DISK INSIDE

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FOR IBM PCs AND COMPATIBLES

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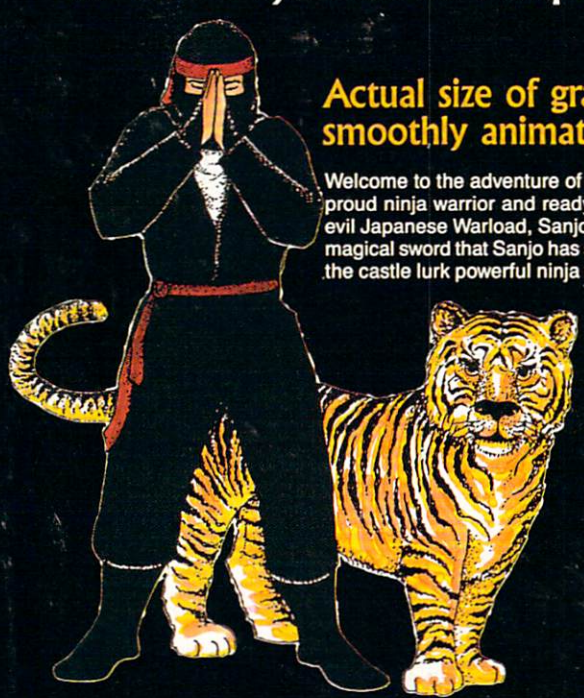

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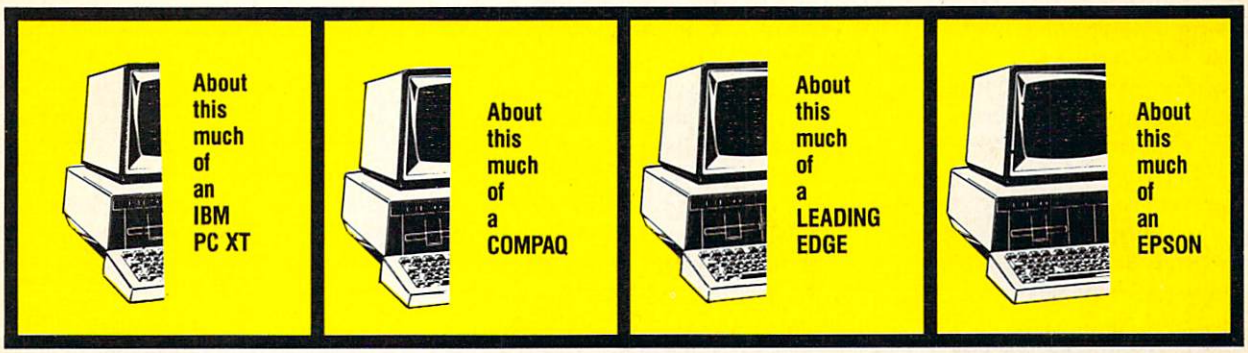

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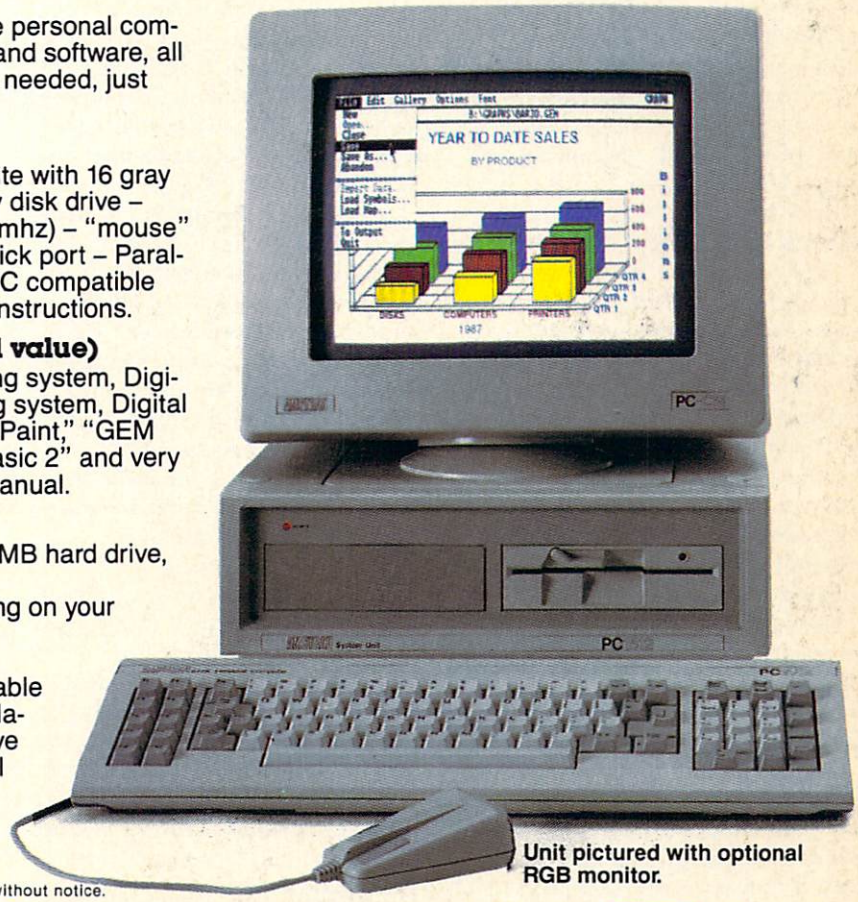

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THE EDITOR'S VIEW

Just as we were finishing work on this, our second issue of COMPUTE!'s PC Magazine, we began receiving preliminary response to our first issue—and we're pleased to report it has been overwhelming.

We were so swamped with orders for charter subscriptions that we were forced to reprint the first issue (extra press runs are extremely rare in the magazine industry).

Based on our experience in other areas of personal computing publishing, we believed the PC-compatible community was ready for a publication like COMPUTE!'s PC Magazine—a magazine that offers solid, useful, and entertaining programs, features, reviews, and tutorials. Our goal is to make COMPUTE!'s PC Magazine the top-notch publication in its field. To that end, we're searching for the best programs we can find.

Until now, there really hasn't been much of a market for PC programs. That might seem strange, since the IBM PC was introduced in 1981 and millions of PC compatibles have been sold in the past six years. But few, if any, PC magazines regularly publish full-length programs. PC programmers have been limited to a few overcrowded outlets: the commercial software market (almost forbiddingly competitive, dominated by a handful of major players), shareware (uncertain rewards, and also highly competitive), and the public domain (sometimes personally gratifying, but always financially unrewarding).

Yet, hundreds of thousands of development packages such as *Turbo Pascal* and BASIC compilers have been sold. We suspect there are hundreds of thousands of closet programmers sitting on thousands of valuable programs.

COMPUTE!'s PC Magazine wants to be the outlet of first choice for those programs. Every issue, we have more than 300K of disk space available for distributing software. We pay from $200 for a short, useful program to $2,000 for a full-blown application. And we pay on acceptance—not on publication like most other magazines. For added encouragement, we're sponsoring a programming contest with $15,000 in cash prizes, including a $7,500 First Prize (see page 50). And your efforts will be expertly presented by our veteran staff of editors, programmers, and testers whose full-time job it is to polish articles and programs prior to publication.

If you happen to be one of those closet programmers who's written some exceptional software—or if you know someone who is—get in touch. Over the past eight years, our other personal computing magazines have established a reputation for publishing the best material available in their markets, and we've set the same goal for COMPUTE!'s PC Magazine.

This issue's disk is packed with interesting software. If you're partial to arcade-style action games—or a younger member of your household is—check out "Wormburner." It's a classic shoot-em-up written entirely in machine language for maximum speed. Can you successfully defend Earth against the alien worms?

If you lean more toward thoughtful strategy than eye-hand coordination, try "Chess." If you're a beginning to intermediate player, you'll find this chess program a challenging opponent who's always willing to play, day or night. The intelligence routines are written in machine language, and numerous options allow you to retrace moves and even watch the computer play itself.

On the practical side, don't miss "Personal Calendar." You'll never forget an important birthday, anniversary, or appointment again. You can set up the program to alert you to upcoming events—up to a year in advance—as soon as you switch on the computer.

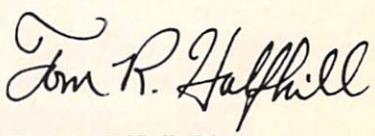
"Front & Back Hardcopy" is one of those handy utilities that someone should have thought of years ago. Not only can you print out copies of text files without bothering with your word processor, but you can also print on both sides of the paper with adjustable margins to make pages that fit neatly into looseleaf notebooks and binders.

"Screen Saver" is a brief program that might pay for itself with a single use. It waits quietly in the background, watching for inactivity at the keyboard. If you've walked away from your computer for a while, it blanks out the screen to prevent burn-in damage to the phosphor of your monitor screen.

Our "Best of the Boards" column, a regular feature in COMPUTE!'s PC Magazine, presents a top shareware program: *FastCopy* by Jim Nech. If you tend to put off making backups of your important floppy disks because of the time it takes, you'll love *FastCopy*. It greatly speeds up the process of formatting blank disks and making multiple copies.

As a bonus, we have a second "Best of the Boards" column in this issue. It features Phil Katz's *PKARC* series, perhaps the best file-archiving system available. With *PKARC*, you can combine and compress any number of disk files to conserve space for archival storage and backups. It's especially useful if your hard disk is filling up and you need more room.

In addition to the programs, of course, we have several interesting feature articles, columns, and reviews. And don't forget to fill out the readership survey on page 57. With your feedback, we hope to make future issues of COMPUTE!'s PC Magazine even better.



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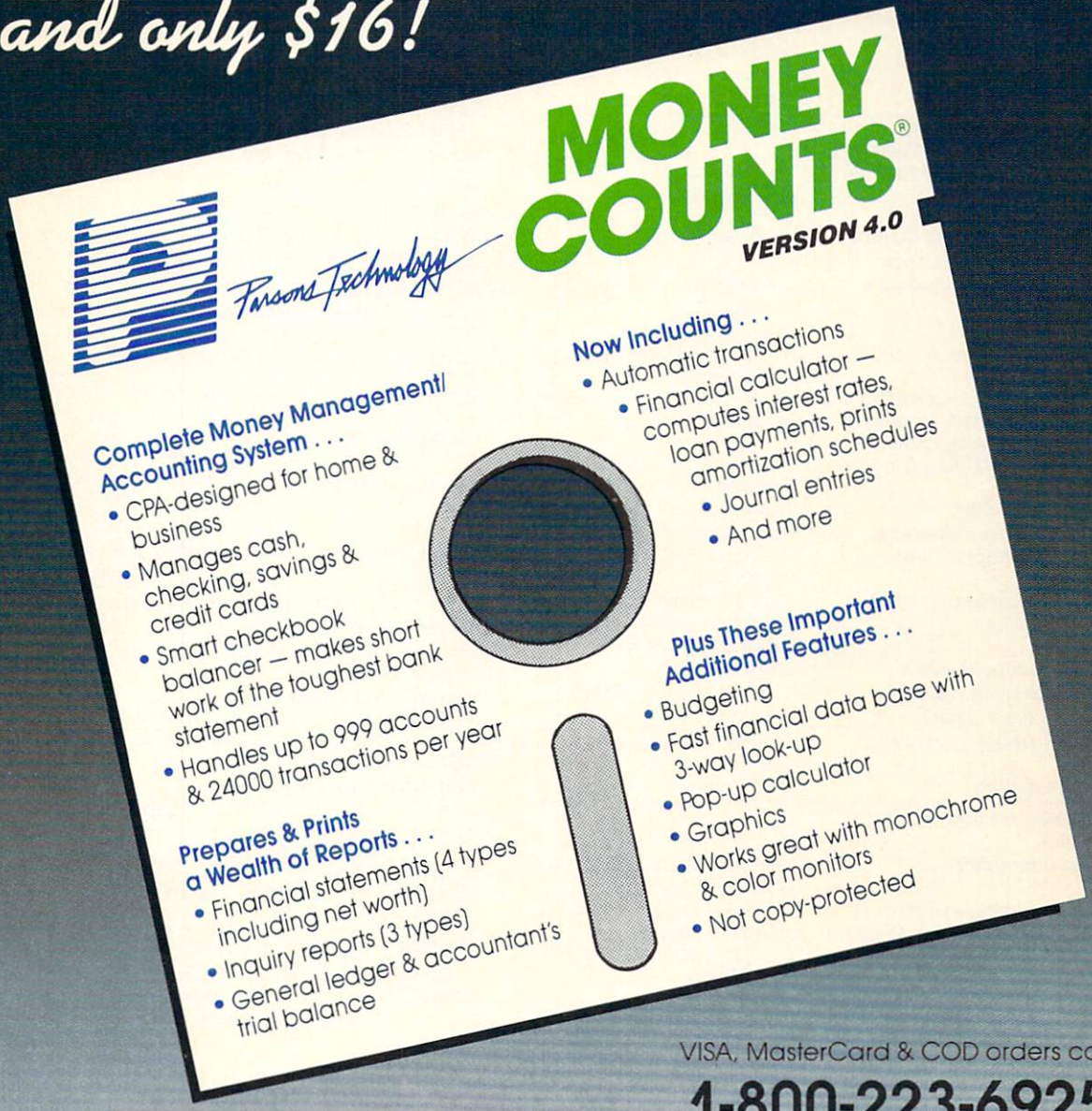

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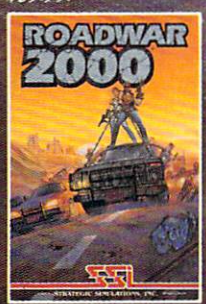

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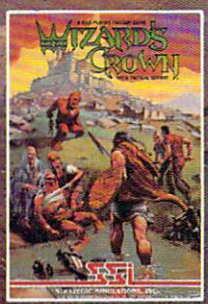

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PC NEWS & NOTES

New Price Breakthroughs For IBM Compatibles

At $1,199, the new Tandy 1000 TX is the lowest priced AT-class computer from a major manufacturer. Tandy rates it six times faster than a standard IBM PC/XT.

Tandy Corporation announced a new lineup of PC compatibles late last summer that made more than a few industry analysts sit up and take notice.

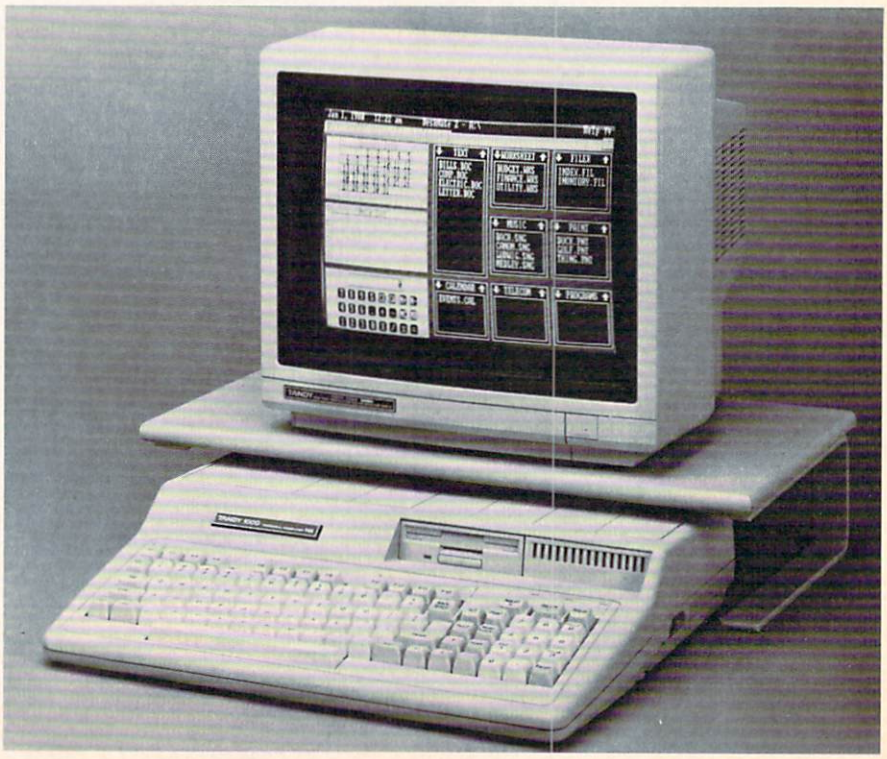
Leading off the new Radio Shack line is the Model 4000, an ultra-high performance computer based on an Intel 80386 microprocessor chip running at 16 megahertz (a standard IBM PC or compatible runs at 4.77 megahertz). The 4000, which should be almost twice as powerful as an 8-mhz IBM AT, comes with a full megabyte of memory, and is the first 80386 compatible we've seen that uses the 1.44-megabyte, 3½-inch microfloppy introduced by IBM on its Personal System/2 series computers. Most importantly, the Tandy 4000's list price of $2,599 sets a new low price point for machines in its performance class.

Two new 80286-based Model 3000s occupy the middle tier of the new Tandy offerings. The new 3000 HL, at $1,499, appears to be a repackaged version of the old 8-mhz 3000 HL with a restyled case and a new keyboard that's compatible with IBM's enhanced keyboard layout (12 function keys across the top, and separate cursor-movement and numeric keypads). Watch for further price reductions on the old 3000 HL, which was cut to $1,299 during the summer.

The 3000 HL's new big brother is the 640K Tandy 3000, a 12-mhz system that, for $1,995, offers performance equaling that of the well-respected Compaq Deskpro 286, which retails for $2,995.

Two new Model 1000s round out the low end of the Tandy line. The 1000 TX, at $1,199, is the lowest-priced AT-class machine from a major manufacturer. Rated six times faster than a PC/XT, it has an 8-mhz 80286 microprocessor, 640K of RAM, and a 720K 3½-inch microfloppy drive.

The 1000 HX, at $699, is the first desktop PC compatible with the MS-DOS operating system built into read only memory (ROM). While the HX doesn't have standard IBM-type expansion slots, its standard 256K of random access memory (RAM) can still be expanded to a full 640K, and a second 720K 3½-inch microfloppy drive can easily be installed. The HX also



The Tandy 1000 HX is the first desktop PC compatible with the MS-DOS operating system built into ROM. Note also the 3½-inch microfloppy disk drive.

Arlan R. Levitan &
The Editors

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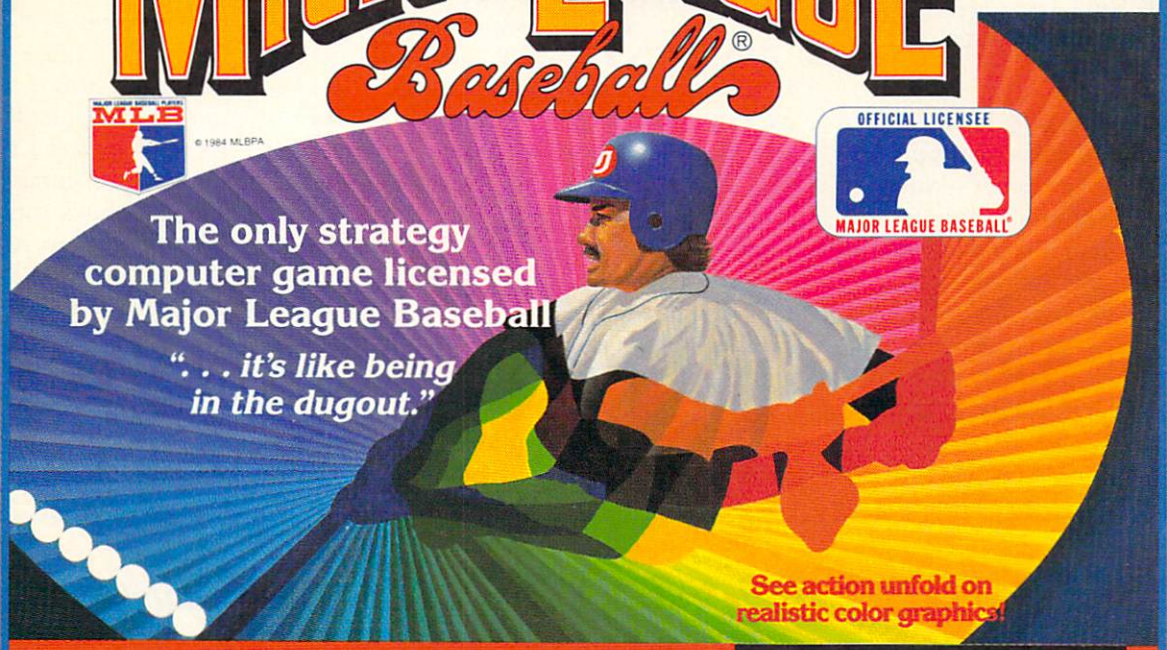

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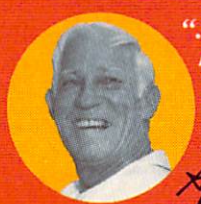

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Laptop power: Tandy's new 1400 LT offers PC compatibility, 768K of RAM, two microfloppy disk drives, a backlit supertwist LCD screen, and removable battery pack—all for $1,599.

has an integrated keyboard and an 8088 microprocessor that normally runs in a "turbo" mode—which makes the machine about 50 percent faster than a standard IBM PC.

Perhaps the most intriguing member of the new Tandy line is the 1400 LT, a battery-powered laptop. The 1400 LT sports 768K of RAM, two 720K 3½-inch microfloppy drives, and a backlit 80-character by 25-line supertwist liquid crystal display screen. At a list price of $1,599, the 1400 LT undercuts the popular Zenith Z-181 and NEC Multispeed EL by $800 to $900.

Tandy isn't the only company making news in the under-$1,000 PC-compatible market, however. The Epson Apex—a dual-speed 8088 computer with 512K of RAM, two 5¼-inch floppy disk drives, and color/graphics display card—should be appearing in stores now. The compact $899 Apex has two full-size expansion slots and comes with MS-DOS 3.2, GW-BASIC, and *First Choice*, an integrated software package that includes word processing, spreadsheet, database, and telecomputing functions. Expect two PC-compatible laptops from Epson later this year.

You might also find Zenith's new under-a-grand EZ-PC setup on display not far from the Epson Apex at your local dealer. The 512K EZ-PC takes a slightly different approach, incorporating a single 720K 3½-inch microfloppy drive and a black-on-white display screen that is reminiscent of the Apple Macintosh. MS-DOS and Microsoft's new DOS manager software are bundled with the EZ-PC.

Commodore, too, raised a few eyebrows this summer by drastically lowering the price of its PC-10 line of IBM compatibles. Although it's not a new system (the PC-10 line has been selling in Europe for almost two years), many people will be seeing PC-10s for the first time this fall, since some Commodore dealers have been a little queasy about carrying the machines at the higher prices. That's not the case anymore. A complete PC-10-1 system with 512K of memory, one 5¼-inch floppy drive, combination color graphics/Hercules-compatible display card, and a monochrome monitor lists for just $799. And we've seen street prices a couple of hundred dollars lower. On the software side, Commodore PC-10 systems come with MS-DOS 3.2, GW-BASIC, and Borland International's popular *Sidekick* program.

Telecommunications Woe

The Federal Communications Commission (FCC) has computer owners who access online information services up in arms this fall. Most of these telecomputerists live in metropolitan areas where a local call connects them through a long-distance network with the information service's mainframe computers. They pay an hourly fee for accessing the information service, but the long-distance connection is usually free. Now those connections are threatened by an FCC ruling that will significantly increase the cost of telecomputing.

Information services such as CompuServe, The Source, GEnie, Delphi, and others typically locate their huge computers at a central site, hundreds or thousands of miles away from most users. The connections between the central computers and the local phone numbers in metropolitan areas are owned by the information services or leased from other companies. These connection systems are collectively referred to as *networks*, and the equipment attached to the local phone number is called a *network node.*

Back in January, the FCC was considering a proposal that would allow local telephone companies to make the information services pay access fees for letting them hook their networks up to the local telephone system. The telephone companies argued that, after all, AT&T, MCI, Sprint, and the other long-distance carriers are networks, too (albeit for voice communications instead of telecommunications), and they're charged for connecting to the local system. Why should the operators of telecommunications networks be exempt from such charges?

This proposal wasn't very popular with telecomputing buffs. These access charges would have added about $4.50 an hour to the connect-time rates currently charged by commercial information services, which already range from $5 to $12.50 an hour and more. The access charges would also add $7 to $9 an hour to Telenet's PC Pursuit, a popular service that makes it possible for telecomputerists in certain major metropolitan areas to call computers in distant cities for a flat fee of $25 a month.

The commercial information services, and telecomputing community in general, raised such a hue and cry over the proposed access charges that the FCC dropped consideration of the proposal in February. But the local telephone companies kept up their pressure, and it wasn't long before the issue was revived.

After the chairman of the FCC left to pursue another career, the remaining commissioners unanimously voted to end the exemption of computer networks from local telephone company access charges as of January 1, 1988.

When telecomputerists and information services recovered from their intial shock, they began organizing an angry protest that has rolled through the telecomputing community. Letter-writing campaigns were started by system operators on information services and local bulletin board systems (BBSs), and heated messages demanding the resignation or impeachment of the FCC members became a common sight in online message systems. As the August 24 deadline for public comment approached, the FCC acknowledged that it had not received a single letter in favor of the proposed change.

The FCC ruling states, in part, that "our ultimate objective is to establish a set of rules that provide for recovery of the costs of exchange access in a fair, reasonable, and efficient manner from all users of access services." George De Bakey, director of the Computer Software & Services Industry Association (better known by its old acronym, ADAPSO), has replied, "There is no basis for singling out one class of users and subjecting them to common carrier-type access charges simply because they are engaged in the provision of computer services."

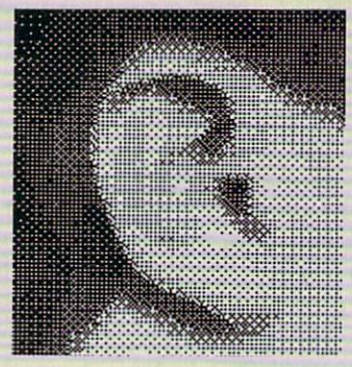
Of course, the information services have a vested interest in overturning the FCC ruling. A financial analyst for one of the largest commercial telecomputing services, who asked not to be identified, said that his firm's internal projections forecast a 28 percent decrease in non–prime time connect hours if the proposal goes into effect. That translates into millions of dollars of lost revenue.

Warner Sinback, manager of telecommunications affairs for General Electric's GEnie information service, says, "It's a proposal under which nobody wins. If put in place, every enhanced service-provider will look for ways to bypass the local phone network." Interfacing local network nodes with cable television services is the method mentioned most often.

The jury is still out. Will the telecomputing community or the telephone companies prevail? By the time you read this, the final verdict may be in.

THE EAR

News, rumors, and gossip heard around the PC community.



Sosumi...

Word has it that IBM representatives have been making calls on several Taiwan and Korean PC-clone manufacturers to inform them that, in the opinion of Big Blue, they are **infringing on IBM copyrights.** Supposedly, IBM has offered to license rights to the foreign manufacturers for a mere 1 to 3 percent of their revenues. So far, we hear, **no one** has decided to accept the offer.

Quick Clones

Chips and Technologies of Milpitas, California, has announced a system logic chip that's likely to bring clones of the IBM PS/2 Model 30 computer to market **much earlier** than had been predicted by industry experts. Clones based on the Chips and Technologies circuitry are now expected to start showing up late this year or early next year. We hear the clones will be about **25 percent faster** than the Model 30 and will require less than half the number of discrete components. Samples of a Model 50 and Model 60 compatible chip set should be released to manufacturers in about two months, which means that clones of those PS/2 computers might appear with the **first flowers of spring.**

PS/2 Graphics For Your PC

As we predicted in our last issue, the first clones of **video graphics array** (VGA) boards for PC and AT compatibles are about to hit the market. In late July, Paradise Systems of San Francisco announced that it has developed a single-chip, very large-scale integrated (VLSI) video controller that is compatible with the new PS/2 VGA standard. VGA supports the IBM color/graphics adapter (CGA), enhanced graphics adapter (EGA), and two new display standards: the multicolor graphics array (MCGA), and a special VGA mode. MCGA, normally found only on the PS/2 Model 30, includes a 320 × 200-pixel, 256-color mode, and a 640 × 480-pixel, 2-color mode. The special VGA mode, normally available only on the PS/2 Models 50, 60, and 80, offers a 640 × 480-pixel, 16-color mode. All of the MCGA and VGA modes have a palette of **262,144 possible colors.**

According to Paradise Systems, samples of the VGA-compatible chip were being sent to manufacturers in September and production was scheduled to ramp up by the end of October. That means you should be able to look forward to VGA display cards from several manufacturers **by February,** with discount prices ranging from $300 to $400.

Converting The Convertible

IBM is making another attempt to resurrect its poorly received laptop, the **PC Convertible.** The price of the PC Convertible Model 2 has been dropped to $1,395. The PC Convertible Model 3, with a backlit screen and improved power supply, has been shifted into the Model 2's old price slot at $1,695. Despite these moves, laptop cogniscenti contend that the Convertible line is **down for the count.** It's still considered too slow, too heavy, and too expensive when fully configured with memory and input/output ports to survive a toe-to-toe fight with its competitors.

More Trouble For Toshiba

NEC may deliver the *coup-de-grace* to Toshiba's line of laptop computers with the introduction of an **AT-clone laptop** equipped with a hard disk. NEC has avoided entanglement in trade tariffs by moving the manufacture of all of its computers from Japan to the U.S. Target price for the new laptop is said to be around $3,995—aimed squarely at the Toshiba 3100.

Big Mac Attack

Rumors are circulating in Europe about an **Apple Macintosh emulator** for IBM PS/2 Model 50, 60, and 80 computers. Sound impossible? It's already been done on Atari ST-series computers—although the ST–Mac emulator still suffers from some nagging compatibility problems. The PS/2–Mac emulator reportedly requires a set of **genuine Macintosh ROM chips** to make it work, just like David Small's Magic Sac product for the Atari ST. We hear the ROMs are installed on a half-size PS/2 expansion board that also houses a Motorola 68000 microprocessor. Dubbed **P.S. Mac**, the emulator takes advantage of the 640 × 480-pixel, two-color mode of the new VGA display standard. That just happens to be the same screen resolution as the Macintosh II.

Riding The Bus

IBM's proprietary PS/2 bark may be worse than its byte. Several sources have reported that IBM may be willing to **negotiate licenses** with manufacturers who wish to incorporate the IBM Micro Channel Architecture bus into their products. IBM has **flatly denied** the reports, but has admitted that it may be possible to duplicate the function of the MCA bus without infringing on their patents and copyrights.

OS/2 Blues

If you wish you had an IBM PS/2 computer so you could run some **hot Macintosh-like programs** under Microsoft's new OS/2 operating system, don't hold your breath. While the first version of OS/2 may be released late this year, software developers (including Microsoft's own Bill Gates) have cautioned that we're unlikely to see OS/2 applications that fully utilize the new Presentation Manager (graphics-oriented) user interface until the **early 1990s.**

Whisper To The Ear

Got something you want to get off your chest? ***The Ear wants to hear.*** *Send missives to* ***The Ear****, c/o COMPUTE!'s PC Magazine, P.O. Box 5406, Greensboro, NC 27403. All sources treated confidentially.*

Trouble For Toshiba

Last summer's heat wave found Toshiba Corporation jumping from the frying pan into the fire. Early in the summer, the trade tariffs levied on Japanese-made laptop computers dried up supplies of Toshiba's extremely popular PC-compatible T1100+ and T3100 models. At the Spring Computer Dealers Exposition (COMDEX) held in June, Toshiba attempted to regain a share of the market it had lost to the NEC MultiSpeed by introducing the T1000, a lightweight laptop with an eight-bit microprocessor. Since the trade sanctions applied only to laptops with 16- or 32-bit processors, the T1000 neatly sidestepped the prohibitive tariffs.

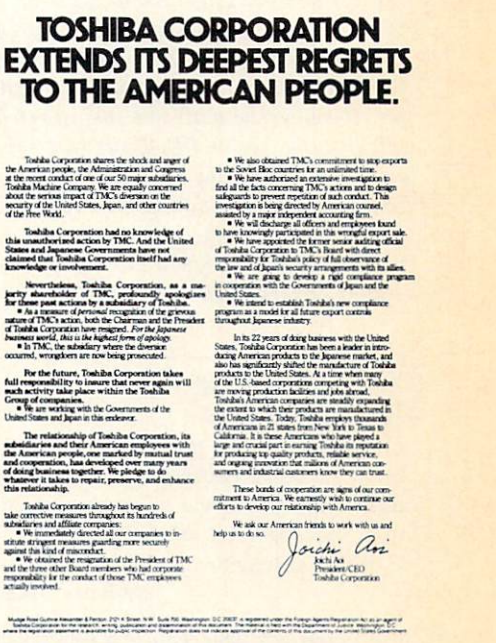
Then came startling news that Toshiba Machine Co., a Toshiba subsidiary, and a Norwegian firm, Kongsberg Vaapenfabrikk, had sold ultra-quiet propeller technology and related milling equipment to the Soviet Union. According to U.S. defense officials, the high-tech propellers will make it much more difficult for Western navies to detect Soviet submarines cruising underwater.

Immediately, talk began to circulate in Washington about banning the sale of Toshiba products in the U.S. in retaliation for the deal. The embargo would affect nearly all Toshiba products for two to five years. Hours after the U.S. Senate voted 92–5 on a resolution in favor of such a ban, Toshiba's chairman and president announced their resignations. "For the Japanese business world, this is the highest form of apology," Toshiba said.

Their departure didn't do much to cool the furor, however. Several weeks later, the flames were fanned anew by news that Toshiba had hired the two former executives as consultants. Computerland, the largest computer store chain in the U.S., quietly told its franchises that it would no longer carry Toshiba products.

In mid-July, Toshiba apologized by placing full-page advertisements in several major U.S. newspapers. "Toshiba Corporation Extends Its Deepest Regrets To The American People," declared the ad. Toshiba said the sale by its subsidiary was unauthorized, and it outlined several corrective actions that were being taken—including the firing of top executives. Toshiba, Japan's third-largest electronics manufacturing company, also pointed out that it has been doing business in the U.S. for 22 years and employs thousands of Americans in 21 states.

Toshiba is also the world's principal supplier of one-megabit RAM chips, the advanced memory chips which make today's multi-megabyte personal computers possible and affordable. Some analysts are concerned that an import ban could damage U.S. companies that depend on Toshiba parts.



TOSHIBA CORPORATION EXTENDS ITS DEEPEST REGRETS TO THE AMERICAN PEOPLE.

Toshiba Corporation shares the shock and anger of the American people, the Administration and Congress at the recent conduct of one of our 50 major subsidiaries, Toshiba Machine Company. We are equally concerned about the serious impact of TMC's diversion on the security of the United States, Japan, and other countries of the Free World.

Toshiba Corporation had no knowledge of this unauthorized action by TMC. And the United States and Japanese Governments have not claimed that Toshiba Corporation itself had any knowledge or involvement.

Nevertheless, Toshiba Corporation, as a majority shareholder of TMC, profoundly apologizes for these past actions by a subsidiary of Toshiba.

• As a measure of personal recognition of the grievous nature of TMC's action, both the Chairman and the President of Toshiba Corporation have resigned. *For the Japanese business world, this is the highest form of apology.*

• In TMC, the subsidiary where the diversion occurred, wrongdoers are now being prosecuted.

For the future, Toshiba Corporation takes full responsibility to insure that never again will such activity take place within the Toshiba Group of companies.

• We are working with the Governments of the United States and Japan in this endeavor.

The relationship of Toshiba Corporation, its subsidiaries and their American employees with the American people, one marked by mutual trust and cooperation, has developed over many years of doing business together. We pledge to do whatever it takes to repair, preserve, and enhance this relationship.

Toshiba Corporation already has begun to take corrective measures throughout its hundreds of subsidiaries and affiliate companies.

• We immediately directed all our companies to institute stringent measures guarding more securely against this kind of misconduct.

• We obtained the resignation of the President of TMC and the three other Board members who had corporate responsibility for the conduct of those TMC employees actually involved.

• We also obtained TMC's commitment to stop exports to the Soviet Bloc countries for an unlimited time.

• We have authorized an extensive investigation to find all the facts concerning TMC's actions and to design safeguards to prevent repetition of such conduct. This investigation is being directed by American counsel, assisted by a major independent accounting firm.

• We will discharge all officers and employees found to have knowingly participated in this wrongful export sale.

• We have appointed the former senior auditing official of Toshiba Corporation to TMC's Board with direct responsibility for Toshiba's policy of full observance of the law and of Japan's security arrangements with its allies.

• We are going to develop a rapid compliance program in cooperation with the Governments of Japan and the United States.

• We intend to establish Toshiba's new compliance program as a model for all future export controls throughout Japanese industry.

In its 22 years of doing business with the United States, Toshiba Corporation has been a leader in introducing American products to the Japanese market, and also has significantly shifted the manufacture of Toshiba products to the United States. At a time when many of the U.S.-based corporations competing with Toshiba are moving production facilities and jobs abroad, Toshiba's American companies are steadily expanding the extent to which their products are manufactured in the United States. Today, Toshiba employs thousands of Americans in 21 states from New York to Texas to California. It is these Americans who have played a large and crucial part in earning Toshiba its reputation for producing top quality products, reliable service, and ongoing innovation that millions of American consumers and industrial customers know they can trust.

These bonds of cooperation are signs of our commitment to America. We earnestly wish to continue our efforts to develop our relationship with America.

We ask our American friends to work with us and help us to do so.

Joichi Aoi
Joichi Aoi
President/CEO
Toshiba Corporation

Toshiba placed this full-page advertisement in major U.S. newspapers to apologize for the sale of sensitive propeller technology to the Soviet Union.

Nevertheless, in a 71–27 vote in July, the Senate passed a trade bill that included a prohibition against importing Toshiba products into this country. The act allows the President to grant specific exemptions, and Apple Computer was among the first to request one for its Toshiba-produced ImageWriter dot-matrix printers. If the act passes the House of Representatives and is signed into law, a ban on importing Toshiba products could be in place by the end of the year.

PC

Do you have a question or a problem 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 PC Feedback, COMPUTE!'s PC Magazine, P.O. Box 5406, Greensboro, NC 27403. We regret that we cannot provide personal replies to technical questions.

(Editor's Note: This second issue of COMPUTE!'s PC Magazine went to press just as our Premier Issue was hitting the newsstands and reaching subscribers. Because the mail has just started trickling in, we've filled out this section with questions compiled from common inquiries found on bulletin board systems and information services. Questions signed with names are actual letters from readers.)

You Can't Take An IBM To The Movies

I have an IBM PC with an RGB color monitor. Some people have color monitors connected to the video output on their videocassette recorders (VCRs). Can I do this with mine?

Lawrence Fischer

Not unless you have sufficient electronics experience to build the necessary converter. The video output signal from a VCR is in a form called composite video. *It's different from the RGBI (Red-Green-Blue-Intensity) output found on your computer and most other PCs and compatibles. Composite video is the type of output found on most home computers. The IBM PCjr provides composite video output as well as RGB. IBM's color/graphics adapter (CGA) card provides a composite video output in addition to RGB, but it's rarely used.*

The RGB system sends red, green, and blue color-level signals to the monitor separately, along with signals for color intensity and horizontal and vertical synchronization. The composite system—as the name implies—mixes all these separate signals together and sends a single combined signal to the monitor. When the color signals are fed to the monitor separately, the video image (especially a character display) is more crisp and more readable than on a composite monitor. The 80-column character display usually used on PCs would be hard to read on even the best composite monitors. However, composite color monitors do have clearer displays than ordinary TV sets, which is why some people hook them up to VCRs. (Some better late-model TVs offer a composite video input jack as well as the standard antenna/cable jack.)

You won't have any more success if you attempt to connect an IBM-style monochrome monitor to a VCR. These monitors have separate circuits for video, intensity, and synchronization signals, so they are also incompatible with composite video sources like VCRs.

We've seen ads for inexpensive devices that perform the opposite conversion—from IBM-style RGBI into composite video—but we've yet to see one to convert composite video into RGB for use with a monitor like yours. Perhaps another reader knows where such a converter can be obtained. Don't confuse it, though, with an RF converter, *an item that's commonly available for about $30. An RF (Radio Frequency) converter converts a composite video signal into a TV signal that can be fed into the antenna connector on a TV or VCR.*

Doctor CHKDSK

I own an IBM PC, but I'm not sure how much memory it has. Can you tell me how to find out how much memory I have without having to look inside the machine? Also, when I try to run a program under DOS 3.1, it works, but when I load the same program under DOS 3.3, I get the message *Not enough room in memory.* Can you tell me why this happens?

David Carlson

You don't have to take the computer apart to find out how much RAM (Random Access Memory) you have. There's a program on your DOS disk, called CHKDSK.COM, that performs this and other tasks. For instance, it also examines your disks and reports the amount of disk space occupied by files.

To see how much RAM your PC has, and how much of it is used, just insert your DOS disk in drive A and type the following command at a DOS prompt:

CHKDSK A:

CHKDSK reports the total amount of memory you have, how much is currently free for your programs, and how much free space is left on the disk. You'll also find a report on the amount of disk space used by hidden files. These files are the part of DOS loaded into RAM when you start up the computer, so they take up memory, too.

When using higher versions of DOS, you'll notice that the hidden files use more disk space and more RAM. Since higher versions of DOS have more functions than lower versions, it's logical that they require more memory. This may explain why some of your programs run with DOS 3.1 but not with DOS 3.3.

It's also possible that your DOS 3.3 boot disk configures the system differently than your DOS 3.1 boot disk. For example, the DOS 3.3 disk may be installing a ramdisk or specifying more open files or more buffers, all of which reduce the amount of available memory. See the "Getting ANSI" and "The DOS Postal System" items in this column for more information on system configurations.

Getting ANSI?

Among the files on my DOS disk, there's one called ANSI.SYS. If I try to run it, it locks up the computer. What does it do, anyway?

ANSI.SYS is one of a class of programs called device drivers. *You can think of these as translators or interpreters. Device drivers control the interaction between DOS and peripheral devices connected to the computer. For example, a device driver for a printer may translate the computer's character codes into the codes specific to your brand of printer.*

ANSI.SYS is an enhanced screen and keyboard driver. As you have probably discovered, DOS has almost no built-in support for the special features of the computer's screen or keyboard. In fact, the only screen command in DOS is CLS,

which simply clears the current display screen. The ANSI.SYS driver adds features such as cursor movement, screen color control, screen clearing, key redefinition, and so on. It also allows programmers to provide special effects (underlined or flashing characters, and so on) which DOS can't do unaided. These features are implemented through the use of command codes common to the many versions of IBM PC and compatible computers. (The ANSI *in the name stands for American National Standards Institute, the organization that proposed this particular set of codes.)*

Some software won't work without ANSI.SYS. These programs display garbage on the screen if the driver isn't installed. Check your software manual if you suspect this might be the case.

You can't install ANSI.SYS by running it like an ordinary program; as you discovered, that just locks up the computer. ANSI.SYS—and all other DOS device drivers with filenames ending in .SYS—must be installed by DOS as part of the system initialization (boot) process that occurs whenever the computer is turned on or reset. Once DOS itself has been loaded from disk and started, it looks on the disk for a file named CONFIG.SYS, which is a text file containing instructions to DOS on how the system is to be configured. Instructions of the form DEVICE = filename *tell DOS to install the device driver file named* filename*, so the line DEVICE = ANSI.SYS would tell DOS to install the ANSI.SYS driver. If the ANSI.SYS file is not on the same disk nor in the same directory as CONFIG.SYS, the instruction must tell DOS where to find it. For example, if your system is set up to boot from a hard disk designated as drive C, and ANSI.SYS is in a subdirectory named SYS, then the instruction in the CONFIG.SYS file should be DEVICE = C:\SYS\ANSI.SYS.*

Use the DIR command to check whether your boot disk currently has a CONFIG.SYS file. (If your system boots from a hard disk, the CONFIG.SYS file must be in the root directory.) If no CONFIG.SYS file is present, you can create one that will install ANSI.SYS by entering the following lines at a DOS prompt:

```
COPY CON CONFIG.SYS
DEVICE = ANSI.SYS
```

Then press the F6 function key (or Control-Z) to write the CONFIG.SYS file to disk. If the ANSI.SYS file itself isn't already on the boot disk, copy it from your DOS master disk. (If you place the file in a subdirectory rather than in the root directory of the boot disk, remember to modify the DEVICE instruction in the CONFIG.SYS file accordingly.) When you next start the system, ANSI.SYS will be installed.

If your boot disk already contains a CONFIG.SYS file, examine its contents by entering the following command at a DOS prompt:

```
TYPE CONFIG.SYS
```

If the file contains a line of the form DEVICE = ANSI.SYS, then DOS is already installing the driver. If not, you must edit the file to add the instruction to install ANSI.SYS. You'll need a text editor or a word processor that can load and save straight ASCII text files. (You can use the EDLIN editor supplied with DOS if you don't have some other favorite program.) See your DOS manual or software manual for more details.

When You Want A Date

BASIC's FILES command doesn't display time and date stamps, or file sizes like the DOS DIR command. Is there a way to get more information from a disk directory in BASIC? Is there a way to put this information at the screen location I want?

Dan L'Hommedieu

One way to get more directory information when programming in BASIC is to use BASIC's SHELL command. (SHELL only works with the versions of BASIC supplied with DOS 2.0 and higher, and it does not work properly with Cartridge BASIC for the PCjr.) When you type SHELL in BASIC, you exit BASIC temporarily and switch to DOS. You can then use the DOS command DIR to display a directory that does include the time stamp information. After typing DIR and viewing the directory, you can return to BASIC by entering the command EXIT. This way, you don't have to quit BASIC to access DOS. Any BASIC program in memory will still be there when you return.

If the SHELL command is executed by a BASIC program, the departure to DOS and the return to BASIC is automatic, and the program continues where it left off. This is a very useful capability. To demonstrate, the following program uses the SHELL command to instruct DOS to copy the contents of the disk directory into a sequential disk file named DIRFILE. The program then reads DIRFILE in the same way as any sequential file. In line 90, the RIGHT$( ) function extracts the time stamp information from the string DIR$, which contains the directory information for a particular directory entry.

```
10 A$ = "dir > dirfile"
20 SHELL A$
30 OPEN "dirfile" FOR INPUT AS #1
40 FOR I=1 TO 3
50 INPUT #1, JUNK$
60 NEXT
70 WHILE NOT EOF(1)
80 INPUT #1, DIR$
90 TSTAMP$ = RIGHT$(DIR$,6)
100 PRINT SPC(5);TSTAMP$
110 WEND
120 CLOSE
```

If you wish, you can also use the LEFT$( ) and MID$( ) functions to extract the file size and filename from DIR$. If you don't know how to use these functions, see your BASIC manual.

As line 100 shows, you can use any of the BASIC screen-formatting commands—such as LOCATE, SPC( ), or TAB( )—to position the directory information where you want it on the screen.

You Can't Take It Back

I have an IBM PC with 256K of memory. I use memory-resident programs, and I also use some large programs which aren't memory-resident. When I've loaded the memory-resident programs, I can't load the other programs without getting an out-of-memory message. How can I clear the resident programs from memory so I can load the large programs? Do I have to reboot the computer?

Frank C. Sitar

Yes—although there are some memory-resident programs available commercially which allow you to selectively unload other *resident programs from memory. Without such a utility, however, your resident programs will use memory until the computer is reset or powered down. Note that even if a memory-resident program has a command for turning itself off, the memory it occupies is almost always unusable by other programs.*

For the benefit of readers who don't know what memory-resident programs are, here's a brief explanation. IBM PCs and compatibles can run two kinds of programs: transient programs and memory-resident programs. Most programs are transient—the ordinary kind you run, use, and then quit. When you exit a transient program, the memory it used is freed. The familiar database managers, word processors, and spreadsheets are usually of this type.

When you load a memory-resident program (sometimes called a terminate-and-stay-resident, *or* TSR *program), it remains in memory to perform its functions. Typical resident programs include printer drivers, print spoolers, clocks, cal-*

culators, notepads, and many others. (The PRINT and MODE utilities on your DOS disk actually belong to this group). Each resident program you install reduces the amount of memory available for transient programs.

Current versions of DOS don't provide a way to free the space used by resident programs. When the IBM PC was introduced in 1981, memory sizes of 256K and up were almost unheard of in personal computing, so no provision was made for resident programs. Nowadays, with 512K and 640K machines quite common, the memory used by resident programs usually isn't missed. Also, the authors of DOS didn't anticipate the demand that eventually developed for programs of this type. Today, there are hundreds of resident programs, some of which are as large as full-featured transient programs.

The only personal computers currently on the market designed with resident programs in mind are the Apple Macintosh, Atari ST, and Commodore Amiga. (Actually, the Amiga is a true multitasking computer, so, in a sense, it makes no distinction between transient and resident programs. Someday that distinction will be erased on all personal computers.) Resident programs are known as desk accessories on the Mac and ST. The IBM Personal System/2 computers will also have better provisions for handling resident programs, when used with the OS/2 operating system to be released in 1988.

Frankly, the best solution to your problem is to install more memory. Expansion to 512K or 640K is fairly inexpensive these days.

Picking The Lock

Is there any way to unlock protected BASIC files in case I need to edit them later?

William Carey

A BASIC program file can be protected from prying eyes by saving it with the P option added at the end of the SAVE command:

SAVE "*filename.ext*",P

where filename.ext is the usual filename of up to eight characters, and optional extension of up to three characters. When a file is protected, it can be loaded and run, but it cannot be listed, edited, or resaved. This option helps protect business programs from tampering. Note, however, that the protection does not prevent the file from being erased. The BASIC command KILL or the DOS command DEL will still delete protected files.

BASIC doesn't provide a way to unprotect a file once it has been protected. Having a simple BASIC command to unprotect the file would defeat the effectiveness of the protection. When the file is protected, every byte in the file is changed in such a way that a cryptographer would be needed to decypher it. However, while BASIC's protection scheme may thwart the casual mischiefmaker, it should not be used for truly sensitive data because the protection isn't too difficult for knowledgeable programmers to overcome.

In the versions of BASIC for the PC and PCjr, memory location 1124 in BASIC's data segment controls whether or not the program in memory is protected. For example, type NEW, then enter the following one-line program:

10 DEF SEG: PRINT PEEK(1124)

When you run this program, it should print a zero. Now save the program with a statement of the form SAVE "TRIAL",P. Type NEW, then reload the protected file you just saved. Note that BASIC won't let you list this version. When you run the program now, it prints 254 instead. Actually, any nonzero value in location 1124 indicates the program is protected.

From this, it should be obvious how to unprotect a program: Simply reset location 1124 to 0 after the protected program is loaded. However, you'll get an error message if you load the protected program and then try using POKE 1124,0. The designers of BASIC anticipated this move and made POKE and PEEK illegal in immediate mode while a protected program is in memory. (Those commands are still legal within protected programs, however.)

So how do you change the contents of a memory location if you can't use POKE? Try this: Enter NEW to make sure no program is in memory, then type DEF SEG: PRINT PEEK(1124) to make sure the location contains 0. If so, enter this command:

BSAVE "UNPROT",1124,1

This creates a one-byte disk file containing the value 0 that will reload at the desired address. Now load the protected BASIC program file you want to unprotect. After the file is loaded, enter this command:

DEF SEG:BLOAD "UNPROT"

Your program should now be unprotected, and you should be able to freely list and edit it. Keep a copy of the UNPROT file handy on your BASIC programming disk so you can use it whenever you need to unlock a protected file.

Unfortunately, this simple technique does not work in GW-BASIC, the version of Microsoft BASIC supplied with PC compatibles. For one thing, the protection flag address is different, but more important, these versions of BASIC disable both BLOAD and POKE when a protected program is in memory, making it impossible to change the value of the flag location. In this case, you must use a more sophisticated procedure. A technique that should work, regardless of the version of BASIC, can be found in the article "Unlocking IBM BASIC Programs" in the June 1985 issue of COMPUTE! magazine.

The DOS Postal Service

My software manual says I should put the commands FILES=20 and BUFFERS=5 into my CONFIG.SYS file. What do these commands do, and how do they influence the computer's performance?

As part of the initialization sequence performed whenever you switch on or reset the computer, DOS automatically looks for a file named CONFIG.SYS on the startup disk. If this file is present, DOS reads it to get certain information about how the system should be configured. Some of the instructions in the CONFIG.SYS file can tell DOS to load device driver routines to support peripheral devices (see "Getting ANSI" elsewhere in this column). Other instructions, including FILES and BUFFERS tell DOS how much memory to set aside for disk operations.

The BUFFERS command tells DOS how much memory to allocate for reading and writing disk sectors. Each buffer contains enough memory to hold the contents of a single disk sector—512 bytes (equal to 512 characters). If the CONFIG.SYS file specifies BUFFERS = 5, for example, DOS sets aside enough space to hold five sectors.

Buffering sounds complicated, but it really isn't. Just think of the operation as a sort of DOS post office. If you read or write to a file, it's like a trip to the post office. If you mail a letter from California to New York, the postal service doesn't pick up your individual letter, put it into its own airplane, and fly it to New York posthaste. For the sake of efficiency, the postal service collects all the letters going to New York into a mailbag and ships them together.

A buffer is like a mailbag. DOS collects into a buffer all the information going to a particular file on the disk. When the buffer is full, DOS ships the entire buffer contents to the disk file. The contents of the buffer are also sent off, full or not, when you close the file. That way, no information is lost at the conclusion of an

operation.

Conversely, letters incoming from New York also arrive together in a mailbag; they don't arrive a letter at a time. Let's say you're expecting a big check in the mail from New York. The greater the number of mailbags that arrive from New York, the more likely it is that your check will be found in one of them—and the sooner you'll get it. Likewise, the more buffers you allocate for DOS, the more likely it is that a given piece of information will be in memory, and DOS won't have to fetch it from the disk.

This analogy suggests you should always specify the maximum number of buffers that DOS allows, which happens to be 99. But this consumes a lot of memory, because each buffer you allocate will reduce the amount of memory available for application programs by 528 bytes (512 bytes of buffer space, plus 16 bytes of overhead for DOS record-keeping). Moreover, there is a point of diminishing returns. DOS has to look at each buffer to see if it contains the information it's looking for, and this takes time. If you have too many buffers allocated, searching the buffers may take more time than a trip to the disk, so allocating too many buffers can be just as detrimental to system performance as allocating too few.

The default number of buffers depends on your version of DOS. If no BUFFERS command is found, DOS 2.0 and 2.1 always set aside two buffers. DOS versions 3.0 and higher allocate a varying number of buffers depending on the amount of available memory and the types of drives installed. The default number can range from two in a system with only 360K drives and 128K or less memory, to 15 in a system with more than 512K. If your programs don't do a lot of disk file manipulations, the defaults may be satisfactory. Many users find that ten buffers are satisfactory for hard drives, and floppy drives do well with three or four. Most software packages that involve extensive disk access suggest an optimum number of buffers to specify for that particular application. Check your software manual for this information.

The FILES command is analogous to specifying the maximum number of mailbags you can be filling or emptying at any one time. You can have a bag for New York, a bag for Hong Kong, and so on, up to the number you specify with the FILES command. For example, if you've set FILES = 8, you can collect mail for no more than eight cities. This doesn't mean you can't send mail to any city on earth; it means you can't collect mail from any more than the maximum number of cities at any one time. If eight files are open and you want to collect mail from a ninth, you must close one of the open files. If you don't, DOS sends you an error message.

The minimum value for FILES is 8, for a maximum of eight simultaneously open files. This is also the default number if no FILES command is found in CONFIG.SYS. DOS allows you to specify values as large as 65534, but there's no need to allow for too many open files. Most software doesn't need to keep a lot of files open at once, so the default is usually satisfactory. Even relational data bases like dBase III Plus don't need more than 20 simultaneously open files. Allowing for an excessive number of open files doesn't degrade performance as does allocating too many buffers, but it does waste memory (39–48 bytes for each file above 8, depending on your version of DOS). The best number to specify with the FILES command is the number recommended in your software manual.

Getting The Most Out Of Your Memory

I use an IBM PC at a library to keep track of all the books going in and out. IBM BASIC memory is limited to 64K, and that's not enough for all the book data I have to keep. Is there a way to add more memory to BASIC?

James F. Mosley

There is no way to make the standard versions of Microsoft BASIC (BASIC or BASICA for the PC, Cartridge BASIC for the PCjr, or GW-BASIC for compatibles) use more than 64K of memory. But you don't need a lot of memory to keep a lot of data. You can use a disk file instead. The amount of data which can be stored in a file on disk is limited only by the size of the disks you use. If you use 360K floppy disks, you can have a file that's up to 360K long, and if you have a hard drive, the sky's the limit (almost).

BASIC supports two types of disk files—sequential and random. Sequential disk files are less suitable for storing large amounts of organized data because your program always has to start reading from the beginning of the file before it can use any part of it. For instance, if you're looking for an entry called elephants in an alphabetically ordered file of animal facts, the program has to start reading the file at the beginning—say at aardvarks—reading everything between that point and the elephants record before it can read elephants. Random disk files, on the other hand, allow a program to go immediately to the part of the disk where the desired data is stored and read only that data into memory. That way, you need only enough memory to hold an elephant, not the whole zoo.

If you're a BASIC programmer, you can learn to write sequential and random files from your BASIC manual. Appendix B of the IBM BASIC manual has several tutorials on the subject of disk files.

When Is COMMAND.COM In Command?

Why can I use some DOS commands no matter what drive or directory I'm in, while others (like FORMAT) require that the DOS disk be in the current drive?

It can be a frustrating experience to type a DOS command such as FORMAT or DISKCOPY only to have the computer respond File not found. You then have to find the disk or the directory where you keep the DOS files before you can accomplish your goal. This can be most inconvenient when the DOS disk is not close by. Other commands, like DIR, always execute, even if there's no DOS disk in the current drive. Here's why.

The designers of DOS divided its commands into two groups—internal and external. The internal commands are included in the DOS command processor program, COMMAND.COM. You'll see this program on all bootable disks. The FORMAT command places this program onto disks when the /S option is used to include DOS system files. The command processor is also responsible for loading and running any other program. COMMAND.COM is loaded into memory when the system is booted, and it remains in memory until it is overwritten by an application program (although many applications, including BASIC, are careful not to disturb COMMAND.COM). That's why internal commands like DIR execute even if the current drive doesn't contain a DOS disk. Following is a complete list of the internal DOS commands:

BREAK	**PATH**
CHDIR	**PROMPT**
CLS	**RENAME**
COPY	**RMDIR**
CTTY	**SET**
DATE	**TIME**
DEL	**TYPE**
DIR	**VER**
ERASE	**VERIFY**
MKDIR	**VOL**

The batch-file processing commands—ECHO, FOR, GOTO, IF, SHIFT, PAUSE, and REM—are also part of COMMAND.COM. This is done so that nothing has to be loaded from disk to run a batch file (except, of course, for the batch file itself).

Other commands, such as FORMAT and DISKCOPY, are external—they are provided as program files on the DOS disk. These files can be identified as command files because their names include the extension .COM. Like any other program, the files must be present in the current drive and directory for the command processor (COMMAND.COM) to load and run them.

Why aren't external commands like FORMAT and DISKCOPY built into COMMAND.COM like DIR or ERASE? PC-DOS for the IBM and MS-DOS for compatibles provide a wide variety of commands—over 60 in the current version 3.0 series. If all the external commands were internal, COMMAND.COM would be so large that there would be little room for anything else on a system-formatted floppy disk, and it would occupy so much of the computer's memory that there would be little room left for other programs. The programmers who created DOS compromised by making the most frequently used commands internal and the others external. This system also provides great flexibility in expanding and enhancing DOS. Any program written to obey the specified rules for a .COM file in effect becomes an additional DOS command.

There is, however, a simple way to make DOS look for external command files in places other than the current directory: the PATH command. PATH allows you to specify a list of directory paths which DOS will check when an external command file isn't found in the current directory. For example, if you have a system with two floppy drives, you might use drive A as your working drive and keep a copy of the DOS disk in drive B. The following command tells DOS to look to drive B for any command files not found on drive A:

```
PATH B:
```

The PATH command is especially valuable for hard-disk users. Suppose you have the COMMAND.COM file in the root directory of your hard disk (drive C) and the remaining DOS files in a subdirectory named DOS. The following PATH command tells DOS that, when it is given a command, it should look first in the root directory and then in the DOS subdirectory to find the command file:

```
PATH C:\;C:\DOS
```

Such an arrangement reduces clutter in the root directory by allowing you to move all the DOS command files to their own subdirectory, yet it still makes all the external DOS commands available no matter what path is selected as the current directory.

The PATH command can be included in an AUTOEXEC batch file. This allows you to specify the desired search paths automatically when the system is booted. See your DOS manual for more information on the PATH command and AUTOEXEC batch files. **PC**

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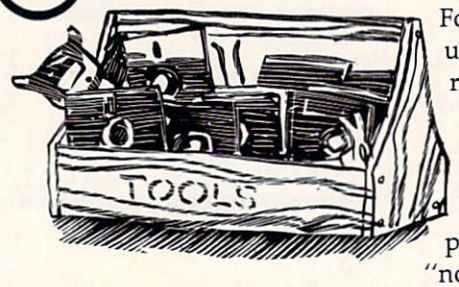


The Best Utility Programs For Your PC

Buying a computer and using it right out of the box is like living in a brand-new house before the landscaping and decorating are finished. Regardless of the application software you may have bought, a computer with the right utility software is easier to use and much more efficient and convenient than a barebones machine.

Utilities are relatively small programs that generally perform from one to a few simple tasks. Often they're stand-alone programs that run from the DOS prompt, just like application programs. Increasingly common, however, are *memory-resident* utilities that automatically load when you switch on the computer and then reside in memory all day. A memory-resident program waits in the background, unseen, until you press a certain key combination; then it pops up on the screen, ready for work. When you're done, another keypress sends it away until you need it again. Memory-resident utilities were popularized on MS-DOS computers by Borland International's *Sidekick*, a multipurpose program that's as versatile as some application software. (For one examples of a short but useful memory-resident utility, see "Screen Saver" in this issue.)

Robert A. Moskowitz

Because utility programs are designed to serve with many different hardware/software configurations, they tend to be self-contained, and you can add them to your system in almost any combination you like.

Although many people, especially new users, are barely aware of utilities, there are hundreds and hundreds to choose from. In fact, if you'd like to change some aspect of the way your computer works, chances are you can find a utility program to do it. Some utilities are free from bulletin board systems and user groups (although you may incur the price of a long-distance phone call to reach a BBS, and many user groups charge a copying fee for their library disks). Other utilities are sold for $20 to $100 by entrepreneurial start-up companies that, like Norton Utilities and Borland International, may someday grow into highly successful corporations.

Combined with your hardware and application software, utilities help customize your system and make it as useful as a backyard patio, or as comfortable as a cozy family room. There are far too many utilities to cover in a single column, of course, but we can give a rundown on some of the most useful utilities you might want to add to your PC.

Restoring Erased Files

Many users live for years without an unerase utility, and then someday, unnecessarily, suffer the ignominy and frustration of accidentally deleting an important data file. Fortunately, erased files are usually recoverable—with the right utility.

Did you know that when you delete a disk file on an MS-DOS computer, it's not actually erased? All the computer really does is mark the file "no longer in use" in the disk directory. Those areas on the disk are freed up and made available for the next file you save. If you do save another file, the data in the deleted file may, in fact, be erased. But for a while at least, it lingers.

Unerase utilities reconstruct the deleted file by finding the data that remains on the disk. Perhaps the best, and most famous, of the unerasers is available with several other functions in the *Norton Utilities*, a commercial package—but other good ones exist as well.

Once you have an unerase utility, you may use it only once a year or less, but it's worth having anyway. There's no feeling of relief quite like that of recovering an important file you accidentally erased—and no feeling of dismay quite like that of losing some valuable data forever.

One tip, though: No unerase utility can recover a file if you've reformatted the disk or overwritten the deleted data. If you hope to recover a file, immediately stop working with the disk until you can get your hands on an unerase utility.

Managing Disk Files

As you add new applications and your disk files multiply, you quickly outgrow the limited subdirectory and multiple-file commands in MS-DOS. What you need is a disk-catalog or file-management utility.

These utilities come in many va-

rieties and degrees of complexity. The point, however, is to provide better control over large numbers of files on both floppies and hard disks. With a few keystrokes, you can view and scroll through hundreds or even thousands of files, select one or more of them for action, and execute DOS commands to copy, delete, protect, or perform other functions on the files all at once.

A good example of a disk-management utility is *FindDupe* in the September 1987 issue of COMPUTE!'s PC Magazine. This program lets you quickly and efficiently search a hard disk, or any number of floppies, for unnecessary duplicate copies of files.

When you have hundreds or thousands of files to manage, you also need a good way to search those files to locate a name, a phone number, or some other piece of information, as you probably find it hard to remember which file contains the item you're looking for. About the only help MS-DOS provides is the TYPE command, so you're forced to display each file on the screen and search for the information you want the hard way. With a multiple-file search utility, you simply enter the fragment of text or data you're looking for, and let the computer scan any or all of your files.

If you never refer to your old files, you probably don't need a search utility. If you modify old files to create new ones, review old ideas and information from time to time, refer to past correspondences, or simply like to refresh your memory, a file-search utility saves a great deal of time and trouble.

Transferring Data

One of the most aggravating limitations of today's MS-DOS computers is the lack of practical software integration, or multitasking. There are dozens of packages that promise these capabilities—everything from *Topview* to *Software Carousel*—but none of them provides the quick response time, jam-free operation, or management of additional memory you need to make them practical.

The problem arises because most users prefer separate application programs for word processing, spreadsheets, database management, time-keeping, data analysis, and other tasks, and each application generally keeps data in its own files and its own format. Data-transfer software that can easily shift information between your main applications is usually worth its weight in gold.

Most data-transfer utilities capture the information as a particular application displays it on the screen; it then writes it out as a file, or brings it into the screen display of the target application. This simplifies the job of addressing a letter with customer information from a database, for example, or pasting a portion of a spreadsheet into a written report. But this screen-at-a-time approach breaks down when transferring large volumes of data.

Unfortunately, the data-transfer utility we really want has not yet been invented. Ideally, it would shift data freely between the files of every application we use, automatically making all necessary translations. You can find one or two universal translators for text files, but nothing like them for other applications. Some progress is being made, however. For instance, standards are emerging that allow graphics screens to be exchanged between MS-DOS, Apple Macintosh, Atari ST, Commodore Amiga, and other computers. Each machine displays the screen to the best of its abilities, although some resolution and colors may be lost in the translation.

Pop-Up Functions

Few computers come with a built-in calendar, appointment book, calculator, or notepad—the basic necessities we use briefly, but frequently, to handle routine activities, regardless of the larger application we're working with. This is a fertile field for utilities, and hundreds of these little accessories have been written.

Some (especially the more ambitious ones) are stand-alone programs which are run from the DOS prompt. Others are memory-resident utilities. Still others are available from pull-down or drop-down menus in graphics-oriented desktop environments, such as Microsoft's *Windows* and Digital Research's *GEM*.

The most widely known memory-resident utility is *Sidekick*, which is actually a collection of utilities in a single package. You can automatically load several of these pop-up programs into your computer each time you boot up, although sometimes there are conflicts as they compete for the attention of the keyboard or the screen. It's always a good idea to test a new combination of memory-resident utilities to make sure they're mutually compatible before doing any important work with your computer. Otherwise, the machine might lock up or crash at a critical moment.

If things get out of hand, there are even memory-resident utilities that manage *other* memory-resident utilities. They let you load and unload memory-resident programs and even try to resolve any sibling rivalry between them. A well-known program of this type is *Referee*.

Convenience Utilities

Most hardware and software is designed for folks who work at an average pace, but some people prefer to work faster and need a zippier cursor. If you often find yourself scrolling through large text files, or spreadsheets the size of Nebraska, you might consider a cursor-control utility. In addition to faster cursor movement, you'll also get better "brakes" (the ability to instantly stop the cursor when it reaches the desired spot). A popular utility of this type is *Cruise Control*.

Those who are rapid touch-typists occasionally find themselves outrunning the keyboard. This happens because the keys you press aren't immediately interpreted and executed by the computer. Instead, their signals are first shunted into a

buffer—a holding area in memory—while the computer saves or retrieves a file, searches for data, or performs some other task that temporarily demands the attention of the central processor. When the task is finished, the computer fetches and executes your keystrokes from the keyboard buffer, but when the buffer fills up, your subsequent keystrokes disappear. (Some PCs emit a beeping sound to warn you of this.)

While you may have realized you can type cautiously even when the computer is occupied, you may not have considered that an expanded keyboard buffer can save time and simplify operations. A utility can enlarge the buffer from its frugal 15-character capacity to something roomier, say 128 or even 256 characters. This extra room lets you work while the computer is busy. You can enter a whole database record, type several sentences of text, or enter the next command—as long as you can do so without seeing the screen respond.

One of the most useful and powerful convenience utilities is a *ramdisk* or *virtual disk*. Plenty of people who should have one still don't. A ramdisk is simply a section of computer memory set aside to serve as another floppy-disk drive. The ramdisk program fools the computer into treating the block of memory just like a real drive; you can save, load, and copy files to and from a ramdisk.

The great advantage of a ramdisk is that it works much faster than a floppy drive—often even faster than a hard drive. Obviously, the drawback is that a ramdisk disappears when you shut off the power (or when the power shuts itself off during a thunderstorm), so any important files in a ramdisk should be copied to a floppy or hard disk periodically. While the ramdisk remains active, however, it handles programs and data files much faster than a mechanical disk drive. A ramdisk utility particularly improves the performance of applications that require a lot of disk access, such as *Wordstar*.

Disk Caching

Another way to make your computer seem faster is to use a *disk-caching* utility. These programs, like ramdisks, take advantage of the fact that mechanical disk drives lag far behind the computer in handling data. A disk-caching utility attacks the problem by automatically copying the most recent data from a disk access into a block of memory called a *cache* (pronounced *cash*). The next time the computer needs data from the drive, it looks to the cache first and may not have to read the disk at all.

Disk-caching software works best with applications that repeatedly access the same disk files, mainly database programs. Some cache utilities are cumbersome to use; others are totally transparent—you never know they're active—but somehow, the computer works faster. Disk-caching is built into the new OS/2 operating system for the IBM Personal System/2 computers.

All of the utilities we've mentioned so far are designed to either improve the computer's performance, or make it easier to use, but some utilities can actually help protect your machine. Automatic screen-blankers fall into this category. Years ago, when home videogames first became popular, some people learned the hard way what happens when a static image remains on a video screen too long: their TV acquired a permanent tatoo from *Pong*. The ghost image is the result of the phosphor coating within the picture tube burning in due to long-term exposure to a static pattern.

Computer monitors are designed to be less susceptible to this kind of damage than ordinary TV sets. Still, it can happen, especially if the brightness and contrast controls are turned up too high. A screen-blanking utility helps avoid this by automatically blanking out the screen if you don't press a key for several minutes. Touch any key and the screen instantly reappears. Some screen-blanking utilities let you set the delay anywhere from one second to a few minutes, or even hours. (See "Screen Saver" elsewhere in this issue.) The unspoken danger, however, is that a blank screen and an unattended computer may be an invitation for someone to turn off the power!

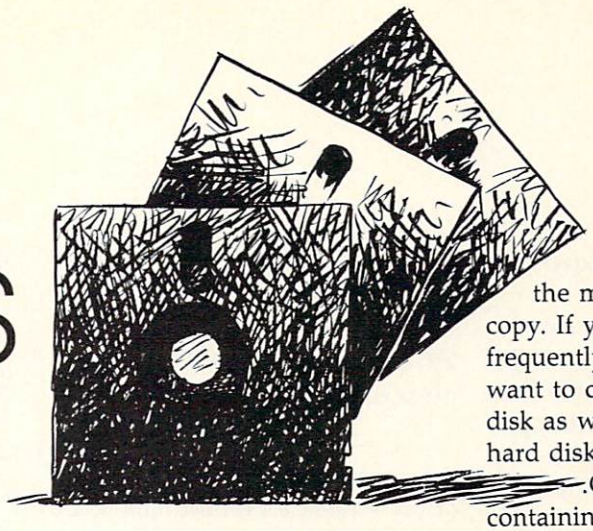
What Do You Need?

This is far from a complete list of what utility programs have to offer: There are utilities that accelerate computer performance in numerous ways; control printing from all of your applications, and make it a background function; insert graphics into documents; monitor the time you spend on various projects; and print a complete log of your activities on the computer—complete with invoices, if you wish.

Future columns will cover these areas more specifically. In the meantime, I'd welcome letters telling me what utility functions you use most, or most need.

Write to Robert A. Moskowitz c/o COMPUTE!'s PC Magazine, P.O. Box 5406, Greensboro, NC 27403. **PC**

BEST OF THE BOARDS



FastCopy

"Best of the Boards" features outstanding programs gathered from bulletin board systems throughout the country. Some of the programs are in the public domain; some are copyrighted by the author but freely distributed; and some are copyrighted "shareware" programs (freely distributed in return for voluntary donations). In each case, COMPUTE!'s PC Magazine obtains the very latest version of the program directly from the original author in return for a publication fee. We then test the program, rework the documentation, and present the polished package here.

This issue's featured program is FastCopy *by Jim Nech. It greatly speeds up the task of formatting blank disks and making copies.* FastCopy *runs on any IBM PC, XT, AT, or compatible with 640K of memory, one or two 360K 5¼-inch floppy disk drives, and DOS 2.0 or higher.*

One of the least pleasant tasks for PC users is making multiple copies of floppy disks. DOS insists on reading the original disk into memory each time a new copy is made. Formatting a new box of floppy disks takes far more time than it should, too.

This issue's installment of "Best of the Boards" solves both of those problems. *FastCopy,* written by Jim Nech of Houston, Texas, speeds up both operations dramatically. It copies the original disk just once into memory, then copies additional floppies directly from RAM. Using *FastCopy,* you can make multiple copies and format new disks much more efficiently.

How much faster is *FastCopy*? Using a PC-compatible running MS-DOS 3.1 at the standard IBM PC speed of 4.77 megahertz, it took 10 minutes, 44 seconds to format a box of ten new floppy disks. *FastCopy* did the same job in 7 minutes, 30 seconds. That's a 30-percent speedup.

On the same system, the DISKCOPY command took 18 minutes to copy a disk to ten unformatted floppy disks. *FastCopy* made the same number of copies in just 8 minutes, 20 seconds. That speed increase makes copying entire disks a pleasure instead of a chore.

FastCopy requires an IBM PC, XT, AT, or compatible with 640K of RAM, DOS 2.0 or higher, and 5¼-inch, 360K floppy disk drives. It works on systems that have either one or two floppy drives. If you're using an AT-class computer with a 1.2-megabyte floppy drive, it must also have a 360K floppy drive.

By Jim Nech
Column By
George Campbell

Using *FastCopy*

Copy the file FASTCOPY.COM from this issue's magazine disk to a disk of your own, saving the magazine disk as a master copy. If you have a disk containing frequently used utilities, you may want to copy the program to that disk as well. If your computer has a hard disk drive, copy FASTCOPY.COM into the directory containing your utility programs.

FastCopy runs from DOS, so all parameters must be entered on the command line when you run the program. For a reminder of the proper command format, type FASTCOPY alone at the DOS prompt. Here's what you'll see:

FASTCOPY (SOURCE) (DEST) (FORCE-FMT) (FMT-ONLY) (VERIFY) (FAST-DRV)

All parameters can be entered in either upper- or lowercase letters. Don't type the parentheses. Separate the parameters from each other with a single space. Let's take a look at what each of the parameters does.

The first parameter, *(SOURCE),* is the drive designation for the source disk. Enter this parameter without a colon (A instead of A:).

The second parameter, *(DEST),* is the destination drive, and is also entered without a colon. You can specify either drive A or drive B for either *(SOURCE)* or *(DEST).* On single-drive systems, use the same drive letter for both parameters; *FastCopy* will prompt you when to swap disks.

The next parameter, *(FORCE-FMT),* specifies whether you want to format disks on every copy, whether or not the disk is already formatted. In most cases, you won't want to do this, so specify OFF for this parameter. If for some reason you want to format each disk, specify ON. If this parameter is set to OFF, the program checks each disk.

If the disk is already formatted, *FastCopy* runs even faster.

Next, *(FMT-ONLY)* tells *FastCopy* that you want to format disks without making copies on this pass. The program handles formatting by working only on the first track of your disk. Unlike DOS, it does not check for bad sectors on each track. As before, type ON or OFF to set this parameter.

The fifth parameter, *(VERIFY)*, specifies whether *DiskCopy* should check to make sure data is written correctly on each track of the disk in the same way that DOS does when you enter the VERIFY ON command. There is a slight loss of speed if you set this parameter to ON.

Finally, the *(FAST-DRV)* parameter can speed up the disk drives on some computers. It works with IBM PCs and some compatibles. On other computers, it has no effect. In some cases, it can even slow down operations somewhat. Try setting this parameter ON. If it speeds up the program, you can use it regularly. If not, as in the case of my compatible, set this parameter OFF when using *FastCopy*.

Important: All six parameters must be included each time you run *FastCopy*. If one or more parameters are missing, the program aborts and shows you the correct format.

Copying Disks With *FastCopy*

Before beginning to make multiple copies of a disk using *FastCopy*, have your original disk and the blank disks close at hand. I generally take the blank disks out of their sleeves to simplify the process. You should also have room to stack disks as they are copied.

For a typical PC with two disk drives, place the disk with the *FastCopy* program in drive A and enter the following command:

```
FASTCOPY A B OFF OFF OFF OFF
```

The program runs and displays the opening screen. At the bottom of the screen, a prompt tells you to insert the source disk in drive A and to strike any key when ready. Do this, then insert a blank disk in drive B. *FastCopy* reads the source disk, copying the data into memory. Once the disk is read, copying begins on drive B and a message prompts you to remove the source disk. Replace it with another blank disk.

After copying the source disk onto the disk in drive B, *FastCopy* sounds a beep, switches to drive A, and copies the data to that disk. Meanwhile, place a new disk in drive B. Continue to swap disks until you've made all the copies you want. An elapsed-time counter on the screen shows how long it takes to copy each disk and then compares it to the time taken for the previous copy.

When *FastCopy* is writing to the last disk, press the Esc key. When the final pass is complete, copying ends and a menu appears at the bottom of the screen. You can choose to (Q)uit, (C)ontinue, or (L)oad a new source disk.

If *FastCopy* encounters an empty disk drive, it displays an error message. Then it offers the same menu, allowing you to quit or continue.

Do not exit *FastCopy* any other way. If you use the Ctrl-Break combination or reboot the computer, the data on the disk being copied could be corrupted. Always use the Esc key to exit *FastCopy*, or leave a drive empty to bring up the menu with the (Q)uit option.

Single-Drive Copying

If your computer has only one floppy disk drive, enter the copying command this way:

```
FASTCOPY A A OFF OFF OFF OFF
```

FastCopy prompts you to change disks as each copy is completed. This form of the command is also useful if you have an AT-type computer with one 1.2-megabyte floppy drive and one 360K floppy drive.

Important: Do not use *FastCopy* with 1.2-megabyte drives alone, since copies made on those drives may be unreadable by normal 360K drives.

Exercising Options

Here are some further examples to clarify use of the *FastCopy* options.

If you want *FastCopy* to verify your copies as they are made, set the *(VERIFY)* parameter ON. The command looks like this:

```
FASTCOPY A B OFF OFF ON OFF
```

To speed up your disk drives, if this option works on your PC, enter the command this way:

```
FASTCOPY A B OFF OFF OFF ON
```

Experiment with this feature on your system. Compare the speeds with the last parameter ON and OFF. Choose the setting that produces the fastest copies.

Formatting With *FastCopy*

Unlike the DOS FORMAT command, *FastCopy* formats by copying the formatting information from a freshly formatted disk to each new disk. That is all that's required to

format a blank floppy. DOS, however, goes one step further—checking each sector for flaws and marking any unusable sectors it finds. These marked sectors will be skipped when the disk is used.

When you format a disk using DOS, you see a report at the end of each format showing the amount of disk space available. With good-quality disks, you almost never see less than the maximum, meaning there are no bad sectors. *FastCopy* takes advantage of the high quality of today's disks and assumes that all sectors are good, copying just the formatting data. The result is a dramatic speed increase.

The actual formatting takes just 30 seconds. The remaining time involves swapping disks in the drives. It is possible to use both drives when formatting with *FastCopy,* but the process is simpler if you use a single drive. I use just one drive for formatting.

Before beginning, format a blank disk with the DOS FORMAT command. Make sure this disk is perfectly formatted by looking at the format report which DOS provides. If bad sectors exist on this disk, they will be marked as bad on all of the disks subsequently formatted with *FastCopy* and this disk.

Now, run *FastCopy* with the following command:

```
FASTCOPY A A OFF ON OFF OFF
```

When prompted, insert your DOS-formatted disk in drive A. (You could also specify drive B when entering the command.) Once the disk is in the drive, press a key. *FastCopy* reads the disk, just as it does when copying. Once the disk has been read, insert blank floppy disks, one at a time, when prompted. After each disk is formatted, the program beeps to signal the end of the process.

After the beep, remove the formatted disk and insert a new floppy. Notice that the drive's busy light doesn't go off. Normally, you should never remove a disk from a drive while the busy light is on. In this case, however, change disks anyway. *FastCopy* senses whether the drive door, lever, or button is in the correct position. It waits for the next disk to be inserted, then proceeds with the formatting operation.

After you've formatted as many disks as you want, remove the last one when the formatting is complete. Then press Esc. As described above, *FastCopy* displays a short menu, allowing you to quit or continue.

Using *FastCopy* With Batch Files

Since *FastCopy* requires you to enter six parameters each time you run it, it's a perfect program to automate with batch files. I've written several sample files which are included on this issue's magazine disk. Each file allows you to run *FastCopy* by typing just a single command. The filenames and functions are shown below.

ABCOPY.BAT Performs copy operations on two-drive systems using both drive A and drive B.

ACOPY.BAT Copies on single-drive systems using only drive A.

BCOPY.BAT Copies on single-drive systems using only drive B.

AFORMAT.BAT Formats using drive A.

BFORMAT.BAT Formats using drive B.

Place the batch files on the same disk or in the same directory as FASTCOPY.COM. To run a batch file, at the DOS prompt you simply enter the filename of the one you select (without the .BAT extension) as if it were a command. For instance, type ABCOPY to run the batch file ABCOPY.BAT.

Each of these batch files sets the *(FORCE-FMT), (VERIFY),* and *(FAST-DRV)* parameters to OFF. This avoids possible conflicts with your system.

You can, of course, create your own batch files for use with *FastCopy.* Use your favorite text editor or word processor and save the batch file in plain ASCII text, or create the batch files with the COPY CON command. For more details, see "Getting Started with Batch Files" elsewhere in this issue.

A Note About Shareware

When you run *FastCopy,* you'll see a request for a donation on the opening screen. Like many of the programs which will appear in this column, *FastCopy* is a *shareware* program which is supported by its users. The donation is voluntary, of course, and goes to the author of the program, not COMPUTE!'s PC Magazine.

If you use *FastCopy* regularly, you may choose to honor the author's shareware request and become a registered user. If so, the author promises to inform you of new versions of the program and to make them available to you at a low cost. In addition, registered users can obtain the program's source code and may contact the author for help or more information. Registration information for *FastCopy* appears on the opening screen.

PC

BEST OF THE BOARDS

BONUS

PKARC: File Archiving System

As a special bonus in this issue of COMPUTE!'s PC Magazine, we're presenting a second "Best of the Boards" program (see FastCopy *elsewhere in this issue). "Best of the Boards" is a regular column that brings you outstanding programs gathered from bulletin board systems throughout the country. Some of the programs are in the public domain; some are copyrighted by the author but freely distributed; and some are copyrighted "shareware" programs (freely distributed in return for voluntary donations). In each case, COMPUTE!'s PC Magazine obtains the very latest version of the program directly from the original author in return for a publication fee. We then test the program, rework the documentation, and present the polished package here.*

This issue's "Best of the Boards" bonus is the PKARC *archiving system by Phil Katz. It's a collection of three programs that allow you to compress and combine any kinds of files to conserve disk space, and then later uncompress and restore the files to their original form. The most versatile archiving system available,* PKARC *has a number of options and is extremely fast and efficient. It runs on any IBM PC, XT, AT, or compatible with at least 128K of memory and DOS 2.1 or higher.*

By Phil Katz

Column By
George Campbell

A good archiving utility is a must in every software collection. Compressed files conserve valuable disk storage space, whether you use floppy disks or a hard disk. By compressing copies of important files and storing them on backup disks, you can protect yourself against mishaps that might cost you hours or days of hard work.

In addition, if you have a modem, an archiving utility allows you to save time when uploading files to a distant computer. That translates directly into money saved on your telephone bill. And since most bulletin board systems and information services compress their files to conserve storage space and speed up file transfers, you'll need a utility to uncompress any files you download.

PKARC, written by Phil Katz, is arguably the best archiving and extraction system available today for IBM PCs and compatibles.

PKARC creates archive files using state-of-the-art file-compression techniques. *PKARC* does not merely compress files; it both compresses and combines a number of files into a single file called an *archive*. The archive takes up much less disk space than the original files it contains. It even takes up less space than would the same collection of files compressed and stored individually.

With *PKARC*, you can create archives, add files to an existing archive, update existing archive files, include comments on each file, and even encrypt files so they can be unlocked only with a password. The program also includes compatibility options which allow you to create archives that can be restored by other archiving programs.

PKXARC, a companion program in this package, allows you to extract files from archives, expanding each file to its original form. It can also extract files from archives created by other archiving programs. Other features allow you to see lists of files contained in an archive, test the integrity of an archive, extract password-protected files, and extract files directly to your video monitor or printer. Both *PKARC* and *PKXARC* allow you to work with all of the disk drives and subdirectories on your system.

We've also included a third program, *PKSFX*. This lets you create archive files which are *self-extracting*, so it's possible to send archival files to other people who may not have the *PKXARC* extraction utility.

Fast And Efficient

The *PKARC* archiving system is exceptionally fast. To get an idea of its speed, we ran a benchmark test comparing the *PKARC* system to another popular archiving program, *ARC*, from Software Enhancement Associates (SEA). For this test, we made an archive of 35 files—a mixture of .COM, .EXE, .DAT, and ASCII text files, totaling 241,664 bytes.

Using a PC compatible running at 4.77 megahertz and floppy disk drives, *ARC* took 21 minutes to compress the files and build the archive file. *PKARC* did the job in 2 minutes, 24 seconds—almost ten times as fast! The size of the completed archive built by *ARC* was 172,267 bytes, while *PKARC*'s archive was 165,082 bytes.

Our second test extracted all

the files from the archive. *ARC* took 12 minutes to extract the files, while *PKXARC* was finished in exactly 2 minutes. That's 600 percent faster.

Although the *PKARC* system works on practically any IBM or compatible with at least 128K of random access memory (RAM), the more memory you have, the faster it runs.

Running *PKARC*

Before using these programs, copy them from the magazine disk onto your utilities disk or into the utilities directory on your hard disk. You'll need the following files:

PKARC.COM
PKXARC.COM
PKSFX.PGM

To run *PKARC*, you enter the command PKARC at the DOS prompt, followed by certain command parameters to switch the various options on or off. If you forget the parameters, simply type PKARC by itself at the DOS prompt. This brings up a display showing the proper command format:

PKARC [compatibility options] options archive [filename.ext]

Compatibility options are parameters for making the archived file compatible with SEA's *ARC* program; *options* are parameters that control the action of the *PKARC* program; *archive* is the name of the archive file; and *filename.ext* specifies the file or files to be archived. Do not append an extension to the name of the archive file; *PKARC* automatically adds the extender .ARC. Items in brackets are optional; do not type the brackets. Parameters can be entered in upper- or lowercase. You can use the DOS wildcard symbols (? and *) and pathnames in the *filename.ext* parameter.

Let's look at the command line, one segment at a time, starting with the main *options* parameter.

Archiving Files

You *must* supply an option in the *options* position of the command line. Here is a list of the available options, with explanations and examples.

A Adds files to an archive or creates a new archive. This is the most-used option. If the archive file named in the *archive* parameter already exists, the specified file or files will be added to it; otherwise, a new archive file will be created. The archive file will be created in the current directory unless you specify a drive or pathname with the *archive* filename.

For this option, the *filename.ext* parameter specifies the file or files to be added to the archive file. You can supply a single filename or a list of filenames separated by spaces. The ? and * wildcard characters can also be used to specify groups of files to be archived. The following commands are all valid:

```
PKARC A ARCHIVE MYPROG.BAS
PKARC A ARCHIVE MYPROG1.BAS
  MYPROG2.EXE
PKARC A ARCHIVE *.EXE
PKARC A ARCHIVE *.COM *.BAT *.BAS
```

If the files to be archived are not in the current directory, then pathnames must be included with the filenames. The following command would run the *PKARC* program from drive A, creating an archive file named ARCHIVE.ARC on drive B which contains compressed copies of all the files with a .DOC extension in the LETTER subdirectory of the WP directory on drive C.

```
A:PKARC A B:ARCHIVE C:\WP\
  LETTER\*.DOC
```

If no filenames are supplied with the command, the program will archive all the files in the current directory. For example, the following command creates an archive file named ARCHIVE.ARC in the current directory which contains compressed copies of all the files in the current directory:

```
PKARC A ARCHIVE
```

F Replaces files in an existing archive. The rules for specifying filenames are the same as for the A option. This option checks whether each specified file already exists in the archive. If so, and if the current unarchived version of the file has a later date/time stamp than the existing compressed version, then the existing version in the archive is replaced with a compressed copy of the new version. For example, the following command would check the archive file named VAULT .ARC for the compressed file LETTER1.DOC and, if that file exists, replace it with a new version of LETTER1.DOC.

```
PKARC F VAULT LETTER1.DOC
```

If no compressed version of the specified file is found in the archive, or if the directory date/time stamp for the current uncompressed version is not later than the one for the current compressed version, then the archive file is not changed.

U Replaces or adds files in an existing archive. This option is similar to the F option, but, unlike F, will also add the specified file or files to the archive if the archive doesn't currently contain compressed versions of the files. Remember, you can use DOS wildcards in *PKARC* commands. For example, the following command would write copies of all files with an .EXE extension in the current directory to the archive file named STORAGE .ARC. If compressed versions of the files already existed, these would be replaced with new versions; otherwise, the files would simply be added to the archive.

```
PKARC U STORAGE *.EXE
```

M Moves files to an archive, then deletes the original (uncompressed) files from the disk. For example, the following command adds compressed copies of all the files with a .DOC extension on the disk in

drive B to the archive ARCHIVE .ARC in the current directory, then deletes all the .DOC files from drive B.

PKARC M ARCHIVE B:*.DOC

The M option does not delete the original files unless it successfully creates archived versions.

G Allows you to encrypt files within an archive to prevent access by unauthorized users. This option must be combined with a password, and must be used in conjunction with with the A, F, U, or M options. For example, the following command adds an encrypted compressed copy of the file LETTER3.DOC to the archive file ARCHIVE.ARC, using the password SESAME.

PKARC AGSESAME ARCHIVE LETTER3 .DOC

When the encrypted file is extracted from the archive using *PKXARC*, it can be read only if the correct password is supplied. Follow the example above and don't separate the options and password with spaces. The password can contain both upper- and lowercase characters. Whatever you do, don't forget the password, especially if you archive the file with the M option (which deletes the original). It is nearly impossible to recover an encrypted file without the proper password.

Don't use this option when preparing archive files that you wish to make self-extracting using the *PKSFX* utility. Password-protected files cannot be made self-extracting.

D Deletes the specified file or files from an archive. For example, the following command would remove the file LETTER1.DOC from the archive named ARCHIVE.ARC.

PKARC D ARCHIVE LETTER1.DOC

To delete several files at once, remember you can specify wildcards in the filename parameter. For instance, specifying LETTER?.DOC in the last example would delete the files LETTER1.DOC, LETTER2 .DOC, LETTER3.DOC, and so on. However, you should use wildcards carefully to avoid unintentionally deleting important files.

V Lists the files in an archive. The listing includes each filename in the archive, along with its uncompressed length, the compression method used, the compressed length, the percentage of compression, the date/time stamp, and a file-checking value. For example, the following command would print a list of all the files in the archive file named LOCKER.ARC.

PKARC V LOCKER

C Allows you to enter or update a comment for each specified file. The comments may be up to 32 characters long.

This causes *PKARC* to prompt you for a comment to be added to the file LETTER1.DOC in the archive named ARCHIVE.ARC. You can view these comments by using the C option with the V option. Example:

PKARC VC

X This option allows you to enter or update a comment for an entire archive. Example:

PKARC X ARCHIVE

This causes *PKARC* to prompt you for a comment to be added to the archive named ARCHIVE.ARC. Comments may be up to 32 characters long. You can view these comments by adding the X option to the V option. Example:

PKARC VX ARCHIVE

L Displays the software license for *PKARC*.

You can combine the above options to customize your archiving techniques. For instance, the following command adds all the .DOC files on drive B to the archive file ARCHIVE.ARC, then prompts you for comments on each file and for the archive as a whole.

PKARC ACX ARCHIVE B:*.DOC

When combining options, however, remember that the G*password* option—if you use it—must be the last option on the command line.

PKARC provides error messages if the archiving process fails for any reason. All of these messages are self-explanatory. If you receive an error message while running *PKARC*, correct the error and enter the command again. If an error occurs, *PKARC* protects your data. No changes are made to any file until the process is successfully completed.

Compatibility With *ARC*

The *compatibility options* parameter in the PKARC command is optional and should be omitted unless you are preparing an archive file to give to another person who does not have a copy of *PKXARC* but does have SEA's *ARC* program. Here are the allowable values for *compatibility options*:

OC Old compression. Makes archive files which can be extracted by the *ARC* program.

OT Old time/date stamping. Uses an *ARC*-compatible time/date-stamping method for files.

OTC Combines OC and OT.

Extracting Files With *PKXARC*

PKXARC, the second program in this package, allows you to extract files from archives created by almost any archiving program. Archived files can be recognized by the extension .ARC in their filenames.

As with *PKARC*, entering the command *PKXARC* by itself at the DOS prompt shows you a summary of the command format:

PKXARC [*options*] *archive* [**d:***path*] [*filename...*]

As with *PKARC*, you can specify the location of the PKXARC.COM program with drive and path information. If, for example, the program is in the \UTIL directory on drive C, and you are logged onto drive A, start the command like this: C:\UTIL\PKXARC.

The *options* parameter will be explained below. *Archive* is the filename of the archive file. It is not necessary to include the .ARC extension with the filename. Where the command line shows [*d:**path*], substitute the destination drive and pathname to which the extracted files should be written. If this information is not supplied, all extracted files will be sent to the current drive and path. In any case, make sure there is enough room in the destination directory for the extracted files.

The *filename* section of the command lets you tell *PKXARC* which specific files are to be extracted from the archive. You can use the DOS wildcard symbols (? and *) here, just as you did with *PKARC*. If you omit this parameter, *PKXARC* will extract all the files in the archive.

The following command extracts all files from the archive file named ARCHIVE.ARC on drive A and writes the extracted files to drive B.

PKXARC A:ARCHIVE B:

PKXARC Options

The actions of *PKXARC* can be modified by selecting an appropriate option in the *options* position of the command line. A list of the available options follows. Notice that all options for *PKXARC* must be preceded by a hyphen (-).

−R Normally, *PKXARC* asks you before it overwrites a file. If you include the −R option, the program automatically replaces existing files. Example:

PKXARC −R A:ARCHIVE B:

This extracts all files from the archive file named ARCHIVE.ARC on drive A and writes the extracted files to drive B, replacing any existing files on drive B that have the same filenames as the extracted files.

−C Writes extracted files to the screen instead of to disk. To prevent confusing screen displays, use this option only with ASCII text files. Example:

PKXARC −C A:ARCHIVE LETTER1.DOC

This extracts the file LETTER1.DOC from the archive file named ARCHIVE.ARC on drive A, but displays the file on your monitor instead of writing it to disk.

−P Use this option to print hardcopies of archived files. As with the −C option, use it only on ASCII text files. Example:

PKXARC −P ARCHIVE *.DOC

This prints all files with the filename extension .DOC from the archive named ARCHIVE.ARC on the default drive. *PKXARC* sends a form feed between files. Make sure your printer is online and loaded with paper.

−T Tests the integrity of an archive file. It checks each file's error-checking value and reports its findings. Example:

PKXARC −T ARCHIVE

This checks the archive file named ARCHIVE.ARC for errors.

−V Allows you to view the contents of an archive file. This option provides the same information as the V option in *PKARC*. A listing will be printed showing each filename in the archive, along with its uncompressed length, the compression method used, the compressed length, the percentage of compression, the date/time stamp, and a file-checking value. Example:

PKXARC −V ARCHIVE

−G Allows you to extract files which were encrypted with a password. You must provide the correct password immediately following the option. Example:

PKXARC −GSESAME ARCHIVE LETTER1.DOC

This command extracts the encrypted file LETTER1.DOC from the archive file ARCHIVE.ARC if the password is SESAME. Note that you must know the proper password to extract the file.

−L This option displays the software license for *PKXARC*.

Error Messages

PKXARC displays error messages on the screen if it has problems extracting any files. Most of these messages are self-explanatory. To continue the extraction process, simply correct the command line.

Other messages indicate a problem with the archive file. If the file is damaged and cannot be extracted by *PKXARC*, you may see one of the following error messages:

Unknown packing method for: *FILENAME.EXT*
Warning! File *FILENAME.EXT* **fails CRC check.**
FILENAME.EXT **is not an archive.**
Archive length error.
File has invalid decode tree.
Internal table overflow.

If you encounter one of these errors, you'll have to find another copy of the archive file before extracting any files from it. However, I've used this program for two years and have never seen one of these messages.

Self-Extracting Archives

The third program in the package, PKSFX.PGM, allows you to create archives which automatically extract themselves. If you ever need to send an archived program to someone who does not have a copy

of *PKXARC*, this is a valuable feature.

To create a self-extracting archive, first create a normal .ARC file with *PKARC* as already described. (Don't use the password encryption option. Password-protected archives can't be made self-extracting.) Once that file is prepared, add it to the PKSFX.PGM file like this:

```
COPY/B PKSFX.PGM + archive.arc
  filename.EXE
```

Substitute the name of your archive file for *archive.arc*, and replace *filename*.EXE with the name you choose for the prepared self-extracting file. The output file *must* have the extension .EXE.

As with *PKARC* and *PKXARC*, you can supply drive and path information anywhere a filename is required by *PKSFX*. Here is a complex example:

```
COPY/B C:\UTIL\PKSFX.PGM + B:
  ARCHIVE.ARC A:OUTPUT.EXE
```

This adds the archive file named ARCHIVE.ARC on drive B to PKSFX.PGM from the \UTIL directory on drive C, and writes the combined output file OUTPUT.EXE to drive A.

Once the self-extracting archive file is made, it extracts itself when the filename is used as a DOS command. All options used with *PKXARC* are valid with *PKSFX* as well. Most often, however, the user will simply want to extract the files. Here is a simple example:

```
ARCHIVE B:
```

This command extracts all of the files from the self-extracting archive file named ARCHIVE.EXE, writing the extracted files to drive B. As you can see, explaining this format to someone who receives the archive file is easy.

Note that creating a self-extracting archive file with *PKSFX* adds 9,758 bytes to the length of the archive. If *PKXARC* is available, that extra length is unnecessary, since *PKXARC* can be used to extract the files.

Using Archives With A Hard Disk

Archived files created with *PKARC* are especially valuable for hard disk users. It isn't long before most people find that their disk is filling up. Compressing files and storing them in archives is a good way to free up disk space. Phil Katz's archiving system has the speed you need to make archival storage practical.

To use the system most effectively, install *PKARC* and *PKXARC* in your utility directory, then include that directory in your normal path. Use *PKARC* and your best judgment to create archives. For example, you might create an archive containing all of the .DOC files from your word processor. Data files from database or spreadsheet programs are other good candidates for archival storage, especially if you don't use the files frequently.

When creating these archives, you can use the M option to automatically delete the original files after they are stored in the archives. As you create new files, add them to the archives with the A option. Any of the updating options are useful after you've changed a file which is stored as an archive. Add comments to archives using the C and X options to help you keep track of your files.

You can view the contents of the archive at any time with the V option of *PKARC* or the −V option of *PKXARC*. Finding files this way is a snap.

When you need to use a file, simply extract it with *PKXARC* before working with it. It's a simple process, and you can save 25–80 percent of the disk space used by the original files. As always, keep careful backups of your hard disk, using your favorite backup method.

To make the archiving system even easier to use, you can create batch files to automate the commands you use frequently. Use your favorite text editor or word processor in the ASCII mode to write these batch files. (For more details, see "Getting Started With Batch Files" elsewhere in this issue.)

A Note About Shareware

Like many of the programs which appear in this column, the *PK* archiving system is a *shareware* package which is supported by its users. The author suggests a donation of $20 to register. A donation of $45 entitles the user to the next update of these programs. The donation is voluntary, of course, and goes to the author of the program, not COMPUTE!'s PC Magazine.

If you use this archiving system regularly, you may choose to honor the author's shareware request and become a registered user. If so, you may contact the author at this address:

PKWARE, Inc.
7032 Ardara Avenue
Glendale, WI 53209

Be sure to include the version number (3.5) of these programs when you write.

COMPUTE!'s PC Magazine is providing these programs for the use of our readers. These programs are normally distributed with documentation files which we have rewritten to create this article. Please do not distribute these programs to others, since important documentation would be missing.

 PC

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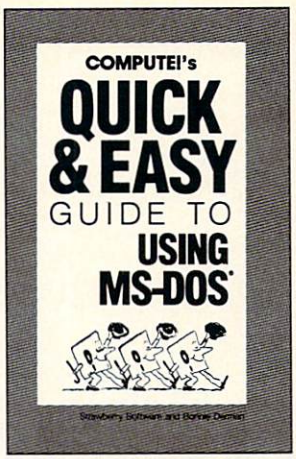

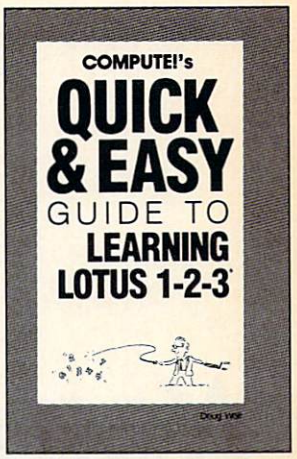

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Donald B. Trivette
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Wormburner

Andrew Walsh

Here's an exciting, arcade-style action game with lightning-fast graphics. Written entirely in machine language for maximum speed, "Wormburner" will challenge the most skilled arcade-game devotee, yet is easy enough for anyone to play on the lower levels. It runs on any IBM PC, XT, AT, or compatible with a color/graphics adapter.

Hold onto your keyboards—Earth is being invaded again.

This time, waves of mutant space worms are weaving their way through the atmosphere toward our home planet. Your job, as usual, is to defend life and liberty by outmaneuvering and destroying the fearsome invaders.

The space worms can't shoot back, but their slightest touch is fatal—and they're especially dangerous when wounded. On top of that, you must evade the hazards of Earth's own automatic defense system, which sweeps the sky with laser fire as you maneuver your fighter into battle. It's not a job for the weak-fingered.

"Wormburner" is a fast-paced game of skill with multiple levels and high-speed animation. If you're good enough to reach the tenth grid, no less than 56 objects will be zipping around the screen simultaneously. The program runs on any IBM PC, XT, AT, or compatible with a color/graphics adapter (CGA) or equivalent hardware; a color monitor is recommended.

Traversing The Grid

You'll find Wormburner on the magazine disk under the filename WORMBURN.COM. To load and run the game, simply type WORMBURN at the DOS prompt. (Make sure WORMBURN.COM is on the disk in the current drive.)

The opening screen asks whether you want instructions. If you type Y, several screens describing the scenario of the game will appear, along with instructions for playing the game. This information may come in handy if you ever lose your copy of this article. To skip the instructions, press N.

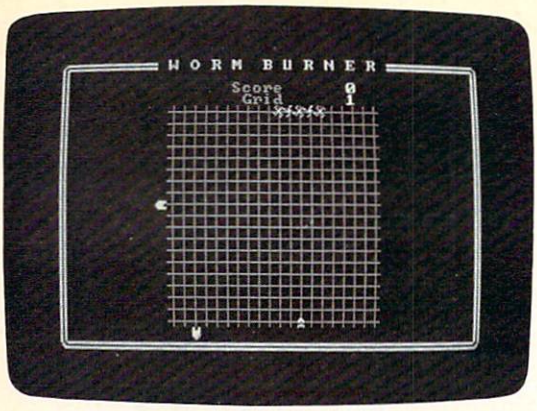
Now the main game screen appears. It consists of a large red grid in the center of the screen. (See photo.) You control the fighter which is initially located in the center of the lowest row on the grid. You can move the fighter about the grid by pressing the four cursor control keys, and you can fire your weapon by pressing the space bar. Note that your fighter can move vertically only a limited distance, although it can travel the full width of the grid.

The only other key recognized by Wormburner is the Esc (Escape) key; this allows you to immediately abandon any game in progress and return to DOS. You may find it necessary to press Esc several times before it is recognized. Also, note that the Esc key allows you to exit the game itself, but not the instruction screens at the beginning of the program.

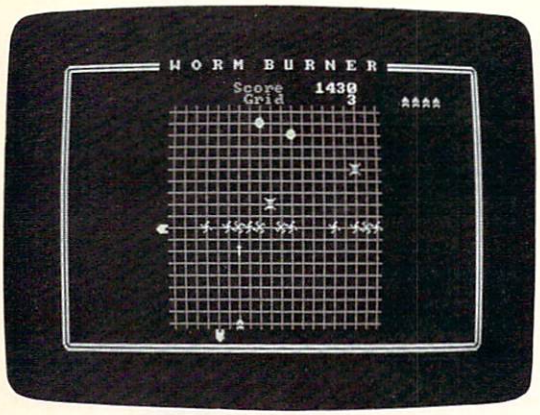
To start the action and begin playing, press any other key on the keyboard.

Attack Of The Killer Worms

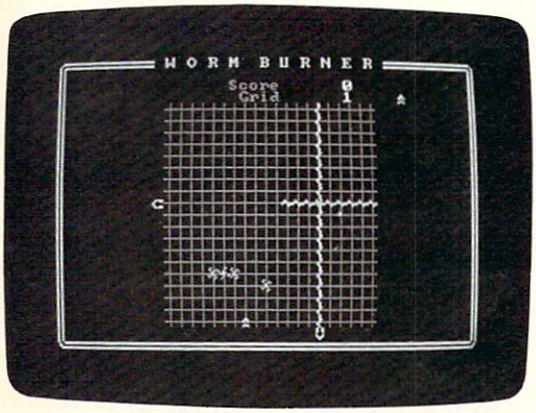
The object of Wormburner is to defend your sector (the grid) against the mutant space worms which enter the grid from the upper right corner and progress downward toward your fighter. The worms don't fire any weapons, but they are extremely toxic and will destroy your fighter on contact. The worms drop one row and change direction each time they reach the side of the grid or run into the wounded section of a worm you previously hit. If there are a large number of wounded worm sections on the grid, this descent can happen very quickly. You advance one level (one grid) each time you destroy all of the worms on a grid.



"Wormburner," level 1: An alien worm emerges at the top of the grid to begin its deadly descent.



Blasting the middle section of a worm only splits the creature into two worms.



Cross fire from the grid's own laser defense system is yet another hazard in "Wormburner."

You'll see one worm per grid for each level you have attained. In other words, one worm on grid 1, two worms on grid 2, and so on. Each worm consists of five sections which travel as a single unit until one or more of its sections have been hit. For example, if you survive to the third grid, you'll have to contend with 15 worm sections initially traveling in three packs.

When a worm section is wounded, it stops moving but begins to mutate. It goes through three stages of transition before falling off the grid. You can score more points by hitting these wounded worms and thereby speeding mutation. Beware, however, of the falling worms once they've fully changed. They're as dangerous when falling as when moving laterally, but more difficult to see. Falling worm sections can't be destroyed by your fighter's weapon; your only defense is to move aside and let them fall harmlessly off the grid.

Fighting the alien worms is bad enough, but you also have to worry about the grid's own self-defense system. A pair of automated lasers fire across the grid to help ward off the worms. Unfortunately, the cross-firing lasers are as deadly to you as they are to the worms. Therefore, you have to be aware of their firing pattern so you don't get destroyed by your own defense system. With practice, the firing pattern is fairly easy to predict, so you can easily avoid it (if you can remember to do so during the heat of action).

You get five fighters per game. The number of reserve fighters is represented graphically in the upper right corner of the screen. A good final score is around 10,000 points. (Even though I wrote the game, I haven't been able to advance beyond the twelfth grid.)

The best strategy seems to be to shoot the tail section of a worm first. If you shoot the head section first, the rest of the worm immediately drops a row and gets to you sooner. If you hit a middle section, the worm splits in two, and you'll have another worm to duck as they approach the bottom of the grid. You can probably get away with shooting the middle sections on the lower levels, but once you get past the fifth grid it becomes increasingly difficult to dodge the steady shower of worms past your position at the bottom of the grid.

Programming Notes

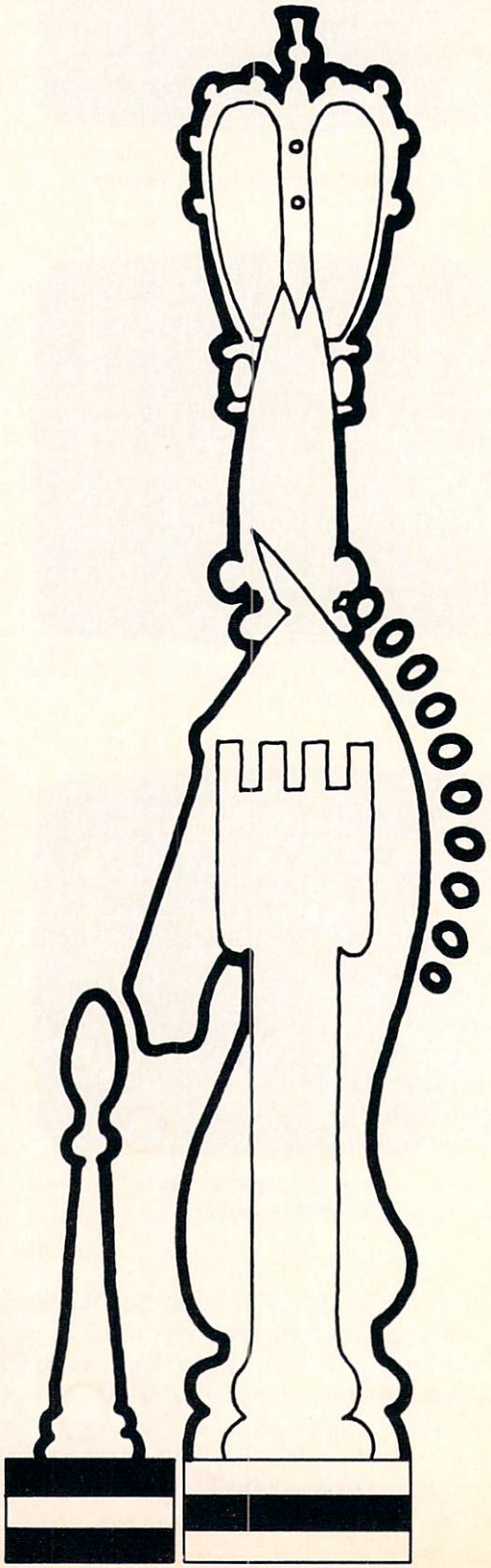
I began Wormburner as an exercise to learn 8088/8086 machine language. I was familiar with 6502 machine language from a Commodore computer I owned before buying my PC. Wormburner turned out to be quite an ambitious project, but a rewarding and very educational one. It consumed several months of my spare time to design, code, and test. The result is a program which runs at a speed that I find astonishing. In fact, I had to deliberately slow down the game to make it playable.

At the tenth grid there are 56 separate objects moving independently around the medium-resolution screen. To attain that type of performance with any high-level language, even compiled BASIC or Pascal, would have been impossible.

Wormburner was written using David Whitman's *CHASM* assembler, a shareware program. If you're interested in writing machine language routines to optimize the performance of your BASIC or Pascal programs, *CHASM*'s interface to these two languages is outstanding. **PC**

Chess

John Krause

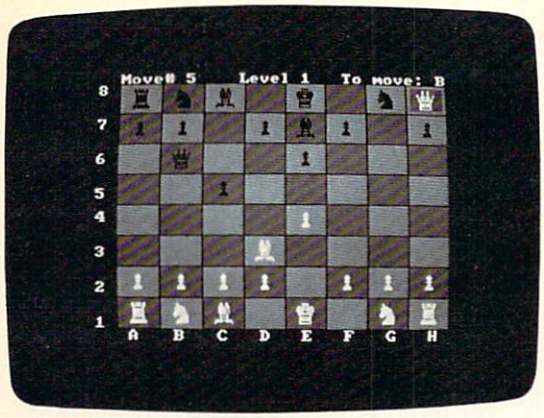


Need a chess partner? If you're a beginning to intermediate player, you'll find this chess program a willing and challenging opponent. The intelligence routines are written entirely in machine language, and other functions are written in compiled BASIC. It has multiple skill levels, checking for illegal moves, one- and two-player modes, reverse moving, and many other features. The program runs on any IBM PC, XT, AT, or compatible with at least 128K RAM and a color/graphics adapter.

A computer chess game is great for those who can't always find a human opponent. But "Chess" is more than just a substitute for a live player. You might call it a "chess processor." It processes chess positions as easily as a word processor manipulates text. It contains almost every feature a chess player could want. Its thinking routines are written entirely in machine language for greater speed, and they use basic principles of artificial intelligence to simulate a human chess player.

You'll find two programs on this issue's magazine disk for Chess. CHESS.EXE is the main program, written in BASIC and compiled with Microsoft *QuickBASIC*, and CHESS.BLD is a data file which contains the machine language intelligence routines. To play chess, simply run CHESS.EXE by typing CHESS at the DOS prompt. (Be sure that the Caps Lock key is off before you run the program. If you start Chess with Caps Lock on, it will not respond properly to the command keys.) CHESS.EXE automatically loads the data found in CHESS.BLD. Therefore, make sure CHESS.EXE and CHESS.BLD are located in the same directory when you copy them to another disk.

After running Chess, you'll see a title screen for a few seconds while the computer prepares itself. Press any key to cut this display short and proceed to the game board. The board is displayed with the pieces in their starting positions. You're in command of the white pieces at the bottom of the board versus the computer's black pieces at the top. When started, Chess is set for skill level 1, the easiest level. You should see a frame around the square in the lower left



"Chess" is a challenging computer opponent for beginning to intermediate chess players.

corner of the board. This is the cursor which takes the place of your hand for moving and capturing pieces.

Use the cursor keys to move the frame cursor atop the piece you wish to move. Press and release the Enter key. Now move the cursor to the square on which you want to place the piece and hit Enter again. Your piece moves to the new square, and the computer responds instantly with a countermove.

Sorry, No Cheating

One of the most valuable features of Chess is that it checks for illegal moves. If you try to make an illegal move, the computer buzzes and keeps your piece on its square.

This feature is not perfect, however. It won't catch illegal moves involving castling or *en passant* captures. But it will catch 99 percent of all illegal moves, including those that put your king in check, as well as the more obvious ones such as moving a pawn backward. If the computer accepts your move, it's probably legal, but not necessarily so. If the computer rejects your move, however, you can be sure that it is illegal.

If you're a beginner at chess, you'll find the move-checking feature especially valuable. Just by trying various moves and noting which ones the computer accepts, you can get a good idea of the way each piece can move.

Information about the current game is displayed at the top of the screen. *Move#* indicates the number of the move currently being made, counting from the start of the game. In chess, a move by both sides is considered one complete move. So, the move number is changed only after both sides have moved.

To Move indicates which side has the move. W means it is white's turn, and B means it is black's.

Normally after you move, the computer automatically makes the next move. This can be turned off by pressing the T key to switch to two-player mode. Now you can play against another person with the computer acting as referee to check for illegal moves. To switch back to one-player mode, press T again.

You can also let the computer make moves for you by pressing the M key. The side that the computer plays depends on whose turn it is. By repeatedly pressing M, you can watch the computer play itself.

Five Skill Levels

One of the advantages of a computer opponent over a human is that you can tell the computer exactly how hard you want it to try to beat you, and it obediently plays at that level of difficulty. This is important because it's no fun if you always lose or always win effortlessly.

Level shows the current skill level from 1 to 5. You can change the level at any time by pressing keys 1 through 5. The difference between levels is the number of moves ahead that the computer looks. On level 1, for example, it looks ahead one full move or two half-moves (its move and your reply). Each succeeding level looks ahead one more half-move than the previous level.

Alas, the smarter play on the higher levels doesn't come without a price. The further ahead the computer looks, the more moves it must examine and, hence, the longer it thinks. Here's a rundown of the five levels:

Level 1: Beginner. Thinking time: one second. Look-ahead: two half-moves. Fast but dumb.

Level 2: Intermediate. Thinking time: five seconds. Look-ahead: three half-moves. Provides a reasonable challenge for impatient players.

Level 3: Tournament. Thinking time: two minutes. Look-ahead: four half-moves. Since the usual time limit for tournament play is 40 moves in two hours, an average of three minutes per move, this level is best suited for serious players.

Level 4: Mate in two. Thinking time: 20 minutes. Look-ahead: five half-moves. Capable of solving most mate-in-two problems.

Level 5: Postal chess. Thinking time: two hours. Look-ahead: six half-moves. Simulates chess by mail where there is no time limit. Can avoid checkmate in two moves.

These thinking times are averages. The actual thinking time varies greatly depending on the position. For example, level 5 takes only five seconds per move with just two kings on the board. Also, these times are for a standard IBM PC or XT running at 4.77 megahertz. Since the PCjr runs at about two-thirds the speed of the IBM PC, the thinking times for the PCjr are greater than the values shown above. On the other hand, if you have a PC compatible with a turbo mode, or an AT compatible, you'll enjoy much better performance.

A Spectacular Blunder

It happens to everyone. It's inevitable. You've played for an hour, somehow managing to maneuver into a superior position in what you consider to be the best game of your life—only to throw it all away in a single, spectacular blunder.

Don't panic. You can take back the last half-move by pressing the B key. If you're in one-player mode, you need to press B again to take back the computer's reply. In fact, you can press B repeatedly to take back moves until you reach the starting position. This is possible because the computer records every move made in the game.

Another use for this feature is to allow the computer to suggest a move for you. If you don't have a good idea of where to move next, press M and the computer will move for you. If you like that move, press M again to continue with the computer's next move. But if you think you've found a better move, press B to take back the suggested move and make your own move.

Pressing the F key does the opposite of B. It moves forward through the move list up to the most advanced position. Note that every time a new move is made, the resulting position becomes the most advanced. So if you use B to backtrack to a previous position, and then make a new move, all subsequent stored moves are erased because they are no longer relevant.

To conserve memory, Chess can record a maximum of 120 moves. This shouldn't be a serious limitation, since chess games rarely involve that many moves. (As mentioned, tournament play is usually limited to 40 moves.) However, beginners playing at the lower skill levels may reach this limit. If you encounter a message telling you that the move limit has been reached, use the B key to back up through the past 15 or 20 moves then try again to conclude the game. If you have only a couple of pieces chasing each other aimlessly about the board, you may want to simply begin a new game by pressing N or I, as will be explained in a moment.

If you have a printer, you can print the current move list by pressing the P key. The list appears in three columns: the move numbers, white's moves, and black's moves. Each move is indicated by the square the piece moved from followed by the square it moved to. Each square is specified by its coordinates according to the numbers along the left side of the board and letters along the bottom.

You can also use the built-in screen dump feature of DOS to print an image of the playing board on the printer. This will allow you to generate a hardcopy of a particularly interesting position. Before loading Chess, place your working copy of the DOS master disk in the drive and type the command GRAPHICS at a DOS prompt. This loads the DOS utility which supports graphics screen dumps. Then run Chess as usual. Whenever you want to print the board, make sure that the printer is turned on, then press Shift-PrtSc (Fn-PrtSc on the PCjr). You should be aware, however, that the GRAPHICS utility was designed to support the IBM Graphics Printer. This technique works only if your printer has compatible graphics capabilities.

Checkmate

The computer thinks by analyzing thousands of possible moves and countermoves and choosing what it considers to be the best move based on the relative value of the pieces. Most positions don't have just one best move but several which are equally good, in which case the computer chooses among them at random. This random factor insures that every game will be different, and makes for varied and interesting play.

The computer announces checkmate when it occurs. However, there are a few quirks in the way the computer evaluates a checkmate. On levels 3–5, it may announce checkmate prematurely. When this happens, the computer has determined that it's impossible to avoid checkmate on the *next* move or two—assuming both sides make the best moves.

Also, the computer doesn't know the subtle difference between checkmate and stalemate. Consequently, when a game is stalemated, the computer announces checkmate even though the game is a draw. Since the computer tries as hard as it can to checkmate its opponent, it also tries to achieve stalemate, possibly forcing a draw when it could have won. Fortunately, this rarely happens, because a stalemate requires unusual circumstances, such as when one side has only the king remaining.

You can start a new game at any time by pressing the N key. This sets up the pieces in the starting position with white on the bottom. If you want to play the black pieces, you can press the I key to invert the board, so you still play from the bottom. However, it's a rule of chess that white moves first, so if you want to play with the black pieces you should begin by pressing the M key to make the computer take the first move. After that, it will respond automatically to your moves in the one-player mode.

As with the N command, I resets the board to the starting position. However, the N and I commands both retain the move list from the previous game. This allows you to replay the game using the F command. When replaying a game, be sure to reset the board by pressing I if the game was originally played in the inverted mode, or N if normal mode was used.

You can end Chess and exit to DOS at any time by pressing the X key. To prevent an accidental exit, you'll be asked to confirm this decision. Press the Y key to exit, or any other key to resume play.

Set Up Any Position

You don't have to begin a game from the starting position. You can set up any position and begin playing from that point. If you want, you can first clear the board by pressing the C key. To add a piece or change a piece to a different one, move the cursor to the appropriate square, hold down either Shift or Ctrl, and press P, N, B, R, Q, or K for pawn, knight, bishop, rook, queen, or king, respectively. Holding down Shift adds one of the lower player's pieces, and Ctrl adds one of the upper player's pieces. (Just remember that Ctrl is above Shift on the standard IBM PC keyboard.) A piece can be removed from the board by pressing the space bar when the frame is on the piece to be removed. Note that these changes are not stored in the move list.

These commands allow you to experiment with hypothetical or downright ridiculous positions. The position doesn't even have to be legal. Live out your fantasy by giving yourself ten queens versus the computer's lone king. Or invent your own type of chess by giving each side two kings, for example (although in this case the computer might get confused trying to determine a checkmate).

You can also set up a problem for the computer to solve, such as the mate-in-two problems published in many newspapers. To solve a mate-in-two problem, press C to clear the board, set up the position, press 4 to select level 4, and press M to start the computer thinking. After several minutes of deep thought, the computer will make a move (the solution) and announce checkmate. The only mate-in-two problems that the computer cannot solve are those which involve castling, *en passant* captures, or pawn promotion.

Special Moves

The computer never castles or captures *en passant* because, due to their complexity, these moves are not included in its thinking routines. But *you* can make these special moves. To castle, move the king *two* squares to the left or right. The rook moves automatically. To capture *en passant*, move your pawn diagonally to the proper square. The opponent's pawn is removed automatically. Remember, the computer doesn't check for illegal moves involving castling or *en passant* captures, so if you're a beginner, you should familiarize yourself with the rules on these special moves.

When a pawn reaches the opposite side of the board, it's automatically promoted to a queen. In the rare event that you would rather promote to a knight, bishop, or rook, you can easily make the change by positioning the cursor over the new queen and pressing N, B, or R with Shift or Ctrl. Note, however, that underpromotions are not stored in the move list.

Chess Commands

B	Move backward
C	Clear board
F	Move forward
I	New game (inverted)
L	Load game from disk
M	Computer's move
N	New game
P	Print move list
S	Save game to disk
T	Two players
X	End game
1–5	Level
Cursor keys	Move cursor
Enter	Your move
Space bar	Remove piece
Shift-P	Lower player's pawn
Shift-N	Lower player's knight
Shift-B	Lower player's bishop
Shift-R	Lower player's rook
Shift-Q	Lower player's queen
Shift-K	Lower player's king
Ctrl-P	Upper player's pawn
Ctrl-N	Upper player's knight
Ctrl-B	Upper player's bishop
Ctrl-R	Upper player's rook
Ctrl-Q	Upper player's queen
Ctrl-K	Upper player's king

Saving A Game

If you want to stop the present game and continue later, you can save the game on disk by pressing the S key. You'll see the prompt *Save:*. Type in a filename for your game and press Enter. The filename can be up to eight characters long. Don't type an extender; .CHS is added automatically. If a file on the disk already has the same name, it will be replaced without warning. If you want the game file to be stored somewhere other than in the default directory, prefix a drive or path specification to the filename.

To load a previously saved game, press the L key. Answer the *Load:* prompt with the name of a previously stored game and press Enter. Don't type the .CHS extender; it will be added automatically. And remember to add a drive or path specification if the game file is not in the current directory. The L command restores the game exactly as it was when it was saved. Not only the position is restored, but also the move list and even the position of the cursor.

Besides allowing you to continue a game at a later time, the S and L commands can be used to create a library of your best games. To do this, press N or I just before saving to reset the board to its starting layout. The game will come up in the starting position when reloaded, and can be replayed using the F command.

PC

Front & Back Hardcopy

Patrick Del'Era
PC Version By Tim Midkiff, Editorial Programmer

Everyone has text files: letters, reports, documentation for programs, source code. If you need hardcopy, you want a quick and easy way to format and print these files. Here's a program that does the job with aplomb. You can even print on both sides of the paper to make a convenient, readable document for binding into folders and notebooks. The program works on any IBM PC, XT, AT, or compatible with DOS 2.0 or higher, and a printer.

Perhaps you'd like a hardcopy of the README file that came with your latest software purchase. Or maybe you need a quick listing of the source code for the latest program you're writing. Or how about an extra copy of that report for the boss?

DOS provides a few ways to print out text files—but they're all rather unremarkable. Whether you TYPE a file and redirect output to the printer, use the PRINT program, or COPY the file to the printer, you'll get a plain-Jane printout that doesn't skip page perforations, has fixed margins and page lengths, and omits headers and page numbers. None of these options allows you to manually feed single sheets of paper into the printer, either.

One way to get a better printout is to use a word processor to load and print the text file—but this can be a bother. It's time-consuming, and you have to add word-processor commands to the text to achieve the desired formatting.

"Front & Back Hardcopy" is an easy solution to the problem. You can quickly load it, specify how you want your printout to look, and get a neatly formatted hardcopy in minutes. You can specify the left, top, and bottom margins, set the number of lines per page, start each page with a header, include page numbers in headers, specify a starting page number, and print either continuous forms or single sheets. You can also print every page in the text file, a few pages, or just one page. This allows you to fix mistakes without having to reprint the whole file.

Perhaps the most innovative feature in Front & Back Hardcopy is that you can print on both sides of the paper if you want. This makes it possible to generate documents suitable for binding into a folder or looseleaf notebook.

Getting Started

You'll find Front & Back Hardcopy on the magazine disk in a file named FNB.EXE. You can run it from DOS or from the magazine menu program. To run it from DOS, simply type FNB at the DOS prompt.

Front & Back Hardcopy was originally written in *Personal Pascal* for Atari ST-series computers. The PC version is written in *Lattice* C. For those interested in programming, a file called FNB.C on the magazine disk contains the C source code for FNB.EXE. This file isn't needed to use Front & Back Hardcopy—it's provided for those who wish to study or modify the program.

When you run Front & Back Hardcopy, you'll see a screenful of boxes for entering information (see figure). Press the Tab key to move the cursor from one box to another. You'll notice that Tab moves you through the boxes in a circular path—when the cursor gets to the last box, another press of the Tab key moves it back to the first box. You can also use Shift-Tab to move through the boxes in the opposite direction, so you can back up to a previous box without having to make a complete loop. This makes it easy to enter corrections. Don't press the Enter key unless you're ready to print or exit to DOS.

Use the left and right cursor keys to move about inside a box. The Insert and Delete keys are inactive while entering information, but you can correct typing mistakes with the Backspace key or the spacebar.

Notice that certain settings are highlighted in the three boxes on the right side of the screen. You can change the settings by moving to the box with the Tab key, then pressing the up and down cursor keys to make the selection. When you make a selection, it flashes on the screen. Use Tab to exit the box.

Preparing The Printout

The first box (labeled File) is where you type the filename of the text file you want to print. If the filename you enter isn't on the disk in the current drive, Front & Back Hardcopy returns the cursor to this box when you attempt to print the file. One restriction applies when entering the filename: Because the program uses the underscore (_) character in the prompt within the

box, you cannot explicitly type filenames that include that character. To get around this, you can type the question mark wildcard character in place of the underscore. For example, to print a program named REPORT_1.TXT you should enter REPORT?1.TXT in the filename box.

The second box (Header) is where you enter the optional page header. Anything entered here is printed at the top of every page. If you want a page number included in the header, type the commercial *at* symbol (@) anywhere on the line; Front & Back Hardcopy prints the page number at that position in the header. For example, the entry

Budget Report/Smith/Page @

would generate the following header at the top of every page:

Budget Report/Smith/Page 1

(Of course, the page numbers are incremented automatically.)

If you don't want a header, leave this box blank. Just press Tab to go on to the next box.

The third box (Start Header Page Numbering) lets you indicate at what number you want page numbering to begin—assuming, of course, that you've used the @ symbol somewhere in the header. You'll notice that the page number is already set for page 1, which is where you'll usually begin, but you can start numbering at any other number, if you like.

The next box (Lines Per Page) is where you indicate how many lines will fit on a page. Most printers fit 66 lines on an 8½ × 11 inch page, so this setting is the default. If your printer prints more than 66 lines per page (European or legal size, for instance), adjust this figure accordingly.

The following two boxes (Starting Pg and Ending Page) determine which pages of the file you want to print. Usually, you'll start at page 1 and print to the end, which is what the default settings do. But you can start printing on page 6 and end on page 8, for example. If you want to print just one page, use the same page number for both entries. This option allows you to reprint any page or pages you've changed without reprinting the whole document.

Setting Margins

The purposes of the next three boxes (Left Margin, Top Margin, and Bottom Margin) are pretty obvious—they allow you to set margins. They require a bit of care, however. If you've entered a header, be sure to specify a top margin of at least 3 to leave room for it; otherwise, the header won't print.

Be careful with the left margin setting, too. If there are long lines in your text file that, when added to the left margin, are wider than your printer carriage, a mess will ensue. For example, if a left margin of 10 is added to a 75-character line, the total is 85 characters wide. That's wider than the 80-character-wide capacity of most printers, so the extra five characters will wrap around to the next line. If you can't avoid this kind of overflow problem, set your printer for condensed type.

If you plan to bind the finished pages into a folder or looseleaf notebook, use an extra-wide left margin to leave room for the punched holes and rings.

Selecting options is easy with "Front & Back Hardcopy."

File:MYTEXT.TXT	
Header:History_of_America__Page_@	
Start Header Page Numbering At:1	
Lines Per Page:66_	Left Margin:5_
Starting Pg:1	Top Margin:5_
Ending Page:32767	Bottom Margin:5_

FRONT PAGES
BACK PAGES
ALL PAGES

CONTINUOUS
PAGE WAIT

PRINT
EXIT

Ready To Print

In the top box on the right side of the screen, you can choose whether to print on only one side of the page or both. Note that to use the front-and-back feature, a sheet-fed printer is desirable so you can insert the sheets backward after one side is printed. A printer that has tractor feed only is a little clumsier to handle because you're dealing with a long strip of continuous forms.

If you want to print a standard one-sided document, select the All Pages option. Then, press the Tab key to move the cursor to the next box. Here, choose the Continuous option to print continuous forms, or Page Wait for single sheets. If you choose Page Wait, Front & Back Hardcopy prints a page and then waits for a keypress before continuing. This gives you time to insert the next sheet into the printer.

To actually begin printing, move the cursor to the bottom box and select Print.

If you want to print on both sides of the paper, first choose the Front Pages option. Then select either Continuous or Page Wait, and begin printing. When the printout is done, select the Back Pages option, and feed the paper into the printer backward. Be sure the first page you feed backward is the first page in the document, because the next page to be printed will be the second page in the document. This method works by first printing all the odd-numbered pages, and when you've turned the paper over, the even-numbered pages.

When you've finished your printouts, select Exit in the bottom box to return to DOS.

Note: Be sure the file you print is a plain ASCII text file. If the file contains special control codes from your word processor—such as codes for underlining, italics, centering, and so forth—you should remove them before printing the file with Front & Back Hardcopy. Most word processors allow you to save a file in plain ASCII format, which strips away all of these codes. Sometimes this is called "printing to disk." Consult your word processor manual if you aren't sure. **PC**

Personal Calendar

Guy Davis
PC Version By William Chin, Editorial Programmer

Never miss an important appointment, birthday, or anniversary again. With this valuable application, you can create an appointment calendar for any month of any year, or even keep a diary. It works on any IBM PC, XT, AT, or compatible with DOS 2.0 or higher. Printer optional.

Elephants and computers may never forget (at least while the power's on), but people do. Forgotten appointments and events can lead to disaster, discord, and divorce. Were you supposed to have lunch with Marty this Tuesday or next Thursday? Is Uncle Ben's birthday on September 7 or September 17? When is the next loan payment due? And is your wedding anniversary creeping up again?

If you use your computer frequently—either at the office or at home—an appointment calendar program may help you keep up with important events. Ideally, the program should be easy and quick to use, allow you to schedule events days or weeks ahead of time, and let you jot down short notes to jog your memory about important dates and appointments.

"Personal Calendar" lets you do all this and more. And if you want to see a calendar for a month in 2001 or 1857, you can do that, too.

Getting Started

On this issue's disk you'll find two files for Personal Calendar, CALENDAR.COM and CALENDAR.PAS. The CALENDAR.COM file is the Personal Calendar program itself. CALENDAR.PAS is the source code file, mainly of interest to programmers. (Personal Calendar was originally written for Atari ST-series computers in *Personal Pascal* and rewritten for PC computers in *Turbo Pascal*.) CALENDAR.PAS is not required to run the program.

Before running Personal Calendar, copy CALENDAR.COM to another disk. Don't run it from the magazine disk, because Personal Calendar uses a lot of disk space for data files, and there isn't enough room for them on the magazine disk. If you have a hard disk drive, you can copy Personal Calendar to a subdirectory on the disk.

Be sure the system date and time are correct before running Personal Calendar. If the computer you're using has a battery-powered realtime clock, the date and time is set for you automatically. If your computer doesn't have such a clock, use the commands DATE and TIME at the DOS prompt to set the clock as described in your DOS manual. Personal Calendar must have this information to operate correctly.

To run Personal Calendar, type CALENDAR at the DOS prompt. The first time you run the program, it asks you to create the data files it needs to store its information. There are two data files, called C*yyyy*.MAI and C*yyyy*.DAT, where *yyyy* is the current year. Personal Calendar retrieves the year from the system date; the data files for 1987, for instance, would be C1987.MAI and C1987.DAT.

When you run Personal Calendar in the future, you'll see this screen only if the program can't find these data files. For now, press C, and after a moment, the files are created. Afterward, you'll find yourself at the main menu, shown in Figure 1.

Creating A Calendar

At the main menu, press F3 to display a page from the calendar. First, of course, you'll have to choose the month to be displayed. You do that from the next menu, which is shown in Figure 2. You'll notice that the last three months of the year are selected with the 0, minus (−) , and equals (=) keys. These are the next three keys to the right of the numeric keys in the top row on an IBM keyboard. This makes it easy to enter a number for months 10, 11, and 12. Make a month selection, and you'll see the calendar page for the month you've picked. An example is shown in Figure 3.

Figure 1: "Personal Calendar" main menu.

```
Use function keys to make a selection
OR move cursor next to choice and press RETURN

F1  Create a new calendar file on your disk (erases old file)
F2  Convert an existing calendar file to another year
F3  Select month for display and edit
F4  Set date for edit
F5  Look at month that is not in this year
F6  Change year (this loads in files for that year)
F7 or <esc>  Quit Personal Calendar and return to system
```

Figure 2: Choosing a month to be displayed.

```
Select month by pressing the key displayed in the left column
OR by moving the cursor next to your choice and pressing ENTER

 1  January
 2  February
 3  March
 4  April
 5  May
 6  June
 7  July
 8  August
 9  September
 0  October
 -  November
 =  December
```

Figure 3: A calendar page showing an asterisk and a headline.

November 1987						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11 *	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26 No School	27	28
29	30					

You can easily flip the pages of the calendar to earlier or later months with the PgUp and PgDn keys. Notice that you have an entire year at your fingertips. You can use a page on your Personal Calendar program in the same way that you use a page on a large wall calendar—there's room to write notes for every day of the year. To leave a calendar page, press the Esc key, and you return to the main menu.

A calendar page is where you do most of your business with Personal Calendar. Here you select the days for which you want to keep memos—such as "Mom's birthday" on February 22, or "Take the dog to the vet at 9:45" on February 10. There's plenty of space for writing notes in the slot for each day.

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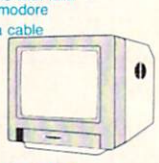

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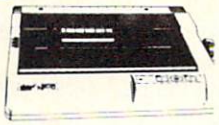

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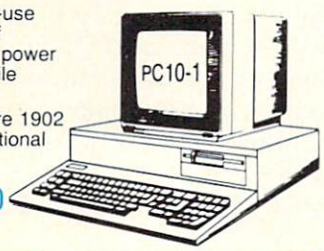

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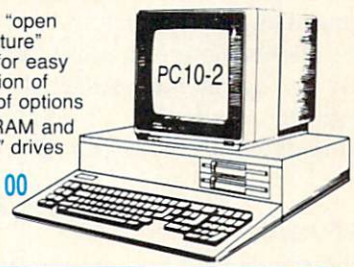

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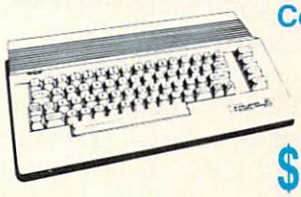

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To make notes, use the cursor keys to move around the calendar page to select a day. Then press the Enter key. This takes you to the memo-pad page for the day you've selected. There's a memo-pad page for every day of the year. Here's where you jot the notes you want displayed for a single day. When you leave the memo-pad page (you'll learn how to do this below), you always come back to the calendar page you left. When you return, you'll see that any day for which you've made notes is marked on the calendar with an asterisk. (You can see how this looks in Figure 3. Notice the asterisk on Wednesday, November 11.) This way you can easily read or write entries for any day. Just use the cursor keys to locate the day, then press Enter.

If you haven't done so already, cursor around a calendar page to select a date; then press Enter so you can examine the memo-pad page for that date in more detail. An example of such a page is shown in Figure 4.

The Memo Pad

The memo pad is used like a mini word processor. You can make an entry and correct it by using the Insert, Backspace, and cursor keys. There are some special commands for editing and performing other functions here, too. These commands are explained when you press F10 (the help key), which pops up a window at the bottom of the screen.

Use Control-Y (press Control and Y at the same time) to delete an entire line, and Control-N to insert one. The Esc key takes you back to the calendar page, but don't press it yet—there are some special features of Personal Calendar that you access from the memo pad.

One such feature is the headline. Press F1 to enter a headline, which is simply a brief entry that appears on the calendar screen in a date box. For example, one such headline could be "No School." This feature allows more important days to show prominently on the calendar screen. (If your headline is longer than ten characters, it's shortened so that it fits inside the day box on the calendar).

Special Events

If Personal Calendar did nothing but what is described above, it would already be a useful program. But it also has the ability to alert you ahead of time to special events that are particularly important.

To record a special event, press F2 while in the memo-pad screen. Then you can enter any number from 1 to 366 to indicate how many days in advance you want to be alerted to the event. For example, if you enter a 10, Personal Calendar will automatically display the memo pad for that day up to 10 days ahead of time. The alarm-set memo-pad page will pop up whenever you press the Esc key to leave the memo-pad screen, but you'll also see any such special memo-pad pages when you start up the program.

For example, if you set the alarm 10 days before "Mom's birthday," you'll be reminded of it every time you start Personal Calendar, up to the day of the big event.

This is an extremely valuable feature. As long as you run Personal Calendar daily, or nearly so, you'll always be alerted to any special event in the upcoming year. Remember, any number from 1 to 366 days can be entered to trigger the alarm.

Note that the memo-pad page that tells you of alarm events can't be changed when it pops up to alert you. But it can be changed if you go to the calendar page where it's found. Go to the memo-pad entry for that particular day, to make any changes.

More Options

Wherever you are in the program, you can press the Esc key to get back to the main menu, where additional functions are available.

Pressing F4 is a shortcut. If you know the month and day of a note you want to read, press this key. You can then enter the date with either *month-number/day-number* or *month-name day-number*. For example:

8/24

or

August 24

Either entry takes you directly to the memo-pad page for August 24 without having to call a calendar page first. This option saves time if you know the date you want to view.

Pressing F5 lets you call a calendar for any month in any year. Type in any date you can think of, and Personal Calendar calculates the calendar for that month of that year and displays it on the screen. You can see how this appears in Figure 5. You might be curious, for example, about what day of the week you were born on. Was it Monday, like mother said? Call up the calendar for the month and year of your birth, and you'll know. Unlike the current calendar, however, you can't use the PgUp and PgDn keys to flip through the months of the year. Nor can you use this function to make memo pad notes for a day. This function is for reference only.

Pressing F6 lets you load the files for some previous year. You must have the files on the current drive to do this, of course. Preserving files from an earlier year requires some care, however, as we'll see in a moment.

Converting Files

The year's about over, and the time has come to prepare Personal Calendar to keep next year's notes. You can do this by pressing F2 at the main menu. This option lets you convert this year's files to next year's files without going to the trouble of entering all the special events again.

Figure 4: A memo pad page.

```
  November 26 * No School  *   alarm:0    330 day of the year

This is Thanksgiving Day.  No School today.



-------------------------------------------------------------------------------
                        Summary of editing commands
control-Y delete a line              F1 enter headline
control-N insert a line              F2 enter alarm
insert toggles insert mode           F3 F4 enter both headline, alarm
esc exit editing                     F10 help messages on/off
```

Figure 5: "Personal Calendar" lets you display a calendar for any year in the past or future.

December 2001						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Figure 6: These options make it easy to update a yearly calendar for the upcoming new year.

```
  November 26 * No School  *   alarm:0    330 day of the year

This is Thanksgiving Day.  No School today.



 INSTRUCTIONS
1 to keep entire contents for this date
2 to keep headline and alarm
3 to keep note, get rid of alarm and use an asterisk headline
4 to delete all three: headline, alarm, note
9 to keep all the rest of the days
```

When you choose this option, Personal Calendar displays in sequence each note in the memo pad of the current year. You can choose to preserve the entire entry in next year's calendar, or you can keep only certain parts of the memo. See Figure 6, which shows all the options. If you choose option 9, the new calendar file is compiled from the changes you've made up to this point. But the remainder stays the same as the previous year's.

Using this option requires some care. The updating procedure erases all the old data files from the disk in order to make room for the new files. If you perform the update on December 1, all of the data for the remainder of December will be erased. It's best to first make a copy of the data files on a blank, formatted disk in order to save them. Then use this option to update the files for next year. Use the old data files until the end of the year, and the new files for the upcoming year.

Special Notes

You can also use Personal Calendar to keep a short diary. Just go to a calendar page and press Enter to make a memo-pad entry for each day. There's enough room on a memo-pad page for a chronicle of important events.

You can't set the alarm for events in the upcoming year from the current year's calendar. For example, if it's December and you need to set an alarm for January 20, you must set the alarm on next year's calendar.

If you want, you can keep separate calendar files—perhaps one for personal events and another for business appointments. You can't, however, keep two calendar files on the same floppy disk, because there isn't enough room. Use separate disks for separate calendars. Copy the program file CALENDAR.COM on each disk, and proceed as described above.

You can easily make a paper copy of any calendar by pressing Shift-PrtScr. Be sure the printer is set up and online.

Personal Calendar computes all of its dates using the Gregorian calendar system. By papal decree, the Gregorian calendar replaced the old Julian calendar in 1752. Although Personal Calendar can display months before this year, the program displays the month as it would have appeared if the Gregorian calendar were in effect at that time. Therefore, the calendar screen won't reflect the actual arrangement of days as they fell under the old calendar. For example, Personal Calendar can display the month of December 0001, but it appears as that month would have looked if the Gregorian calendar had been adopted in the year 0001. **PC**

Screen Saver

Claude C. Jones

This short memory-resident program helps protect your video monitor from burn-in damage caused by leaving the computer unattended for an extended period of time. It works on any IBM PC, XT, AT, and most compatibles with DOS 2.0 or higher.

You've probably seen a video monitor that has an image burned into its screen. When a screen display remains static for a long time, the phosphor coating on the inside of the picture tube can become permanently etched with the image, particularly if the brightness and contrast controls are cranked up. The burned-in image appears as a dark shadow on the screen, and it's most visible when the display changes or when the monitor is switched off.

The effect was noticed when home videogames first became popular in the late 1970s. Someone would leave a videogame on the TV all day, only to discover a shadow image of the game remaining when the channel was changed. Videogame manufacturers soon modified their machines to cycle through a series of colors whenever the screen displayed a static playfield.

Video monitors for computers are designed to be less susceptible to this kind of damage than ordinary TV sets, but occasionally, burn-in still occurs. In normal use, the screen display is constantly changing as text is scrolled, different screens are called up, and so on, but if you leave the computer unattended for a while, or if you forget to turn it off before leaving the office or retiring for the night, the screen may burn in. Wouldn't it be nice if the monitor could turn itself off when you're not using it?

In effect, that's what "Screen Saver" does for you. Although it doesn't actually switch off the monitor's power, it does blank out the screen after a certain period of inactivity. You don't need to turn any knobs, flick any switches, or remember to do anything. If you don't use the keyboard for three minutes, Screen Saver turns off the display automatically. When you return to the keyboard, just touch any key—Screen Saver turns the display back on. It's that simple.

Using Screen Saver

You'll find the program on this issue's magazine disk in a file called SAVESCRN.COM. You can run it from DOS by typing SAVESCRN at the DOS prompt, or you can run it from the magazine menu program as described in the "How to Use the Disk" section found elsewhere in this issue.

Either way, you won't see anything that shows you Screen Saver has gone to work. It's a routine that runs in the background while you're busy doing other tasks. With Screen Saver in memory, you can run your favorite word processor or game, or perform any other task on the computer. As you work, Screen Saver watches for you to leave the keyboard for a while. If you don't press any keys for three minutes, Screen Saver blanks out the display until the next time you press a key. It remains on the job until you turn off or reset the computer.

If you want, you can modify Screen Saver to change the amount of time it waits before blanking out the display. See the instructions in the next section.

Memory-resident utilities such as Screen Saver are so handy, it's often desirable to have them available every time you use the computer. This is easily done by including them in your AUTOEXEC.BAT file to save yourself the trouble of installing them manually.

To make Screen Saver install itself automatically whenever you boot up or reset the computer, simply include the command SAVESCRN as a separate line in your AUTOEXEC.BAT file. If you aren't familiar with AUTOEXEC.BAT files, see the article "Getting Started With Batch Files" elsewhere in this issue, or consult your DOS manual.

There's one precaution to observe before using Screen Saver. The MS-DOS operating system used by IBM PCs and compatibles was not really designed with memory-resident programs in mind. These pro-

grams rely on programming tricks to install themselves in memory and respond to a keypress. Because of this, there are sometimes conflicts between memory-resident utilities and application programs, or between two or more memory-resident utilities that are installed simultaneously. For technical reasons explained in detail below, Screen Saver may not work properly with certain versions of BASIC, some telecommunications software, and some PC compatibles with nonstandard video adapters.

To avoid problems, you should test Screen Saver on your system with your application software and other memory-resident utilities before doing any important work. It's a wise idea to take this precaution when using any new memory-resident program on your system for the first time.

Changing The Waiting Period

You can change the amount of time that Screen Saver waits to receive a keypress before it turns off the display. To do this, you must change a few values in a BASIC program, which then creates a new version of Screen Saver for you.

The BASIC program is found on the magazine disk under the filename SAVESCRN.BAS. Before loading it, you must first run BASIC. Then load SAVESCRN.BAS with the command LOAD "SAVESCRN".

When the BASIC program is loaded, type LIST 140 and press Enter. You'll see the following line:

```
1002 DATA 2E,81,3E,00,01,CD,0C,73,01,CF,777
```

To modify Screen Saver's waiting period, change the values CD,0C to a value selected from the accompanying table. For example, if you'd rather have Screen Saver turn off the display after five minutes instead of three, look in the table for the five-minute entry and you'll find the value 55,15. Replace CD,0C in line 140 with 55,15 and remember to press Enter on the line after making the change. If you type LIST 140 again, the edited line will look like this:

```
1002 DATA 2E,81,3E,00,01,55,15,73,01,CF,777
```

After making the change, type RUN. The BASIC program creates a new version of SAVESCRN.COM on the disk. (If the old version of SAVESCRN.COM was on the same disk and in the same directory, it will be replaced.)

If you want to save a copy of the modified BASIC program without erasing the original version, save it on disk with a new filename. While still in BASIC, enter

SAVE *"filename.ext"*

where *filename.ext* is any valid filename of up to eight characters with an optional extender of up to three characters. This leaves the old version of SAVESCRN.BAS unchanged on the disk, just in case the new version doesn't work the way you want it to.

To use the modified version of Screen Saver, reboot or reset the computer and type SAVESCRN at the DOS prompt, just as you did before. (Make sure the disk with the modified version of SAVESCRN .COM is in the drive.) This installs the new version of Screen Saver with the new time value.

How It Works

For the technically inclined, the magazine disk contains the machine language source code for Screen Saver in a file called SAVESCRN.ASM. Here's how the program works.

Screen Saver first determines whether your monitor is monochrome or color by using service Fh of interrupt 10h. Next, the program adds short routines to the timer-tick interrupt (INT 1Ch), the keyboard interrupt (INT 09h), and the computer video interrupt (INT 10h).

Timer Countdown Values in 15-Second Increments

Minutes	Value	Minutes	Value	Minutes	Value
.25	11,01	10.25	BC,2B	20.25	66,56
.50	22,02	10.50	CD,2C	20.50	77,57
.75	33,03	10.75	DE,2D	20.75	89,58
1.00	44,04	11.00	EF,2E	21.00	9A,59
1.25	55,05	11.25	00,30	21.25	AB,5A
1.50	66,06	11.50	11,31	21.50	BC,5B
1.75	77,07	11.75	22,32	21.75	CD,5C
2.00	89,08	12.00	33,33	22.00	DE,5D
2.25	9A,09	12.25	44,34	22.25	EF,5E
2.50	AB,0A	12.50	55,35	22.50	00,60
2.75	BC,0B	12.75	66,36	22.75	11,61
3.00	CD,0C	13.00	77,37	23.00	22,62
3.25	DE,0D	13.25	89,38	23.25	33,63
3.50	EF,0E	13.50	9A,39	23.50	44,64
3.75	00,10	13.75	AB,3A	23.75	55,65
4.00	11,11	14.00	BC,3B	24.00	66,66
4.25	22,12	14.25	CD,3C	24.25	77,67
4.50	33,13	14.50	DE,3D	24.50	89,68
4.75	44,14	14.75	EF,3E	24.75	9A,69
5.00	55,15	15.00	00,40	25.00	AB,6A
5.25	66,16	15.25	11,41	25.25	BC,6B
5.50	89,18	15.50	22,42	25.50	CD,6C
5.75	9A,19	15.75	33,43	25.75	DE,6D
6.00	AB,1A	16.00	44,44	26.00	EF,6E
6.25	BC,1B	16.25	55,45	26.25	00,70
6.50	CD,1C	16.50	66,46	26.50	11,71
6.75	DE,1D	16.75	77,47	26.75	22,72
7.00	EF,1E	17.00	89,48	27.00	33,73
7.25	00,20	17.25	9A,49	27.25	44,74
7.50	11,21	17.50	AB,4A	27.50	55,75
7.75	22,22	17.75	BC,4B	27.75	66,76
8.00	33,23	18.00	CD,4C	28.00	77,77
8.25	44,24	18.25	DE,4D	28.25	89,78
8.50	55,25	18.50	EF,4E	28.50	9A,79
8.75	66,26	18.75	00,50	28.75	AB,7A
9.00	77,27	19.00	11,51	29.00	BC,7B
9.25	88,28	19.25	22,52	29.25	CD,7C
9.50	89,28	19.50	33,53	29.50	DE,7D
9.75	9A,29	19.75	44,54	29.75	EF,7E
10.00	AB,2A	20.00	55,55	30.00	00,80

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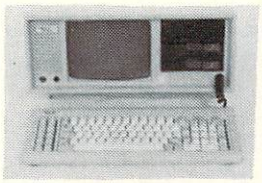

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ROM BIOS executes the timer-tick interrupt (INT 1Ch) 18.2 times per second. Each time INT 1Ch is executed, the timer-tick routine is executed. The INT 1Ch routine determines how long it has been since the keyboard or video monitor has been used. If it has been longer than 0CCDh (3277) timer ticks (three minutes), the video-enable bit is turned off and sent to port address 03B8 for monochrome, or 03D8 for color. Then a logical flag is set. Each time a key is pressed or output is sent to the screen, the keyboard- and video-interrupt extensions check for the flag. If the flag is set, it's then reset, and the video-enable bit is turned back on and sent to the monitor port address. This turns the screen back on.

Some versions of BASIC take over the 1Ch interrupt for sound generation timing, and you may find that Screen Saver won't work with these versions. Interrupt 1Ch is also used for timing in modem software (such as *PC-Talk*), and this software may not work properly with the added 1Ch routine in place.

This program assumes the address of your 6845 video controller is in low-memory address 463h, and the current CRT mode setting is in low-memory address 465h. The 6845 video-controller address determines whether the monitor is monochrome or color, and the video disable/enable command is sent to the appropriate port (3b8 or 3d8). The timer-tick extension retrieves the current CRT mode setting and resets bit 3 to 0, which disables the video monitor. The keyboard- and video-interrupt extensions retrieve the current CRT mode settings and set bit 3 to 1, which enables the video monitor.

SAVESCRN.COM initially occupies 228 bytes of memory. As soon as the interrupt extensions are added, the routine trims itself to 127 bytes. **PC**

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7. Entries must be accompanied by an article which explains how to use the program and what it does. If your program employs any new or unusual techniques that you think will be of interest to other programmers, you can also describe how the program works. (If you feel that writing is not your strong point, please do not hesitate to enter; this is a programming contest and the entries will be judged solely on the basis of the programs submitted.)

8. Submissions which do not win a prize and are not accepted for publication will be returned only if accompanied by a self-addressed, stamped mailer.

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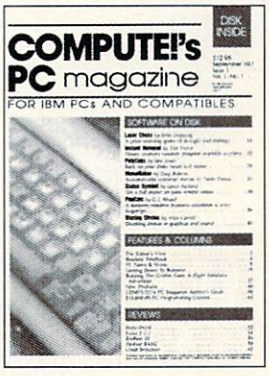

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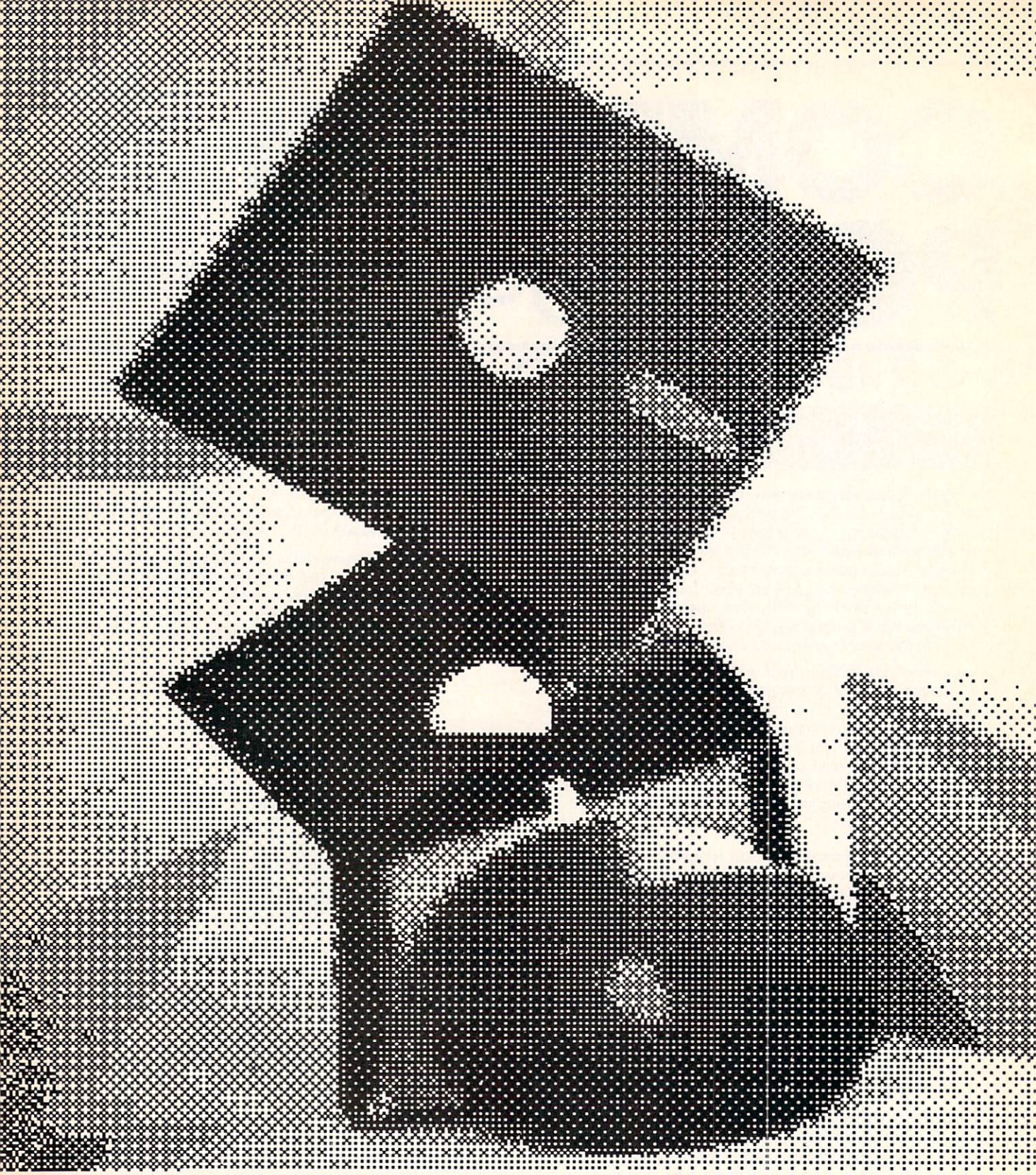

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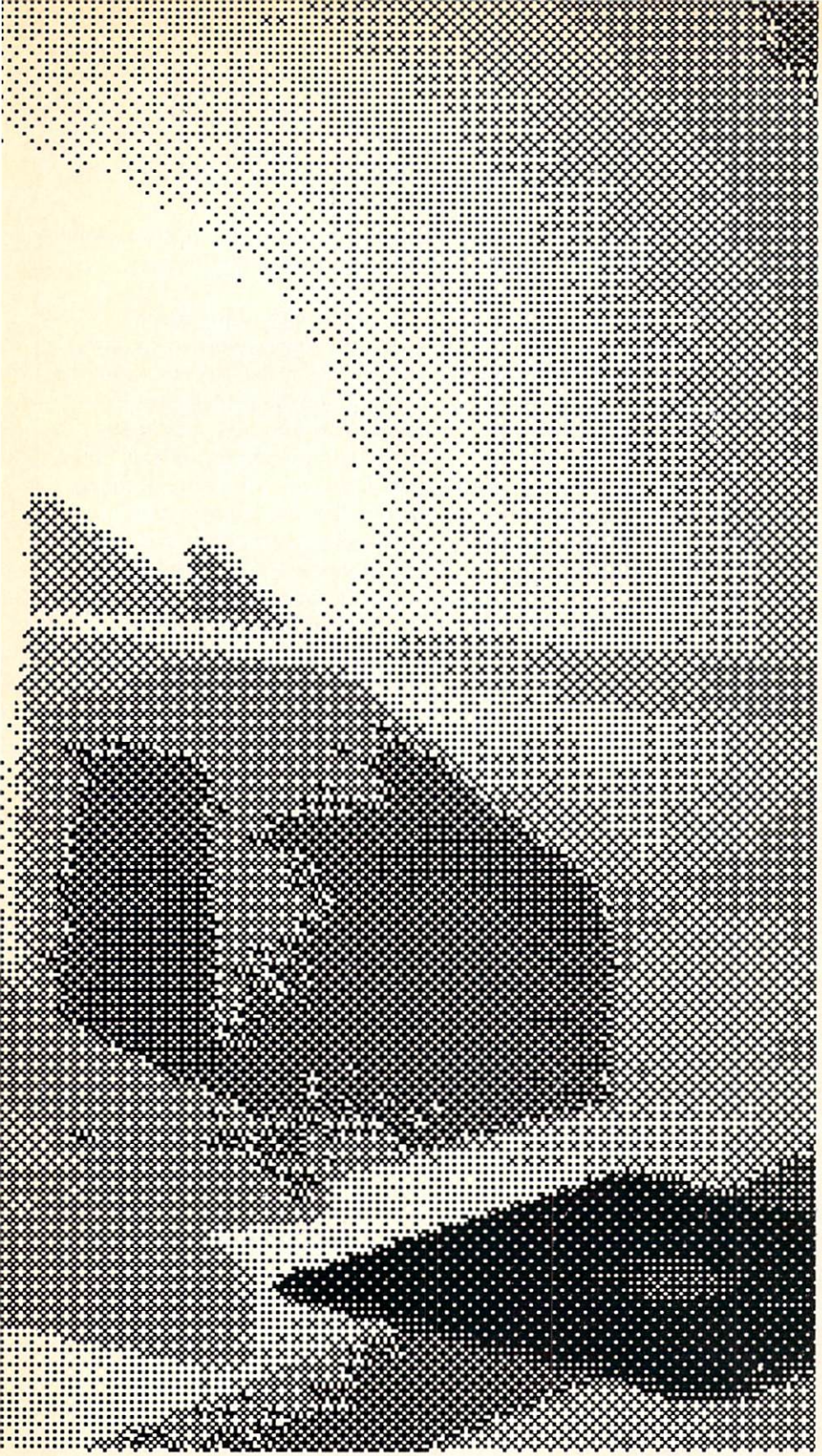

E BAD DISKS

John Klein

Sooner or later, it happens to everyone: An important disk goes bad, and you don't have a backup. Here are some hints, tips, and last-ditch tricks to try when your disk drive stubbornly refuses to read a disk. The techniques apply to any IBM PC, XT, AT, or compatible with DOS 2.0 or higher and BASIC.

Losing valuable data because of a bad disk can be a traumatic experience. One day you insert the disk which has served you faithfully and well for months or years, and out of the blue comes the message: *Read error drive A:*. Or worse, *General disk failure drive A:*. Your expensive software package, your spreadsheet, or the report or program you've worked on for weeks seems gone for good.

This isn't a problem if you regularly make backups. But not everyone is so careful, and even those who are careful can get caught. Perhaps something distracted you as you were preparing to back up the disk and you forgot to complete the task, or maybe the backup disk has failed, too.

Fortunately, all's not lost. There are some methods for salvaging bad disks. Depending on how desperate you are and how valuable the lost data is, these may be well worth your time and trouble, and the techniques are as readily employed by beginners as by experts.

Why Bad Things Happen To Good Disks

One common cause of disk failure, particularly with 5¼-inch disks, is fingerprints. If you grab the wrong end of a disk and touch the exposed magnetic surface through the head access window, you can leave fingerprints that attract dust and dirt. You can sometimes see these fingerprints by rotating the disk inside its protective envelope under a strong light. The 3½-inch microfloppies used with laptops and the IBM PS/2 computers are almost immune to this problem—their head access window is protected by a metal cover that automatically slides into place when the disk is removed from the drive.

Magnetic fields are especially hazardous to disks because they don't just obscure the data recorded on the magnetic surface, they actually erase it. All video monitors and electric motors create magnetic fields, and so do power supplies, loudspeakers, and ringing telephones. While these aren't usually strong enough to damage disks, you can head off trouble by storing your disks far away from magnetic sources.

Still another cause of disk failure is the sudden interruption of a disk access, either because of a power outage or operator carelessness (for instance, failing to heed the busy light and popping open the drive door before the drive has finished writing). Also, floppy disks can just plain wear out from hard use. The read/write head of a floppy disk drive is always in physical contact with the magnetic disk surface, while the read/write head of a hard disk floats just above the disk on a cushion of air.

Most of the time, you probably won't know what made the disk fail. You'll just stick it in the drive one day, try to read it, and get an error message.

Diagnosing The Trouble

Whatever the cause, the disk has most likely become unusable for two reasons—which cure to use depends on the reason.

One malady is a corrupted directory. When this happens, you can't get a proper directory listing when you type the DIR command, or you get a *File not found* message when you attempt to load a file which appears in the directory.

The other problem is a bad FAT (File Allocation Table). The FAT contains a list of the disk areas where the data for each file is stored. By checking the FAT, the disk drive knows not to store new information in areas where current information is already kept. The FAT itself can be damaged, or it can refer to a part of the disk which is worn out, scratched, or fingerprinted. When this happens, you can't copy a file from one disk to another, or you get a *Read error* message when you try to load a file.

When disk trouble strikes, the first thing to do is copy the flawed disk to a good blank disk, if you can. Use either the DISKCOPY or COPY command:

```
DISKCOPY A: B:
```

or

```
COPY A:*.* B:/V
```

Using the /V switch with the COPY command above lets you view the name of each file as it is copied. If there are any error messages, note which files are being copied when the error occurs.

Sometimes, if you're lucky, copying the disk is all that needs to be done if the copy proceeds without error messages. Disk areas containing frequently used programs, such as word processors or BASIC, often become worn from hard use, and just a fresh copy on a new disk solves the problem.

Above all, once you suspect disk problems, don't write any more files to the flawed disk. If you do, you may lose the new files, and you may overwrite important data in existing files.

The Road To Recovery

If the disk copy didn't succeed without error messages, you'll have to begin rescue operations. The first step is to use the CHKDSK command to analyze the disk. If you have the DOS disk in drive A and the problem disk in drive B, type

```
CHKDSK B:/V
```

Again, the /V switch lets you view the filenames as the files are examined.

At the end of the process, CHKDSK reports how many *lost clusters* are in the file, and you'll be asked if you want these lost clusters turned into files. (A *cluster* is the minimum amount of disk space that a file can use.) Type N for No. If there are lost clusters, they may contain important data; but if you turn them into files at this point, you may cause even more damage to a problem disk.

If the disk *isn't* bad, you can call CHKDSK again with /F (for Fix) added at the end of the command. The lost clusters will be converted to files named FILE*nnnn*.CHK, where *nnnn* is a consecutive number to distinguish the files. You can use a word processor or text editor to read these files and see if they contain valuable data. Usually they don't and can be safely deleted. But don't use CHKDSK with the /F option if you're trying to recover a bad disk.

After you've run CHKDSK, the next step is to call a directory of the bad disk with the DIR command. If you get an error message when the directory is listed on the screen, the error is in the directory. If this happens, it's time to use the RECOVER program which is included on your DOS disk.

RECOVER uses the information in the FAT to build a new directory with new filenames. If your DOS disk is in drive A and the problem disk is in drive B, type

```
RECOVER B:
```

When RECOVER is finished, all files on the disk are renamed FILE*nnnn*.REC, where *nnnn* is a consecutive number to distinguish the files. Copy these files to a blank, formatted disk, and don't use the bad disk again. You must then begin what can be the difficult task of examining each file and re-

storing its original filename. If the recovered files are text files, you can use a word processor to load them, examine them, and recombine them, if necessary (sometimes a large file will be broken into pieces when recovered). Data files and program files are more difficult to identify and reconstruct.

Directory corruption often occurs when the drive is interrupted while writing a file. Normally, the directory is updated when the drive has finished writing the file. When the update doesn't happen, a directory listing shows the file length is zero bytes, even if the file occupies a substantial amount of disk space. To regain this material, use the CHKDSK program with /F added to the end. The recovered files are named FILE*nnnn*.CHK (not .REC). Again, use a word processor to examine these files for what's valuable, and recombine the files if you need to.

Dealing With FAT Foibles

If the directory seems alright, and all the files on a disk are usable except one or two, the FAT is probably damaged, or an entry in the FAT refers to a damaged area on the disk. You can determine this by attempting to copy the bad disk to a blank, formatted disk. With the DOS disk in drive A and the problem disk in drive B, enter

```
DISKCOPY B:
```

Or you can put the bad disk in drive B and a blank, formatted disk in drive A and enter

```
COPY B:*.* A:/V
```

Again, the /V option displays each filename as it is copied, and when the damaged file is reached, there is an error message. In addition to seeing error messages on the screen, you may also hear the drive make repeated attempts to read a disturbed file. When this happens, the drive makes a telltale razzing sound.

You may also receive this message: *Error—(A)bort, (I)gnore, (R)etry.* If so, continue to press I for Ignore. This forces DOS to copy the bad part of the disk to the new disk. If you keep receiving the error message, choose the Abort option to return to DOS. Then copy the remaining files one by one, if you can.

Next, use the RECOVER program, but instead of recovering the entire disk, use it to recover the bad files. Enter

```
RECOVER x:filename
```

where *x:* is the drive specifier (such as A: or B:) and *filename* is the name of the bad file. For example, if the bad file is named MESSEDUP.FIL and is found on the disk in drive B, type

```
RECOVER B:MESSEDUP.FIL
```

This rebuilds the FAT for the flawed file, and if any part of the disk used by the file is spoiled, that part of the file is left out. This doesn't regain the whole file, but part of a file is better than none. If it's a text file, the missing part can be retyped with a word processor.

When All Else Fails

If there are still significant amounts of missing data, the following last-ditch method may salvage what's left. However, it involves some work, and it's only practical with text files or data files that can be examined and reconstructed with a word processor.

First, back up the corrupted disk with DISKCOPY (not COPY), if you haven't already. Then use the CHKDSK program with the /F option on the backup disk and examine any resulting files for important data.

Next, you need to put the remaining, seemingly empty disk space into files of manageable size and examine them for data. To do this, load your BASIC interpreter (such as BASICA or GW-BASIC) and run the following BASIC program:

```
10 OPEN "FIX1.FRE" AS #1 LEN=1
20 FIELD #1,1 AS A$
30 LSET A$=""
40 PUT #1,10000
50 CLOSE
```

(The program is also found on the magazine disk under the filename LASTHOPE.BAS.)

This program builds a file called FIX1.FRE containing 10,000 bytes of the free disk area. Using a word processor, you can examine this file for missing material.

You need to repeat this process as many times as necessary until no free space is left on the disk. Each time you run the program, change the filename in line 10 so it doesn't erase the previous file (Example: FIX2.FRE, FIX3.FRE, and so on). Use the FILES command each time you run the program to see how much space remains on the disk. When the amount of free space is less than 10,000 bytes, change the number 10,000 in line 40 to equal the amount of free space remaining.

When all the free space on the disk is collected into the files named FIX*n*.FRE, copy them one by one onto a good disk with COPY. Then, using a word processor, reconstruct the files, if necessary. It is important that you recombine all the files on a good disk—not the bad disk or its backup—because some files may use the same cluster for data storage. If you change this sector in one file, the data in the second will also be changed. Combining the files on a good disk avoids this nightmare.

The Floppy Graveyard

If a disk goes bad from fingerprints or dirt, throw it away. Dirt spreads on a disk surface when the drive heads move over it, and more areas may become contaminated. The dirt also isn't good for the drive heads.

You can try to reformat disks which have no apparent physical defects. During formatting, DOS marks all bad sectors to prevent them from being used. However, disks with bad sectors shouldn't be used as target disks with the DISKCOPY command, because DISKCOPY ignores bad-sector flags, and the copy will be flawed.

With today's low disk prices, perhaps the best policy is to dispose of all bad disks to avoid future headaches. **PC**

COMPUTE!'s PC Magazine

For IBM PCs & Compatibles

Author's Guide

Most of the following suggestions serve to improve the speed and accuracy of publication. We are much more concerned with the content of an article than with its style, but articles should be clear and well-explained. The guidelines below will permit your good ideas and programs to be more easily edited and published.

1. The upper left corner of the first page of your article should contain your name, address, daytime telephone number, and the date of submission.

2. The following information should appear in the upper right corner of the first page: the language in which your program was written and the maker of that language, if applicable (for example, if your program was written in C, which compiler was used); the size, in kilobytes, of both your source code and executable object code; and any special requirements for your program (memory size, color or monochrome display card, hard disk, printer, modem, and so on).

3. The underlined title of the article should be placed about ⅔ of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number—for example: Memory Map / Smith / 2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not right-justify. Leave the lines ragged.

6. Please use standard typing paper (no erasable, onionskin, or other thin paper), and type on one side of the paper only (upper- and lowercase).

7. Sheets should be attached with a paper clip, not stapled.

8. If you are submitting more than one article, send each one in a separate mailer with its own disk.

9. Short programs (under 20 lines) can be included within the text. Longer programs should be stored twice on disk and submitted with the article. For compiled programs or machine language, include the executable object code, source code, and any files needed to recompile the program. Compiled object code must be a self-standing runtime file that can be used by readers who do not own a copy of the language in which the program was written. In addition, we must be able to legally distribute the runtime code without incurring licensing fees or other obligations to the maker of the language. Check with the maker if you aren't sure about licensing fees. If your article was written with a word processor, we also appreciate a copy of the ASCII text file on the disk. The disk should be labeled with both your name and the title of the article. For their safety, disks should be enclosed within plastic or cardboard mailers (available at photography, stationery, or computer supply stores).

10. For greater clarity, use all capitals when referring to language commands (LIST, RND, GOTO, CASE OF) and languages which are acronyms (such as BASIC, PILOT, and FORTRAN, but not Forth, Pascal, or Logo). Headlines and subheads should, however, be initial caps only. Do not capitalize words for emphasis; instead, underline words you wish to emphasize, thus indicating *italics.*

11. Articles can be of any length—from a single-line routine to a multiple-issue series. The average article is four to eight double-spaced, typed pages.

12. If you want to include photographs, they should be either color slides or 5 × 7 black-and-white glossies.

13. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.

14. COMPUTE!'s PC Magazine pays between $200 and $2,000 for published program articles. Payment is made upon acceptance. Following submission (to Submissions Reviewer, COMPUTE!'s PC Magazine, P.O. Box 5406, Greensboro, NC 27403), allow four to eight weeks for a reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. *Rejected manuscripts are returned only to authors who enclose a self-addressed, stamped envelope.*

15. If your article is accepted and you subsequently make improvements to the program, please submit an entirely new disk and a new copy of the article reflecting the update. Send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing *Revision* on both the envelope and the article.

16. COMPUTE!'s PC Magazine does not accept unsolicited product reviews.

COMPUTE!'s PC Magazine Readership Survey

What do you like about COMPUTE!'s PC Magazine? What don't you like? What kind of PC system do you use, and what are you interested in doing with your PC?

We want to make COMPUTE!'s PC Magazine as valuable to you as possible. Our goal is to make COMPUTE!'s PC Magazine the top publication in its field.

Please take a moment to fill out and mail this questionnaire (photocopies are fine). Although this isn't a scientific survey, it will allow us to draw some general conclusions about you, our readers.

Several of the questions may require you to check more than one answer (for example, if you have both a monochrome and a color/graphics video adapter). Also, we're interested in hearing from you even if you don't own a PC or compatible; perhaps you're reading the magazine because you're thinking about buying a PC, or maybe you use one at your office or school.

Please mail the questionnaire to Readership Survey, COMPUTE!'s PC Magazine, P.O. Box 5406, Greensboro, NC 27403. We'll publish the results in an upcoming issue.

Which computer do you own or use?
- ☐ IBM PC or XT
- ☐ IBM PCjr
- ☐ IBM AT
- ☐ IBM PS/2 Model 30
- ☐ Tandy PC compatible
- ☐ Leading Edge PC compatible
- ☐ PC's Limited compatible
- ☐ Epson PC compatible
- ☐ Compaq PC compatible
- ☐ Other PC compatible/clone: _____
- ☐ I don't own or use a PC yet

If you own a PC or compatible, is it your first computer?
- ☐ Yes
- ☐ No

If you previously owned (or still own) a computer that is *not* a PC compatible, what kind is it?
- ☐ Commodore
- ☐ Apple II series
- ☐ Apple Macintosh
- ☐ Atari
- ☐ Tandy/Radio Shack
- ☐ Texas Instruments
- ☐ Other: _____

Which video display adapter is in your PC compatible?
- ☐ Monochrome display adapter (MDA)
- ☐ Hercules graphics card (HGC)
- ☐ Color/graphics adapter (CGA)
- ☐ Enhanced graphics adapter (EGA)
- ☐ Multicolor graphics array (MCGA)
- ☐ Other: _____

What kind of monitor do you own or use?
- ☐ Monochrome
- ☐ RGB color
- ☐ Composite color
- ☐ TV

Which peripherals do you own or use with your PC?
- ☐ Dot-matrix printer
- ☐ Letter-quality printer
- ☐ Color printer
- ☐ Laser printer
- ☐ 300-bps modem
- ☐ 1200-bps modem
- ☐ 2400-bps modem
- ☐ Mouse
- ☐ Joystick
- ☐ Graphics tablet
- ☐ Other: _____

Which disk drives do you own or use?
- ☐ 5¼-inch floppy
- ☐ 3½-inch floppy
- ☐ Hard disk
- ☐ Two or more disk drives

Where do you primarily use your PC system?
- ☐ At work
- ☐ At home
- ☐ At school

Which types of PC software have you purchased?
- ☐ Word processor
- ☐ Spreadsheet
- ☐ Database management
- ☐ Telecommunications
- ☐ Programming language
- ☐ Games/entertainment
- ☐ Graphics design
- ☐ Educational
- ☐ Other: _____
- ☐ None

In which languages do you program on the PC?
- ☐ BASIC
- ☐ Pascal
- ☐ Assembly/machine language
- ☐ COBOL
- ☐ FORTRAN
- ☐ LISP
- ☐ Forth
- ☐ Prolog
- ☐ C
- ☐ Other: _____
- ☐ I don't program on the PC

Which types of articles and programs would you like to see in this magazine?
- ☐ General-purpose home applications
- ☐ Business applications
- ☐ General utilities
- ☐ Utilities for programmers
- ☐ DOS utilities
- ☐ Using printers
- ☐ Telecommunications
- ☐ Programming explanations and tutorials
- ☐ Educational programs for youngsters
- ☐ Game/entertainment programs
- ☐ Graphics
- ☐ Sound and music
- ☐ Hardware modifications and projects
- ☐ General-interest feature articles and interviews
- ☐ New products
- ☐ News and rumors
- ☐ Other: _____

Which types of new product reviews would you like to see in this magazine?
- ☐ Home applications
- ☐ Business applications
- ☐ Educational software
- ☐ Games/entertainment
- ☐ Programming languages
- ☐ Utilities
- ☐ Hardware
- ☐ Other: _____

Which article in this issue do you like best?

_____

Which article in this issue do you like least?

_____

If you saw our first issue, which article did you like best?

_____

If you saw our first issue, which article did you like least?

_____

Do you think the inclusion of program source code on the disk is useful?
- ☐ Yes
- ☐ No
- ☐ No opinion

Do you like the idea of a *Flight Simulator* adventure in each issue?
- ☐ Yes
- ☐ No
- ☐ No opinion

What other things would you like to see on the disk?

_____

How did you happen to see this issue of COMPUTE!'s PC Magazine?
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- ☐ I bought the issue from a newsstand or a dealer
- ☐ I borrowed the issue

What is your age?

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Additional comments:

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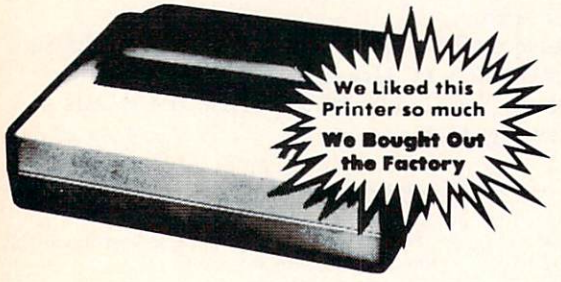

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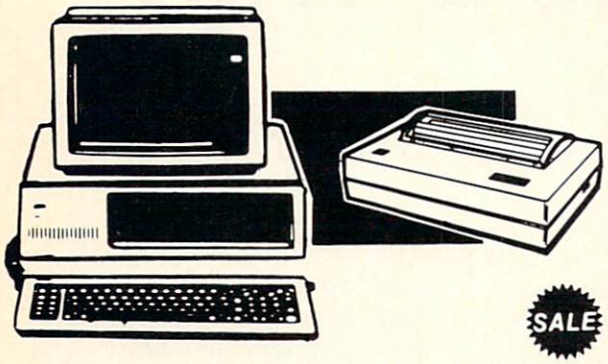

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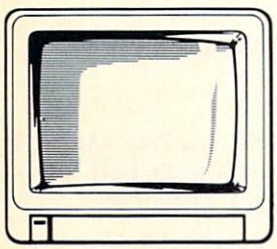

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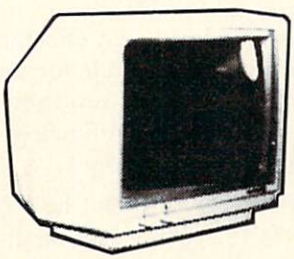

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Getting Started With Batch Files

George Campbell

One of the main reasons for using a computer is to minimize the need to perform tedious, repetitive work. But if you find yourself repeatedly typing the same DOS commands at the system prompt, here's an easy way to make the computer save you even more time.

What happens when you switch on your PC? If all you see is a request for the date and time, or just the familiar DOS prompt A>, this article is just what you need. There is a simple and easy way to make your PC do so much more. Your computer can automatically carry out a series of predetermined DOS commands, load your favorite program, or even present you with a customized menu of programs to choose from.

The secret is a *batch file*. If you've heard about batch files but aren't sure what they do or how they work, you might be surprised to discover how easy they are to create and use. You'll also be amazed at the tricks that batch files can perform and how much repetitive typing they can save you.

Let's start with a definition: A batch file is simply a text file on disk that consists of a series of DOS commands. Any DOS command that you can type at the DOS prompt—DIR, COPY, TYPE, and so forth—can be included in a batch file. Using a word processor or text editor, you just type each DOS command, followed by a carriage return, on a separate line, and then save the file on disk. (For more details, see the accompanying article, "Creating a Batch File.") From then on, whenever you enter this filename at the DOS prompt, DOS reads the commands in the file and carries them out in sequence—just as if you had typed the commands yourself on the keyboard.

In effect, a batch file makes it possible for the computer to practically run itself, although it's really just following a script that you've written.

But how can you predict exactly which sequence of DOS commands you need to type? Sometimes you can't, of course. Most people, however, find that they issue a certain series of DOS commands each time they switch on the computer. For example, you might always type DIR to look at the disk directory, WP to run a word processor, or DB to run a database program. If so, you're a prime candidate for a special type of batch file called *AUTOEXEC.BAT*.

Wake-Up Call

Whenever you switch on your PC, it looks for a batch file named AUTOEXEC.BAT on the startup disk. If the file exists, the computer carries out the DOS commands found in the file. In the process, the date and time requests that usually appear on the screen are bypassed.

Let's start with the simplest type of AUTOEXEC.BAT. If you have a floppy disk system, you probably boot up with your PC-DOS or MS-DOS disk (the one with COMMAND.COM) in drive A. Here is a batch file that automates something you probably do manually:

```
DIR/W
```

This simple, one-line batch file, when saved on your DOS disk under the filename AUTOEXEC.BAT, will start your computer and load DOS as usual; then it will show you a directory of the files on the disk, arranged in columns. This is accomplished by the DOS command DIR/W, which is simply DIR accompanied by the /W option to arrange the files in a wide format of columns across the screen.

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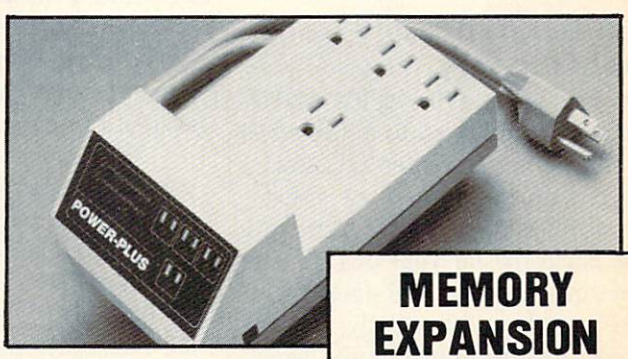

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The results are the same as if you had typed DIR/W yourself at the DOS prompt after starting up the computer. In fact, if you watch closely when this batch file runs, you'll see the DIR/W command appear at the DOS prompt, as if by magic.

All of the sample batch files in this article are on the disk included with this issue of COMPUTE!'s PC Magazine. The file above is called AUTOEXEC.1. To use it, just copy the file to your DOS disk and rename it AUTOEXEC.BAT. Then make sure this disk is inserted in drive A, turn off the computer, and then switch it on again. (You can also simultaneously press the Control, Alt, and Delete keys to restart the computer instead of turning the power off and on.)

Run Programs Automatically

The next sample file, called AUTOEXEC.2, is designed to automatically run a program when you start the computer. You can use a text editor or word processor to modify this batch file for your own needs. For this example, we'll assume that you want to automatically run a word processor and that the word processing program is saved on your startup disk under the filename WORD.

```
ECHO OFF
CLS
WORD
```

Here's a line-by-line explanation:

ECHO OFF This command, purely for cosmetic reasons, tells DOS not to display the following commands on the screen as they are executed from the batch file.

CLS Again, just for looks, this command clears the screen.

WORD This is the filename of the word processing program we're automatically running. When executed from the batch file, it runs the program, just as if you had typed the command at the DOS prompt.

In the third line, of course, you would substitute the filename of whatever program you want to run.

Again, for this to work, your startup disk must contain a copy of the DOS command processor (the file COMMAND.COM), the file shown above (saved with the name AUTOEXEC.BAT), and the program you're automatically running.

What if there's no room on your DOS disk for the program, or if the program is copy-protected and can't be transferred to your DOS disk? Simple: Just change the third line above to something like B:WORD—for example, to run the program from a disk in drive B. Remember, a batch file may contain any DOS command that you'd normally type at a DOS prompt.

Pick A Program

Let's move on to another AUTOEXEC.BAT file. This sample, called AUTOEXEC.3 on the magazine disk, presents you with a choice of several programs to run.

To begin, copy the programs you use regularly to your startup disk. For the purposes of this example, we'll assume that all the programs have either a .COM or .EXE file extension. Here is the AUTOEXEC.3 file:

```
ECHO OFF
CLS
DIR *.COM/W
DIR *.EXE/W
ECHO Type the name of the program
  and press Enter
```

Be sure to save this file on your startup disk under the filename AUTOEXEC.BAT. When you start your computer with this disk, it will clear the screen and display two directories, one for each file extension (.COM and .EXE). Below the directories, the following message will appear on the screen:

```
Type the name of the program and press
  Enter
```

followed by the usual A> prompt. This demonstrates that whenever you enter a line of text following an ECHO command, that text will be displayed on your monitor when the batch file executes.

This batch file makes it easier to select and run a program from a disk full of programs when you can't remember the exact filename. The directories are displayed right on the screen, so you can pick the file you want and simply type the filename at the DOS prompt. Of course, you can customize the DIR commands in the batch file to display just the type of directory you want.

Advanced AUTOEXEC Files

As you become more experienced with batch files, you can create more complicated AUTOEXEC.BAT sequences. The next example, stored on the magazine disk as AUTOEXEC.4, demonstrates the power of these files. It prints a menu on your screen when you start your PC. Using the menu, you can call up any of the programs on your disk. This batch file is especially appropriate for hard drives, where many different programs are stored on the same disk.

AUTOEXEC.4 uses the ECHO command to print the menu on the screen. Here's how it looks:

```
ECHO OFF
CLS
ECHO Which program do you want to
  use?
ECHO 1) Word Processor
ECHO 2) Database
ECHO 3) Spreadsheet
ECHO 4) Communications
ECHO 5) Exit to DOS
ECHO Type a number and press Enter
```

The menu automatically appears on the screen when you boot up your PC. For the menu to work, you must create a separate batch file for each menu selection. These files will be named 1.BAT for menu choice 1, 2.BAT for menu choice 2, and so on. As an example, 1.BAT is included on the magazine disk. Any batch file called from the menu will carry out the commands contained in that file.

Here is 1.BAT:

```
ECHO OFF
CLS
CD \WP          (Changes to the \WP
                subdirectory.)
WORD            (Calls the word processing
                program named WORD.)
CD \            (Changes back to the root di-
                rectory when you exit the
                word processor.)
AUTOEXEC        (Returns to the menu.)
```

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Creating A Batch File

You can use almost any word processor or text editor to create AUTOEXEC.BAT or any other batch file. Most word processors, however, save files which contain special formatting characters that are not allowed in batch files. To eliminate these characters, save the file in straight text or ASCII format. For batch files, you must save the text in a pure ASCII format. Refer to the manual that came with the program if you're not sure how to do this.

When creating a batch file, put only one DOS command on each line, and end each line with a carriage return. The DOS commands can be typed in either upper- or lowercase letters.

Short AUTOEXEC.BAT files can be created with the DOS COPY command instead of with a word processor. For instance, to create the AUTOEXEC.1 example shown in the main article on a disk in floppy drive A, enter the following commands at the DOS prompt:

```
COPY CON A:AUTOEXEC.BAT DIR/
W {F6}
```

Enter a carriage return following each line. The {F6} at the end of the final line of the file means to press the F6 function key. (This will show up on the screen as ^Z.)

If you make a typing error when using COPY CON to create a batch file, you can press the Backspace key to delete characters on the current line. Once you press Enter and proceed to the next line, however, you can no longer edit previous lines. You have to load the batch file into a text editor or word processor to make further changes.

Notice again that the commands in the batch file are the same ones you would use to call the program if you typed them at the DOS prompt. Of course, you can easily customize this menu by changing the commands and altering the ECHO lines in the AUTOEXEC.BAT file. Important: The AUTOEXEC.BAT file and the other batch files must be on the *root directory* of your hard disk—not in a subdirectory.

Item 5 on the menu, which allows you to exit to DOS, calls the file 5.BAT, which looks like this:

```
ECHO OFF
CLS
PROMPT $P$G
```

Only the last line is unfamiliar. The PROMPT command allows you to customize your DOS prompt. Instead of the usual DOS prompt, the line shown here displays the path you have selected. If, for example, drive C is the current drive and you change to the \WP subdirectory, the prompt will look like this:

```
C:\WP>
```

You can also enter text following the PROMPT command in a batch file. You can do this to remind yourself to back up files or something else.

To insert blank lines in your menu, use the ECHO command followed by a space, then hold down the Alt key while you type the number 255 on the numeric keypad. (Note: Not all word processors allow this.)

You can also use batch files to remind you of important tasks, like backing up data files after exiting a program. Just insert an ECHO command with your message following the command which called the program.

Experiment with AUTOEXEC.BAT and other batch files. Just remember that any command you can enter at the system prompt can be included in AUTOEXEC.BAT or any other batch file.

AUTOEXEC.BAT File Tips

1. Certain characters cannot be used in ECHO statements. The > and < characters have a special meaning to DOS, and will trigger an error message.

2. Some DOS commands print messages on the screen, which you may want to avoid. A good example is the COPY command. When you include this command in an AUTOEXEC.BAT file, this message normally appears after each file is copied:

```
1 file(s) copied
```

To avoid this, enter COPY commands this way:

```
COPY d:FILENAME.EXT d:FILENAME
  .EXT >NUL
```

where *d:* is the optional drive identifier. This format uses the > character to redirect the screen message to the NUL device, effectively sending it into oblivion.

3. If you get a *File not found* message when running an AUTOEXEC.BAT file, check your ECHO statements. You must leave a space between the ECHO command and the text which follows it.

4. If you use an AUTOEXEC.BAT file to load a few memory-resident programs such as *Sidekick,* be sure to construct the file so the programs are loaded in the correct order. (Some memory-resident programs insist on being loaded in a certain order if used with other memory-resident programs.) **PC**

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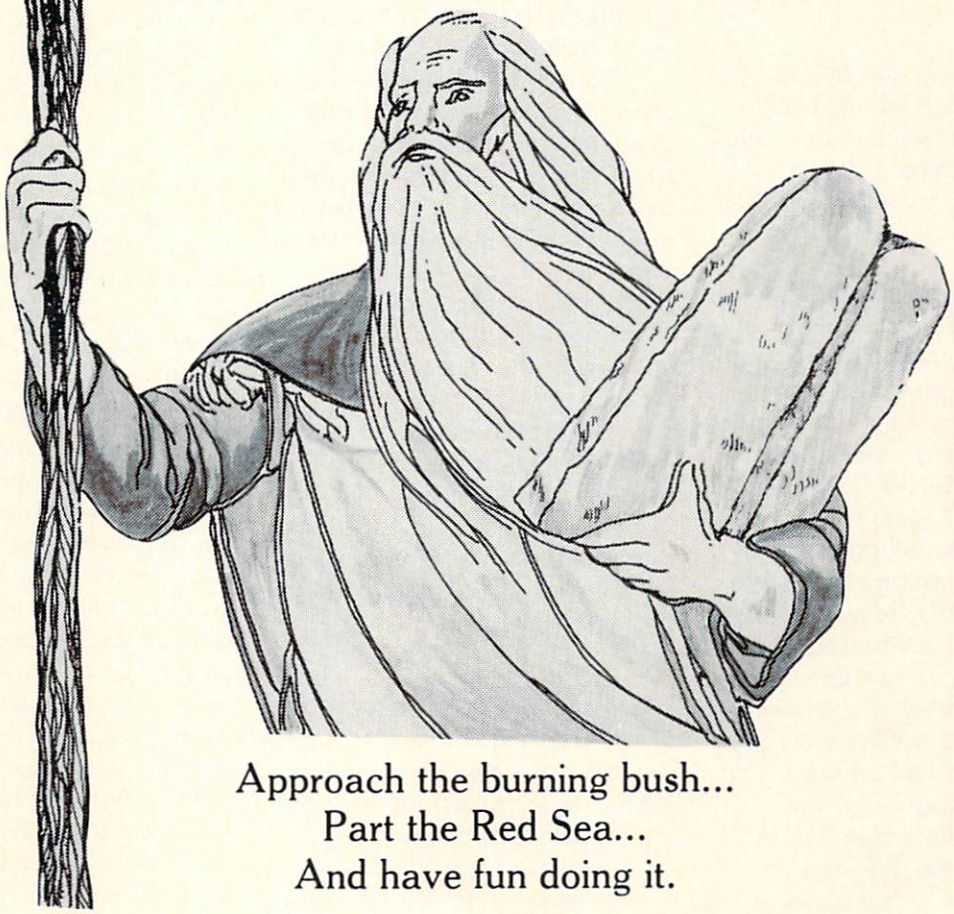

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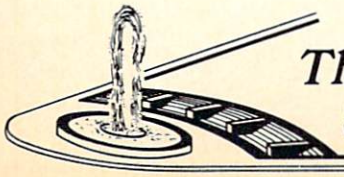

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The desktop-publishing market for PC compatibles has quickly mushroomed into a pitched battle dominated by two major combatants: *Aldus PageMaker,* which runs under Microsoft *Windows;* and *Ventura Publisher,* which runs under Digital Research's *GEM* (Graphics Environment Manager) desktop environment. Both are extremely capable programs, but they're really aimed at two different submarkets.

PageMaker, as its name implies, is best suited for short documents (see review in COMPUTE!'s PC Magazine, September 1987). *Ventura Publisher,* on the other hand, was designed from the ground up to handle documents of enormous length. It boasts such features as stylesheets and the ability to automatically generate tables of contents and indices—features missing from the current version of *PageMaker.*

Ventura Publisher's full official name is *Xerox Desktop Publishing Series: Ventura Publisher Edition,* but users invariably call it *Ventura Publisher.* It comes in a package that includes 11 disks and two manuals. The manuals—a training guide and a reference guide—are standard IBM-size looseleaf binders and are apparently reproduced from laser-printer output. Unlike the *PageMaker* documentation, the *Ventura* manuals aren't strikingly beautiful examples of the unbridled power of desktop publishing. Rather, they look as if they were put together by a writer who happened to have a good layout package at his disposal—namely, *Ventura Publisher.*

Thanks to the manuals and previous experience with similar programs, I found *Ventura* easy to learn. However, a coworker who had no experience with stylesheets or desktop-publishing software had difficulties. If you've used stylesheets with a word processor such as *Microsoft Word,* and if you're familiar with the concepts of desktop publishing, you'll probably do just fine. On the other hand, if you're a complete novice, you may have trouble learning *Ventura Publisher* from the current manuals—despite the Macintosh-like appearance of the software. This isn't a package for rank beginners.

Faster Than *PageMaker*

Ease of learning, of course, is quite different from ease of use. Because *Ventura* is optimized for creating large documents, in the hands of an experienced user, it's matchless.

To begin with, *Ventura* is fast, mainly because *GEM* is much faster than *Windows* (*Ventura* comes with a runtime version of *GEM,* in case you don't own a copy). In fact, *Ventura* runs so much faster under *GEM,* that while *PageMaker* requires an AT-class computer, *Ventura* works surprisingly well on a PC XT. On an AT-class machine, it positively sings.

Another reason for *Ventura*'s speed is that, wherever possible, it uses "pointers" to documents instead of incorporating the documents themselves. In other words, most of the text and images in a *Ventura* chapter come from outside sources. (A *chapter* is what most word processors would call a document; *Ventura* chapters can be ganged together into a special entity called a *publication.*) For example, I used *Word* and Borland International's *Sidekick* to compose the text for a manual and a newsletter I assembled with *Ventura,* and I used Zenographics' *Mirage* to create the images. *Ventura* cleverly appears to import the word-processor text into its own chapters, but in fact, it only sets up a pointer to your document. When you delete a word with *Ventura*'s simple text editor, it disappears from the original text file.

To make *Ventura* even easier to use, almost all aspects of a document can be controlled from either the drop-down menus or the text files. For example, to boldface a word in *Ventura,* you can simply select it and choose bold from a menu, just as you would on a Macintosh, or you can insert special formatting codes into the original document. In this case, you'd add <B> to the beginning of the word you want to appear in boldface, and <D> at the end of the word. When *Ventura* displays the word, it knows not to print the <B>; instead, it starts boldfacing, and it stops when it encounters the <D>.

Some people might think this is a hideous leap backward—after all, why was the desktop-style interface invented in the first place? In actual use, it proves to be a real plus. Less advanced users will always have the menus available, and power users and fast typists gain both the speed of being able to do things their way and the convenience of onscreen preview. *Ventura,* at its best, gets high marks on ease of use for both the timid and the adventuresome. It would be even better with more complete documentation.

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"This program really is good and deserves to be shown off a bit"

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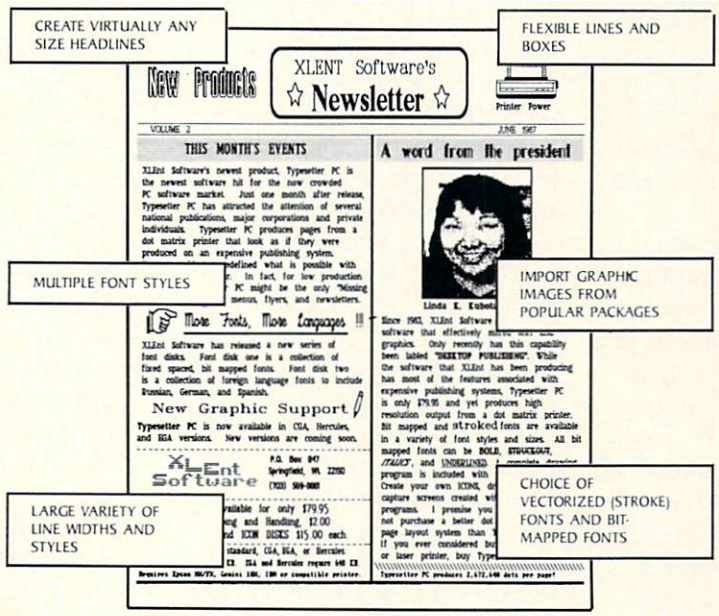

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Typesetter PC provides a complete graphics environment plus the capability to import graphics from most popular graphics programs. There are far too many features in Typesetter PC to describe here. However, PC Publishing stated that the "Font capabilities will amaze you" and that the graphics capabilities are "quite impressive."

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The purpose of a desktop-publishing system is to assemble text files and images into an integrated document or publication. *Ventura* does a fine job of importing text from many word processors, and images from a wide variety of painting and drawing programs. Text files can be imported from all of the biggies: *Word, Wordstar, MultiMate, WordPerfect,* and many more. Text attributes such as italics and boldface are retained, but document/paragraph attributes like multiple columns, stylesheet information, and decimal tabs are lost.

Ventura is compatible with Lotus PIC image files, and graphics created with *AutoCAD, PC Paintbrush, CGM,* various Macintosh programs, and lots of others. Colors are translated into shades of gray for output on laser printers, and a wide variety of editable patterns is also available. *Ventura* had no trouble accepting *CGM* and Lotus PIC images that *PageMaker* balked at.

When *Ventura* imports a text file, it hyphenates the text at every possible syllable, then hides the hyphens until they're needed. This trick makes it possible for *Ventura* to manipulate the text file much more quickly. Some other programs hyphenate words as they appear on the screen, then discard the hyphens when the words scroll off, thus creating a lot of extra work for themselves. *Ventura*'s method results in speedier performance, which adds to the appeal of the package.

This extra speed is also readily apparent when generating tables of contents, indices, tables, and figures. *Ventura* is astoundingly fast; however, the entire chapter you're manipulating must be stored in RAM. The largest chapter tested was 64 pages long, and there was never a major loss of performance.

Book-Sized Projects

If you need to tackle even larger projects, *Ventura* allows you to chain documents together; the program can handle up to 128 chapters and automatically numbers up to 10,000 pages. You can tell one file to start numbering where a previous file left off. There are several numbering and renumbering schemes to choose from. For instance, you can precede page, table, and figure numbers with a chapter number, such as 6-14 or 21-2. All of this is handled automatically. No competing package has this kind of flexibility.

Stylesheets are both a boon and a curse—a boon, because they make life a great deal easier in cases where standardization and maintenance are important—a curse, because new users have a tough time understanding them. A stylesheet is a separate file containing "canned" formatting information. In *Ventura*'s case, the stylesheet works only on paragraphs. Paragraph *tags* (individual styles) contain directions for type fonts, line breaks, paragraph spacing, special effects, horizontal and vertical rules, and so on.

For example, one paragraph style might be for a chapter title. You enter paragraph mode, select the line you want to use for the title, and apply the Chapter Title stylesheet to it. The stylesheet might immediately set the line in 24-point type, position it two inches down from the top margin, draw a horizontal rule underneath it to the opposite margin, and insert two lines of space below. A stylesheet called Bullet might automatically draw a filled circle next to the first line, indent the circle, and italicize all following text automatically.

All of these features make stylesheets ideal for such jobs as creating a manual, where several writers may be writing different chapters that will eventually have a uniform appearance. However, stylesheets also make the creation of a short newsletter a bit troublesome for beginners. *Ventura* makes it extra tough because every paragraph *must* have a style. If you want only one line in the whole chapter to be centered, too bad—you can't just center a single line. Instead, because centering is a paragraph attribute, you must create a centered-line stylesheet for that sole occurrence.

Manuals Need Improvement

Curiously, the manuals accompanying this powerful program are thorough in some areas and frustratingly incomplete in others. The training manual is more than 100 pages long and does a good job of leading the user, step by step, through typical work sessions, but it leaves out some key concepts. It doesn't cover several issues which must be understood to create and maintain large documents. It also doesn't satisfactorily explain the underlying concepts of desktop publishing in general, as well as many concepts unique to *Ventura*.

Unfortunately, the reference manual doesn't elucidate these topics (more on this later). On the other hand, it does a spectacular job explaining the use of software-based fonts for laser printers, and how to connect your printer—even to the point of showing you how to make a cable.

Here's an example of one shortcoming in the documentation that was revealed during actual use. *Ventura Publisher* views all elements (whether text- or graphics-oriented) in terms of *frames.* Briefly, a frame is a rectangle that contains the element. When you want to add an image to a document, you create a frame by drawing it on the screen, making it the size you want, then loading the image into it. If you're putting together a newsletter, the best approach is to put each article into a frame (or several frames—text flows naturally from one frame to the next). A blank document is actually a special kind of frame called an *underlying page,* acting as a sort of master frame.

The basic concept of frames is explained quite well in the documentation. However, when *Ventura* was used to create a 150-page manual, it was discovered that many characteristics of frames are not well explained. For instance, a frame stays where it is, no matter what. This seems to make sense until you decide to insert several pages into a chapter. Since frames stay put, an illustration that was correctly positioned a moment ago

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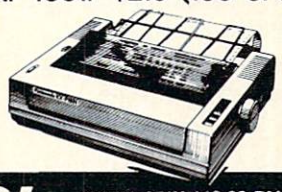

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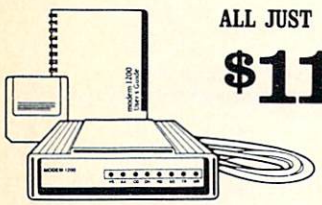

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suddenly becomes irrelevant in its current location.

The solution is to *anchor* the image frame to the text frame so it moves right along with the text in which it's referenced. But anchored frames don't automatically move with the text. You have to issue an explicit re-anchor frames command. If you make extensive changes to a document and print it without re-anchoring the frames, images end up scattered all over the document.

Anchors are an extremely powerful concept (*PageMaker* doesn't have them at all), but they may be useless to some people without a better explanation. Nor is this an isolated example: Another confusing area is the discussion on line breaks, a critical aspect of stylesheets that gets little more coverage than to refer the user to a picture of the menu. On the whole, *Ventura*'s documentation is not for the timid and should be better for the price.

No program is perfect, but version 1.1 of this extremely complex piece of software is remarkably stable. I fed it documents that were too long, ran it with only marginally acceptable amounts of memory, and in general, tried to be a pain in the neck. Much to its credit, *Ventura* always responded with sensible error messages. Its error-handling during actual use was equally impressive.

If you do run into problems, Xerox provides technical assistance over the telephone. This assistance is free to registered users, although the call isn't toll-free. It's important to register your copy of *Ventura Publisher* because Xerox does indeed keep track of serial numbers. The technical-assistance line was tested several times with some pretty tough questions, and satisfactory answers were received each time.

Even with this help, be prepared to spend a lot of time learning *Ventura*. If you've acquired stylesheet experience with another desktop-publishing program or a word processor, you have a leg up on those who haven't. But you'll still need to experiment a lot, because some things simply aren't covered in the manual as well as they should be. Finally, keep in mind that *Ventura* is probably better suited for creating and maintaining large documents than for printing out the occasional church newsletter.

Acknowledging those caveats, *Ventura Publisher* has no peer. No competing package, for example, can create an index for a 2000-page document. No other package offers its speed, multichapter dynamic page-numbering, and automatic generation of tables of contents, table and figure numbers, and indices. This is all in addition to standard desktop publishing features like page layout and onscreen preview. In the hands of the right user, *Ventura Publisher* is an incredibly powerful piece of software.

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PC-Desk

Buddy Cooper

System requirements: IBM PC, XT, AT, or compatible with at least 128K of memory for stand-alone execution, or 192K for memory-resident execution. Autodial modem and printer recommended.

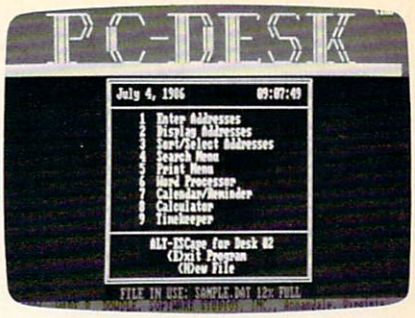
Pop-up utility programs have been showing up everywhere during the past few years—thanks, largely, to the instant popularity of Borland International's *Sidekick*—and they've been growing ever larger and more sophisticated.

Software Studios' *PC-Desk* (not to be confused with a shareware disk called *PC-Desk*) is a huge program that includes an address book, Rolodex card printer, automatic file and retrieve, a calendar/reminder system, clock/alarm, client-billing log, telephone-usage log, autodialer, mail merge, DOS functions, word processor, printing calculator, label-and-envelope printer, and file encryptor. If it seems that *PC-Desk* includes everything you need to operate a small office, you're not far from right. This is a fairly complete piece of software, suitable for a small business or the home.

If *PC-Desk* has a weak point, it's not a lack of features. Rather, it's the unusual way you must install the program. You have a choice of running *PC-Desk* as a conventional application or as a memory-resident program—except it's not memory-resident in the generally accepted sense. If your computer has at least 192K of RAM, *PC-Desk* divides the memory into two partitions called Desk #1 and Desk #2. *PC-Desk* itself resides in Desk #1, using 192K, while any other program can be loaded into the remaining memory of Desk #2. You can switch back and forth between *PC-Desk* in Desk #1 and anything else in Desk #2 by pressing the Alt-Esc key combination.

This arrangement is very touchy, however. I found that if you exit *PC-Desk*, you can't reenter it without rebooting the whole system. If you try to reenter *PC-Desk* with the partitioning command PC-DESK, or try to run it as a nonresident program with the regular command DESK, you get an error message that reads, *Switchola already loaded, type Alt-Esc to switch consoles*—but it doesn't work. During one attempt, my printer inexplicably began grinding out copy after copy of the main menu screen. Typing Ctrl-C and making other attempts to break in had no effect.

In other ways, *PC-Desk* is more sturdy than advertised. For example, while the manual admonishes you not to use *PC-Desk* in concert with any other (truly) memory-resident programs, I ran *Sidekick* in Desk #2 and it worked fine. I managed to revise a letter, exit *Sidekick*, and print the letter with *PC-Desk* in Desk #1 without problems.



Above: *Picking a function from the* PC-Desk *main menu.* Below: *Entering a record into the database.*

Built-In Reminders

Let's take a look at the numerous functions that *PC-Desk* has to offer, starting with the address database.

In addition to the usual functions expected in an address book, *PC-Desk* has several features to help you generate special mailings or keep track of important events. If you're using the address book to build a client list, for instance, you could send welcome letters to all clients entered on a certain day. Entries can be coded to record birthdays, anniversaries, call-back dates, and the like, so that when you run *PC-Desk* on that date, the program automatically displays a reminder screen with a calendar, a things-to-do list, and that day's special events.

Entering names and addresses requires nothing more than filling in the blanks on a preformatted screen. While the screen is fairly well thought-out, there are no separate fields for middle names, titles, or degrees (M.D., Jr., III, and so on). Middle initials must be included with first names, and presumably, other necessary abbreviations must be tacked onto last names. Oddly, there isn't a separate field for the state, either. States are included with cities. The incompletion of the name field is not as bothersome as the lack of a state field; many people sort their addresses by state.

The manual indicates that *PC-Desk* is designed for "about 200 full records with data in each field." That might seem like a small number of records for a database, but you can maintain multiple files and, while it's not specifically stated, the implication is clear that each file may contain up to 200 full records. You might keep one file for friends, one for clients, one for vendors, one for tenants in a particular apartment building, and so forth.

You can search a database by the person's name, the name of the person's company, or the record number. The manual indicates that record numbers change as entries are deleted, although that didn't seem to happen when I deleted entries. When searching by names or company names, it's not necessary to enter the full name. Of course, the more letters you enter, the more accurate the search will be.

Also, the search is not case-sensitive—it's not necessary to enter uppercase and lowercase letters exactly as they appear in the field (for example, a search for *Smith* would find *SMITH*).

You can sort a database by any field or combination of fields. You can even use the sort function to locate a particular record if you know only part of the information you need. Let's say, for instance, you have a client nicknamed Buddy who lives in Atlantic Beach, North Carolina, but you can't remember his real name or the name of his company. You could possibly find the record by sorting the database according to the salutation you use when writing letters (Buddy) or the city and state (Atlantic Beach, North Carolina).

One minor inconvenience is that the results of a sort aren't displayed automatically. The program returns you to the main menu, where you must select the display option to view the sorted information.

Easy Word Processing

Why do you need to sort your database of names and addresses in the first place? So you can send letters to your friends or invoices to your clients. Enter the word processor.

PC-Desk claims its word processor is "full featured." It's not, of course, but it is remarkably well-appointed. It's also easy enough for a beginner to use. Merely by pressing a function key or Alt-function key combination, you can move to the top or bottom of a document; insert or delete a line; load, save, or print a file; set or clear margins, tabs, and paragraph indentions; reform a paragraph; center text; force a page break; search for strings; mark text for moving, copying, or deleting; delete or merge files; and encrypt or decrypt files for security purposes.

The Home key moves the cursor to the beginning of a line, the End key moves it to the end of a line, and the PgUp and PgDn keys scroll the document up and down the screen. The Esc key exits the word processor.

If you need to tote up some quick figures, the *PC-Desk* calculator is available from within the word processor. Another interesting feature makes it easy to generate customized form letters. There are 16 two-letter variables which can be embedded in the body of a letter to extract information from a database record and insert it at that point in the text. That way, personalized letters can be sent to various members of a subset of a searched or sorted database. These variables include names, company names, addresses, notes, salutations (or familiar greetings), and the current date.

A real weakness, however, is that the program does not adjust the length of a line or wrap words to the next line when replacing these variables with the information from the database record. The result can sometimes be ragged-looking lines of text within your document. To get around this, you can resort to tricks like embedding a variable on the last (short) line of a paragraph. Otherwise, the uneven line lengths will give away that the document was created as a form letter.

Printing Functions

After you've written a letter, *PC-Desk* can print a single copy for an individual or multiple copies for groups of people, sorted by any combination of fields in the database. *PC-Desk* also prints a nice-looking envelope with a return address. For less personalized work, *PC-Desk* can print peel-and-stick labels with addresses or return addresses.

Simple commands let you specify boldface and underlining, but the symbols required for these commands leave blank spaces that separate the emphasized word(s) from the surrounding text. This looks unprofessional and makes it impossible to use certain punctuation correctly.

There are other limitations as well. *PC-Desk* always prints a colon after the salutation in a letter, which is more suited to business letters than personal letters. There is no left tab, and at least once, while wrapping words to the next line, *PC-Desk* moved the indention of the first line of a paragraph one space to the right.

For some reason, *PC-Desk* wouldn't center the name in the letterhead during my testing. All other lines of the letterhead were centered correctly, but the name had to be centered by inserting blank spaces. There may have been some misunderstanding between *PC-Desk* and my printer, but the program was tested with an Okidata Microline 192 with factory-installed IBM ROM chips, which should have been completely compatible.

Another problem encountered when using the print functions was that some screens weren't entirely cleared before a new screen was displayed. For instance, before printing envelopes, the program asks whether continuous-form envelopes or single envelopes are being used. When you enter your choice, the screen is not erased; the instruction to begin printing appears on the same screen. Fortunately, it doesn't obscure the prompt.

You don't have to use the *PC-Desk* word processor to write a letter to be printed with *PC-Desk*; you can use your favorite word processor if you prefer. For a test, I wrote a letter with *WordPerfect* and saved it as an ASCII text file, and I also wrote a letter with *Sidekick*. Both letters included variables for inserting record information, and *PC-Desk* printed both letters perfectly.

Automatic Phone-Dialing

PC-Desk includes an automatic dialer which will call any phone number retrieved from a database (assuming you have an autodial modem, of course). It's quick, easy, and accurate. It dials the area code if one is included, so local numbers in your records should omit the area code.

If you want, you can print a copy of your phone directory in two different formats. One format is designed to fit a little black plas-

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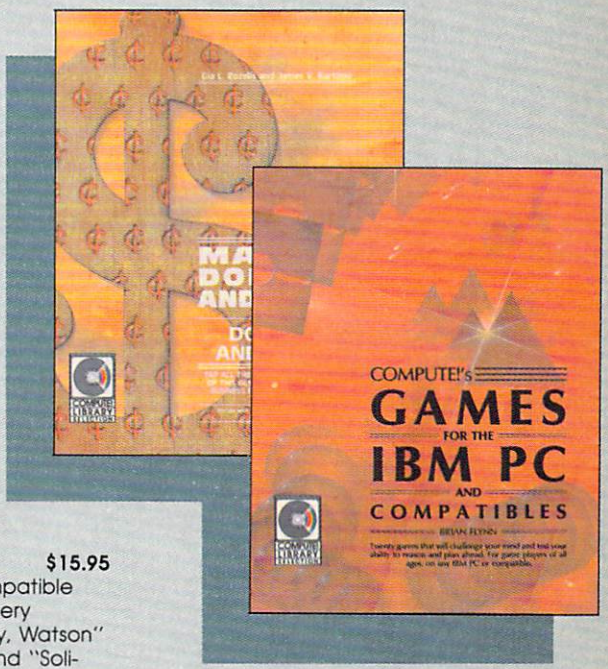

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tic folder that comes with the program, making a personal phone directory that holds about 12 names per page. However, multiple pages require you to cut, tape, and staple the pages together.

The smaller phone directory format prints just the name and telephone number, alphabetized with neat headings for easy reference. You can also sort and print by company names. Both printed phone directories look good.

On The Timeclock

PC-Desk has a timekeeper function that may be useful to those who charge by the hour or to those who, for some other reason, need to keep track of time spent on a project. It's fairly straightforward and easy to operate. One strength is that it draws its default log-in and log-out times from the system clock, so you can log in on a project, exit *PC-Desk*, run another program to do the work, then return to *PC-Desk* and log out—and the timekeeper keeps the time all the while.

The timekeeper is not without its drawbacks, however. It doesn't distinguish between days, so work started one afternoon and continued the next morning does not register. When printing the time log, which is very thorough, there is no page eject at the end, so you must manually eject the page from the printer. It tracks only one function at a time, so logging in a second function terminates the timing of the first function without a log-out time. To get around this, you'd have to log off from the first function before logging in the second function. Also, it's not possible to have two clocks running at the same time, even with memory partitioning. Nevertheless, what the timekeeper does, it does well.

PC-Desk's handy four-function calculator has a memory, an adjustable decimal point to nine places, and a printing feature. It works more like a printing calculator than a regular calculator. For instance, it doesn't add, subtract, divide, or multiply when you press the corresponding keys; it requires you to press the enter key after each step. For programmers, the calculator can display results in hexadecimal (base 16), octal (base 8), or binary (base 2).

The *PC-Desk* calendar/scheduler allows you to enter general things-to-do items for a month at a time, as well as specific time-and-date appointments. When running *PC-Desk* for the first time on a given date, *PC-Desk* displays the calendar, the to-do list, and any appointments which may be scheduled for that day. You can also print the appointment calendar and to-do list.

Printer Mysteries

A few inconsistencies were noted when using *PC-Desk*'s printer functions. Certain screens would look different when called up a second time, apparently dependent on how the screen was entered. For example, sometimes there were borders around the print menus, and sometimes not. When printing letterheads, sometimes the alignment of the name and the letterhead would vary between two consecutive letters. And occasionally, the program miscounted the number of lines on a page and ejected the paper with an extra linefeed or a missing linefeed. Although these flaws don't otherwise seem to affect the operation of the program, it tends to make the user uneasy.

Despite these quirks, *PC-Desk* is a handy, easy to use program that should appeal, especially, to less-experienced users. It would be an ideal program for a manufacturer to bundle with a computer, because a first-time user can have it up and running with no effort. It's entirely adequate for use in the home, a small business, or an office where one computer does all the work. More experienced users, however, will probably outgrow *PC-Desk* and seek out more complete, powerful programs.

PC-Desk
Software Studios
8516 Sugarbush, Suite 104
Annandale, VA 22003
$79

MultiMate Advantage II

Mike Oppenheim

System requirements: IBM PC, XT, AT, PS/2, or compatible with at least 384K of memory, DOS 2.0 or higher (for 5¼-inch disk drives) or DOS 3.3 (for 3½-inch drives), and a printer.

It was a different world in 1983. IBM and *WordStar* dominated their respective markets. The sum of $3,200 bought an IBM PC with two floppy drives and 128K of RAM—a price that seemed reasonable. And *WordStar* was the leading word processor, thanks partly to momentum acquired when CP/M was king.

That's why I was surprised when an aggressive ComputerLand salesman told me that *WordStar* was passé. Sophisticated writers preferred the new *MultiMate*, he insisted. He listed its advantages: commands tailored for the IBM, advanced features, WYSIWYG (what you see is what you get—which really means that underlines are displayed on the screen), three free updates, and free telephone support.

I bought it, and I liked it. As promised, the updates arrived *gratis*—each with a thicker manual and more disks. Despite spending interminable time on hold, the telephone support was superb. In 1984, *MultiMate* outsold all other word processors.

One year later, *MultiMate* was being challenged; other programs were selling briskly.

By 1986, *MultiMate* was clearly fading. *WordPerfect* captured first place, a position earned with its many features, imaginative design, and—almost unique today—unlimited free support (*MultiMate* dropped this a few years ago). Gaining rapidly was Microsoft *Word*—slow but with unmatched high-tech features. IBM loyalists pushed *DisplayWrite* into competition. *PFS:WRITE*, easy but limited, was transformed into *PFS:Professional-WRITE*, still easy but now fairly sophisticated. *XyWrite* was well behind in numbers, but then

Maserati does not outsell Toyota; few programs can match *XyWrite*'s editing speed and power.

MultiMate was showing its age. It lacked split screens and unerase. Most annoying of all was that it stuck stubbornly to page orientation—and a very slow orientation at that. Moving to another page required seven seconds. Any editing function not involving the current page took a long time. Using the spelling checker was excruciating, although a hard disk made things tolerable.

Now we have *MultiMate Advantage II*, and with it, a shift in philosophy. It's now document-oriented—sort of—with page orientation an option. Other additions improve speed and flexibility. In the competition for sheer size and number of features, *MultiMate* is always one of the front runners. For zippiness of operation, it's well to the rear, although this version makes some improvements.

MultiMate Advantage II is not quite a major update. Some new features, such as pull-down menus, may be considered more trendy than useful. Other new features really are useful: DOS access from within a document, autohyphenation, conditional merging (you can now print out only part of a list, if you wish), and the ability to include printable or nonprintable comments within a document. Document orientation is a big addition, but there's less there than meets the eye.

A Library Of Manuals

As befits such a jumbo program, the *MultiMate Advantage II* package consists of a large, nine-pound case containing three thick spiral-bound manuals plus five thinner booklets—all for instruction or reference. Four years ago, *MultiMate* came with three disks. *MultiMate Advantage II* contains eleven 5¼-inch disks or six 3½-inch microfloppies. The disks aren't copy-protected. Also included are stick-on key labels, quick-reference cards for both *MultiMate* and *On-File* (a simple database that comes with the word processor), templates for both traditional and enhanced PC keyboards, and ten write-protect tabs.

A tutorial disk runs through basic editing and printing commands. Aimed at the rank beginner, the lessons take less than an hour. They are repeated in one of the booklets, which goes on to other features. Another booklet explains more sophisticated applications. A large spiral manual covers advanced topics. No matter what your level of experience, one of the references will get you started quickly. With a sensible command structure, elaborate help screens, and well-organized manuals, *MultiMate* has always been easy to learn.

Although *MultiMate* offers menus of its many options, you can bypass the common ones with commands. After you run the program, the first menu lists the usual choices (Edit, Create, Print, Utilities, and so on). Typing the name of a document after booting takes you directly into that document.

MultiMate lets you enter up to 20 characters to name a file, but you'll only see the full number of characters within your document—where you don't need them. Disk directories show the usual 8 characters. Since *MultiMate* only recognizes files with .DOC as an extension, you can't use those three extra letters to jog your memory.

However, the document summary screens are a useful compensation. Each file begins with a full screen where you can fill in the name, author, addressee, a half dozen index words, and a four-line summary. The program itself displays other information: creation date, date of last session, number of keystrokes, and editing time.

The document summary screens are not much use while working on a file, but it pays to fill them out. Later, you can display or print the screens, find any document by searching the screens for any combination of the above data, or group the screens in a separate file to manage a crowded hard disk.

Uncluttered Editing Screen

The editing screen is simple and uncluttered. Your document occupies 23 lines under a single status line listing the document name, page number, and cursor position.

The top of each page displays a format ruler. Pressing F9 throws the cursor onto the ruler to set spacing: single- to triple-spacing in half-line increments, but you can also set zero- and quarter-spacing. You can set tabs and line length—up to 156 characters. Pressing F9 again returns you to the text. Shift-F9 inserts the ruler at the cursor, so you can easily change formats within a document. The text obeys only the last format line.

Pressing F2 begins a new page. If you've chosen page orientation, the screen blanks out and the status line reports your location in the document. In document orientation, your text remains onscreen and a format ruler appears below the text.

To scroll through a document, you can press the PgUp or PgDn keys, or you can press F1 (Go To...) followed by a page number. Cursor movement is almost instantaneous within a page, but there are several seconds of hesitation when crossing a page boundary. Since this occurs in both orientations, the only advantage of document orientation is that your previous page remains on the screen.

In fact, *MultiMate Advantage II* is still page-oriented. After you enter 6144 characters (about 80 lines) on a page, it freezes and complains until you go on to another page. While this provides security—documents are automatically saved when a page boundary is crossed—those who are accustomed to other word processors may find it slow.

Easy Keystroke Commands

Writing and editing commands are straightforward. Most require one keystroke, and sometimes two, but never more. While many word processors ignore the IBM keyboard labels, *MultiMate* takes them literally. The Home key moves the cursor to the upper-left corner of the screen, and the End key to the lower right.

PgUp and PgDn shift the screen 18 lines up or down. Other cursor movements are equally sensible. New in this version is a simple command (Shift+, Shift−) to change the cursor speed. Pressing Shift+ half a dozen times will speed it beyond any conceivable need.

The minus (−) key deletes the character at the cursor, and the plus (+) key inserts a space—an excellent shortcut for minor deletions and insertions. In early versions of *MultiMate*, the Ins (Insert) key moved everything following the cursor off the page except the nearest 33 characters, which peeked at you from the lower-right corner of the screen to remind you what came next. After inserting text, pressing Ins again restored the hidden copy. This caused complaints, so recent versions let you choose between the above "drop-down" insertion method and the more common "push" insertion. If you find it disorienting to watch your copy wiggle wildly across the screen as you type, you still have the drop-down alternative.

To delete, copy, or move text, you use the traditional cut-and-paste technique. You press the appropriate command key (Del, F8, or F7, respectively), highlight the text by moving the cursor, and then press the command key again. To copy or move the text, you reposition the cursor and press the command key a third time.

Any cursor movement will do for highlighting. You can also enter a character to tell *MultiMate* to highlight everything up to that character. For example, if you press the A key, *MultiMate* highlights all text up to the first *A* it finds. Pressing the space bar highlights to the first blank—good for deleting a word. To delete three words, you can quickly hit Delete, space, space, space, Delete. This is a useful, imaginative feature.

An external copy command works the same way, enabling you to bring in text from another document. But it's not as powerful as split screens—surprising in a program struggling to remain competitive.

A Great Spelling Checker

MultiMate allows you to search and replace almost anything, including format lines, up to 49 characters long. Simple commands permit you to ignore case, to pause at each occurrence, and—a new option in this version—to search backwards. You still can't use wildcards, though.

Pressing the Esc key before executing a command cancels the command. Afterwards, you can restore any accidentally deleted text by pressing the asterisk (*) key—another new feature. To reclaim an entire file, there's a document-recovery utility.

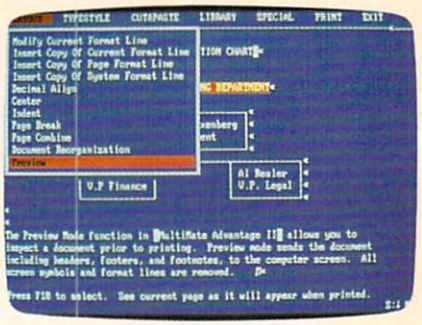
MultiMate was one of the first programs to include a spelling checker, and it's been refined through the years until it's one of the best. Simple commands enable you to check part or all of a document. You can create several custom dictionaries for various purposes, although you can use only one at a time. Editing a custom dictionary is easy, or you can simply add or delete words from the dictionary as you go. This version seems faster than the previous one, but it's still no match for RAM-resident spellers. It takes about 20 seconds to check one screen.

The thesaurus, containing 470,000 synonyms, is ingenious and sometimes useful. Alt-T brings up a window containing your word and a list of synonyms. Typing the number of the synonym inserts it into your document, and simple keystrokes enable you to browse through alternative meanings.

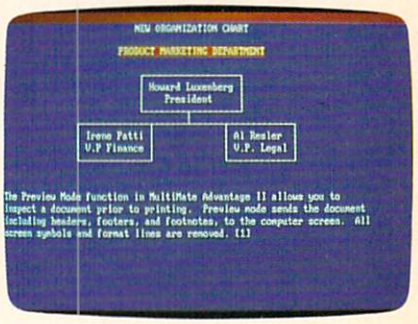
Use Any Printer

Features and printer support have always been a *MultiMate* strong point. This version supports more than 400 printers (including my ancient Brother HR-1, discontinued four years ago). There's also a generic entry that supports basic features of virtually any printer.

While copying the Hewlett-Packard Laserjet printer tables to my hard disk using a wildcard, the drive chugged away for so long



Before: A new feature of MultiMate Advantage II *is the preview function, which lets you see how a document will look when printed. Notice the formatting codes embedded in the text.*



After: With the formatting codes removed, the document appears onscreen as it will on paper.

that I feared it was malfunctioning. It wasn't; it was simply copying six printer action tables and 46 character-width translation tables.

Pressing Alt-3 while working on a document brings up a formidable document printing screen with dozens of user-definable print conditions, such as margin settings, justification, page lengths, header and footer numbering, and so on. If you don't want to exit your file, a hot-print command (Ctrl-PrtSc) prints the current page.

Another powerful feature of *MultiMate* is its *key procedures*, or macros. You can save a series of keystrokes and then execute them with a single command. For example, I've set up my copy of *MultiMate* so that when I hit Ctrl-F8 (display a key procedure), N (its name), and F10 (execute), the program types three carriage returns, my name, address, and phone number—all centered—followed by two carriage returns and a tab. That takes me from the title of an article to the beginning of my copy.

Even better, you can pause during a key procedure to enter text. This enables you to create templates for forms and memos and then quickly fill them in without tediously repeating headings, salutations, data, lines, and boxes.

The library function allows you to store frequently used blocks of text (*boilerplates*) and then insert them as you write. Each block can include up to 150 lines.

Charts, Sections, Footnotes

In addition to manipulating text, *MultiMate* can also draw horizontal and vertical lines, double lines, boxes, and horizontal and vertical bars. This feature may be all you need to create graphs, charts, and tables. However, your printer must support the IBM Extended Character Set. Most don't; there's a list of printers supporting this character set in the reference manual.

A section-numbering feature produces an outline or a table of contents. By using this as you write, you can create a table of contents as a separate document which you can then edit or print.

The footnote command produces a blank screen with its own format line. After entering up to a page of text, you save the footnote as a separate file. This is a flexible feature. It's easy to call up footnotes for editing; repagination won't scramble the footnotes; and you can print them at the bottom of a page or as endnotes. This version of *MultiMate* also increases the maximum number of footnotes from 128 to 250 and allows 6K rather than eight lines per footnote. Once written, the footnotes are invisible until you print. However, the new *MultiMate* contains a preview mode that allows you to inspect any page exactly as it will appear when printed.

With the appropriate printer support, *MultiMate* can create alternative keyboards for Romance and Germanic languages, mathematics, and graphics. You can now perform six math functions both horizontally and vertically (older versions supported only addition and subtraction).

The *MultiMate* instructions claim you can use the column mode to write plays and screenplays, but the example is in an unacceptable format, and neither of the column modes supports an acceptable one. Since a proper script involves overlapping column formats, few word processors can do this without some tricky maneuvering. With *MultiMate*, at least, you can store one format as a key procedure, turning it off and on with a few keystrokes as needed.

A Clever Database

It's hard to imagine any word processor with more file conversion options. The *MultiMate* utility disk contains overlays for ASCII, COMM, and DIF files. Two entire disks are devoted to other conversions: Wang, DCA, *Lotus 1-2-3*, *Just Write*, GSA, Honeywell, VCDIF, FFT, and *WordStar*.

The two most recent updates of *MultiMate* (3.5 and 3.6) did not include *On-File*, a clever but limited database manager offered in 1985 with the first *MultiMate Advantage*—a deluxe version of *MultiMate* that included several other extra features. *On-File* was then sold separately for $149, but now it's back with *MultiMate Advantage II*, described as an integrated mailing list and information manager. While no match for *dBase III*, it's surprisingly versatile.

On-File is an index-card filing system. Except for menus, the screen always displays a rectangular box which you treat as a 3 × 5 card. You can work with a blank card or create a template that appears automatically to guide data entry. A keystroke "flips" the card to permit writing on the back. You can edit, view, select, print, cross-reference, or sort by subject, by date, and by the half dozen index words you choose when filling out the card. You may also sort by color—literally, if you have a color system, but cards are labeled by color on monochrome systems, too. One thing *On-File* won't do is calculate.

A "card box" may contain as many as 600 cards on a floppy or 7500 on a hard disk—and they can be shuffled and subdivided into any number of "decks." When printing, the program offers many extremely helpful options. For example, when printing mailing labels, you can print a test pattern and then make subtle adjustments on the screen to align margins without moving the paper.

Naturally, you can convert a card file into a word-processing document and vice versa, and also use the merge feature to combine cards with a document for personalized letters. *On-File* is an imaginative program, easy to learn, powerful enough for any list or address file, and adequate for simpler personnel or accounting records.

No More Free Support

If you own an earlier copy of *MultiMate*, updating to *MultiMate Advantage II* costs $100. But gone is the toll-free help line and unlimited free support. New users get 90 days. Afterwards, it's $50–$150 a year.

There is also a monthly newsletter. It contains a few genuinely helpful tips, but it's no longer free, either. It costs $18 per year—$12 if you pay for the telephone support.

With all of its improvements, *MultiMate Advantage II* is a decent, meat-and-potatoes business program. Although it's rather slow, it's easy to learn and use, and full of features useful in correspondence, reports, record-keeping, and simple desktop publishing. It would be nice if *MultiMate* were faster, genuinely document-oriented, and had split screens, but these are not crippling defects. Future versions will probably correct them. As a first word processor, it's a good choice, but it still faces tough competition from *WordPerfect*, *XyWrite*, and others.

MultiMate Advantage II
Ashton-Tate
20101 Hamilton Ave.
Torrance, CA 90502
$565 (5¼-inch disks)
$595 (5¼-inch and 3½-inch disks)

Chuck Yeager's Advanced Flight Simulator

Keith Ferrell, Features Editor

System requirements: IBM PC, XT, AT, or compatible with at least 256K of RAM, DOS 2.0 or higher, and a color/graphics adapter, an enhanced graphics adapter, or equivalent hardware.

This is perhaps the first "celebrity" flight simulator, but the program has much more going for it than Chuck Yeager's name. In fact, *Chuck Yeager's Advanced Flight Simulator* is in many ways the most sophisticated of the flight simulation programs I've seen. Yeager's participation in the project extends beyond simple endorsement: From the detailed instruction manual peppered with his comments, to the look and feel of the simulation itself, this program is obviously informed by the experiences and instincts of someone who's done just about everything that can be done with airplanes.

Certainly it offers the largest selection of airplanes of any flight simulator. The disk offers a choice of 14 separate aircraft, ranging from World War I biplanes, to sturdy Cessna and Cherokee private aircraft, to supersonic jets, both real and speculative. Each aircraft has its own features, challenges, and dangers. The variety of aircraft is a marvelous idea, and it's fun simply to look at the different planes' capabilities.

Each plane, though, must be *flown*, and it is the quality of the simulation, and such features as formation flying, airplane racing, and aerobatics that earn the program its designation as "advanced." With Yeager as teacher, coach, and drillmaster, even jaded computer pilots will find themselves pushing the envelope of their skills.

Novices Not Forgotten

Electronic Arts has not neglected the beginning flyer, however. A lengthy appendix to the manual addresses basic principles of flight and airplane control, with clearly written instructions and easy to understand diagrams showing how airplanes function in various situations. Yeager's italicized comments throughout the manual provide a voice of experience whose advice can help you through some tricky situations.

The manual's tutorial is complemented by on-screen demonstrations and instructions. Step by step, the program and the manual walk the beginner through the elements of preflight checklists and taxiing from the hangar, and the rudiments of takeoff and remaining airborne once the ground is left behind.

Chuck Yeager's Advanced Flight Simulator can be flown with the keyboard, a joystick, or a mouse. It's not for the faint-hearted in any mode, but I found keyboard control to be the most sensitive.

Training Flights

It might be wise for those new to flight simulators to select the program's observation mode. In that mode, you can sit back and watch a Cessna being put through the paces of takeoff, ascent, descent, recovery from stall, and landing.

Observation can't take the place of the real thing, but *Chuck Yeager's Advanced Flight Simulator* offers still another learning option for those not yet ready to solo. In demo mode, both the player's and the instructor's moves are presented on the screen. It's up to you to match the instructor's control of the aircraft, a challenge that sounds much easier than it really is.

I especially liked the flight-recorder option which is accessed, like all of the program's features, by way of a pull-down menu. With the flight recorder on, you can go back and review your maneuvers to find areas of improvement.

On To The Airplanes

When you're ready for a test flight, a pull-down menu lets you choose from aircraft which span virtually the entire history of manned flight.

- Avion Spad XIII combat biplane, ca. 1917
- Sopwith Camel combat biplane, ca. 1917
- P-51 Mustang, fighter, World War II
- Supermarine Spitfire, fighter, World War II
- Douglas X-3 Stiletto, experimental rocket plane, ca. 1953
- Bell X-1, experimental rocket plane, 1940s–1950s
- Piper Cherokee, private plane
- Cessna 172 Skyhawk, private plane, ca. 1955 (and still flying...)
- General Dynamics F-16 Fighting Falcon, supersonic jetfighter, 1980s
- McDonnell Douglas F-18 Hornet, supersonic jetfighter, 1980s
- Lockheed SR-71, supersonic reconaissance jet, 1960s–1980s
- Hilleman Ltd. XRH-4 MadDog, experimental subsonic jet
- Lerner Aeronautics XNL-16 Instigator, experimental jet
- Grace Industries XPG-12 Samurai, experimental jet

A section at the front of the manual provides specifications for each aircraft. This information—which can play a part in the success or failure of your own test flights—includes the plane's maximum speed and its service ceiling, above which only the bravest or most foolhardy of pilots will push their craft.

Contact

Once the basics of flight are mastered in the Cessna—a good plane to learn in—it's exciting to attempt to transfer those skills to other craft. Taking off in an SR-71, for instance, is a vastly different experience than taking off in a propeller plane, and getting airborne in one of the rocket planes can test your skill, nerves, and patience all at once.

Airborne, you can explore the simulation's universe, a 250-kilo-

meter square. This is not a scenic simulation based on real-world terrain. Rather, the emphasis is on providing you with a feel for handling each aircraft in a variety of flight situations. Scattered about the square are three airports and a variety of geometric shapes that serve as obstacle courses and points of reference.

Pull-down menus—accessed by tapping the spacebar—let you change options quickly. The touch of a key can put you at a different location (including the obstacle courses), lined up for landing, cruising at 10,000 feet, or 40 miles from your present position.

Other menus give you the chance to shift your point of view from the straight-ahead cockpit/instrument panel that's the default to side and rear views, the view from the airport, the tower, or a chase plane. There's even a satellite view of your plane and its position as seen from space. Another menu lets you magnify your screen view up to 256 times.

Instrumentation

Cockpit instrumentation is thorough and believable. Readable gauges indicate heading, airspeed, altitude, vertical speed (whether you're climbing or descending), and power. A graphic attitude indicator shows your position relative to the horizon. Switches can raise or lower landing gear, apply flaps, and apply or release brakes.

A control surface monitor and a slip indicator help you work the airplane's ailerons and flaps in coordination for smooth flight and even turns. A message bar across the bottom of the screen provides radio information about your position, instructor's messages during training flights, and emergency information when things go awry.

A heads-up display (HUD) projects aileron, elevator, and rudder positions. HUD can be turned on or off from a menu.

The instrumentation plays a vital part in the simulation, but it doesn't overpower the urge for seat-of-the-pants flying. Rather, it provides vital information about aircraft systems, helping you achieve greater and more sensitive control of your craft.

Maneuvers And Races

Once confident that you've mastered the fundamentals of flight, you can begin learning aerobatic maneuvers. For this series of lessons you learn Immelman rolls, aileron rolls, loops, slow rolls, and the challenging Cuban 8 and Split S.

The aerobatic menu allows you to either sit back and observe the maneuvers to get a feel for how they're accomplished, or attempt to fly them yourself.

Formation flying puts you in the cockpit of a Spad as you follow another Spad through a sequence of aerobatic manuevers and flights through gates. Switching to a P-51, you can tail—or attempt to tail—Yeager's Mustang through the Knife (a 90-degree roll), the Hammer (a hammerhead stall and, with luck, recovery), and the Waxman. Your best bet is to keep your eye on Yeager's P-51 and do your best to keep up.

The appropriately named Deadman maneuver seats you in the experimental XPG-12 Samurai. The challenge here is to follow in formation behind Yeager's Samurai as he slaloms around a series of buildings. Slaloming is the goal—I usually found myself *slamming* into the buildings instead.

As though formation aerobatics were not enough, the program also offers five airplane racing courses. The courses consist of gates whose portals must be perfectly entered—at high speeds, barely 100 feet off the ground. Which planes are available depends on the course: Two courses place you in a P-51; others place you in the F-18, the Spad, and the Spitfire.

Should you win one of the races, the program automatically records your performance for inclusion as a competitor next time around. You're forced either to improve or to get accustomed to losing.

Push That Envelope

While Yeager achieved fame as a combat pilot, those skills are reserved for the next program in this series. It is his even greater fame as a test pilot on which this program rests, and underlying all the simulations is an implicit challenge—can you master your aircraft well enough to get it to exceed its performance specifications?

It's possible, for example, to take the SR-71 and the rocket planes past the edge of space. When you exceed 90,000 feet, the sky darkens and the stars and the moon come out. This is an impressive effect that recaptures a special moment players might recall from Yeager's autobiography, as well as from the book and motion picture, *The Right Stuff*.

Don't get lost in the beauty of near-space flight, though—this is a flight simulation, and the farther you push the envelope, the more critical your control becomes. Some maneuvers don't work out the way you planned. Others you won't walk away from.

When you do auger in for a crash, Yeager's features appear on the screen along with a caustic comment about your flying skills. More than once he told me that I'd just dug a hole halfway to China, or suggested that I pursue a nonflying activity like fishing. I didn't tire of the comments—only of my own poor performances that earned them. The fact that Yeager seems to be watching your every move made me, at least, work that much harder to master the art and skill of flying.

But as Yeager points out in the manual: "Never believe anything another pilot tells you about how to fly."

With *Chuck Yeager's Advanced Flight Simulator*, you have the opportunity to get the feel of flying for yourself. And that's the only way to fly.

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Electronic Arts
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PC

ADVERTISERS INDEX

HOW TO USE THE DISK

Every issue of COMPUTE!'s PC Magazine includes a 5¼- or 3½-inch disk as part of the package (newsstand copies contain 5¼-inch disks only; subscribers get their choice). If you experience a problem with the disk, please contact us at (919) 275-9809 from 8:30 a.m. to 4:30 p.m. Eastern time, Monday through Friday.

Before using the magazine disk, you should first make a backup copy. Format a blank disk with DOS system files and copy the entire contents of the magazine disk onto the backup disk. Then use the backup copy and keep the original disk in a safe place. This is important because some of the programs require COMMAND.COM and other DOS system files to operate correctly; making a backup copy on a disk which has the system files for your particular computer assures compatibility.

To make the backup disk, put your working copy of the DOS master disk in drive A and a blank floppy disk in drive B. Type FORMAT B: /S. After the formatting is complete, remove the DOS disk from drive A and insert the magazine disk. Type COPY A:*.* B: to make the backup copy. (If the computer you're using has only one floppy disk drive, consult your DOS manual for instructions on backing up disks.)

There are two ways to access the programs on the magazine disk. You can run a program by following the instructions in the corresponding magazine article. Or you can use the magazine-disk menu program to run the program of your choice. The menu program contains descriptions of each file as well as special instructions.

To run the menu program, insert the backup copy of your magazine disk in drive A and type DISKMENU or RUN at the DOS prompt. The menu program displays the disk directory and the title of the magazine article to which each disk file belongs. If there are too many disk files to fit on one screen, the menu program displays them in pages. To flip through these pages, press the PgUp and PgDn keys. You can exit the disk menu program to DOS by pressing the End key.

To select a program from the disk menu, press the corresponding number key; you'll see your selection at the bottom of the screen. You then have the option of reading a description of the selected program, running the selected program, or making another selection.

Some files on the magazine disk are not runnable programs—for instance, some files contain source code for programs included elsewhere on the disk in compiled, runnable form. The disk menu program won't let you run these nonexecutable files. Usually, these files can be displayed on the screen with the DOS TYPE command or can be printed out with the DOS PRINT command.

Important: Be sure to consult the corresponding magazine article for instructions before using any programs or files on the magazine disk.

There are four special files on the magazine disk which are required to run the menu program. These are DISKMENU.EXE, DIRFILE.TXT, DIRTEXT.TXT, and RUN.BAT. These files do not appear on the disk menu itself. Do not delete them if you intend to use the menu program. If you intend to use the menu program on a backup copy of the magazine disk, be sure these files have been copied.

Special Notes

The disk menu program in our last issue did not work properly on the IBM PCjr due to keyboard compatibility problems. Those problems have been fixed with this issue, but the menu program still won't work on a PCjr with less than 256K of RAM. This does not prevent PCjr owners from using the disk, however; the disk menu is a convenience, not a requirement. You can still view a directory of the disk contents by typing DIR at the DOS prompt, and programs can be run from DOS or as otherwise described in the articles.

Because of additional differences between the PCjr and most other PC compatibles, the compiled BASIC program "Chess" in this issue also won't run properly on the Junior. To circumvent these difficulties, we have provided an uncompiled BASIC version of "Chess" on this disk. The program CHESS.BAS runs on the PCjr from Cartridge BASIC. All functions are the same as in the compiled BASIC version, although the program runs a little slower.

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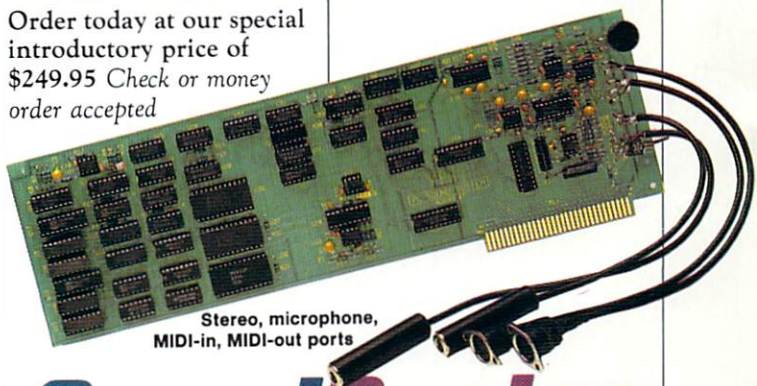

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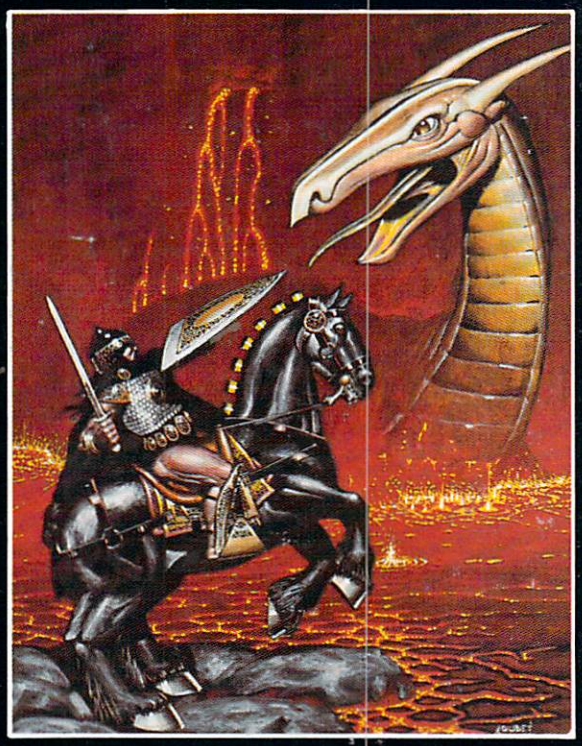

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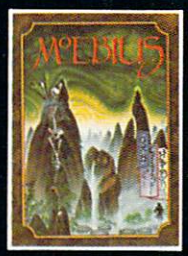

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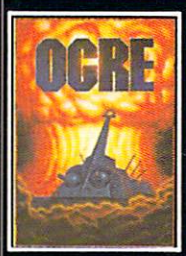

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