0A 4C C9 FE
0EC1:0E F0 13 94 FF 05 09 BD B0
0EC9:94 2E E3 80 4C D8 0F BD E1
0ED1:29 5C 3C 60 36 20 A4 39 DB
0ED9:01 2D 05 30 1D AE BE 5B E1
0EE1:CA 04 48 D0 CC BC 94 22 1F
0EE9:9C 90 C2 DF 20 A3 0B F0 65
0EF1:17 C1 C6 49 C9 FF 28 2A 40
0EF9:06 21 CD 22 1C 80 06 CD F9
0F01:CD 8D D0 A5 06 ED 07 AD 81
0F09:BA 30 F0 27 D8 86 07 06 16
0F11:D0 1F AD BB 0A 16 00 87 01
0F19:82 BC E1 3F 2B 30 86 06 05
0F21:A0 CA B9 72 2F 76 68 20 E4
0F29:F5 4F 5D 46 3B 04 AD BD 29
0F31:30 8F 75 80 E1 5E 10 C5 70
0F39:3A C0 C8 0E C7 8D C2 30 C8
0F41:68 4A 20 33 22 ED 3D 65 06
0F49:2B F8 3C C1 4C F1 3D 90 14
0F51:F1 A0 A1 DA F0 F8 1E D8 F2
0F59:4C BB 16 47 35 E2 11 2A 84
0F61:21 14 15 87 0E 14 4E C6 54
0F69:83 80 91 0B 02 0E 10 DE 93
0F71:08 42 A1 03 20 61 53 1C D1
0F79:68 F5 10 78 29 0E 08 42 A6
0F81:50 1C C8 D5 A3 38 90 CD 32
0F89:4C 10 11 53 69 60 07 51 55
0F91:31 B5 71 11 1D 8F 6A 40 31
0F99:23 6F 42 E1 C1 18 28 0B 55
0FA1:A0 D6 03 05 CC 7A 00 0E D4
0FA9:44 01 1C E3 50 2B A0 55 B1
0FB1:11 CB 50 40 C8 48 E0 00 82
0FB9:41 10 D2 10 8C 46 FC A1 F0
0FC1:01 0D D0 28 17 10 13 85 E4
0FC9:08 82 A4 C5 8C D3 D0 13 E5
0FD1:24 97 43 1D 84 0C 8A 20 AB
0FD9:59 AA 11 2E 40 F0 DF C0 9A
0FE1:07 F0 DB C0 33 D0 0C 4A 86
0FE9:0E 17 B1 63 22 83 10 48 C8
0FF1:E4 0F 06 0C 57 51 20 21 29
0FF9:24 4C 0F 12 C0 3F D0 1F 04
1001:D0 F1 AE E2 2E 16 47 4E B0
1009:60 E2 D1 82 C0 C0 01 F0 70
1011:3B E0 7D 4B B9 C2 EB 70 8C
1019:09 E0 0D 09 83 B9 03 EC 1E
1021:4C F9 11 B9 81 EB E2 CE F3
1029:0A 22 AE C2 AD 04 2B 12 BE
1031:80 20 04 24 A5 C5 38 ED FE
1039:78 2D F0 F8 20 6E 12 4C B9
1041:72 11 D5 DD 21 04 52 80 B5
1049:50 2A 60 15 03 2B CA F0 C4
1051:A9 3E 30 C6 14 44 34 84 E6
1059:F5 AD B9 13 9E 13 05 01 94
1061:51 B1 F1 57 54 88 CC 90 39
1069:90 06 03 41 4C 49 12 60 D3
1071:20 73 0A 14 FC 64 0A C8 57
1079:AE 07 2B 57 2F 90 F4 F0 24
1081:F2 60 C2 4A C4 71 4F 80 3B
1089:83 00 B0 00 85 CC AE 41 7F
1091:2B AC 74 80 83 60 8A FB B7
1099:C9 80 90 68 32 1B 91 FB 74
10A1:B0 48 08 18 74 50 D0 1A 4F
10A9:A5 90 F0 16 29 40 C9 40 5E
10B1:F0 10 A0 1C B9 0A 29 54 C0
10B9:F5 90 C2 11 A0 4C 18 45 0E
10C1:0F F1 90 5C 50 02 30 A0 49
10C9:08 70 60 0A 0E 18 26 02 D5
10D1:06 C0 26 F0 04 C8 4C C6 9B
10D9:12 83 F0 CE 03 71 AD B8 E0
10E1:40 19 20 B1 36 D0 0C 67 FB
10E9:91 32 93 60 01 4C 0F 13 42
10F1:AD 51 A0 15 8A C6 08 35 57
10F9:D0 12 AD 52 2D C9 30 D0 A3
1101:0B C7 59 02 04 C3 4C 38 E5
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1ED1:05 0E 01 16 0F 01 11 11 45
1ED9:80 0B 12 88 13 00 1C 14 C8
1EE1:00 0A 15 00 09 0D E0 06 87
1EE9:82 14 08 1E 09 0A 1E 08 04
1EF1:0F 1E 05 17 24 3F 27 17 D2
1EF9:28 3F 2B 17 2C 3F 2F 17 C4
1F01:30 3F 33 17 34 3F 37 43 4F
1F09:24 6B 27 43 28 6B 2B 43 D5
1F11:2C 6B 2F 43 30 6B 33 43 33
1F19:34 6B 37 6F 24 97 27 6F 67
1F21:28 97 2B 6F 2C 97 2F 6F 43
1F29:30 97 33 6F 34 97 37 04 35
1F31:30 E2 05 05 44 06 40 04 EF
1F39:07 44 08 05 80 1C 40 05 57
1F41:40 04 06 44 07 40 04 08 EE
1F49:10 0A 04 50 05 40 04 06 CE
1F51:44 07 40 04 08 1B 0A CD 4A
1F59:D0 48 40 F0 09 30 5A 80 67
1F61:00 CE 41 4D 01 21 C6 49 B3
1F69:B2 5A E1 01 10 CD 49 C8 F6
1F71:4C 41 62 CC 72 E2 00 04 62
1F79:4C D1 1B 90 03 A1 0E 98 12
1F81:20 CC CA 18 3C 00 A6 F0 FD
1F89:49 54 59 B2 83 D3 54 EA D6
1F91:45 5D 0C 20 DA 49 CC 2B 0E
1F99:80 D0 48 4F 4E A9 23 27 D0
1FA1:08 75 3C CF 54 48 74 3E B0
1FA9:32 8D 41 31 0D 5C F8 01 6C
1FB1:A2 32 4C 64 D9 D3 68 CD 5A
1FB9:41 38 02 D0 D2 C9 CE D4 24
1FC1:C5 D2 1A 1C 22 80 D2 C5 1B
1FC9:C3 CF D2 C4 0D 48 22 86 D8
1FD1:00 62 25 0E D1 0A 0F 10 13
1FD9:68 BD 43 21 0E DD 8D 2D 66
1FE1:70 85 C1 39 2A 41 44 0C 70
1FE9:40 28 C4 CC 4F 41 44 A9 69
1FF1:0C 80 43 61 23 46 4C 54 F3
1FF9:C8 2A E0 24 C3 00 0E 20 DF
2001:08 26 0A 54 00 06 C9 CE CF
2009:45 58 9E C6 86 09 34 56 59
2011:49 C7 46 24 80 20 89 00 8A
2019:6D 58 55 64 10 40 2C 53 44
2021:34 D2 30 51 24 40 6A 00 42
2029:03 75 E3 4E 41 2A EE C2 FC
2031:B9 0C 10 57 25 D3 43 5E 26
2039:AC E0 0D 41 2F 1E A0 45 36
2041:45 44 26 91 41 57 22 03 C1
2049:19 01 2E 2E C6 41 53 54 35
2051:8C 71 E1 48 E3 03 7C 40 59
2059:03 15 12 F7 D8 80 43 8A FB
2061:18 C3 55 52 53 62 01 AC 41
2069:4C 4F 52 75 6E 90 11 23 40
2071:60 0A CD 4F 44 45 90 00 6B
2079:66 01 04 D7 8D 74 54 45 57
2081:00 C3 21 07 10 00 D0 41 AA
2089:19 00 8C 14 51 0B 01 D8 BA
2091:20 00 C5 44 49 54 D7 59 83
2099:46 4C 45 79 59 CA 8D 49 AA
20A1:53 4B 20 C5 52 52 3A 00 0F
20A9:12 8C 71 98 8D 6B C2 55 C2
20B1:54 54 84 04 CF 30 09 B0 04
20B9:01 80 C2 47 20 D4 4F 20 7A
20C1:C3 57 61 C1 1D 55 45 92 5D
20C9:00 C4 C0 CA 56 09 64 B1 51
20D1:50 A0 81 45 A9 98 2F C9 BE
20D9:3B 88 D2 45 41 44 59 00 56
20E1:B1 7E 41 56 15 4C 2C 40 9A
20E9:9B 3C C6 94 90 CD C9 C4 3D
20F1:47 50 48 00 41 46 47 CC 71
20F9:73 92 C3 D4 D9 47 D3 D4 C6
2101:C1 60 04 DA C9 D0 46 D0 59
```

```
2109:C8 CE 60 04 19 09 CF D4 11
2111:55 42 41 31 20 04 C9 CE 3D
2119:32 3E 3C 23 23 23 3E C4 A4
2121:03 20 20 20 12 D0 94 04 F3
2129:40 6C CF C4 45 56 49 78 7B
2131:CE 15 09 00 39 B0 E7 78 16
2139:43 95 65 44 41 52 59 DC 56
2141:44 44 52 B2 4C D8 07 73 73
2149:00 19 01 68 32 02 9A 81 C8
2151:03 26 E4 C2 05 A7 2C 40 C6
2159:06 06 A4 20 0D 20 07 00 AD
2161:13 8A 83 3A 16 32 3C C8 9E
2169:60 20 23 00 02 0E C4 B3 CD
2171:4F 79 50 41 43 45 20 C1 09
2179:56 41 12 CE 41 42 43 39 39
2181:80 3A 4D 4C 2E 53 A0 36 37
2189:00 53 2C 57 00 0E 18 27 2B
2191:45 63 72 81 8B 9F B3 C7 BF
2199:C8 C9 D6 0B 0F 1E 1E 0F 7A
21A1:0F 0A 14 14 14 01 01 12 6A
21A9:C9 4E 49 A0 C7 41 4C 49 BC
21B1:5A E0 54 C6 49 4C 45 53 A9
21B9:EE 13 04 6D 58 55 50 D0 19
21C1:42 3C C4 5C 56 A0 05 11 E2
21C9:19 1E 14 21 CF 50 5E 20 51
21D1:41 02 4F 4E 46 11 0D 0D A1
21D9:12 1D 1D 1D C7 45 54 20 FD
21E1:D3 54 52 CC 9D 2D 72 2A EA
21E9:CE 55 4D 42 45 52 78 46 61
21F1:46 82 EA 20 3D 20 9B C8 C1
21F9:10 D4 C9 CE D5 C5 3E A0 82
2201:3C C1 C2 CF D2 51 9E 91 D3
2209:3C C3 D5 D2 D2 C5 CE C1 51
2211:1D 20 3C C2 C1 D3 C5 C4 4D
2219:20 CF CE 20 C7 C5 D4 3E 7A
2221:00 12 D3 AC 27 54 49 4E 9A
2229:47 20 D2 45 43 4F 52 44 08
2231:53 00 30 00 00 00 00 00 25
```

Maurice Yanney, the author of Balloon Pop (August 1992) and Cats and Mice (January 1993), lives in Lebanon, Pennsylvania.

UTILITY PLUS

By Eric Jevon Bryant

Utility Plus is a group of three useful utility programs for the 64 written in machine language to take advantage of the language's power and speed. The first utility, Word Wrapper, wraps text around the screen when words become cut off by the screen border. Integer Array Search lets you quickly search through an array of integers for a specific value, and String Array Search searches through an array of strings for a specific string of characters.

The utilities in the Utility Plus package can be used separately or together. They were programmed independently. Also, they reside at 52376–53247, which is near the top of free RAM, so it may be possible to run other machine language programs with these in place. If you use all three programs, this leaves you with 3227 bytes of free RAM, a little more than 3K.

Originally, Utility Plus was written to complement a text adventure I had written. The majority of the program was in BASIC, and the utilities were created to speed up the parsing of commands and outputting text to the screen. Utility Plus's usefulness, however, is not restricted to text adventures. You may use the package in just about anything from databases to your own word processor.

Entering Utility Plus

Utility Plus is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following starting and ending addresses if you want to have all three utilities.

Starting address: CC98
Ending address: CFFF

Note that Utility Plus is a package of three utilities that are independent of each other. This means that you may wish to type in only the ones that you need. If you want only one or two of them, use the addresses listed below and enter only those lines of the MLX listing.

Word Wrapper
Starting Address: CC98
Ending Address: CDFB

Integer Array Search
Starting Address: CDFC
Ending Address: CEE4

String Array Search
Starting Address: CEE5
Ending Address: CFFF

Be sure to save a copy of the program before exiting MLX. When you're ready to use the program, load it with the ,8,1 extension, type *NEW*, and then start to work on your own BASIC programs. You'll find Utility Plus helpful in many programming situations.

Word Wrapper

If you've ever used the PRINT statement in a program to print out instructions or other information, you know how difficult it can be to make the words wrap properly. It usually takes a good deal of trial and error to make the statement print correctly. Word Wrapper does the work for you.

To use this utility, place the text you wish printed to the screen in the string variable A$. (Failure to do this could result in the computer's locking up). Type *SYS 52376,0* and the text contained in variable A$ will be printed. Any words that might have been cut off by the edge of the screen will be wrapped around. If you type *SYS 52376,1* the words will print, but the program will automatically add a prompt that tells you to press Return to continue. Note that you may print something beforehand with a semicolon and then invoke Word Wrapper, and it will continue from that PRINT statement, wrapping accordingly.

Word Wrapper is quite powerful. After Word Wrapper has printed something onscreen, anything that is printed afterward will be tacked onto the end of the string, as if you used PRINT with a semicolon. To avoid this, simply print after you execute Word Wrapper.

Integer Array Search

An integer is any number that does not contain a fraction. On the 64, an integer must fall within the range of from 32767 to -32767. In Commodore BASIC, an integer is recognized as a variable name following by a percent sign, A% or BC%, for example.

Integer Search can look through any array of integers that contains no more than 255 elements. (It's better if your arrays have no more than 254 elements since a 255 is a null value for Integer Search.)

To invoke the Integer Array Search, type the statement *SYS 52732,XY%, NUM,Z*. In this statement, XY% is the integer array to search through (the percent sign is needed), NUM is the number to search for, and Z is the initial value in memory location 251. Index Array Search will retrieve the index held in 251 first and will start the search at the very next index. Therefore, it's a good idea to initialize your integer search by entering *SYS 52732,XY%,0*. This will place a 0 in 251 and start

your search at an index of 1.

The array index that contains your value NUM is held at memory location 251; just enter *PRINT PEEK(251)* to find its value. A value of 255 means there was no match, while anything less indicates the index where there was a match. If the variable you entered for XY% does not exist, the program will return a *SEARCHING ERROR* message.

String Array Search

In BASIC, a string is any string of characters. String Array Search lets you search through any list (an array) of strings for a specific string or even a part of a string.

Place the string you're searching for in string variable A$. This may even be the first few characters of the string. For example, JOH would locate JOHNS, JOHNSON, or JOHANSON, but not JIM JOHNSON. Failure to have something contained in A$ could result in the computer's crashing.

With this done, enter *SYS 52965,AB$,X,* with AB$ being the string array to search (the $ is necessary) and X being the initial value for 252. Once again, if string AB$ does not exist, you'll receive a *SEARCHING ERROR* message. This time, however, the matched index will be stored in memory location 252, so it will not conflict with the Integer Array Search. A 255 in this location indicates that a match was not found.

Utility Demo

This demonstration program gives you an example of the Utility Plus features and how to use their functions. Programmers may find that dissecting the code is helpful. Since Utility Demo is written entirely in BASIC, enter it with The Automatic Proofreader to help eliminate typing errors. Be sure to save the program before running it.

Simply run the demonstration with Utility Plus already in memory and watch as it demonstrates the integer and string searches, saving the Word Wrapper for the finale.

The program sets arrays T%() and IR%() for integer arrays and S$() for a string array. The demo illustrates the Integer Search by picking ten random numbers between 0–254 and then searching for these values in arrays T%() and IR%(). T%() has a maximum of 100 elements, so some of the random numbers will not be found if they exceed 100. Also, the values in T%() are equal to 100 minus the index, while in IR%() there is a direct relationship. Thus, the value 37 is held in index 73 in T%() and 37 in IR%(). Use this to check the searches.

The second demo deals with the string S$(). This array contains the word *TRASH* in 234 of its 254 elements and the word *TREASURE* is scattered at random in 20 elements throughout the array. The numbers onscreen are the indexes of the elements that contain the word *TREASURE*. The variable LI$ contains this list.

Finally, the word-wrap demo prints some text on the screen, prompts you to press Return, and continues with more text.

Some Final Notes

First, the Z in SYS 52732,XY%,Z (Integer Search) and the X in SYS 52965,AB$,X (String Search) are optional; they may be left out. The utility will simply begin the search at the current index held in 251 for Integer Search or 252 for String Search.

Second, when searching for negative values in the Integer Search, you must place this value in a variable and then enter *SYS 52732,XY%,VAR* with VAR being this variable. If you attempt to enter *SYS 52732,XY%,-1* you will run into problems.

Third, if your A$ variable contains a short string and you call Word Wrapper, you may see some garbled text printed after your word. To clear this up, simply add CHR$(0) after your A$ text as in A$=A$+CHR$(0). This will add a null character to your string and stop the garbage.

Finally, there is a programming trick that will allow you to set the left margin for Word Wrapper. Simply enter *POKE 52496, 256 – left margin.* For example, if you wanted a left margin of 5, you would enter *POKE 52496, 255 – 5*, or *POKE 52496, 251.* There is also a way to set the right margin, but it isn't as simple; those able to decode machine language may be able to solve it. Hint: fool around with locations 52460 and 52496 combined.

UTILITY PLUS

```
CC98:A2 00 20 79 00 C9 2C D0 6F
CCA0:03 20 00 E2 86 B1 4C 47 CC
CCA8:CD 00 A5 D3 18 E9 27 B0 82
CCB0:02 69 28 8D A9 CC A2 00 49
CCB8:A0 00 B1 A5 C9 00 D0 08 2B
CCC0:A5 B1 D0 01 60 4C AC CD 1F
CCC8:20 D2 FF C9 20 D0 08 A9 C1
CCD0:01 85 A3 A2 00 86 A4 C9 18
CCD8:0D D0 05 A2 FF 8E A9 CC 52
CCE0:A0 01 20 8E CD EE A9 CC 42
CCE8:AD A9 CC C9 28 F0 0C E6 FD
CCF0:A5 A5 A5 C9 00 D0 BF E6 C1
CCF8:A6 D0 BB C6 A3 A2 00 E8 8E
CD00:A9 14 20 D2 FF E4 A3 D0 52
CD08:F6 CA A9 20 20 D2 FF E0 36
CD10:00 D0 F6 A0 01 20 8E CD 3C
CD18:A5 A5 E5 A3 85 A5 A5 A6 9B
CD20:E5 A4 85 A6 4C 2D CD C8 6E
CD28:84 A3 4C AA CC A2 03 E6 01
CD30:A5 A5 A5 C9 00 F0 08 CA F7
CD38:E0 00 F0 08 4C 2F CD E6 84
CD40:A6 4C 37 CD 4C AA CC A5 52
CD48:2D 85 A3 A5 2E 85 A4 A0 1C
CD50:00 B1 A3 C9 41 F0 06 C8 0C
CD58:20 8E CD F0 F2 C8 B1 A3 32
CD60:C9 80 D0 F4 A0 03 20 8E 4A
CD68:CD A0 00 B1 A3 85 A5 C8 75
CD70:B1 A3 85 A6 C6 A3 A5 A3 9C
CD78:C9 FF D0 02 C6 A4 A0 00 3D
CD80:B1 A3 A8 A9 00 91 A5 A0 BF
CD88:01 85 A4 4C 27 CD E6 A3 41
CD90:A5 A3 C9 00 F0 06 88 C0 92
CD98:00 D0 F3 60 E6 A4 F0 F6 8F
CDA0:12 5B 52 45 54 55 52 4E A5
CDA8:5D 92 A0 00 B9 A0 CD 20 B7
CDB0:D2 FF C8 C0 02 D0 F5 A0 BA
CDB8:00 B9 A2 CD AE 18 D0 E0 4C
CDC0:17 F0 0A 20 D2 FF C8 C0 50
CDC8:06 D0 EE F0 05 18 69 80 64
CDD0:D0 F1 A0 00 B9 A8 CD 20 91
CDD8:D2 FF C8 C0 02 D0 F5 A9 EB
CDE0:00 85 C6 A5 C6 F0 FC A0 A5
CDE8:00 A0 00 84 B1 A9 14 20 71
CDF0:D2 FF C8 C0 08 D0 F6 A9 36
CDF8:00 85 C6 60 A9 80 85 A4 D3
CE00:20 FD AE 09 80 85 A3 20 15
CE08:73 00 C9 25 F0 07 05 A4 3D
CE10:85 A4 20 73 00 A9 25 20 E5
CE18:FF AE 20 83 AE 20 AA B1 9A
CE20:85 A6 84 A7 20 79 00 F0 0D
CE28:05 20 00 E2 86 FB A5 2F 1D
CE30:85 AD A5 30 85 AE A0 00 DB
CE38:B1 AD C5 A3 D0 07 C8 B1 F2
CE40:AD C5 A4 F0 1E A5 AD C5 72
CE48:37 D0 0D A5 AE C5 38 D0 7F
CE50:07 A0 0C 20 2F F1 D0 06 06
CE58:20 DB CE 4C 36 CE 4C 65 86
CE60:A4 EA EA A9 00 85 B0 A0 1B
CE68:00 20 DB CE C8 C0 04 D0 98
CE70:F8 A0 00 B1 AD 85 AA C9 70
CE78:03 F0 D6 AA CA 20 DB CE B6
CE80:20 DB CE B1 AD 95 AF E0 1E
CE88:00 D0 F1 C6 AF A5 B0 F0 6B
CE90:02 C6 B0 20 DB CE A9 00 66
CE98:85 AB 85 AC A0 00 B1 AD 75
CEA0:C5 A6 D0 12 C8 B1 AD C5 34
CEA8:A7 D0 0B 18 A5 AB AA E5 48
CEB0:FB 90 03 86 FB 60 20 DB B6
```

```
CEB8:CE 20 DB CE A5 AB C5 AF 45
CEC0:F0 05 E6 AB 4C 9C CE A5 C7
CEC8:AC C5 B0 F0 09 E6 AC A9 3A
CED0:00 85 AB 4C 9C CE A9 FF 7D
CED8:85 FB 60 E6 AD A5 AD F0 03
CEE0:01 60 E6 AE 60 A9 80 85 0F
CEE8:B1 20 FD AE 85 B0 20 73 B4
CEF0:00 C9 24 F0 07 05 B1 85 C9
CEF8:B1 20 73 00 A9 24 20 FF 04
CF00:AE 20 79 00 F0 05 20 00 0A
CF08:E2 86 FC A9 00 85 AC 85 E9
CF10:AA A5 2E 85 AB A0 00 B1 1E
CF18:AA C9 41 F0 0C E6 AA A5 AD
CF20:AA C9 00 D0 F0 E6 AB F0 FF
CF28:EC C8 B1 AA C9 80 D0 ED 31
CF30:E6 AA 20 EB CF E6 AA 20 40
CF38:EB CF A0 00 A2 00 B1 AA F8
CF40:95 A3 E0 02 F0 04 E8 C8 02
CF48:D0 F4 A5 2F 85 AA A5 30 87
CF50:85 AB A0 00 B1 AA C5 B0 26
CF58:F0 20 A5 AA C5 37 90 0E 12
CF60:A5 AB C5 38 90 08 A0 0C EB
CF68:20 2F E1 4C 65 A4 E6 AA 1D
CF70:A5 AA C9 00 D0 DC E6 AB 3A
CF78:F0 D8 C8 B1 AA C5 B1 D0 9B
CF80:DA A0 00 E6 AA 20 EB CF A1
CF88:C0 03 F0 03 C8 D0 F4 A0 AB
CF90:00 B1 AA C9 01 D0 D3 E6 68
CF98:AA 20 EB CF E6 AA 20 EB 1E
CFA0:CF 38 B1 AA E9 00 85 A9 1B
CFA8:E6 AA A0 00 A2 00 B1 AA 9D
CFB0:95 A6 C0 02 F0 04 C8 E8 0F
CFB8:D0 F4 A6 A3 CA E4 A6 B0 F4
CFC0:0F A0 00 B1 A4 D1 A7 D0 B7
CFC8:07 C8 C4 A3 F0 27 D0 F3 AA
CFD0:E6 AC A5 AC C5 A9 D0 05 0A
CFD8:A9 FF 85 FC 60 A0 00 E6 3A
CFE0:AA 20 EB CF C0 02 F0 C2 0B
CFE8:C8 D0 F4 A5 AA C9 00 F0 87
CFF0:01 60 E6 AB 60 18 A5 AC 1C
CFF8:AA E5 FC 90 D3 86 FC 60 23
```

UTILITY DEMO

```
HB 10 REM UTILITY/DEMO
EX 20 REM BY ERIC J. BRYANT
XB 30 REM COPYRIGHT 1993 - COM
      PUTE PUBLICATIONS - ALL
      {SPACE}RIGHTS RESERVED
DD 40 REM DIMENSIONING ARRAYS
EC 90 DIM T%(100)
GR 100 DIM IR%(254)
MH 110 DIM S$(254)
MA 120 REM
XG 130 REM BUILDING ARRAYS
CC 140 REM
EC 150 FOR X=1TO100: T%(X)=100
      -X :NEXT
DP 160 FOR X=1TO254: IR%(X)=X
      {4 SPACES}:NEXT
PD 170 FOR X=1TO254:S$(X)="TRA
      SH":NEXT
CF 180 REM
SS 190 FOR X=1TO20 :IX$=MID$(S
      TR$(X),2)
KB 200 Y=INT(RND(0)*254):IF S$
      (Y)<>"TRASH" THEN 200
PA 210 S$(Y)="TREASURE-"+IX$:N
      EXT X
HH 220 REM
QF 230 REM DEMO
AH 240 REM INTEGER ARRAYS
DK 250 REM
DA 260 PRINTCHR$(147);CHR$(18)
      ;"INTEGER ARRAY DEMO:"
PF 270 FOR X=1TO10:Y=INT(RND(0
      )*254):NU$=MID$(STR$(Y)
      ,2)
BC 280 PRINTSPC(1);NU$;TAB(5);
      "(T%){2 SPACES}";
PF 290 SYS 52732,T%,Y,0:IF PEE
      K(251)=255 THEN PRINT"N
      OT FOUND":GOTO 310
BQ 300 PRINT"LOCATION";PEEK(25
      1)
DS 310 PRINTTAB(5);"(IR%) ";
KB 320 SYS 52732,IR%,Y,0
ER 330 PRINT"LOCATION";PEEK(25
      1) :NEXT X:GOSUB590
JS 340 REM
PK 350 REM STRING ARRAYS
BA 360 REM
JE 370 PRINTCHR$(147);CHR$(18)
      ;"STRING ARRAY DEMO:"
KS 380 PRINT" THE TEXT ";CHR$(
      34);"TREASURE-(X)";CHR$
      (34);" IS LOCATED:":POK
      E252,0
RP 390 FOR X=1TO20:IX$=MID$(ST
      R$(X),2):A$="TREASURE"
DE 400 SYS 52965,S$,PEEK(252)
HQ 410 VU$=MID$(STR$(PEEK(252)
      ),2):LN=LEN(VU$): ZE$="
      000"
KK 420 IF LN<3 THEN VU$=LEFT$(
      ZE$,3-LN)+VU$
SH 430 PRINT" ";VU$;:LI$=LI$+V
      U$+" ":NEXT X:GOSUB 590
EF 440 REM
KF 450 REM WORD WRAPPER
QG 460 REM
HR 470 PRINTCHR$(147);CHR$(18)
      ;CHR$(14);"WORD WRAPPER
       DEMO:";CHR$(146);" ";
HJ 480 A$="THIS IS A DEMO FOR
      {SPACE}THE WORD WRAPPIN
      G UTILITY! SEE HOW THE
      {SPACE}WORDS WERE "
AD 490 A$=A$+"AUTOMATICALLY WR
      APPED AROUND THE HEADIN
      G? WORD WRAPPER KEEPS T
      RACK "
HF 500 A$=A$+"OF WHAT POSITION
       ON SCREEN YOU ENABLED
      {SPACE}THIS UTILITY, AL
      LOWING FOR "
PM 510 A$=A$+"MUCH VERSITILITY
      ."
JK 520 SYS 52376,1:PRINT:PRINT
FH 530 A$="ALSO NOTICE HOW WOR
      D WRAPPER JUST PROMPTED
       YOU TO PRESS [RETURN],
       "
EF 540 A$=A$+"THIS ALLOWS YOU
      {SPACE}TO PROMPT THE US
      ER BEFORE CONTINUING WI
      TH A RATHER "
FQ 550 A$=A$+"LENGTHY TEXT."
FF 560 SYS 52376:PRINT:PRINT:G
      OSUB 590:
BP 570 PRINTCHR$(147);CHR$(142
      );"UTILITY/DEMO COMPLET
      E."
QM 580 END
HX 590 PRINTCHR$(18);"CONTINUE
      ?":PRINTCHR$(18);"(Y)ES
       OR (N)O"
EJ 600 GET A$ :IF A$="" THEN 6
      00
DR 610 IF A$<>"N" THEN RETURN
XQ 620 END
```

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DIRECTOR-EASE

By Randy J. Clemmons

I have subscribed to Gazette since 1985, and I always look forward to reading Jim Butterfield's "Machine Language" column. In October 1992, Jim wrote that programming to read a disk directory is no trivial task. I thought you might like to look at my solution for reading directories. Director-Ease (pun intended) makes it possible to create a directory reader easily wherever 102 bytes of RAM are available.

Director-Ease has an option to create a BASIC loader, which allows BASIC programmers an easy path to incorporate a directory reader into their work. Also, if you wish, Director-Ease lets you display only specific file types, such as PRG, SEQ, REL, or USR files.

Entering the Program

Director-Ease is written entirely in BASIC. To help avoid typing errors, enter the program with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you try to run it.

Using the Program

Load and run Director-Ease. To use the program for the first time, use the default starting address of 828 which appears on screen. Location 828 is in the 64's cassette buffer, a favorite place for small machine language routines. Respond to the make loader question with *N* for no. You'll then see a message onscreen that tells you to use SYS 828 to view files. Enter that SYS to verify that everything is working well.

Relocation

Let's check out Director-Ease's relocatability feature. Enter *RUN* and repeat the steps outlined in the previous paragraph, but this time pick an address in the 64's upper RAM. For example, enter a starting address between 49152 and 57145. Remember, use a place where 102 bytes of RAM are available.

You could choose a location inside BASIC's normal program space, but you'd have to take steps to protect the code from being overwritten eventually by BASIC. You could do it by moving BASIC's top-of-memory pointer down and then entering a CLR statement to realign BASIC's pointers. Then you could safely use an address above the top-of-memory pointer.

Create a Loader

To use the BASIC loader option, enter *Y* when the programs asks if you want to create one. When the program finishes executing, several lines of BASIC code will appear onscreen. This code is ready to run, save, or renumber.

It's easy to add this BASIC loader code to your programs by using an append routine. If you don't already have an append routine, see Randy Thompson's "Programmer's Page" in the September 1992 Gazette.

What's Happening

As Director-Ease executes, the following events take place. The code is placed in 102 bytes of RAM and then a relocation routine makes adjustments to some machine language instructions (JMP and JSR) inside the code. When the make loader option is selected, the dynamic keyboard technique is employed to create the data statements for BASIC and to delete Director-Ease from memory, leaving only the code for a BASIC program.

Being Selective

Reading either specific (PRG, SEQ, REL, USR) file types or all file types is easy with Director-Ease. The default for Director-Ease is to view all file types, but by entering a few POKEs, you can change the program to read specific file types only. Another default option is to view sequential files only. To switch to this default, enter *POKE (starting address + 9),6*. Then enter the SYS and starting address to view the directory. If there are no sequential files on the disk, only the disk header is printed. To switch back to viewing all files, enter *POKE (starting address + 9),1*.

Before continuing, let's review the decimal equivalents for ASCII characters *P, S, R,* and *U*. The ASCII value for *P* (PRG) is 80, the value for *R* (REL) is 82, the value for *S* (SEQ) is 83, and the value for *U* (USR) is 85. Here's how those values can be used to select specific file types for display.

POKE (starting address + 99),80
to view program (PRG) files only.
POKE (starting address + 99),82
to view relative (REL) files only.
POKE (starting address + 99),83
to view sequential (SEQ) files only.
POKE (starting address + 99),85
to view user (USR) files only.

To enable the option to view specific file types, enter one of the above POKEs and then *POKE (starting address + 9),6*. Then use SYS to get to the starting address to see the directory. To switch back to viewing all file types, enter *POKE (starting address + 9),1*.

Device Numbers

Director-Ease also lets you see directories on devices other than device 8. You can customize the program by entering the following three POKEs plus the device number of your drive or REU. (Note: The selective directory option will not work with Commodore 1700 series REUs. When used with these REUs, the option only lists directories of all file types.)

For directories on devices other than device 8, you'll have to enter three POKEs, each ending with the desired device or drive number. Here are those POKEs.

POKE (starting address + 1), device #
POKE (starting address + 21), device #
POKE (starting address + 89), device #.

Now, when you check a directory by typing *SYS starting address*, you'll get a listing of programs and files on whichever device or drive number that you selected in the above POKEs.

DIRECTOR-EASE

```
BM 0 REM COPYRIGHT 1993 - COMP
     UTE PUBLICATIONS INTL LTD
      - ALL RIGHTS RESERVED
JM 1 GOTO10:REM BY RANDY CLEMM
     ONS
SD 2 S=10{2 SPACES}:REM * DELE
     TE ROUTINE 2-8 *
JR 3 PRINT"{CLR}{2 DOWN}":FORI
     =S TO S+60 STEP10
FD 4 IFI>340THEN NEXT:PRINT"GO
     TO7":GOTO6
HS 5 PRINTI:PRINTCHR$(20):NEXT
     I:PRINT"S="S+60"{LEFT}:GO
     TO3"
GH 6 POKE198,10:FORK=1TO10:POK
     E630+K,13:NEXTK:PRINT"
     {HOME}":END
XK 7 PRINT"{CLR}{2 DOWN}":FORM
     =1TO8:PRINTM:NEXTM:PRINT"
     PRINT CHR$(147):LIST"
SH 8 POKE198,9:FORK=1TO9:POKE6
     30+K,13:NEXTK:PRINT"
     {HOME}":END
PJ 10 GOSUB130:INPUT"{CLR}
      {2 RIGHT}{2 DOWN}CREATE
      {SPACE}BASIC LOADER Y/N"
      ;C$:IFC$="Y"THENGOSUB110
      :GOTO 30
KJ 20 PRINT"{2 RIGHT}{2 DOWN}S
      YS";S:PRINT"{2 RIGHT}
      {2 DOWN}TO VIEW "T$" FIL
      ES":END
JH 30 PRINT"{CLR}{2 DOWN}":FOR
      I=STOS+47STEP6
JJ 40 IFI>FTHENNEXT:PRINT"GOTO
       80":GOTO70
PK 50 PRINTI;"DATA ";:FORJ=0TO
      5:R$=STR$(PEEK(I+J)):PRI
      NTRIGHT$(R$,LEN(R$)-1);"
      ,";
PJ 60 NEXTJ:PRINTCHR$(20):NEXT
      I:PRINT"S="S+48"{LEFT}:F
      ="F"{LEFT}:GOTO 30"
BM 70 POKE198,10:FORK=1TO10:PO
      KE630+K,13:NEXTK:PRINT"
      {HOME}":END
GH 80 SA=(PEEK(679)*256)+PEEK(
      680):EA=SA+101
DE 90 PRINT"{CLR}{3 DOWN}"SA-1
      "FORI="SA"TO"EA":READDA:
      POKEI,DA:NEXTI:END"
MF 100 PRINT"RUN 2":POKE198,2:
       POKE631,13:POKE632,13:P
       RINT"{HOME}":END
EK 110 REM **{3 SPACES}SAVE ST
       ARTING ADDRESS
       {3 SPACES}**
MB 120 TV=S:HB=INT(TV/256):LB=
       INT(TV-(HB*256)):POKE67
       9,HB:POKE680,LB:RETURN
SC 130 PRINT"{CLR}{3 RIGHT}
       {3 DOWN}ENTER STARTING
       {SPACE}ADDRESS NO.
       {3 SPACES}828"
DX 140 INPUT"{30 RIGHT}{UP}";S
DK 150 PRINT"{3 RIGHT}{2 DOWN}
```

```
        POKING DATA TO MEMORY .
        .."
GG 160  REM * DIRECTORY ML DATA
         *
XR 170  FOR I= S TO S+101:READD
        A:POKEI,DA:NEXTI:F=S+10
        1
FC 180  DATA 169,8,170,160,0,32
        ,186,255,169
KS 190  DATA 1,162,154,160,3,32
        ,189,255,32
XS 200  DATA 192,255,162,8,32,1
        98,255,32
QJ 210  DATA 228,255,32,228,255
        ,32,225,255
HC 220  DATA 240,49,32,228,255,
        32,228,255
AH 230  DATA 165,144,208,39,32,
        228,255,141
PD 240  DATA 160,3,32,228,255,1
        74,160,3,32
MG 250  DATA 205,189,169,32,32,
        210,255
JE 260  DATA 32,228,255,240,6,3
        2,210,255,76
DJ 270  DATA 126,3,169,13,32,21
        0,255,76,91
KJ 280  DATA 3,32,204,255,169,8
        ,32,195,255
FD 290  DATA 96,36,48,58,42,61,
        83,0,0
DH 300  REM ** RELOCATION DATA
        {SPACE}**
QR 310  DATA 94,11,13,100,50,51
        ,100,56,57,66,75,76,31,
        83,84
RM 320  REM ** RELOCATION ROUTI
        NE **
EB 330  FORI=1 TO 5:READ DA:TV=
        S+DA:HB=INT(TV/256):LB=
        INT(TV-(HB*256))
SG 340  READLO:POKE(S+LO),LB:RE
        ADHI:POKE(S+HI),HB:NEXT
        I:RETURN
```

Randy Clemmons wrote this program when he found himself needing to relocate a directory reader to make room for other machine language code which required the same memory. He lives in San Diego, California

CROSSREF 128

By Donald G. Klich

Have you ever wanted to make modifications to someone else's BASIC program but were afraid to touch it for fear of reusing a variable name or removing an instruction that may be used as an entry point? Then you need CrossRef 128.

CrossRef 128 will process any 64 or 128 BASIC program and send an alphabetical listing of all variables and all the lines that refer to them to your printer. It also prints a list of all entry-point line numbers with their associated branching line numbers.

With this listing, it's then possible to choose unused variable names or replace original coding lines without the fear of accidentally queering the original program.

Typing It In

CrossRef 128 consists of two program segments, both written in BASIC 7.0. To help avoid typing errors, enter the programs with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Save the first segment with any name you wish, but be sure to save the second segment with the filename SEG.2 since the first program loads the second by that name. Note that abbreviated commands (upper case characters) are used on line 20 of the first segment. This is necessary so that the required code will fit in the key-definition area.

Creating a List

Load and run the first short program, and make sure your printer is turned on. This program loads the f1 function key area, displays some instructions, and then exits. Now DLOAD the program to be cross-referenced. Finally, be sure that the disk containing SEG.2 is in the drive and press the f1 key.

The amount of execution time required depends on the length and complexity of the target program. Large programs may take 15 minutes or more to process. As a comfort, turn up the volume on your monitor, and you should hear the churning activity.

The printout lists all variables used in the program in alphabetical order and the line numbers in which they appear. Following that is a listing in numerical order of lines that branch to other lines and their destinations. Now you can consult this cross-reference list before making changes or alterations to 64 or 128 BASIC programs without worrying about deleting or overwriting important variables or line numbers.

CROSSREF 128

```
PK 5 REM COPYRIGHT 1993 - COMP
       UTE PUBLICATIONS INTL LTD
       - ALL RIGHTS RESERVED
JS 10 REM LABELS AND CONSTANTS
SB 20 A$= "FAST"+CHR$(13)+"OP2
      ,8,2,"+CHR$(34)+"0:W,S,W
      "+CHR$(34)+CHR$(13)+"CM2
      "+CHR$(13)+"LI"+CHR$(13)
      +"PR2"+CHR$(13)+"CLOSE2"
MF 25 KEYI,A$+CHR$(13)+"RUN"+C
      HR$(34)+"SEG.2"+CHR$(34)
      +CHR$(13)
BQ 30 COLOR0,1:COLOR4,1:PRINT"
      {CLR}{4 DOWN}{YEL}
      {5 SPACES}LOAD THE PROGR
      AM TO BE PROCESSED":PRIN
      T"{10 SPACES}THEN PRESS
      {SPACE}THE F1 KEY"
```

SEG.2

```
MS 10 REM COPYRIGHT 1993 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
AG 20 REM SEGMENT 2
ED 30 FAST:OPEN2,8,2,"@0:W,S,R
      ":DIMRS$(150),PU$(14),LB
      $(700),LN%(700),ZS$(20),
      NA%(200),BA%(200):B=1:Q=
      1:QT$=CHR$(34):OPEN1,4
SG 40 FORI=1TO150:READRS$(I):N
      EXT
QA 50 FORI=1TO12:READPU$(I):NE
      XT
PF 60 REM ***ROUTINE TO EXTRAC
      T A LINE
CX 70 GET#2,A$:SU=ST
PB 80 IFA$=CHR$(13)THEN100
GC 90 B$=B$+A$:GOTO150
ER 100 IFLEFT$(B$,5)="READY"TH
       ENB$="":GOTO150
MA 110 IFB$=""THEN150
SB 120 I=INSTR(LEFT$(B$,9),"RE
       M"):IFI>0THENB$="":GOTO
       150
PA 130 I=INSTR(LEFT$(B$,10),"D
       ATA"):IFI>0THENB$="":GO
       TO150
XP 140 GOSUB170:B$=""
KH 150 IFSU=0THEN70:ELSECLOSE2
       :GOTO600
CH 160 REM ***ROUTINE TO EXTRA
       CT AN INSTRUCTION
CE 170 C$="":I=INSTR(B$," ",1)
       :N=VAL(LEFT$(B$,I-1)):P
       =I+1:ZP=1
QQ 180 IFP>LEN(B$)THEN250
BD 190 IFMID$(B$,P,1)=":"THEN2
       40
HK 200 IFMID$(B$,P,1)<>QT$THEN
       220
EH 210 P=P+1:IFCS=0THENCS=1:GO
       TO180:ELSECS=0:GOTO180
GC 220 IFCS=0THENC$=C$+MID$(B$
       ,P,1)
AB 230 P=P+1:GOTO180
DB 240 CL=LEN(C$):GOSUB270:P=P
       +1:C$="":GOTO180
MB 250 CL=LEN(C$):GOSUB270:RET
       URN
DC 260 REM ***SUBROUTINE TO EX
```

```
      TRACT CONSTANTS
AQ 270 L=1
PQ 280 HT=0
JM 290 GOSUB520:IFL>0THEN290:E
       LSEL=-L
DC 300 IFL=CL+1THEN470
BR 310 FORT=1TO12:IFMID$(C$,L,
       1)<>PU$(T)THENNEXT:GOTO
       330
FD 320 HT=1:L=L+1:IFL=CL+1THEN
       470:ELSE310
MA 330 IFASC(MID$(C$,L,1))<>34
       THEN380
RP 340 HT=1:L=L+1
FK 350 FORT=LTOL+254:IFASC(MID
       $(C$,T,1))=34THENL=T+1:
       GOTO370
MM 360 NEXT:END
HH 370 IFL=CL+1THEN470
PC 380 IFMID$(C$,L,1)<>CHR$(44
       )ANDMID$(C$,L,1)<>CHR$(
       32)THEN400
GQ 390 L=L+1:HT=1:IFL=CL+1THEN
       470:ELSE380
FB 400 IFASC(MID$(C$,L,1))>57O
       RASC(MID$(C$,L,1))<48TH
       EN430
RH 410 IFSN=1THEN430
GR 420 HT=1:L=L+1:IFL=CL+1THEN
       470ELSE400
GG 430 IFHT=1ANDSN=0THEN280
AA 440 IFHT=1ANDSN=1THEN460
HK 450 SN=1:E$=E$+MID$(C$,L,1)
       :L=L+1:IFL=CL+1THEN470:
       ELSE280
BQ 460 SN=0:GOSUB480:GOTO280
AK 470 IFSN=1THENSN=0:GOSUB480
       :RETURN
SA 480 REM ***ROUTINE TO BLOCK
        DUPLICATE REFERENCES
RF 490 FORI=1TOZP:IFE$=ZS$(I)T
       HENE$="":RETURN
EB 500 NEXT:LN%(B)=N:LB$(B)=E$
       :ZP=ZP+1:ZS$(ZP)=E$:B=B
       +1:E$="":RETURN
KC 510 REM ***SUBROUTINE TO ST
       RIP INSTR
XE 520 FORT=30TO150STEP30:IFMI
       D$(C$,L,LEN(RS$(T)))>RS
       $(T)THENNEXT:GOTO580
CQ 530 T=T-29:FORU=TTOT+29:IFM
       ID$(C$,L,LEN(RS$(U)))>R
       S$(U)THENNEXT:GOTO580
DX 540 IFMID$(C$,L,LEN(RS$(U))
       )<RS$(U)THEN580
JF 550 IFRS$(U)="REM"THENB$=""
       :GOTO150
AD 560 IFRS$(U)="THEN"ORRS$(U)
       ="ELSE"ORRS$(U)="GOTO"O
       RRS$(U)="GOSUB"THENGOSU
       B700
CG 570 L=L+LEN(RS$(U)):HT=1:RE
       TURN
GE 580 L=-L:RETURN
HF 590 REM ***ROUTINE TO PRINT
        OUTPUT
GK 600 PRINT#1,"VARIABLE CROSS
        REFERENCE LIST":PRINT#
       1,"LABELS MAY APPEAR MO
       RE THAN ONCE ON A LINE"
       :PRINT#1
DR 610 A$="ZZZZ":FORI=1TOB-1:I
       FLB$(I)<A$THENA$=LB$(I)
CB 620 NEXT:IFA$="ZZZZ"THEN650
FM 630 PRINT#1,A$;SPC(6-LEN(A$
       ));"-";:FORI=1TOB-1:IFL
       B$(I)=A$THENPRINT#1,LN%
       (I);:LB$(I)="ZZZZ"
BQ 640 NEXT:PRINT#1:GOTO610
QG 650 PRINT#1:PRINT#1,"ACCESS
       ED LINES AND WHERE THEY
        ARE REFERENCED":PRINT#
       1
GJ 660 A%=32767:FORI=1TOQ-1:IF
       BA%(I)<A%THENA%=BA%(I)
MM 670 NEXT:IFA%=32767THENPRIN
       T#1:CLOSE1:SCRATCH"W":S
       LOW:END
AC 680 PRINT#1,A%;" - ";:FORI=
       1TOQ-1:IFBA%(I)=A%THENP
       RINT#1,NA%(I);:BA%(I)=3
       2767
JH 690 NEXT:PRINT#1:GOTO660
AD 700 L$="":FORI=L+LEN(RS$(U)
       )TOCL:A$=MID$(C$,I,1):I
       FASC(A$)<58ANDASC(A$)>4
       7THENL$=L$+A$:NEXT:GOTO
       730
SC 710 IFA$=" "THENNEXT:GOTO73
       0
RC 720 IFA$=","THENNA%(Q)=N:BA
       %(Q)=VAL(L$):L$="":Q=Q+
       1:NEXT:GOTO740
SC 730 IFL$<>""THENNA%(Q)=N:BA
       %(Q)=VAL(L$):Q=Q+1
RF 740 RETURN
DS 750 DATA ABS,AND,APPEND,ASC
       ,ATN,BACKUP,BANK,BEGIN,
       BEND,BLOAD,BOOT,BOX,BSA
       VE,BUMP,CATALOG,CHAR,CH
       R$,CIRCLE,CLOSE,CLR,CMD
       ,COLLECT,COLLISION,COLO
       R,CONCAT,COPY,COS
PB 760 DATA DCLEAR,DCLOSE,DEC,
       DEF,DIM,DIRECTORY,DLOAD
       ,DO,DOPEN,DRAW,DSAVE,DV
       ERIFY,ELSE,END,ENVELOPE
       ,ERR$,EXIT,EXP,FAST,FET
       CH,FILTER,FN,FOR,FRE,GE
       T
AJ 770 DATA GOSUB,GO64,GOTO,GR
       APHIC,GSHAPE,HEADER,HEX
       $,IF,INPUT,INSTR,INT,JO
       Y,KEY,LEFT$,LEN,LET,LIS
       T,LOAD,LOCATE,LOG,LOOP,
       MID$,MOVSPR,NEW,NEXT
AM 780 DATA ON,OPEN,OR,PAINT,P
       EEK,PEN,PI,PLAY,POKE,PO
       S,POT,PRINT,PUDEF,RCLR,
       RDOT,READ,RECORD,REM,RE
       NAME,RESTORE,RESUME,RET
       URN,RGR,RIGHT$,RND,RREG
       ,RSPCOLOR
JF 790 DATA RSPPOS,RSPRITE,RUN
       ,RWINDOW,SAVE,SCALE,SCN
       CLR,SCRATCH,SGN,SIN,SLE
       EP,SLOW,SOUND,SPC,SPRCO
       LOR,SPRDEF,SPRITE,SPRSA
       V,SQR,SSHAPE,STASH,STEP
       ,STOP,STR$,SWAP
PM 800 DATA SYS,TAB,TAN,TEMPO,
       THEN,TO,TRAP,TROFF,TRON
       ,UNTIL,USING,USR,VAL,VE
       RIFY,VOL,WAIT,WHILE,WID
       TH,WINDOW,XOR,ZZZZZ,#,(
       ,),+,-,/,*,↑,;,<,>,=
```

Donald Klich is the author of File Index 128 (April 1993). He lives in Mount Prospect, Illinois.

YOUR OWN DATABASE

By Jim Butterfield

You can sit down at your 64 or 128 and write your own customized database program. The program will be in BASIC, and although it will have a few limitations, it will work nicely. Here's how to go about it. A sample program is included that will run on either a 64 or 128.

Types of Databases

The simplest type of database is called a flat file system. You may think of it as a set of cards in a drawer, in no particular order. To find a given record, you'll have to search through the whole set. That's not too hard to do if your database is of modest size. Our program will use flat files. This means that any new items that we add go at the end. We may also delete or modify existing records.

Indexed files are the next type of database and are a step up in complexity. The records are put in some type of order, such as alphabetical order by name. Although it wouldn't be a great deal of work to change our simple program to an indexed type, we'll stick with the simple flat files.

Relational databases are more complex because records are linked to each other. A school database might link students to classes to teachers to classrooms. These databases are too complex for us to tackle here.

Limitations

Some Commodore 8-bit machines have hard disks, but the most common setup is a single floppy disk drive. That configuration limits the size and

style of databases that can be easily fitted into our system.

Our project will stay with a database that can be read completely into the computer's RAM memory. The process consists of reading in the whole file, viewing or modifying the data, and writing the whole file back to floppy disk.

Commodore BASIC is limited by the INPUT statement (and the related INPUT# statement). If the data coming in contains a comma (,) or colon (:) character, these statements will not behave. Ornate coding can get around these problems. But to keep it simple, we'll forbid the use of these characters in our database.

Typing It In

Database is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

The Program

Database is a brief demo program to show you how to go about doing the job. You may want to modify it and expand on its basic form. As it stands in this demo, the database keeps track of members of a small club: last name, first name, date (of birth or membership), and high score.

In planning a database, it's important to list the fields: the data elements that go to make up a record. The sample program has four fields, and I've deliberately chosen three types: string (a name), date, and numeric value. A fourth type, dollars and cents, is also common, but isn't included here.

Decide on a maximum number of records for your database. I've chosen 50 records, but this can be easily changed by modifying the value of N9 in line 110.

The four fields are set up as arrays named A$( ), B$( ), C$( ), and D( ). The dollar symbols used with the first three indicate that these are strings. Field 3, C$( ), is the date, and it could be a number rather than a string. But since we don't do arithmetic on this field, it may be conveniently left as a string value. You may want to total or average field 4, which is the high score, so we'll drop the dollar sign and make this field a numeric one.

Program Modules

In lines 100–350, the program does a little initialization and then reads in the data file. If the data file doesn't exist, the program warns you of this but allows you to continue with an empty database. The program will create this file once you have entered some data.

Lines 400–510 ask for some action. You have the following options: add, delete, change (a record), show (the file), or quit. Some actions are not available if the database is empty or full.

Quit

Lines 520–760 handle the Quit option. If no changes have been made to the file or if the database contains no records, the program quits immediately. Otherwise, the program creates an updated file called MYDATA and writes it to disk. This is done carefully so that a backup file will exist. The sequence scratches the previous backup file; renames the former data file so that it becomes the backup; and, finally, writes the new data file.

Add

Lines 1000–1160 let you add records to the database. Data for the new record is requested. Then this record is displayed, allowing you to accept or cancel it.

Delete

Lines 2000–2210 contain the routine to delete records. You can select the record for deletion. That record is shown in detail so that you can confirm or cancel the delete request.

Change

The routine to change a record is found in lines 3000–3190. You are allowed to select the record to be changed. The record is shown in detail, with the four fields numbered; you are asked to select which field to change. After any change, you may continue to make changes on the same record.

It should be noted that a program can be set up to allow only certain changes. For example, the high score field might be available for modification, but the name fields, once entered, might be nonchangeable.

Display

Lines 4000–4290 display the records on the screen or send them to the printer. The coding assumes a 40-column screen, so the data is squeezed to fit. The screen display pauses from time to time to allow the data to be read. Printer output, in contrast, takes advantage of the wider output area and prints all records without pause.

Specify

The DELETE and CHANGE commands call for a specific record to be selected. This is done in the subroutine between lines 5000–5160. If you don't find the desired record, a no-record-selected value of 0 may be returned.

Date

Lines 8000–8120 handle the date routine: You are prompted for a date in year/month/day order. This is changed to a numeric string within the database. Dates held in this way, 19930214, for example, may be easily searched or sorted if necessary. Note that you may enter the month either as a name or as a number.

Comments

Database programs often contain extra features not shown here. For example, the program might search for selected data or produce totals or averages. Again, there are related programs (report generators) that sort and summarize data, but our simple program is kept to a minimum of steps.

Watch for the limitations of the INPUT statement. We've mentioned the need to stay away from commas and colons. As you expand the features of your database, keep in mind a few other factors. The computer won't like empty fields. If you have fields such as middle initial, apartment number, or date of marriage, be sure to have your program fill unused items with a dummy character such as a slash or asterisk.

Some databases never delete or change a record. If you need a change, a correcting entry is added. That's a valid way to do things, but it may cause the data file to grow to an unreasonable size. You might find it useful to reform your data at intervals, say

at the start of each year. The old database may be kept as an archive; the new one will contain only current information.

The program Database is just a start. Plan your own data, and modify the program to meet your own needs.

DATABASE

```
FC 50 REM COPYRIGHT 1993 - COM
      PUTE PUBLICATIONS - ALL
      {SPACE}RIGHTS RESERVED
AS 100 REM SIMPLE FLAT FILE DA
      TA BASE
XE 110 N9=50
QM 120 DIM A$(N9),B$(N9),C$(N9
      ),D(N9)
QH 130 S$="{17 SPACES}"
JF 140 M9$="..JANFEBMARAPRMAYJ
      UNJULAUGSEPOCTNOVDEC"
KH 200 OPEN 15,8,15
PR 210 OPEN 1,8,3,"0:MYDATA,S,
      R"
AD 220 INPUT#15,E,E$
PF 230 IF E=0 GOTO 300
QM 240 CLOSE 1:CLOSE 15
DA 250 PRINT "I CANNOT FIND FI
      LE 'MYDATA'"
DS 260 INPUT "CONTINUE";X$
SR 270 IF X$="Y" OR X$="YES" G
      OTO 400
MH 280 END
JE 300 N=N+1
DQ 310 INPUT#1,A$(N),B$(N),C$(
      N),D(N)
EF 320 IF ST=0 GOTO 300
FX 330 CLOSE 1:CLOSE 15
SJ 340 PRINT N;"RECORDS FOUND
      {SPACE}ON FILE."
EQ 350 IF N+10>N9 THEN PRINT "
      FILE ALMOST FULL!"
GB 400 IF N>0 THEN PRINT "SHOW
      , ";
RJ 410 IF N<N9 THEN PRINT "ADD
      , ";
BP 420 IF N>0 THEN PRINT "DELE
      TE, CHANGE, ";
QG 430 PRINT "QUIT?"
JS 440 INPUT X$:X$=LEFT$(X$,1)
HX 450 IF N=0 GOTO 490
GG 460 IF X$="S" GOTO 4000
DP 470 IF X$="D" GOTO 2000
RK 480 IF X$="C" GOTO 3000
BF 490 IF N=N9 GOTO 510
QM 500 IF X$="A" GOTO 1000
MH 510 IF X$<>"Q" GOTO 400
QS 520 REM QUIT .. BUT PERHAPS
       WRITE FILE
XJ 530 IF F9=0 OR N=0 THEN END
FP 540 PRINT "READY TO WRITE F
      ILE!"
HX 550 PRINT "PRESS ANY KEY."
EE 560 GET X$,X$,X$
EJ 570 GET X$:IF X$="" GOTO 57
      0
CH 580 REM DELETE ARCHIVE IF P
      RESENT
AB 590 OPEN 15,8,15
RA 600 PRINT#15,"S0:MYDATA.OLD
      "
SJ 610 REM RENAME PREVIOUS DAT
      A FILE
XA 620 PRINT#15,"R0:MYDATA.OLD
      =0:MYDATA"
JQ 630 REM WRITE NEW MASTER FI
      LE
HS 640 OPEN 1,8,3,"0:MYDATA,S,
      W"
HQ 650 INPUT#15,E,E$
FE 660 IF E<>0 THEN PRINT E;E$
      :CLOSE 1:CLOSE 15:END
FE 670 FOR J=1 TO N
XA 680 PRINT#1,A$(J)
HG 690 PRINT#1,B$(J)
QG 700 PRINT#1,C$(J)
JS 710 PRINT#1,D(J)
FD 720 NEXT J
JD 730 INPUT#15,E,E$,E1,E2
XB 740 IF E<>0 THEN PRINT E;E$
DM 750 CLOSE 1:CLOSE 15
FF 760 END
RG 1000 REM ADD A RECORD
EQ 1010 INPUT "LAST NAME";A$(N
      +1)
RR 1020 INPUT "FIRST NAME";B$(
      N+1)
GX 1030 V=N+1:GOSUB 8000 : REM
       GET DATE
HD 1040 INPUT "HIGH SCORE";D(N
      +1)
KX 1050 PRINT
KJ 1060 PRINT A$(N+1)
AS 1070 PRINT B$(N+1)
PX 1080 PRINT C$(N+1)
KE 1090 PRINT D(N+1)
DG 1100 INPUT "IS THE ABOVE OK
      ";X$
QM 1110 IF X$="Y" OR X$="YES"
      {SPACE}GOTO 1140
JX 1120 PRINT ">>> RECORD CANC
      ELLED! <<<"
XA 1130 GOTO 400
XF 1140 N=N+1:F9=1
PE 1150 PRINT N;"RECORDS TOTAL
      ."
GF 1160 GOTO 400
GE 2000 REM DELETE A RECORD
AB 2010 GOSUB 5000
MJ 2020 IF X=0 GOTO 400
FD 2030 PRINT "READY TO DELETE
       RECORD:"
AX 2040 PRINT "{2 SPACES}";A$(
      X)
ER 2050 PRINT "{2 SPACES}";B$(
      X)
FH 2060 M=VAL(MID$(C$(X),5,2))
PB 2065 PRINT "{2 SPACES}";LEF
      T$(C$(X),4);MID$(M9$,M
      *3,3);RIGHT$(C$(X),2)
HG 2070 PRINT "{2 SPACES}";D(X
      )
PC 2080 INPUT "OK TO DELETE";X
      $
QR 2090 IF X$="Y" OR X$="YES"
      {SPACE}GOTO 2120
DA 2100 PRINT "RECORD >>>NOT<<
      < DELETED!"
RX 2110 GOTO 400
PH 2120 N=N-1
AF 2130 IF X>N GOTO 2220
XQ 2140 FOR J=X TO N
JM 2150 A$(J)=A$(J+1)
RJ 2160 B$(J)=B$(J+1)
SS 2170 C$(J)=C$(J+1)
CH 2180 D(J)=D(J+1)
GE 2190 NEXT J
FH 2200 F9=1
FK 2210 PRINT ">>> RECORD DELE
      TED! <<<"
FE 2220 GOTO 400
QB 3000 REM CHANGE A RECORD
GR 3010 GOSUB 5000
BM 3020 IF X=0 GOTO 400
KS 3030 PRINT "READY TO CHANGE
       RECORD:"
SJ 3040 PRINT "1:";A$(X)
HR 3050 PRINT "2:";B$(X)
MF 3060 M=VAL(MID$(C$(X),5,2))
DS 3065 PRINT "3:";LEFT$(C$(X)
      ,4);MID$(M9$,M*3,3);RI
      GHT$(C$(X),2)
EH 3070 PRINT "4:";D(X)
PA 3080 INPUT "CHANGE WHICH FI
      ELD (0=NONE)";J
EP 3090 J=INT(J):IF J<1 OR J>4
       THEN J=0
SG 3100 ON J GOTO 3120,3140,31
      60,3180
JQ 3110 GOTO 400
JG 3120 INPUT "LAST NAME";A$(X
      )
BH 3130 F9=1:GOTO 3040
DP 3140 INPUT "FIRST NAME";B$(
      X)
PG 3150 F9=1:GOTO 3040
JK 3160 V=X:GOSUB 8000 : REM G
      ET DATE
FE 3170 F9=1:GOTO 3040
RP 3180 INPUT "HIGH SCORE";D(X
      )
XP 3190 F9=1:GOTO 3040
JS 4000 REM SHOW - DISPLAY OR
      {SPACE}PRINT
CM 4010 INPUT "SCREEN OR PRINT
      ER";X$
BP 4020 X$=LEFT$(X$,1)
SC 4030 IF X$="P" GOTO 4190
SM 4040 IF X$<>"S" GOTO 4010
KS 4050 J=1
RM 4060 K=J+20:IF K=N THEN K=N
      +1
FC 4070 PRINT LEFT$(A$(J)+S$,1
      3);
GH 4080 PRINT LEFT$(B$(J)+S$,1
      0);
DE 4090 M=VAL(MID$(C$(J),5,2))
EP 4100 PRINT LEFT$(C$(J),4);M
      ID$(M9$,M*3,3);RIGHT$(
      C$(J),2);
```

```
DB 4110 PRINT RIGHT$(S$+STR$(D
        (J)),7)
EQ 4120 J=J+1:IF J<>K GOTO 417
        0
BA 4130 PRINT "{2 SPACES}>> MO
        RE - PRESS ANY KEY <<"
        ;CHR$(145)
BR 4140 GET X$,X$,X$,X$
BM 4150 GET X$:IF X$="" GOTO 4
        150
RF 4160 GOTO 4060
RS 4170 IF J<=N GOTO 4070
HD 4180 GOTO 400
DP 4190 REM SEND TO PRINTER
KQ 4200 OPEN 4,4
BF 4210 FOR J=1 TO N
MB 4220 PRINT#4,LEFT$(A$(J)+S$
        ,20);
BJ 4230 PRINT#4,LEFT$(B$(J)+S$
        ,15);
JQ 4240 M=VAL(MID$(C$(J),5,2))
EE 4250 PRINT#4,LEFT$(C$(J),4)
        ;MID$(M9$,M*3,3);RIGHT
        $(C$(J),2);
AA 4260 PRINT#4,RIGHT$(S$+STR$
        (D(J)),10)
QG 4270 NEXT J
MB 4280 CLOSE 4
MM 4290 GOTO 400
XM 5000 PRINT "SELECT WHICH RE
        CORD:"
JM 5010 J=1
XK 5020 K=J+20:IF K>N THEN K=N
HS 5030 FOR S=J TO K
AF 5040 PRINT RIGHT$(S$+STR$(S
        ),3);": ";LEFT$(A$(S)+
        S$,12);
BR 5050 PRINT LEFT$(B$(S)+S$,6
        );
BG 5060 PRINT LEFT$(C$(S)+S$,8
        );
CR 5070 PRINT RIGHT$(S$+STR$(D
        (S)),7)
QQ 5080 NEXT S
DF 5090 PRINT ">> SELECT RECOR
        D NUMBER, OR 0 ";
SD 5100 IF K<>N THEN PRINT "FO
        R MORE <<"
AH 5110 IF K=N THEN PRINT "TO
        {SPACE}QUIT <<"
SE 5120 INPUT X
JB 5130 X=INT(X):IF X>N THEN X
        =0
SS 5140 J=K
KM 5150 IF X=0 AND K<>N GOTO 5
        020
XB 5160 RETURN
XP 8000 INPUT "YEAR";Y
CM 8010 IF Y<1900 OR Y>9999 GO
        TO 8000
CQ 8020 INPUT "MONTH";M$
FD 8030 M=VAL(M$):IF M>0 AND M
        <13 GOTO 8050
JM 8040 M$=LEFT$(M$+S$,3)
SX 8050 FOR J=1 TO 12
HP 8060 IF M$=MID$(M9$,J*3,3)
        {SPACE}THEN M=J
FG 8070 NEXT J
QQ 8080 IF M<1 OR M>12 GOTO 80
        20
SE 8090 INPUT "DAY";D
MQ 8100 IF D<1 OR D>31 GOTO 80
        90
RK 8110 C$(V)=RIGHT$(STR$(Y),4
        )+RIGHT$(STR$(M+100),2
        )+RIGHT$(STR$(D+100),2
        )
RS 8120 RETURN
```

Jim Butterfield writes "Machine Language," a regular Gazette column. He lives in Toronto, Ontario, Canada.

ML MACROS

By Cameron Kaiser

On the side of my computer I have taped a list of SYS codes: SYS 62913; SYS 49152,X,Y,Z; SYS 64738; SYS 57812"filename",D,S; and so on. The only way I can keep them straight is to use them or write them down; otherwise, I'll forget them.

Unfortunately, I still have problems keeping all those SYS codes straight. This is where ML Macros comes in. All you have to do is remember one SYS code, and with a simple symbol that you define, you can call up an infinite number of ML programs easily and quickly. And ML Macros can prove a boon to programmers by providing an easily customized and handy interface to their programs.

Entering the Program

ML Macros is written in machine language. To enter it, you'll need MLX, our machine language entry program; see "Typing Aids" elsewhere in this issue. When the program prompts for starting and ending addresses, enter the following.

Starting address: CE00
Ending address: CFE7

Be sure to save a copy of the program before exiting MLX.

Running the Program

To install ML Macros, simply load the program with the ,8,1 extension. After it loads, type *SYS 53052*, press Return, and then type *NEW* to clear pointers. If you want to load and run ML Macros from within a BASIC program, add these lines to your program.

```
0 IFA=0 THEN A=1:LOAD "ML MACROS",8,1
1 IFA=1 THEN SYS 53052
```

Of course, you can use whatever line numbers are convenient for you.

Using the Program

To converse with ML Macros, you'll use commands that all begin with the # symbol. In ML Macros the first command defines a macro. To use it, type *#,2, ASC("character"), address. Character* is any symbol not reserved by the computer. Most punctuation marks are acceptable. *Address* is the starting address of the machine language subroutine that will be triggered when you enter the character. For example, #,2,ASC("&"),64738 will program the ampersand to reset the computer if it is entered as a command.

The second command lets you save a set of macros to disk. To use it, type *#,3,"filename",dev,1,* where *filename* is any legal filename and *dev* is the device number of your drive, usually 8. This command also saves the ML Macros code to disk with the macros so that one LOAD command will give you easy access to macros and ML code on all your disks.

The final command reloads a set of macros from disk. To use it, type *#,4,"filename",dev,1. Filename* and *dev* are used the same as they are in the SAVE command.

ML Macros isn't fussy about its input. It's possible to define two macros to the same character; however, only the first macro defined will be honored. This means you cannot erase a macro by defining its character to another ML routine. Should you wish to wipe the macro memory, type *POKE 52992, 3.* Should you wish to erase only the last macro defined, type *POKE 52992, PEEK(52992)–3.*

While ML Macros was designed with compatibility in mind—it doesn't modify IRQ, NMI, or Kernal vectors and occupies a rarely used portion of memory—any modifications to locations 52736–53223 ($CE00–$CFE7) will cause erratic behavior when ML Macros or any macro defined under it is invoked. This doesn't apply to BASIC, but it does apply to some ML routines. Good luck with your ML programs, and I hope ML Macros makes them easier.

ML MACROS

```
CE00:23 0C CF 00 00 00 00 00 2C
CE08:00 00 00 00 00 00 00 00 A5
CE10:00 00 00 00 00 00 00 00 AD
CE18:00 00 00 00 00 00 00 00 B5
CE20:00 00 00 00 00 00 00 00 BD
CE28:00 00 00 00 00 00 00 00 C5
CE30:00 00 00 00 00 00 00 00 CD
CE38:00 00 00 00 00 00 00 00 D5
CE40:00 00 00 00 00 00 00 00 DD
CE48:00 00 00 00 00 00 00 00 E5
CE50:00 00 00 00 00 00 00 00 ED
CE58:00 00 00 00 00 00 00 00 F5
CE60:00 00 00 00 00 00 00 00 FD
CE68:00 00 00 00 00 00 00 00 06
CE70:00 00 00 00 00 00 00 00 0E
CE78:00 00 00 00 00 00 00 00 16
CE80:00 00 00 00 00 00 00 00 1E
CE88:00 00 00 00 00 00 00 00 26
CE90:00 00 00 00 00 00 00 00 2E
CE98:00 00 00 00 00 00 00 00 36
CEA0:00 00 00 00 00 00 00 00 3E
CEA8:00 00 00 00 00 00 00 00 46
CEB0:00 00 00 00 00 00 00 00 4E
CEB8:00 00 00 00 00 00 00 00 56
CEC0:00 00 00 00 00 00 00 00 5E
CEC8:00 00 00 00 00 00 00 00 66
CED0:00 00 00 00 00 00 00 00 6E
CED8:00 00 00 00 00 00 00 00 76
CEE0:00 00 00 00 00 00 00 00 7E
CEE8:00 00 00 00 00 00 00 00 86
CEF0:00 00 00 00 00 00 00 00 8E
CEF8:00 00 4C DB CF 4C 98 CF 8E
CF00:03 00 00 20 FD AE 20 9E AC
CF08:AD 4C 01 B8 20 03 CF C0 AA
CF10:01 F0 0F C0 02 F0 E6 C0 BC
CF18:03 F0 DF C0 04 F0 15 4C D7
CF20:E7 A7 4C AE A7 D0 08 A9 4C
CF28:01 8D 01 CF 4C AE A7 A9 DE
CF30:00 4C 29 CF 20 73 00 4C 20
CF38:8F CF 60 0D A9 47 A0 CF EB
CF40:8D 08 03 8C 09 03 60 20 07
CF48:73 00 A2 00 DD 00 CE F0 73
CF50:2C E8 E8 E8 EC 00 CF D0 C3
CF58:F3 20 79 00 4C E7 A7 8E 09
CF60:02 CF 20 73 00 20 6B CF 57
CF68:4C E7 A7 AE 02 CF E8 BD E6
CF70:00 CE E8 BC 00 CE 85 FE F1
CF78:84 FF 6C FE 00 AD 01 CF 60
CF80:F0 DD 20 73 00 F0 D8 DD 9E
CF88:00 CE F0 D3 4C 82 CF 20 63
CF90:D4 E1 20 A7 F4 4C AE A7 6F
CF98:20 03 CF 98 AE 00 CF 9D 3F
CFA0:00 CE EE 00 CF 20 FD AE 7B
CFA8:20 9E AD 20 F7 B7 A5 14 B5
CFB0:AE 00 CF 9D 00 CE EE 00 94
CFB8:CF A5 15 9D 01 CE EE 00 47
CFC0:CF 4C AE A7 20 D4 E1 A9 6D
CFC8:00 85 FD A9 CE 85 FE A9 58
CFD0:FD A2 E8 A0 CF 20 D8 FF EF
CFD8:4C AE A7 20 73 00 4C C4 3A
CFE0:CF 00 00 00 00 00 00 00 68
```

Cameron Kaiser is a senior at Lutheran High in San Diego. His interests include Pink Floyd, basketball, rock music, and his nine-year-old Commodore. He lives in La Mesa, California. ❐

The Automatic Proofreader helps you type in program listings for the 128 and 64 and prevents nearly every kind of typing mistake.

Type in Proofreader exactly as listed. Because the program can't check itself, be sure to enter each line carefully to avoid typographical errors or other mistakes. Don't omit any lines, even if they contain unusual commands. After you've finished, save a copy of the program before running it.

Next, type *RUN* and press Return. After the program displays the message *Proofreader Active,* you're ready to type in a BASIC program.

Every time you finish typing a line and press Return, Proofreader displays a two-letter checksum in the upper left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, the line probably was typed correctly. If not, check for your mistake and correct the line. Also, be sure not to skip any lines.

Proofreader ignores spaces not enclosed in quotation marks, so you can omit or add spaces between keywords and still see a matching checksum. Spaces inside quotes are almost always significant, so the program pays attention to them.

Proofreader does not accept keyword abbreviations (for example, ? instead of PRINT). If you use abbreviations, you can still check the line by listing it, moving the cursor back to the line, and pressing Return.

If you're using Proofreader on the 128, do not perform any GRAPHIC commands while Proofreader is active. When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing Proofreader to crash. The same thing happens if you run any program with a GRAPHIC command while Proofreader is in memory.

Though Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. To disable it, turn the computer off and then on. A gentler method is to SYS to the computer's built-in reset routine (65341 for the 128, 64738 for the 64).

AUTOMATIC PROOFREADER

```
0 CLR
10 VE=PEEK(772)+256*PEEK(773):
   LO=43:HI=44:PRINT"{CLR}
   {WHT}AUTOMATIC PROOFREADER
   {SPACE}FOR ";
20 IF VE=42364 THEN PRINT "64"
30 IF VE=17165 THEN LO=45:HI=4
   6:WAIT CLR:PRINT"128"
40 SA=(PEEK(LO)+256*PEEK(HI))+
   6:FOR J=SA TO SA+166:READ B
   :POKE J,B:CH=CH+B:NEXT
50 IF CH<>20570 THEN PRINT "*E
   RROR* CHECK TYPING IN DATA
   {SPACE}STATEMENTS":END
60 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
70 CH=CH+RF+LF+HF:POKE SA+LF,L
   B:POKE SA+HF,HB:NEXT
80 IF CH<>22054 THEN PRINT "*E
   RROR* RELOAD PROGRAM AND CH
   ECK FINAL LINE":END
90 IF VE=17165 THEN POKE SA+14
   ,22:POKE SA+18,23:POKESA+29
   ,224:POKESA+139,224
100 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773):PRINT"
    {CLR}PROOFREADER ACTIVE"
110 SYS SA:POKE HI,PEEK(HI)+1:
    POKE (PEEK(LO)+256*PEEK(HI
    ))-1,0:NEW
120 DATA120,169,73,141,4,3,169
    ,3,141,5,3,88,96,165,20,13
    3,167
130 DATA165,21,133,168,169,0,1
    41,0,255,162,31,181,199,15
    7,227
140 DATA3,202,16,248,169,19,32
    ,210,255,169,18,32,210,255
    ,160
150 DATA0,132,180,132,176,136,
    230,180,200,185,0,2,240,46
    ,201
160 DATA34,208,8,72,165,176,73
    ,255,133,176,104,72,201,32
    ,208
170 DATA7,165,176,208,3,104,20
    8,226,104,166,180,24,165,1
    67
180 DATA121,0,2,133,167,165,16
    8,105,0,133,168,202,208,23
    9,240
190 DATA202,165,167,69,168,72,
    41,15,168,185,211,3,32,210
    ,255
200 DATA104,74,74,74,74,168,18
    5,211,3,32,210,255,162,31,
    189
210 DATA227,3,149,199,202,16,2
    48,169,146,32,210,255,76,8
    6,137
220 DATA65,66,67,68,69,70,71,7
    2,74,75,77,80,81,82,83,88
230 DATA 13,2,7,167,31,32,151,
    116,117,151,128,129,167,13
    6,137
```

TANDY SENSATION!

Tired of computers whose names look like catalog order numbers? Ready for a machine that does more than merely boot up or run Windows? Need a little fanfare before you start punching numbers into your spreadsheet?

Probably not. Most likely, you're more concerned with getting a computer that runs quickly and efficiently at a good price—one that comes with plenty of software, a sharp monitor, and worthwhile extras like a mouse and advanced sound. Fortunately, the Tandy Sensation! offers all that along with its cutesy name, colorful graphical user interface, and flashy introductory screen.

The Sensation! is a multimedia PC, meaning it has a CD-ROM drive and meets the MPC hardware standards as defined by the MPC Marketing Council (see Test Lab in the December 1992 issue of COMPUTE). It also has a 107MB hard drive, a 3½-inch floppy drive, a 2400-bps modem (4800-bps for fax communications), a 486SX processor running at 25 MHz, a standard 101-key keyboard, a two-button Tandy mouse, stereo MPC sound, and a Super VGA monitor running in 1024 × 768 noninterlaced mode. Loaded with plenty of software, including CD-ROM programs, this system gives you enough to keep you busy until the next congressional elections.

Forget about sitting through any tedious installation programs. Despite its wealth of features, getting started with the Sensation! couldn't be simpler. All you do is take the unit out of its box; plug the monitor, keyboard, and mouse cables into the receptacles labeled for them; run the phone cord provided from the modem to the nearest jack; and plug in the PC and monitor. Turn on the power button at the front of the unit—it's clearly marked, and it's distinct and separate from the reset button—and within moments the Sensation! announces itself with a trumpetlike fanfare. Another few seconds, and you're in WinMate, Tandy's brightly colored, talking Windows companion.

Once past the Tandy Sensation!'s exclamatory name and heraldic introductory screen, you'll find a versatile multimedia PC.

From there you're only a few clicks of the mouse button away from hours of fun and/or productivity. WinMate takes you through your programs in much the same way that Windows does; it just enhances the icons, sets them against vivid backdrops, and organizes them under such logical headings as In Touch and In the Know. Need to type a memo? Try Windows' Write program, or the truncated version of Microsoft Word included with Microsoft Works. Planning a trip? Try Travel Planner, which organizes all your important vacation information into one logical file. Want to know who invented the cotton gin? Look it up in the Concise Columbia Encyclopedia.

There's plenty more software where that came from—including Bartlett's Quotations, The World Almanac, Phoenix MicroFAX, and startup programs for America Online, Prodigy, and The Sierra Network—accessible from the moment your Sensation! powers up. I installed and used a few programs of my own, including XyWrite and The Norton Antivirus, and they all worked fine, even when modifications were necessary to the Sensation!'s CONFIG.SYS or AUTOEXEC.BAT files. I tried nearly every preinstalled program at least once, and I never had a problem except the occasional prompts to put a missing CD in the CD-ROM drive. (It would be nice if the Sensation!'s WinMate icons indicated which CD to use for which program, but that's hardly a significant concern.)

Those CD prompts take little effort to fulfill. The CD-ROM drive sits in the upper right corner at the front of this compact PC (its footprint is 15 × 15.5 × 4.2 inches), to the right of the floppy drive and above the volume buttons and jacks for microphone and headphones. You open the CD-ROM drive by pushing it in a little, after which the CD tray slides out. Unlike some multimedia machines, the Sensation! requires no CD caddy. You simply place the CD in its slot and manually close the drawer, and the disc begins to spin. As a music fan, I enjoyed being able to listen to Thelonious Monk, Jesus Jones, and Charlie Rich CDs played in the background on the Sensation! while I did my work. Like the Sensation!'s keyboard and mouse, the CD drawer proved a little stiff and clunky, though not debilitatingly so. While not blindingly fast, both the CD-ROM and hard drives gave me the speed I'd expect from a 486 machine.

The logically organized user's guide provides clear, helpful information for novice and veteran alike. I'd like to be able to tell you the technical support for the Sensation! did as well, but I don't know. The computer ran so well that I never found an excuse to call the

company and find out. The biggest drawback I found with the Sensation! had nothing to do with technical support, anyway: I missed having a 5¼-inch floppy drive to load my old programs that came in that format. That's the price you pay, I suppose, for having a hard drive, 3½-inch floppy drive, and CD-ROM drive. The Sensation! also has a crisp, colorful monitor; a sturdy modem; and MIDI connector cables to facilitate the use of the computer's multimedia capabilities.

Looking for a computer that does a good job on a variety of tasks, comes loaded with software and CDs, and offers multimedia functions? Don't let the Sensation!'s flash fool you. Behind all the lights and sounds, you'll find an excellent machine that does a lot and does all of it well.

EDDIE HUFFMAN

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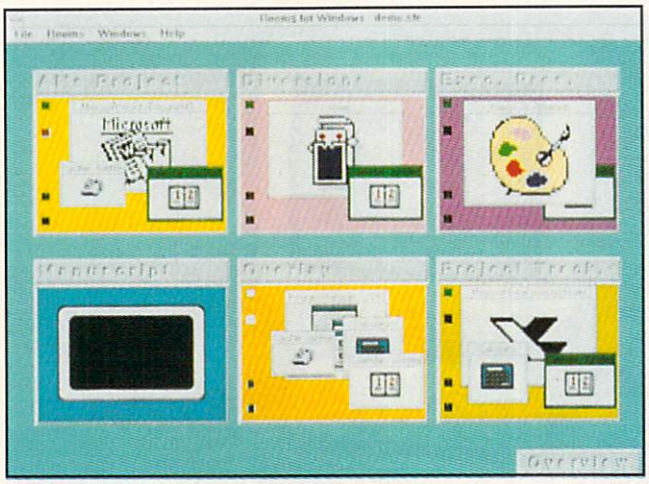
ROOMS FOR WINDOWS

Whether you're a Windows novice or power user, Rooms for Windows can make your computing life a lot easier. Rooms offers a convenient and simple way to multitask like a master and organize your applications and files—both Windows and DOS. The Rooms metaphor—with its concrete images of rooms, suites, and doors—makes the program fairly intuitive; learning is also enhanced by plenty of online help and a well-designed, slim manual.

With Rooms, instead of working in a window, you work with applications, files, and other objects in a room. (Each room is a separate Windows desktop, even though only one instance of Windows is actually running.) Several rooms occupy a suite, and doors enable you to enter and exit the rooms. From the Suite Overview, you can see at a glance all the rooms in your suite: They appear side by side as large squares.



Open a new door into Windows computing with Rooms for Windows, a simplified way to organize your applications and files.

Each room can contain a specific application, such as a database program and files, or all applications and files for a specific client or project. For instance, a Newsletter Room can hold a desktop publishing program, graphics application, and all newsletter files. But what if you want to draft newsletter stories in your DOS word processor? Simply create a full-screen DOS Room. The screen looks as if you exited to your word processor in DOS, except that when you finish your DOS document, you return to the DOS Room and can enter the door to your Newsletter Room.

Switching back and forth between projects and/or applications and files in Windows and DOS is as simple as double-clicking on a Door icon. And there you go: You're multitasking and well organized to boot. What's more, you can create different suites for different tasks or people. If you share the computer with someone, each can have his or her own suite of rooms.

A special room in a suite is the Overlay Room, because any application you put inside it automatically appears in all rooms. Having Program Manager in Overlay enables you to start up Windows applications from any room. With your word processor in Overlay, it's available in whatever room you need it. It's also handy to include Windows accessories such as Cardfile and Calendar in Overlay, so you can grab or jot down names and dates from any room.

You can also share a document between rooms by using the Include command; this is similar to placing a document in Overlay. A Copy command enables you to copy a file to another room, such as a contract, and make changes to it without changing the original. You can also drag an object out of one room and into another with Move.

Rooms runs as an application under Windows; when you start a Windows session, all rooms and suites you've created are automatically opened and ready for business. To conserve system resources, you create shortcut buttons in a room. Buttons may store a special Windows application or an exit to a full-screen DOS room, or they may execute a DOS command such as copying files for backup. The application or file isn't opened until you click on the button icon.

Overall, Rooms for Windows is a practical way to take the hassle out of getting the full benefits of the Windows environment.

BETH C. FISHKIND

IBM PC or compatible (80286 compatible, 80386SX/DX compatible recommended), 2MB RAM (4MB recommended), EGA or VGA, Windows 3.0 or 3.1; mouse recommended—$59

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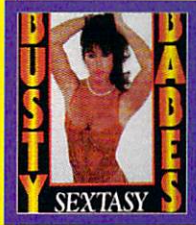
Aces of the Pacific....47
Air Force Commander 37
Ancient Art of War in Skies 37
A.T.A.C....37
A.T.P. Flight Commander....37
Aces of the Pacific....43
Ancient Art of War....31
B-17 Flying Fortress....42
Campaign....37
Carrier Strike 43
Carriers at War....34
Carriers War Constuction Set ..37
Command HQ Classic....22

SPORTS

4D Boxing....22
Bill Elliot's Nascar Challenge....32
Car & Driver....40
Front Page: Sports Football 43
Hardball 3 37
Hardball 3: Park Disk ....Call
Jack Nicklaus:Signature Ed. 43
Jack Nicklaus Tour Disk 1or 2 ...20
Jordan In Flight....39
John Madden Football 2....33
Links 386 PRO....42
Links: Mauna Kea Course Disk..20
Links: Course Disks 18
MicroLeague Baseball 4 42
NCAA:Road to Final Four 2 ....CALL
NFL Pro League Football 47
NFL....32
NFL Full Motion Video 47
PGA Tour Golf 32
World Circuit Racing....37
Tom Landry Football 32
World Tour Tennis....30
Wayne Gretzky Hockey 3....37

PRODUCTIVITY

AutoMap 57
AutoWorks....47
BodyWorks 47
Chemistry Works 43
Family Doctor....35
GameMaster....29
Giffs Galore 22
Golf Guide 45
Grammy Awards 49
Grolier's Encylcopedia 99
Guinness Disc of Records 39



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Beat the House....32
Black Crypt....33
Bridge 7.0....32
Buzz Aldrin's Race Into Space..43
Caesar....37
Car & Driver....40
Castles 2: Siege & Conquest 37
Challenge of the 5 Realms....42
Civilization....43
Cobra Mission 47
Creepers....32
Crisis in the Kremlin....37
Crusaders of the Dark Savant ...42
Out of this World 37
Paladin II 37
Populous 2....40
Powerhits: Battletech 32
Putt Putt Joins the Parade....33
Quest for Glory 3....43
Railroad Tycoon Classic 22
RoboSport for Windows....37
Rome....CALL
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Scrabble Deluxe....27
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ShadowLands 32
Shadow President 43
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Sharif on Bridge for Windows....32
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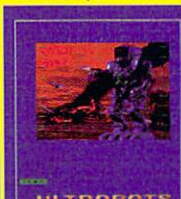
Dune 2....37
Eco Quest 2 32
Empire Deluxe....37
Eric the Unready 37
Eye of the Beholder III 43
Global Effect....33
Grand Slam Bridge 2 33
GODS 27
Guy Spy 32
Heaven and Earth 32
Home Alone 2....30
HongKong Mahjong Pro 33
Hoyles Book of Games 3 32
The Humans....27
Indiana Jones 4:Fate of Atlantis 40
Inspector Gadget 37
Island of Dr. Brain 32
King's Quest 5....37
King's Quest 6....47
Leather Goddesses Phobos 2 ...43
Legend of Kyrandia 37
Leisure Larry 5....37
Sim City Graphic:Ancient Cities..24
Sim City Graphic:Future Cities ...24
Sim Earth 41
Sim Earth for Windows....43
Solitaire for Windows....32
Space Ace 2: Borf's Revenge 37
Space Quest 5....37
Spaceward Ho!....37
Spear of Destiny 37
Speedball 2....27
Spellcasting 301....37
Spellcraft:Aspects of Valor....37
Star Control 2 37
Star Trek 25th Anniversary....37
Strike Commander....52
Strike Command Speech Pak ...22
Strip Poker 3....33
Stunt Island....37
Super Jeopardy 27
Super Space Invaders....27
Super Tetris....32
Terminator 2029....43
Tracon for Windows 47
Tracon 2:Air Traffic Controller ...43
Turtles:Arcade Game 32
Turtles:Manhattan Missions....32
Ultima 7: The Black Gate 52
Ultima 7's Forge of Virtue....22
Ultima 7: Serpent Isle....52
Ultima Underworld....52



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Lost Treasures of Infocom 2 37
The Lost Tribe....27
Magic Candle 3....40
Ultima Underworld 2....52
Ultima Trilogy 2....52
Ultrabots 39
Virtual Reality Studio 2.0 57
Veil of Darkness....39
Waxworks 37
Wheel of Fortune w/ Vanna 27
Where in Time is Carmen 32

Commanche: Maximum Overkill..47
Commanche: Mission Disk 1....28
F15 Strike Eagle 2 Classic 22
F15 Strike Eagle 3....47
Falcon 3.0 47
Great Naval Battles:1939-43 47
Global Conquest 37
Harpoon 30
Harpoon BattleSet # 2 or 3 21
Harpoon BattleSet # 4....25
Harpoon Challenger Pak....46
Harpoon Scenario Editor 28
Jump Jet 43
Line in the Sand....27
Lost Admiral 37
Patriot....47
Pirates Gold 43
P.T.O. ....CALL
Silent Service 2 Classic 22
Task Force 1942....43
V for Victory 47
X-Wing....45
Hockey League Simulator 2....37

EDUCATIONAL

Algeblaster Plus 32
Grammar Gremlins 32
Kid Pix....37
Kid Works 2....37
Mario Teaches Typing....32
Math Blaster Plus....32
Math Blaster Plus Windows....37
Oregon Trail Deluxe 37
Read & Roll VGA....32
Reader Rabbit 2....37
Reading Adventures in Oz....37
Reading & Me....32
Storybook Weaver 32
Spell It Plus Talking....32
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Guy Spy....39
Ham Call 49
Jets & Props 44
KGB/CIA Factbook....35
Legend of Kyrandia....49
Lion Share 34
Loom 34
Lost Treasures of Infocom 2..47
Lost Treasures of Infocom....47
Mantis Experimental Fighter ..49
Mayo Family Health Book 42
Mixed Up Mother Goose....30
Monster Disk (2 Disk Set) 49
Mother Earth....39
Omar Shariff On Bridge 46
Our Solar System 22
PowerPack Gold 34
Publishers Paradise....33
Publish-It 2.0 39
Readers Library....29
Refernece Library 34
Secret of Monkey Island....29
Secret Weapons of Luftwaffe.29
Shareware Overload 19
Shareware Studio....29
Sherlock Holmes Detective ..39
Sleeping Beauty 39
Software Jukebox....45
Space Shuttle Simulator 27
Star Trek 47
Super CD....32
Talking Classic Tales....39
Talking Schoolhouse....39
Too Many Typefaces 19
Toolworks Refernce Library....39
US Atlas with AutoMap....42
US/World Atlas 39
US History 34
U.S. Presidents....39
U.S.A. Wars: Civil War....39
Where in World Carmen 29
Windoware....19
Windowmaster....32
Windows 1993....34
Wing Commander 2 Deluxe ...52
Wing Commander/Ultima 6 ...39
World Atlas (MPC) 34

SOUNDCARDS

Ad Lib Gold 1000 179
Ad Lib Music Card 47
Pro Audio Spectrum 16 199
SoundBlaster....99
Sound Blaster Pro 169
Sound Blaster Pro Basic 139
Sound Blaster 16....249
UltraSound Card....139

JOYSTICKS

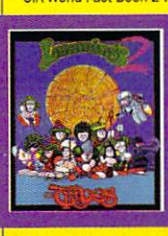
Analog Plus....25
BeeShu Colored Joystick....9
Flight Stick by CH Products 42
G-FORCE Yoke....49
Gravis PRO Joystick for PC 39
Gameport Auto CH Products....34
Gameport (MicroChannl) by CH .48
Flight Control 69
Weapons Control....89
Thrustmaster Game Card 35
FX 2000....27
Mach 1....19
Mach III by CH Products 33
Mouse Wheel....49
Mouse Yoke 34
PC Gamepad by Gravis....25
Quickshot Aviator 5 32
Quickshot Intruder 5....29
Virtual Pilot....69

CD-ROMS

7th Guest 64
Adventures of Willy Beamish .29
American Bus. Phonebook 39
American Heritage Dictionary.64
Animals in Motion 37
Animals (MPC) 34
Barney Bear Goes to School ..29
Barney Bear Goes to Space....29
Basics Electronic Cookbook ..49
Battle Chess (Enhanced)....29
BattleChess....47
Beauty & the Beast 39
Bible Library....34
Bibles and Religion....29
Britanica Family Choice 33
Business Master....29
CD Powerbox 32
ChessMaster 3000 (MPC)....32
CIA World Fact Book 2 24

ADULT CD ROM

Animation Fantasy 1, 2 *or* 3 ..69
Asian Ladies 44
Busty Babes 69
Erotic Encounters 44
Esctacy Hot Pix 69
Hot Pix 2, 3 or 4 44
Island Girls 39
Local Girls 39
Lovely Ladies 49
Moving Fantasies 44
My Private Collection 1 or 2...44



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Private Pictures I 69
Smutware 29
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Visual Fantasies....69
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Visual Fantasies....44

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ble Toshiba T6400, had only one slot, which I didn't want to devote to an interface card for a tape backup system.

Fortunately, several manufacturers make parallel-port tape backup drives, including Colorado Memory Systems, a company with a reputation for selling quality tape drives at affordable prices. I looked at the Jumbo Trakker 250. It should work with any PC that has a parallel port, including notebook, laptop, and desktop computers.

As you might expect, the parallel-port tape drives are somewhat slower than standard internal or external tape drives. A 33-MHz 80386 can back up 10MB in roughly three minutes with a Jumbo Trakker; it takes roughly two minutes with a standard tape drive. The slower speed isn't a problem in most cases, as you can get the system going and come back to it when it's finished. If your computer has a bidirectional parallel port, you can pick up some extra speed. (I wasn't able to get this setting to work with the T6400; Colorado Memory Systems is currently working on a fix). And if you have an EPP (Enhanced Parallel Port) on your system, the Trakker can actually move data as fast as a standard tape drive.

The Jumbo Trakker comes in two models: the 120 (a 120MB system for $448) and the 250 (a 250MB system for $548). These capacities are based on data compression, so you may get more or less than this amount on a single tape.

If you have additional data to back up, the software will prompt you to insert additional tapes. Both models use standard DC-2000 minicartridges and QIC formatting and provide a parallel-port pass-through for your printer.

The DOS-based software is easy to use and well documented. The Windows software wasn't ready in time for this review, but it should allow you to run other programs while you're performing a backup.

Overall, I like the Trakker 250 very much. If you have a notebook or laptop, it's your best solution for backing up a medium to large drive.

And if you have more than one PC and don't mind the slower speed, you can use the Trakker on all your PC-compatible systems by installing the software on each and moving the drive from machine to machine.

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Colorado Memory Systems Jumbo Trakker 250: slower than a conventional tape backup, great for notebooks and laptops.

MIGHT AND MAGIC: CLOUDS OF XEEN

Bigger, brighter, and bolder than ever, New World Computing's latest flight of fantasy is so charismatic that it nearly jumps off the screen. From the opening credits—with a clever parody of MGM's Leo the Lion—to the rogues' gallery at game's end, designer Jon Van Caneghem displays the confidence of an artist at the top of his form.

Caneghem utilizes the same dynamic front-end of his previous hit, Might and Magic III. Might and Magic: Clouds of Xeen may well be the perfect role-playing interface: detailed, yet streamlined, and colorfully intuitive. The main display window is among the largest in the genre, pulling players into this 3-D fantasy world. Even the ornate window frame is interactive, featuring unique animated signs of nearby danger, secret passages, and active spells. Character portraits also provide visual clues to your party's health: Facial expressions change to show conditions such as pain, unconsciousness, fatigue, and insanity. Select any portrait to display the icon-driven character screen, where you can view individual attributes, track party statistics, and manage inventories. Every aspect of the game is easily accessed via keyboard or mouse.

Beyond these familiar trappings, the game's story line takes the series in an entirely new direction. Your party of six adventurers gathers in the town of Vertigo, summoned through their dreams by Crodo, adviser to King Burlock. He warns of a stranger who has appeared, claiming to be the King's long-lost brother. The impostor is in fact Lord Xeen, a demonic fiend who imprisons Crodo and poisons the land from his elusive cloud kingdom. Your quest: Search the vast nether world, battle hordes of terrible creatures, and put an end to Xeen's rule.

The game world is huge: five towns, nine mines, three towers, three cloud worlds, four castles, five dungeons, three caverns, and 24 unique outdoor areas. The game's open-ended design encourages spontaneous exploration, allowing you to branch off on dozens of miniquests. Although most have nothing directly to do with your main objective, these subplots earn characters experience and rewards while adding flavor and variety. The game also contains built-in links to the Darkside of Xeen, a forthcoming sequel.

Other new features include two initial play modes: Adventurer and Warrior. The first, designed for novice players, softens the combat aspects of play.

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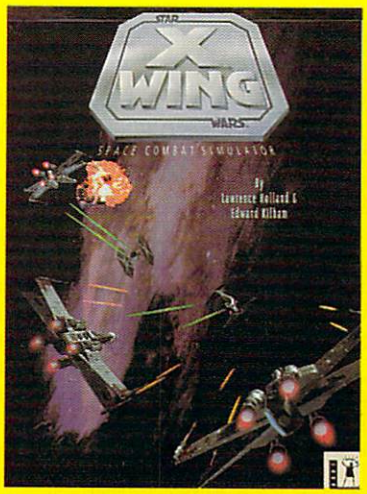

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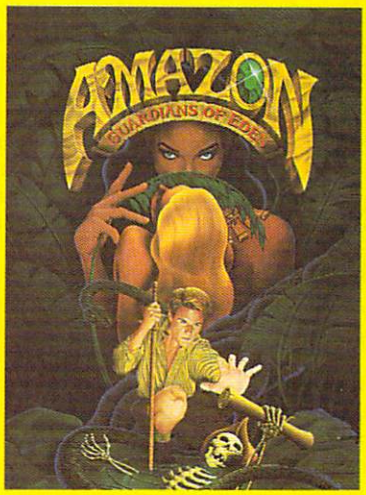

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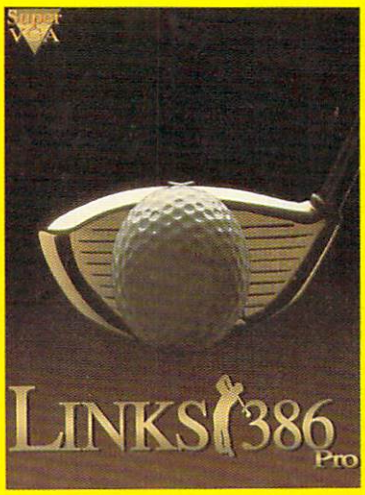

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The second unleashes full-tilt carnage from the game's roster of 90 ghastly creatures. These oversized characters, beautifully rendered in 256-color VGA, spring to life with vivid animation and chilling sound effects. Fend them off with specially modified weapons and armor, or master each of the 76 unique cleric and sorcerer spells. Veteran players will be especially pleased with the new adventurer's journal, which automatically records important clues, locations, and quest items.

The only shortcoming worth mentioning is the rather rudimentary nature of your quest. Role players itching to solve complex puzzles might be disappointed by the combat-intensive plot. On the other hand, hardcore hack-'n'-slashers will revel in melees that grow more intense with every turn.

Nearly perfect in design and execution, Might and Magic: Clouds of Xeen is one fantasy you'll wish would never end.

SCOTT A. MAY

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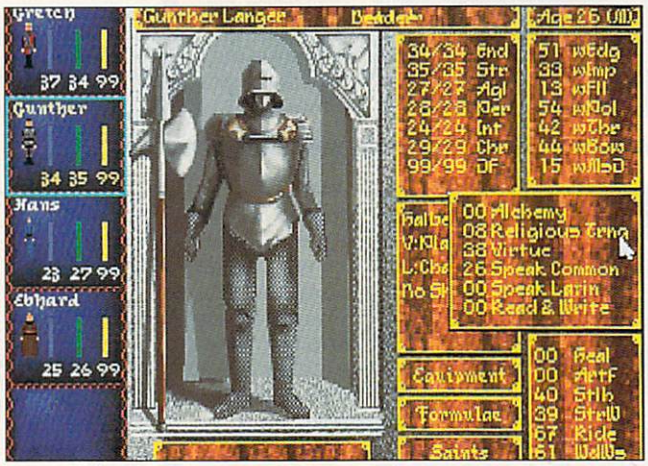
DARKLANDS

The setting is medieval Germany in the 1400s, where witches, alchemists, religious fanatics, dragons, demons, myths, and superstitions fill the popular consciousness. Darklands, a new adventure game from MicroProse, takes you there.

In Darklands, magic, or alchemy, is based on the mixing of 19 potions of three distinct quality levels from 19 special substances and four bases. They're mixed in glass flasks which are thrown at, applied to, or imbibed by the intended target.

Clerics call to 140 saints for individualized intervention in worldly events. These saints not only have a personality but they also have a sense of humor, which makes selecting different saints in various situations an entertaining game within itself.



Suit up for a trip to medieval Germany in Darklands, a role-playing adventure game packed with interesting details.

Parties can be created via a selection of heritage, training, and professions, which will mold the six attributes and 19 skills into a group of four adventurers. A fifth member can join the group for specific quests, or you can choose a predetermined party. Characters appear in paper-doll fashion on the comprehensive character information screen, which shows the item inventory (holding up to 45 items), known saints, and known alchemic formulas.

An overhead oblique display of realtime combat shows the invoking of saints, use of alchemic formulas, and ranged melee weapons, which become effective automatically when you select various actions. Combat can be with city street thugs and roving bandits, and can occur in robber knights' castles, Templar monasteries, witches' Sabbaths, dragons' lairs, and dwarven mines. I'd advise directing the play in realtime rather than allowing the rather limited and flawed artificial intelligence routing to direct the action. But for easy battles, autocombat will do.

Attention to detail is exemplary in Darklands. It's filled with appealing details, such as the relative destructive power of brass versus iron handguns, which were engineered and used in the fifteenth century. All details are as they were—or as they would've been, had the myths and stories been true.

The interiors of mines, monasteries, and the final citadel are all in the same overhead oblique display. Currently, games cannot be saved from these interiors, making gameplay more of a marathon realtime arcade game than most role players are used to. MicroProse has plans to eliminate the problem. The interior maps can be scrolled, allowing the map to serve as its own automapping routine.

Movement through the cities is achieved by making selections from lists of choices that are overlaid by watercolor background representations of the events at each area. These drawings evoke the original Samurai game engine on which Darklands has been hung. You get many such choices throughout the game, and the decisions made from these choices determine not only where the character goes and his or her success or failure, but also the plot's texture, flavor, and nuances.

The real beauty of the Darklands epic is the multitude of choices you get, which surpass the complexity and historical accuracy seen in any other contemporary computer game. The true role-playing enthusiast will be dazzled by the game's sheer volume of choices and historically accurate situations. Even after you've explored the central plot and many subplots, you can continue the quest indefinitely.

In spite of the initial trouble with bugs, this newly revised game should give you hours of pleasure. MicroProse should be congratulated for a truly heroic effort in creating a game for sword, sorcery, and history buffs.

ALFRED C. GIOVETTI

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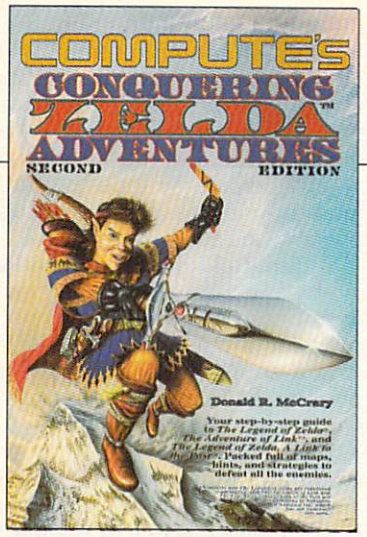

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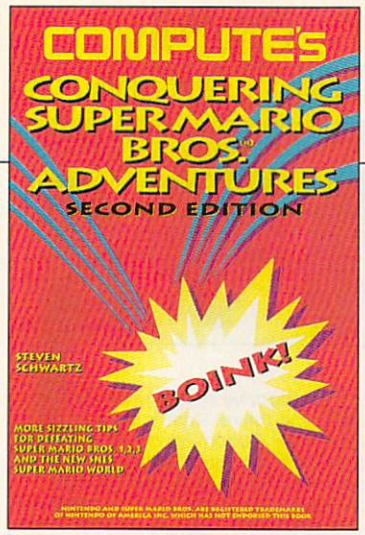

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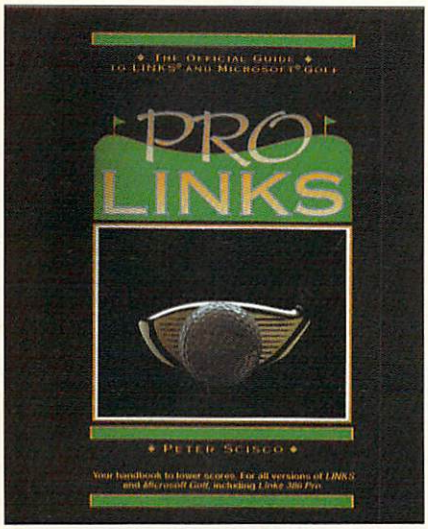

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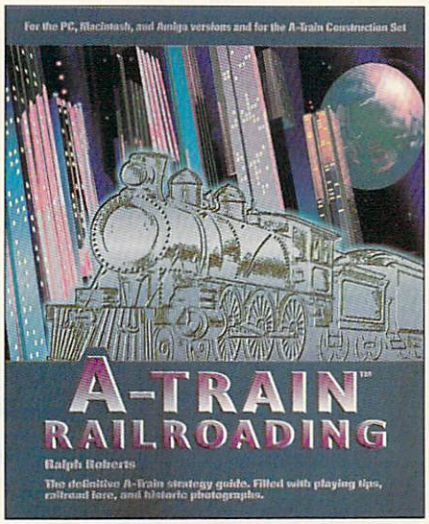

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ZOLTRIX ENHANCED 96/24, ZOLTRIX STANDARD 96/24, ZOLTRIX INTEGRA

As much as I'd like to have a fax machine, the cost is too great for two or three transmissions a week. But I use a modem every day, and its cost is easy to justify. Zoltrix has addressed this problem head-on with three low-cost internal fax/modem cards. Each of them functions just like a modem and adds full fax capabilities—all for about twice the price of a standard internal modem.

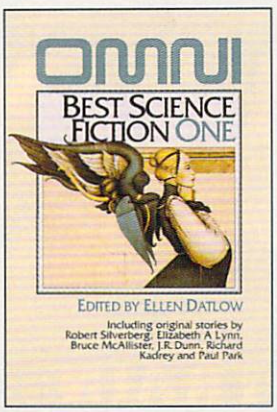
They're not at the leading edge of fax/modem technology. The manual isn't 500 pages boasting thousands of features. In other words, they're just at my level.

I don't want features I'll never use or a manual that takes a Ph.D. to read. I want a simple, straightforward device that does what I need. Anyone who can read will have no trouble installing and configuring the cards and getting the software up and running.

All three communicate at 300, 1200, or 2400 bps. All my terminal programs worked perfectly, and the America Online software—notoriously picky about modems—worked fine. I've used plenty of dedicated modems that had more trouble coexisting with a variety of communications programs.

BitCom Deluxe software comes with all three. It's a basic telecommunications package for modem mode without a lot of bells and whistles. There isn't a script or macro language as powerful as Telix's or Procomm's, and file transfers are limited to ASCII, XMODEM, YMODEM, CompuServe B Plus, and Kermit protocols. If you're new to modems, online services, and BBSs, though, it's an adequate start. One nice feature is software-generated MNP 5 compression. Since the modems aren't equipped with MNP 5 compression in hardware, this is the next-best thing. Theoretically, MNP 5 can speed up transfers as much as 200 percent.

In fax mode the boards perform well. The Standard and Enhanced models send and receive at 9600 bps, while the Integra sends at 9600 bps and receives at 4800 bps. All of them have the ability to drop their transmission speeds to 7200 or 4800 bps if the



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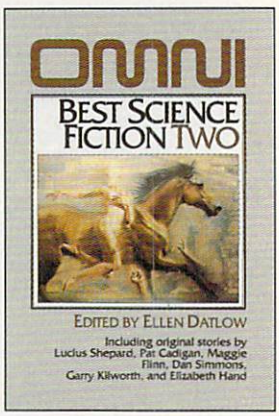

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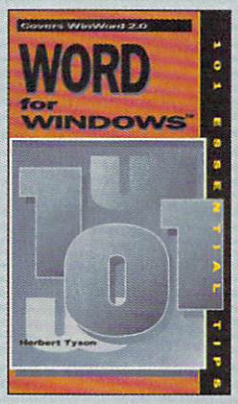

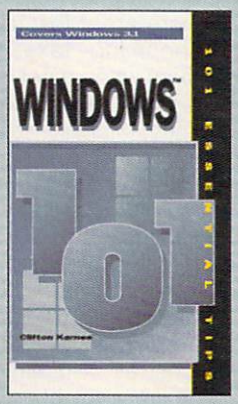

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receiver is at a lower speed or if adverse transmission conditions such as line noise make a slower speed advisable. Don't worry if all of this sounds technical. It's handled automatically by the hardware and software; I was never aware of the communication speed when sending and receiving.

Most of my testing was done between two computers at home. That provided a great advantage for reviewing these units. I saw the results of transmissions immediately and was able to draw accurate conclusions quickly. Both systems are IBM compatibles, but they're configured differently. One is a 286 with Stacker managing the hard drive. The other is a 486 with plenty of extended memory. There wasn't the faintest hint of hardware or software conflicts on either machine, even when I ran the background send and receive modules. I'd feel comfortable saying that you'll probably have the same results. Of course, there will be exceptions to this, but those will probably be rare.

All three fax/modem cards come with BitFax/SR software. It's easy to use, and it has everything I need. I was disappointed not to get an installation program to make the setup easier. But the manual is clear and easy to follow, so I didn't have any problems.

The Enhanced model has built-in error correction protocols. The best of these is the V.42/MNP auto reliable mode. It senses whether the other machine has the equivalent error-correcting protocol and responds accordingly. This is one of the most sophisticated error-correcting operating modes available today. My phone lines are relatively free of noise, so I couldn't tell the difference between models. If you're worried about line noise, though, this feature might be important for you.

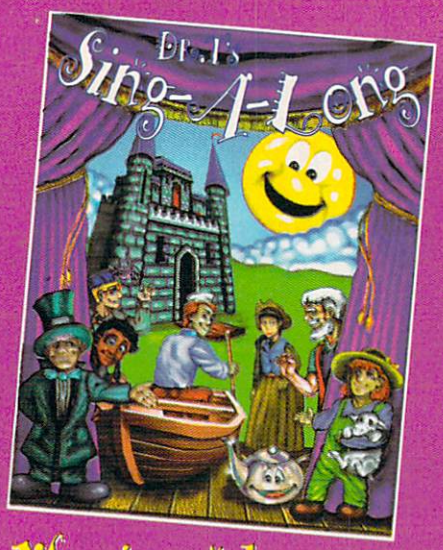
Sending faxes with BitFax is easy. It loads any file in MultiMate, WordPerfect, Microsoft Word, or WordStar format. If you have any other word processor, you have to save a document as an ASCII file before sending. Then you design a cover sheet, enter information about the destination fax machine (the phone number, for instance), and press a function key.

From there it's all automatic. The transmission is initiated and managed entirely by the software and hardware. Different cover sheets can be saved to disk and loaded anytime before sending a fax. Or you can send a document without a cover sheet. And a database of destinations can be retained on disk for easy retrieval.

I found the built-in text editor useful for sending faxes. Most of the time, I send faxes with a one- or two-page message. Using my word processor requires two steps: creating the document and saving to disk, then running BitFax and sending the document. With the built-in editor, you can type your document and send it from within the same program shell.

It's just as easy to send PCX, TIF, IMG, BFX, or DFX graphics files. The software loads them and sends the graphics image automatically. And there's a conversion utility that changes received faxes which are usually in TIF format to other graphics formats. That way, you can use faxes in other programs, possibly importing them into a desktop publishing application as part of a presentation.

BitFax has a module you can install as a memory-resident program that automatically sends and receives faxes in the background. Background sending can be done automatically at a preset time, freeing up your computer from having to dedicate itself to fax transmissions. I found that sending and receiving would occasionally cause my systems to slow down. I suppose you'd have to weigh that against the benefits of running the back-



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REVIEWS

ground module. I prefer sending and receiving faxes from the main BitFax menu without loading the memory-resident module.

There are a lot of features I don't have space to describe in detail, but here are a few that deserve mention. Incoming faxes can automatically print when received. You can view faxes on the screen instead of printing them. Multiple files can be sent in a single transmission, saving you separate initial connect charges. Form letters can be customized with a mail-merge feature.

After spending time with these fax/modem boards, I'd have a hard time justifying a dedicated fax machine for myself. It's not so much a question of cost as of usefulness. These internal fax/modem boards do so much more than a stand-alone fax machine that I'd choose them anytime over a regular fax machine for personal use. The folks at Zoltrix have arrived at what appears to be the best solution to having a complete communications system at a reasonable cost. Now I can happily give out my fax number, which happens to be the number to my home office, too.

(Editor's note: After this review was written, Zoltrix announced that the Integra was being discontinued.)

RICHARD C. LEINECKER

Zoltrix Enhanced 96/24—$149
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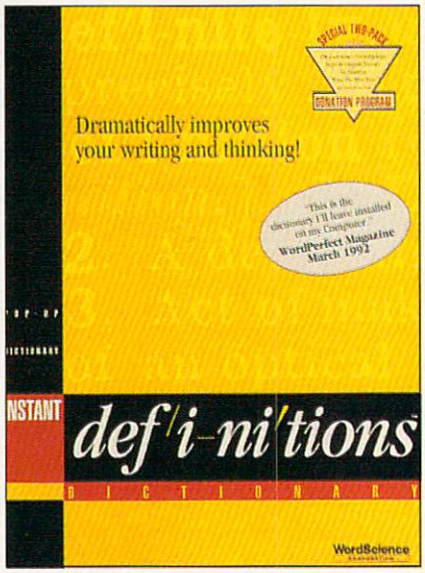
ELECTRONIC DICTIONARIES

The two things to look for in an electronic dictionary are speed and thoroughness; if there's a serious deficiency in either department, you may as well stick with the old-style, static-display, manually accessed codex (that is, book). WordScience's Instant Definitions Dictionary and Reference Software's Random House Webster's Electronic Dictionary and Thesaurus (College Edition) come up to scratch in both respects. Both are well-executed TSR dictionaries that can be quickly summoned via hot keys either from DOS or from within a word processor, and both are generous in supplying definitions—but each is superior to the other in one of these two departments.

Instant Definitions is based on *Houghton Mifflin's American Heritage Dictionary* (Office Edition) and boasts "more than 116,000 words, word forms, and phrases." The word *instant* is not misapplied. Once invoked, Instant Definitions looks up the word at your cursor or allows you to enter a word manually. If the word matches



Instant Definitions is quicker than Random House Webster's, but less thorough.

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Instant Definitions' DictionaryScan feature also allows you to look up entries via key words in the definitions. Can't think of the name of the biped meat-eating dinosaur of the Cretaceous period? Enter *carnivorous* and *dinosaur* into DictionaryScan, and *tyrannosaur* will pop up. DictionaryScan can speed things along by letting you limit the range of the search to those letters of the alphabet that you think the word is most likely to occur in. Instant Definitions can be used in conjunction with the thesaurus or spelling checker in most word processors to make sure you're choosing exactly the word you want.

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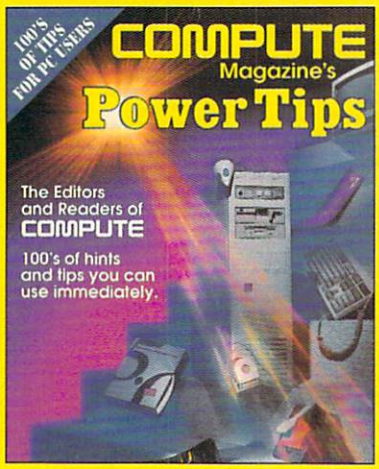

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REVIEWS

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Like Instant Definitions, RHW has a definitions search mode that can scan the dictionary for key terms in the definitions and conjure up the words you want. Unlike Instant Definitions, however, the alphabetic search range cannot be limited, so this may mean settling down to a several-minute wait, even with the fastest PCs. RHW also provides a Wildcard search mode, for times when you're uncertain of the spelling, and an Anagram search mode, presumably for Scrabble players. As an extra, RHW includes its own thesaurus with 275,000 entries, providing not just synonyms and antonyms but also contextual usage samples that help you to fine-tune your word choice.

Which is better? Well, Instant Definitions is faster and more concise, just the sort of quick-reference electronic dictionary you need if you want to look up a definition right now and get back to work with no fuss. RHW, though a bit slower, is unquestionably the more thorough of the two—a logophile's electronic reference tool. Decide whether your style is to grab and run or relax and browse, and buy accordingly.

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TOM LANDRY STRATEGY FOOTBALL

The ongoing fight for top gridiron simulation has left many participants battered and bruised. So far, the only clear winners are the fans, basking in the rumble of tough competition. The latest contender to take the field, Merit Software's Tom Landry Strategy Football, should be greeted with a warm cheer.

One of football's true innovators, Landry coached the Dallas Cowboys to 20 consecutive winning seasons, including 13 division championships, five NFC titles, and two Super Bowl victories. True to its namesake, the game adopts a low-key, conservative approach to this often volatile sport. Players don't directly control the on-field action but guide the team through myriad coaching duties. Exhibition and season games can be enjoyed by one or two players or as straight simulation with two computer-controlled teams. Head-to-head match-ups are by far the most rewarding, executed via null or remote modem link, with chat window. This exciting option makes it possible to form player leagues across town or across the country. Unfortunately, season play is for statistical purposes only—there are no built-in playoffs or league championships.

The game offers 28 professional teams—loosely based on their real-life counterparts—divided into two leagues but no divisions. Detailed scouting reports offer coaches a glimpse into their rivals' offensive and defensive ratings, from individual player stats to overall team performance: run/pass blocking, tackles, penalties, and turnovers. Reports can be saved to disk or printed, and they're automatically updated throughout season play. The only thing missing is the ability to trade players or manually adjust player attributes.

Landry's playbook boasts 2500 possible offensive combinations and hundreds of defensive plays. Most calls on either side of the line are standard issue, although a few surprises await. For example, offensive coaches can designate a "hot" secondary receiver—useful if the primary receiver is covered or for quickly dumping the ball during

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a blitz. The ability to put a man in motion also helps to confuse your attackers. Otherwise, as mentioned earlier, Landry's playbook is fairly conservative. Fans of razzle-dazzle football will be disappointed.

Defensive highlights include three types of line shifts and linebacker blitzes. Run and pass coverage is quite generic, limited to straight man-to-man and two types of deep zone coverage. Strong points include the ability to specify double coverage on different primary receivers and to key linebackers on a specific running back or simply to follow the offensive flow.

The game's point-and-click mouse interface makes it easy for anyone to assemble a cohesive play. Would-be coaches will be disappointed to find no playbook designer. Instead, the program offers a scenario builder, which allows you to specify the details of a hypothetical match-up and then play the game.

Optional 256-color VGA graphics depict the outcome of your coaching expertise. The images are well drawn but superfluous to the game. Limited animation and poor color separation make the action difficult to follow. The graphics also slow the game considerably, requiring extensive hard drive access before each play. Peripheral high points include digitized referee calls and VCR-style instant replay. Context-sensitive on-screen help is available throughout the program.

The game's main weakness is common to all statistical sport designs: internal number crunching versus real-time player interaction. When the results of your efforts are simply variables weighed against mathematical percentages, the game loses spontaneity and emotional appeal. Winning or losing becomes less a matter of inspiration and personal effort than the roll of invisible dice.

Although the program functions flawlessly, it's far too dry and distant. Designer Kerry Batts deliberately limits his audience, while most of his current competitors offer both statistical and hands-on play. Saved from obscurity by its excellent multiplayer modem option, Tom Landry Strategy Football will satisfy stat hounds but leave others wanting more.

SCOTT A. MAY

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JOHN MADDEN FOOTBALL II

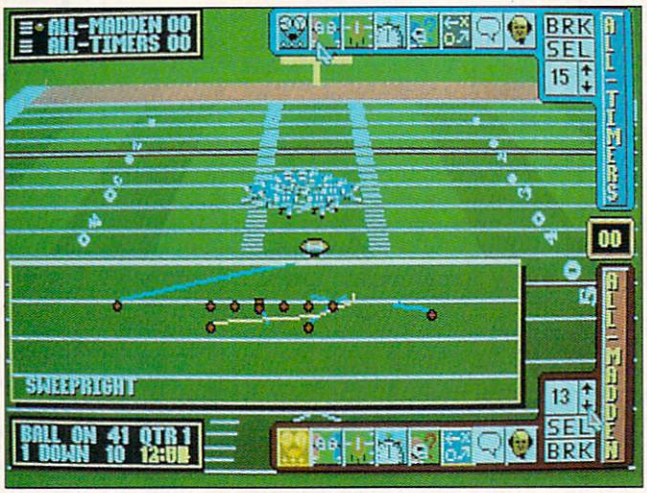
If you're a computer football fan, you've been spoiled lately. Whether you prefer arcade-style or strategic football, software shelves host several excellent games from which to choose.

That choice just became a little tougher, though, with the release of Electronic Arts' John Madden Football II.

John Madden Football II, like most other games of its type, offers several play modes. From the main screen, you can choose to play a quick game, play a standard game, resume a previously saved game, or practice plays. If you choose to play a game—either quick or standard—the game setup screen appears. Here, you can change the weather, the length of a quarter, and the game playing speed, as well as toggle such options as fatigue, injuries, penalties, and the 45-second clock.

In a quick game, after the game setup screen, you needn't bother with choosing teams and playbooks, or even setting up game-save directories. Rather, you jump right onto the field, ready to test your moves against those of your opponent. Quick games play much like standard games, but with limited playbooks and some options, like game saves, unavailable.

The standard game, on the other hand, is your passport to the full simulation. After the game setup screen, you choose the visiting and home teams. Then, you select the teams' playbooks, set the teams' playing abilities, choose home-field conditions (the conditions under which the team is used to playing), and set the coaching style (which controls the balance of running plays and passing plays). Then it's onto the field, where, unlike in the quick game, you have full access to the plays in the chosen playbooks. (If you find the number of available plays overwhelming, John Madden is happy to narrow things down to a few good choices. All you have to do is ask.)



What are those blocky cartoon characters doing? John Madden Football II offers excellent simulation but inadequate graphics.

When the game begins, you select your play, and then the teams line up on the scrimmage line to battle it out. If you like, when the action begins, you can control the player with the ball, directing his run or guiding the pass. However, the arcade elements of the game are limited to a few simple moves. Where John Madden Football II shines is on the strategic side of the sport. You'll probably find yourself just picking the plays and watching the teams run them.

And speaking of the plays, John Madden Football II offers extensive opportunities for the computer coach with his eye on victory. The game includes two defensive playbooks and one offensive playbook, each of which offers more than 80 ready-to-run plays. And if you can't find the plays you need in the supplied playbooks, you can always create your own playbook with the program's Chalkboard. Here, you select various starting formations, and, using chalkboard-like tools, modify them by moving players, assigning tasks and routes, changing the types of players, and more.

Unfortunately, while John Madden Football II offers a fairly complete strategic football simulation, the graphics are less than state-of-the-art. The players are blocky figures that scurry about the field like characters in a cut-rate Saturday morning cartoon. Because of this lack of graphical detail, plays are often hard to follow.

Still, if you're fascinated by this rough-and-tumble sport's strategic side, John Madden Football II comes through. Besides having the power provided by the large playbooks, you can compare players head to head, view team rosters and statistics screens, test individual plays, construct your own playbooks, and analyze plays with the VCR-like replay feature.

The game's mediocre graphics keep it from tackling all the competition, but it's still a worthy contender for your software dollars.

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HONG KONG MAHJONG PRO

Mahjong, a Chinese gambling game that's more than 3000 years old, is played in China, Japan, and Taiwan with a passion that rivals the playing of poker in Atlantic City and Las Vegas. The game mah-jongg, which was popular in America early in this century, uses rules modified for Western play. Every geographical area to which mahjong has spread uses its own variation of the ancient rules of the game. Hong Kong Mahjong Pro uses the Hong Kong rules for the game, believed to be very similar to those used by the ancient Chinese mahjong players.

Mahjong derives its name from the design of one sparrow, the spirit of mahjong, sitting on one bamboo stick on one of the tiles used in the game. The 144

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tiles are divided into six suits: the characters, the bamboo sticks, the balls (circles or dots), the winds, the dragons, and the flowers. From a wall of tiles that surrounds the playing board, a hand is dealt to each player.

You must choose 3 computer opponents from the screen, which shows 12 increasingly more challenging opponents and their distinctive playing styles. Gameplay is augmented by smoothly animated, high-resolution, black-and-white digitized picture; the opponents' digitized speech; and high-resolution, 256-color, Super VGA still picture. The music, reminiscent of Wing Commander's, can be turned on and off; it generally complements the play. Play proceeds clockwise, as each player picks a tile from the wall, according to the throw of the dice, and discards a tile until a winning hand is made. The complex rules and nuances of mahjong include discard priorities, unique winning hands, and 14 scoring rules, but the excellent interactive tutorial that comes with the game and the instructive help system will get almost anyone playing the game and winning against the easiest opponents in several hours.

This computer version of mahjong is very unforgiving; it lacks a utility to take back a move that may have resulted from a careless slip of the finger. The documentation is flawed concerning the selection of alternative chows, or straights. When presented with one alternative of several chows, you can select No, and the computer will immediately select another alternative chow. The game is for solo play and does not support modem or multiple human players. Once the little inconveniences of gameplay are understood, the game will move along more smoothly.

Hong Kong Mahjong Pro will make it very easy for a beginner to learn this complex game without embarrassment. Mahjong players in search of opponents will find this game a godsend. Some may benefit from understanding the passion that drives many to continue playing this old-time favorite.

ALFRED C. GIOVETTI

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STAR NX-1040 RAINBOW

Anyone looking for a printer these days is sure to be confused by the literally hundreds of printers available. While IBM and Epson set the compatibility standards, several companies offer high-quality printers at reasonable prices.

Star Micronics jumps to the front with the new 9-pin NX-1040 Rainbow printer. This lightweight, Epson- and IBM-compatible printer not only produces high-quality monochrome output but also prints in seven colors in eight near letter quality fonts with up to eight enhancement modes. That's three colors more than the nearest competitor—and with a lower price tag. The NX-1040 is no faster than the average 9-pin printer, though, so don't buy it expecting 24-pin speed.

Most low-end color printers require installation of an optional color kit. The NX-1040 comes ready to print in color with the installation of the color ribbon. The ribbon cartridge doesn't need to be exchanged for another ribbon to switch from monochrome to color printing.

As with the high-end 24-pin Star printers, the NX-1040 includes the Electronic DIP Switch (EDS) mode, which changes the power-on settings without your having to manually change DIP switches. You can control up to 15 power-on defaults from the front touch panel, such as font, pitch, paper park, paper feed, panel macros, and buffer clear. Another handy feature included with the NX-1040 is quiet mode, which can also be controlled from the front panel.

Thanks to the easy-to-understand instruction manual, it took only about five minutes to set up the printer. The manual includes a command summary with page numbers in the back and a separate quick-reference guide to the operations of the control panel.

A variety of paper-handling features add to the printer's ease of use. Multipaper paths, the short tear-off function, automatic paper loading, top-of-form set, and the adjustable sheet-feed paper guide offer features that usually come with more expensive 24-pin printers. Paper parking offers the user the option of printing single sheets without removing the fanfold tractor-feed paper.

I was impressed with the color output of the NX-1040. Frankly, I didn't expect high-quality output from a 9-pin printer, but I was pleasantly surprised by the results.

Even if most of your home printing doesn't require color output, you should take a look at the NX-1040. With the low cost, ease of use, and quality color and monochrome output of this lightweight 9-pin printer, you can't lose. Even though it's limited to 9-pin speed, the NX-1040 has created a niche for itself outside the realm of overpriced and overrated printers.

JOYCE SIDES

Star NX-1040 Rainbow—$269

STAR MICRONICS AMERICA
420 Lexington Ave., Ste. 2702
New York, NY 10170
(800) 447-4700

Circle Reader Service Number 445

STAR NX-2430 MULTI-FONT

What's so different about the Star NX-2430 Multi-Font? It's just another 24-pin dot-matrix printer, right? That's what I thought when I began reviewing the unit.

Star Micronics pushes dot-matrix printer technology a step closer to that of laser printers by offering eight optional font cartridges ($39 each) that provide more than 21 extra fonts, as well as 13 bitmapped scalable fonts on disk for use with Windows 3.0 application software (an upgrade for use with Windows 3.1 is available from the company at no charge). The fonts also work with DOS-based applications such as Harvard Graphics 3.0, Lotus 1-2-3 3.1, and First Publisher 3.0. Even without the optional cartridges, there are two draft and nine letter-quality resident fonts.

For an extra $49, you can add a 32K buffer with a battery backup. If you intend to use the bitmapped fonts or

Advertisers Index

Reader Service Number/Advertiser	Page
162 8-Bit	G-21
299 Access Software	36,37
AICS	63
268 Amish Outlaw Shareware Co.	125
244 Antigrav Toolkit	G-17
170 AT&T/Paradyne	11
298 Bare Bones Software	A-29
151 Bear Technologies	A-29
152 Bear Technologies	G-17
Best Personalized Books	121
288 BIX	23
293 Blue Jay Software	70
173 Blue Valley Software	122
218 Body Cello	124
304 Cal Ad Software	124
181 Caloke Industries	G-11
149 Chips & Bits	101
294 CIE	25
166 Citizen American Corp	19
269 Commodore	13
235 Commodore	29
128 ComPro Software Systems	121
150 Compsult	122
108 CompuServe	17
Computer Business Services	121
254 Computer Friends	122
270 Computer Liquidators	122
284 Computer Technologies	G-17
125 Creative Labs	3
113 Creative Pixels	G-11
226 Crosley Software	125
161 Delphi	27
131 DemoSource	120
238 DevWare Video	125
253 Disks O'Plenty	G-17
208 Disk-Count Software	115
275 Dr. T's Music Software	106
175 D&K Enterprises	120
281 Electronic Arts	32,33
296 Electronic Arts	51
302 Evergreen Technologies	120
FGM Connection	G-23
285 Finetastic Computers	A-13
115 Free Spirit Software	107
303 Friendly Software	120
Gateway 2000	IFC,1
215 Genesis Electronic Services	A-27
145 Grapevine Group, The	G-13
Grapevine Group, The	A-27
295 Grolier Electronic Publishing	5
Hope Career Center	121
234 Horse Feathers	G-9

Reader Service Number/Advertiser	Page
300 ID Software	87
271 Interplay	69
272 Interplay	91
231 Jackson Marking Products Co. Inc	124
JP PBM Products by Mail	G-11
282 Lawrence Research Group	109
117 Legacy Software	125
255 Logitech	56,57
260 Mad Man Software	G-21
280 Mallard Software	55
305 Mallard Software	41
289 MicroStorm Software	G-17
246 Mission Control	99
249 MSI/Micro Systems International	A-3
307 Multiwave Innovations	43
191 Needham's Electronics	123
141 Odyssey OnLine	122
Oldsmobile	35
192 Origin	32
OSCS Software Development Inc.	119
164 Parsons Technology	21
106 Parth Galen	A-29
273 Passport Designs	15
250 PC Enterprises	124
Pendragon Software Library	124
107 Penthouse Modem	123
103 Penthouse OnLine	109
153 Performance Peripherals	G-23
169 Pixel Perfect	68
185 Poor Person Software	A-27
PowerDisk	G-11
277 Professional Cassette	117
256 Profit Group, The	118
165 Psygnosis	53
Pure Entertainment	116
257 Ramco	A-29
212 SafeSoft Systems Inc.	124
112 School of Computer Training	125
116 SeXXy	122
306 Sierra On-Line	71
148 Sierra On-Line	BC
109 Smart Luck Software	122
121 SMC Software Publishers	124
182 SoftLogic Solutions	47
126 SoftShoppe Inc.	124
Software Hut	A-9
Software Hut	G-7
210 Software Support International	125
190 Software Support International	G-5
297 Software Suppport International	A-29
SOGWAP Software	A-13
SOGWAP Software	G-9

Reader Service Number/Advertiser	Page
184 SONY	6,7
252 Sparks Electronics	G-17
286 Spectrum Holobyte	83
287 Spectrum Holobyte	59
158 Spirit of Discovery	92
203 Star Micronics	31
130 Starware Publishing	119
179 SubLogic	38,39
147 Thrustmaster	119
242 Tycom Inc.	G-11
301 US Robotics	IBC
267 Virgin	74,75
183 Virgin	61
172 Wedgwood Computer	125
Windows 900	123

Classfieds 126,127
Product Mart 118,119,120,121,122,123,124,125

Amiga Best Utilities Disk	A-17
COMPUTE Books	81,A-25,A-27,G-10,103,104,105,108
COMPUTE's On Disk	79
Gazette Disk Index	??
Gazette Disk Subscription	G-9
Gazette Productivity Manager	G-19
Gazette Specialty Disks	G-15
Gazette Speed Script	G-21
SharePak Disk Subscription	65

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images, you may be interested in adding this cartridge to permanently store frequently used downloadable fonts or bitmapped images.

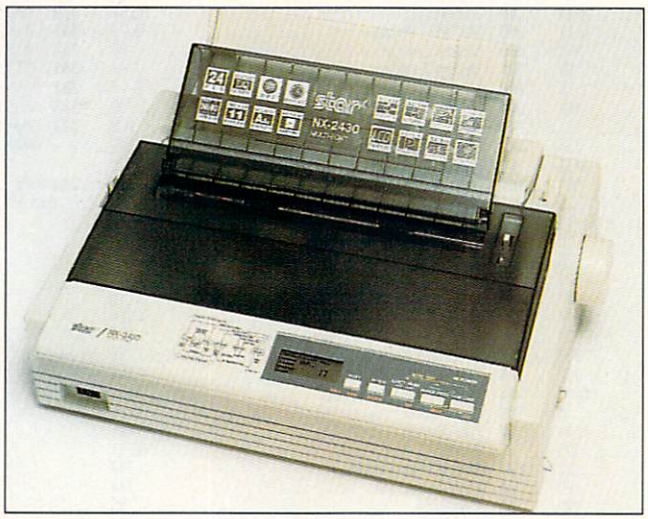
I welcome the absence of DIP switches on this printer. Instead, Star included a built-in Electronic DIP Switch (EDS) mode that offers more options than normal DIP switches. This saves times and skin, since you don't have to be a contortionist capable of reaching hidden switches.

The NX-2430 is as small as many 9-pin printers (17.3 × 13 × 5.9 inches) and with the three paper-feed paths (rear, bottom, top), it'll fit just about anywhere. It handles forms of up to three parts.

Setting up the printer took about ten minutes. The installation of the automatic sheet feeder took longer than the printer setup, but the sheet feeder is well worth its additional cost in time and money ($99). I had to keep reminding myself that I was reviewing a dot-matrix printer, not a laser printer. The sheet feeder is exceptional. It worked well with all the software I tried, including Express Publisher, Publish-It Lite, and XyWrite.

Setup time was short, thanks to the easy-to-understand instruction manual. It includes a command summary with page numbers in the back and a separate quick-reference guide to the control panel operations.

The front control panel with liquid crystal display includes five buttons that control more than 20 functions, such as font, pitch, paper park and feed, macros, form feed and micro feed, top of form, and quiet mode. The special EDS mode is set from the front panel as well, and it controls up to 15 functions, including emulation, RAM usage, and graphics print direction.



The Star NX-2430 Multi-Font, a 24-pin dot-matrix printer, rivals the quality of laser printers at a much lower price.

Special features include automatic paper load, short tear-off, automatic bail lever closing, paper parking, external paper adjustment, top-of-form set, first line printing, landscape paper loading, dual sheet feed paper guides, and quiet mode (the output is slower in this mode).

The quality of the output is not just as good as that of any 24-pin dot-matrix printer I've ever used—in most cases, it's better. Of course, the weight of the paper used determines the quality to a certain extent. I used 20-pound business stationery for important documents and standard fanfold paper for everything else.

I always look for pros and cons, but I simply couldn't find anything wrong with this printer. It's a great buy at $399, even with the additional cost of the automatic sheet feeder and font cartridges. I'd buy it in a heartbeat if I were looking for a 24-pin dot-matrix printer.

JOYCE SIDES

Star NX-2430 Multi-Font—$399

STAR MICRONICS AMERICA
420 Lexington Ave., Ste. 2702–25
New York, NY 10170
(800) 447-4700

Circle Reader Service Number 446

PC FILE 6.5

PC File 6.5 has made a very successful move from shareware powerhouse to commercial contender, more than holding its own with other databases in its price range. Jostling for shelf space at Egghead demands a highly competitive product, but PC File fills the bill.

The best changes from its shareware predecessor are modern, mousing user interfaces and native support of dBASE III PLUS databases and index files (including memo files, which let you type in large amounts of free-form text). It also reads and writes the most popular data-interchange formats such as 1-2-3, WordPerfect merge, and DIF. There is no language as such, but you can select from a wide variety of built-in functions such as UPPER() and SOUNDEX() when creating indexes and reports.

Installation is automated but a little too smart for its own good: My Stacker drives weren't detected, so I had to call tech support for a work-around in order to install it on my hard disk. The documentation is a single typeset paperback with 600 beautifully written pages. This is one of the best manuals I've ever seen, somehow mixing beginning and advanced material with uncanny skill. Apart from a glossary, I could find nothing missing from the manual and everything was where I expected to find it. The online help is almost as good, with the glaring omission of context-sensitive help for each menu item. So, while the File|Open dialog has its own help screen, Open on the File menu doesn't.

PC File 6.5 is a good data manager, allowing you to create, maintain, and alter the structure of database files. What gives it an edge is the extras: bar code support, a somewhat complex but well-designed mail merge, autodialer, macros, global search, SOUNDEX matching, and a really cool calculator. The calculator not only does the usual arithmetic but also lets you include field names in calculations, an innovative and universally handy fillip. The mail-merge feature is unmatched by any other I've used and is equally good for mass mailings and the one-offs I find myself writing with surprising frequency. I found merge instantly useful and up to the most demanding tasks, but I suppose it might be a bit much for a beginner to grasp right away. Never fear, though, because the manual explains the merge feature superbly.

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Microsoft Golf 39
Midnight Rescue 35
Might and Magic 3 38
Might & Magic 4 40
Mike Ditka Ultimt FB 37
Millie Math House 31
Mixed-Up Fairy Tale 30
Mixed-Up Mother Gs 30
Monkey Island 1 or 2 23
Monopoly Deluxe 34
Moonbase 25
Muncher Bundle 30
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Dinosaur World 22
Race Thru Space 22

Mice & Trackball

Appoint MousePen 70
Microsoft Mouse 85
Mouseman Serial 69
Trackman Serial 79

Modems & Fax

MaxFax 9624 Fx/Md 99
Practical Peripherals
PM 14.4 Int. 129
PM 14.4 Ext. 175
Sportster 9600 Int. 129
Sportstr 14.4 v.42bs 309
Zoom External 62
Zoom Internal 59

Scanners

Scanmaker II 859
Scanman 32 133
Scanman 256 259

C D ROM

Aesops Fables 33
Aircraft Encyclopda 45
Aloha Hawaii 45
Amer Bus. Phnbk. 39
Amer Hert Pict Dict 75
Arthur Teacher Trbl 41
Audubon Mammals 37
Autodesk Explorer 119
Barney Bear Goes to School 26
into Space 26
Batik Designs 45
Battlechess 49
Beauty & Beast 49
Beethoven Ninth 59
Berlitz Think & Talk
French 105
Spanish 105
Bible Library 49
Bibles & Religon 30
Bookshelf 129
Britanica Family Chc 75
Business Backgrnd 45
Business Master 32
Buzz Aldrin Race 59
Carmen World Dlxe 65
Career Opportunities 42
Cautious Condor 45
C D Game Pack 55
C D Speedway 57
Challenge 5 Realms
Christmas Carol 33
CIA World Fact 39
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Dictionaries & Lang 30
Don Quixote 33
Education Master 32
Electronic Cookbook 75
Elect. Home Library 49
Elctrn Traveler:Calf 33
European Monarchs 49
Family Doctor 59
Font Master 39
Food Analyst 49
Fresh Arte 49
Front Page News 29
Game Master 32
Game Pack 2 39
Gettysburg:MM Hist 43
Gofer Winkles Adv 33
Golden Immortal 28
Great Cities Vol 1 49
Guinness Book Rec 59
Guy Spy 32
Ham Call 49
Interactive Storytime 45
Interactive Vol 2 45
Intl Bus & Econ Atlas 39
Intro Games French 79
Intro Games Span 79
Jazz:Multimedia Hist 69
Jets & Props 55
Jones in Fast Lane 37
Just Grandma & Me 36
Kings Quest 5 42
Languages of World 99
Learn to Speak Span 59
Leisure Suit Larry 42
Libry of Art:Renaisn 65
Libry of Art:Overview 65
Library of Future 99
Loom 39
Lovely Ladies II 49
MacMillian Child Dict 49
Manhole 49
Magazine Rack 45
Mantis 45
Marketing Master 39

Mavis Beacon 39
Mixed Up Mothr Gse 37
Monarch Notes 75
Monkey Island 39
M S DOS Archives 35
MM Music: Mozart 33
MM Music: Vivaldi 33
Nat'l Geo Mammals 49
North Amer Fax Bk 55
North Amer Indians 57
Officers Bookcase 50
Our Solar System 29
PC Game Room 49
Peter & Wolf 45
Presdnt:It Strt Geo 105
Programmers ROM 59
Publish it! 69
RBBS in a Box 65
Reference Library 59
Rotor/Airball/Time 35
Seals of US Gov't 60
Secret Weapons 59
Seventh Guest 59
Shakespeare 37
Sherlock Holme 39
Sherl Holmes 2 42
Sleeping Beauty 37
Sound Works 35
Space Quest 4 42
Space Series-Apollo 49
Spirit of Excalibur 37
Stellar 7 37
Strange Bedfellows 39
Star Child 33
Star Trek Enhanced 49
Street Atlas 99
Talking Classic Tale 75
Talkng Jungle Safari 75
Time Mag Almanac 49
Time Table History 69
Time Table Science 59
Too Many Typefonts 35
Ultima 1-6 49
Ultimate Shareware 59
U S Atlas 42
US Atlas w/Automap 49
US History 39
US Presidents 49
USA State Fact Bk 45
USA Wars:Civil War 49
USA Wars:Korea 49
USA Wars:Vietnam 49
USA Wars: WW II 49
Vintage Aloha 45
Vital Signs 75
Voyage Planet I-3ea. 69
White Horse Child 33
Wild Places 26
Willy Beamish 42
Windows Shareware 39
Wing Comm & Miss 45
Wing Com/Ultima 6 45
Wing Comm 2 57
W C 2/Ulti. Undrwld 57
World Atlas 42
Adults Only-Must be 21
Animation Fantasy 65
PC Pix Vol 1 or 2 65
Private Collection 65
Priv. Pictures 1 or 2 65
Seedy Vol 1-7 ea. 65
Storm 1 or 2 65
Visual Fantasy 65
Volcano 65
Caddies 7.95ea. 3/$ 19

Skins & Pads

Dust Covers 15
Grounded Wrist Strap 9
Keyboard Skins 15
Static Pads
Large- System 15
Wrist Pads 8
Stax (Dust Repellent) 5
Statx Complete
Cleaning System 15

Sound Cards

Ad Lib Sound Card 65
Ad Lib Microchannel 69
Ad Lib Gold 1000 179
ATI Stereo F/X 109
VGA StreoF/X 1MB 369
Covox Snd Mster II 145
Gravis Ultra Sound 129
Media Vision
Audio Port 139
CDPC / XL 1199.95
Pro Audio Spec + 139
M.M. Upgrade Kit 765
Pro Audio Spec 16 194
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Upgrade Kit 955
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Snd Blast Pro MCA 259
Sound Blaster Pro 189
S B Pro 16 239
S B Multimedia Kit 560
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Sound Machine incl.
SB,Speaker,Joystick 95
Roland SCC-1 GS 375
Sound Canvas 559
Roland MA-12C ea 105
SPEAKERS Shielded 28
w/ 3 band Equilizer 45
Altec Lansing 200 219
ACS 300 w/subwof 299

MIDI Interface

Midiator 101 Serial 95
PC Midi Card 79
MQX-32 179
MPU-IPC 135
Cakewalk Apprentic 145
The Miracle 325

MIDI Software

Ballade 129
Band in a Box 69
Cadenza 129
Cakewalk 95
Cakewalk Pro 169
Cakewalk Window 240
Encore 379
Piano Works 95
Play it by Ear 69
Master Tracks Pro 249
Midisoft Studio 159
Music Bytes Vol 1 65
Music Mentor 79
Music Printer Plus 419
Music Time 169
Musicator 375
Quick Score Deluxe 99
Rhythm Ace 69
Songwright 5 65
Trax for Windows 60

Joysticks

CH Flightstick 37
CH Game Card 3 31
CH Mach 3 31
CH Virtual Pilot 65
CH Virtual Pilot Pro 84
Eliminator Game Cd 26
Gravis Analog Pro 39
Gravis Joystick 32
Gravis PC GamePad 21
Kraft KC3 Joystick 18
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REVIEWS

Two of PC File 6.5's most-touted features are its ability to run in graphics mode and its ability to do charts, but I found neither overly impressive. The GUI slowed performance to the point that I wouldn't have used PC File if full-time graphics mode were the only option. Fortunately, you can run in the much-snappier text mode and switch modes only when graphs are displayed. The graphs are no great shakes and only use a magnified system font.

PC File 6.5 can process large amounts of data fast. It indexed a 13,500-record DBF file in less than a minute on my 33-MHz 386 and took only a few minutes to export it to DIF. This was a real data set, not a toy file generated for review purposes.

The labeler was formerly a separate product. It will do just about anything that needs to be done but lacks the kind of integration that distinguishes other features, such as the calculator and autodialer. The user interface is outmoded and bears no resemblance to the rest of PC File 6.5. It prints to generic labels and lets you create your own configuration; a selection of Avery presets would make life much easier.

I thought the eclecticism of the new features would work against PC File 6.5, but it didn't. This feels very much like a product designed with the primary emphasis on user input, labeler excepted. It's a solid product and well worth its $149.95 price. Just be sure to get phone support fast—after 30 days, you must switch to a 900 extra-charge number.

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PLAN 9 FROM OUTER SPACE

Celestial saucers from outer space! Corpses on the patio! Guest appearance by Bela Lugosi! Mix these cinematic faux pas with liberal portions of schlock horror devices, wooden tombstones, atrocious acting, and unforgivably awkward camera work and you have the original *Plan 9 from Outer Space*—the movie. Now, now, earthlings, don't groan in despair just yet. While most big-to-small screen adaptations leave us wanting, Plan 9 from Outer Space doesn't eclipse the flick of its inspiration with its badness. As games go, though, if Plan 9 isn't terrible enough to rise to cult hit status, how bad is it?

Bad is in the eye of the beholder, of course. From a gaming standpoint, Plan 9 offers nothing in the way of innovations. The point-and-click interface would profit from a more Sierra-like approach instead of tedious selection from menu options: Use item, Talk, Hit, and so on. After choosing Examine, for instance, you click on an onscreen item for a description. Then it's back to the menu to select Examine again so you can repeat the process on another item. This procedure alone could drive you to distraction. More annoying, however, is the tendency of dropped objects to disappear, hijacked by a meddlesome gremlin. Then, in a storeroom filled with useful items, you discover that you can carry only two before the irate producer of the movie shows up to berate you.

Speaking of the sleazy producer, he hires you—at a cut rate, of course—to find the missing reels of *Plan 9.* Bela Lugosi's double (he's the one who stomped around with a cape over his face) has stolen the film and plots to recut it with footage featuring himself and, even worse, to colorize it. You'd probably stop this conspiracy for free if the producer wasn't paying you.

To track down the missing reels, you'll visit both Bela's tomb and his suburban home—each characteristically limited in the number of locations to explore and objects to gather. The ubiquitous taxi proves a cumbersome and blatant method of design cost-cutting. Instead of roving from place to place, you take a taxi, and your list of destinations is limited by characters you've talked to or by the fliers you've read.

As reckoned by Konami, Plan 9 could supply beginning and intermediate players with sufficient challenge. Anyone who's seen the movie in all its tragic pretentiousness would enjoy the game. But most younger gamers probably haven't seen it; neither have most adults. Does a quest to find six reels of film set your heart aflutter? Let's hope Konami's ready to go with plan 10.

DAVID SEARS

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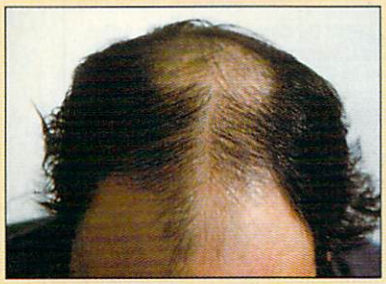

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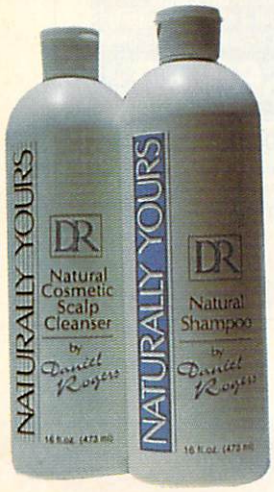

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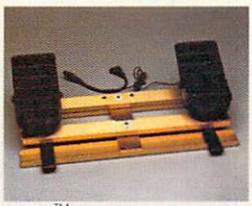

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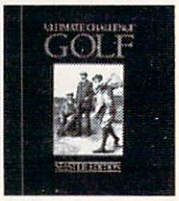

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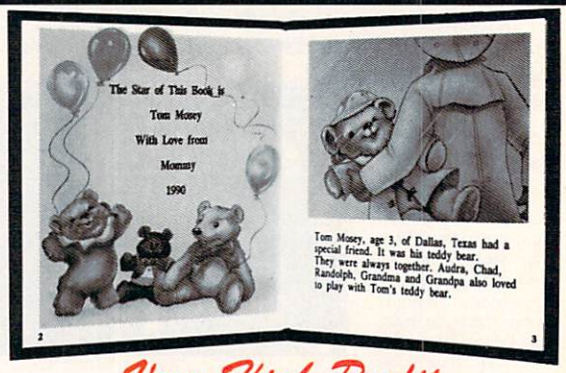

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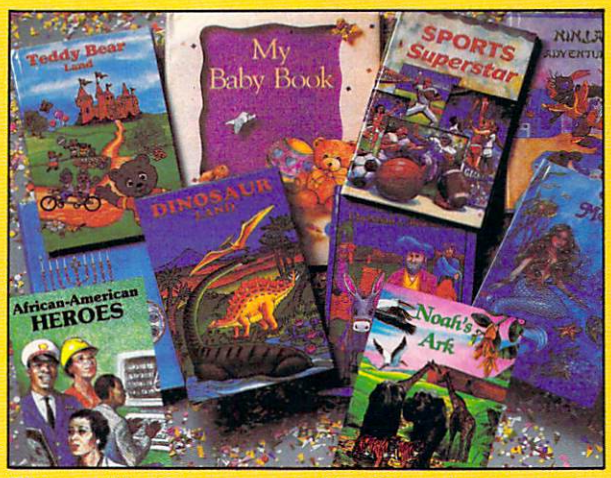

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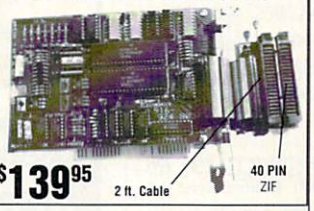

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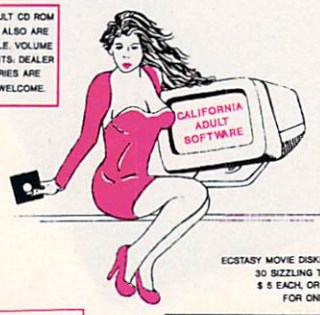

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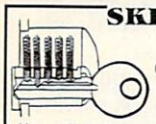

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NEWS BITS

Jill Champion

Cops and robbers, virtual libraries and portfolios, and a book for parents of cyberkids

Daryl Gates, Software Author

Controversial former Los Angeles police chief Daryl Gates recently signed a publishing agreement with Sierra On-Line to design the next Police Quest game, which will be the fourth installment in the popular adventure series.

Police Quest 4, which will feature a new, as-yet-unnamed character, will take place in Los Angeles and will be set against actual L.A. backgrounds that are digitally scanned from photographs. Look for a Christmas 1993 release.

Paperless Society Approaches

Old books deteriorate, and a library's shelves can only hold so much new material. So Columbia University Law Library has begun creating a time- and space-saving "virtual library" that can find and display on one computer screen an actual image of a printed page among millions sorted digitally.

Named Project Janus, the system is the first library application of digital full-text stored-image search and retrieval.

The superfast system allows for full-text searches, which means that a researcher can order the computer to search its entire memory for any word, phrase, or text using the Roman alphabet and then retrieve on the same computer screen an optical image of the actual printed page or document.

While you won't see an *all*-electronic library for another half-century, imagine what such systems will eventually bring to your research sessions—talking, animated history texts, for instance. Libraries as we know them will be things of the past.

Not Such a Glorious Thing

It may be a glorious thing to be a pirate king, if you live in Penzance. If you live in Boardman, Ohio, however, and you call yourself Rusty or Edie, you could be in *big* trouble.

The FBI recently raided Rusty & Edie's bulletin board service for allegedly distributing copyrighted software programs free to its many online subscribers.

Following complaints from a number of the Software Publishers Association members that their software was being illegally distributed, the SPA worked with the FBI, downloading dozens of copyrighted business and entertainment programs from the board.

Would-be pirates should take warning: This BBS was no mom-and-pop operation. Rusty & Edie's was one of the largest private bulletin board systems in the country, with 124 nodes available to callers and more than 14,000 subscribers throughout the United States and several foreign countries.

Ilene Rosenthal, general counsel for the SPA, applauded the FBI's action, which, she said, "clearly demonstrates . . . that the government understands the seriousness of software piracy." Similar raids on other boards are expected soon, as the SPA continues to work with the FBI on investigations.

Piracy, the SPA says, adds to the cost of computing. The previous year saw software industry losses to piracy of $1.2 *billion* in the U.S. alone.

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This electronic megaportfolio allows clients—advertisers, photographers, casting agencies, talent agencies—to view models' materials, including their stats, in full, hi-res color, page by page or even compared to several other portfolios at once.

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Sourcebook for Parents

Parents, Kids & Computers, a new book from Random House Electronic Publishing (November 1992; $20.00), is an activity guide/source book for parents that's designed to lead the entire family into the Information Age.

Written from a parent's perspective, the book provides innovative suggestions for making computer time quality time. Parents can learn how to select the best hardware and software for their kids, explore popular programs, and discover how Windows, LOGO, and Prodigy can be homework helpers.

Authors Robin Raskin and Carol Ellison (both computer experts) encourage parents to take a hands-on approach to exploring their collection of hand-picked programs, and they furnish hundreds of ideas on how to extract maximum learning and fun from a variety of software. ❐

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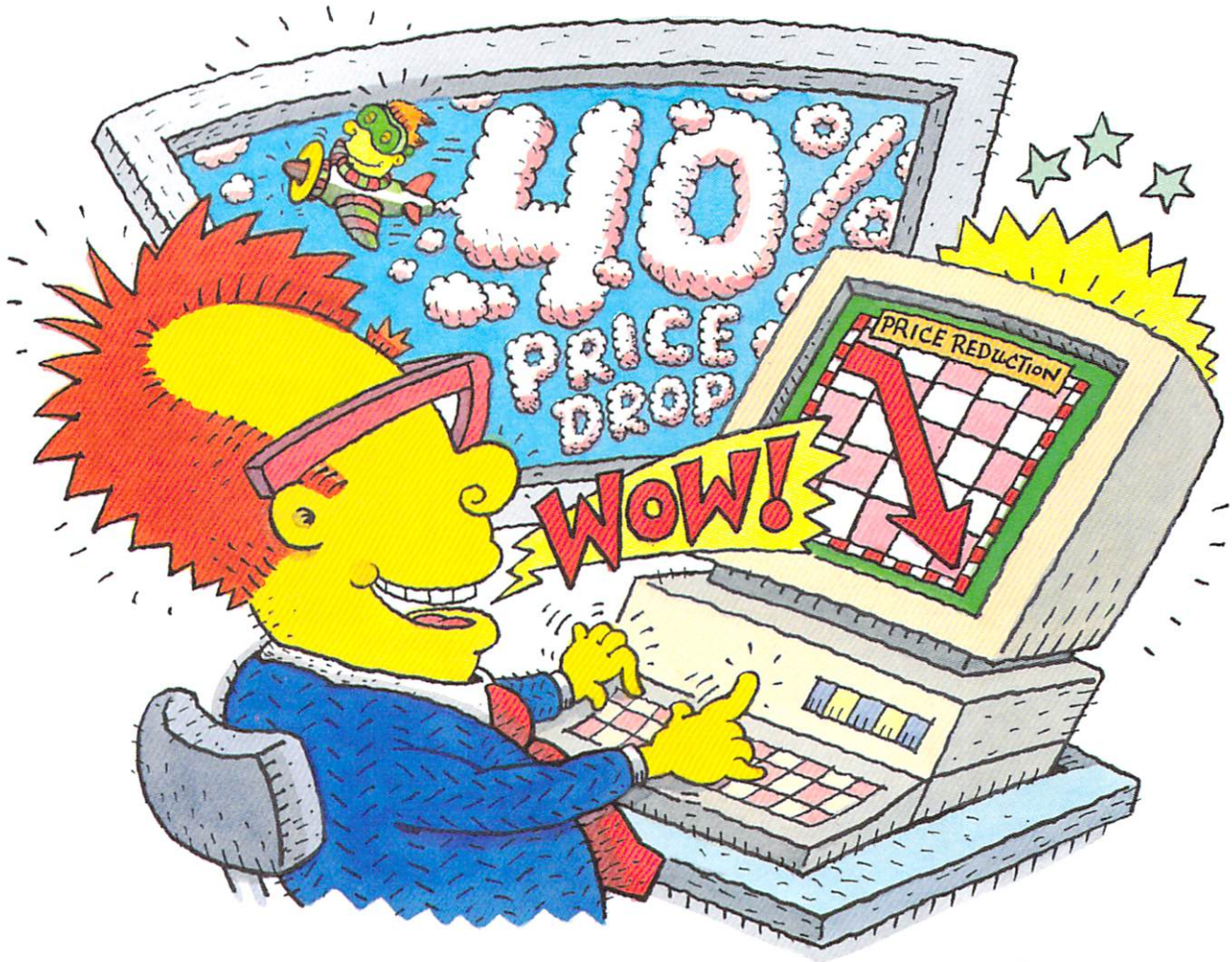

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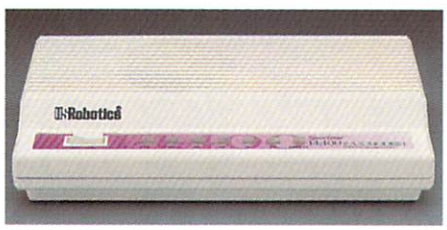

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