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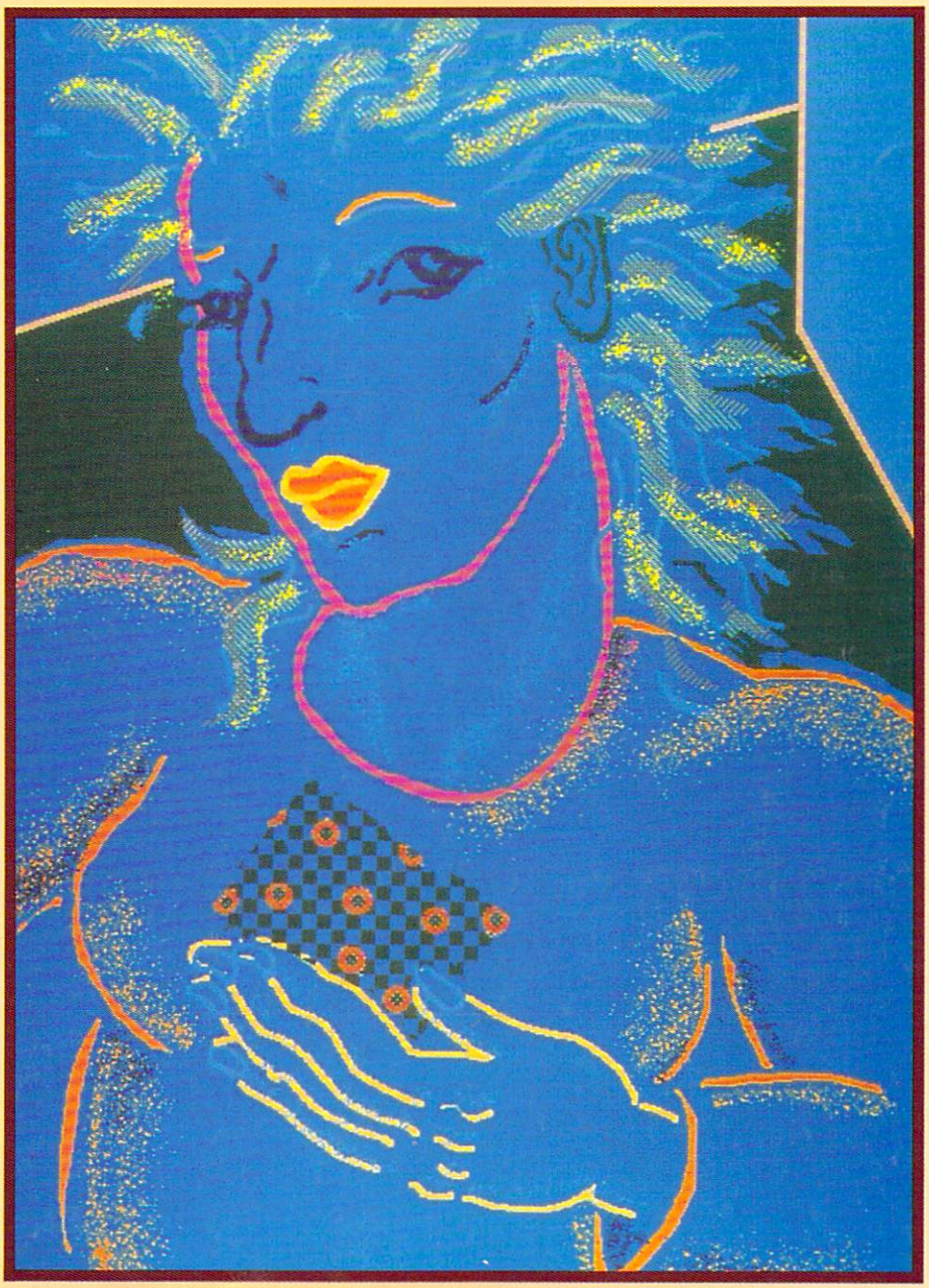
APRIL 1991



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Michael S. Hedgepeth
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21 January 1991

Ed Bates
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Dear Ed:

Well, we're finally settled in.

The kids are registered in school. We've unpacked everything but the pictures. And I'm in my new digs.

Wonder of wonders, I actually have a window!

And -- as you can see -- no more 9-pin printer. Funny thing, one morning I sat down at my desk and there was a brand new Panasonic printer hooked up to the PC. Oh well, what are birthdays for? It's an 1123. And it has a lot of the same features as the 1124 you use at the shop. Just more affordable.

I love it. That is, when I can get to it. Barbara's putting all her recipes on computer. And John's at the age where it seems like there's a term paper due every week.

Well, gotta run. You're not the only one with deadlines to meet.

Give my best to everyone in the department. Tell Pete he still owes me a beer. You collect it for me.

Can't wait for you and Ann to come visit.

Bye for now.

Hec

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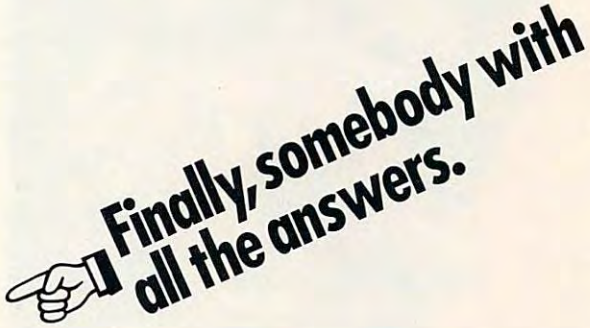
Who put the bop in the bop-sh-bop-sh-bop?
Why is the sky blue?
When will the bull market be back?
How much does Isaac Asimov weigh?
Why won't my Macintosh talk to my laser printer?
How do you fold fitted sheets?
How's the weather up there?
Where can I find the best steak in Chicago?
How much is that doggie in the window?
How is OS/2 going to affect me?
Which hard drive is best for me?
Will you marry me?



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COMPUTE

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Writing Faster BASIC Programs G-10
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TOM NETSEL
There's important news for U.S. readers who buy Gazette from newsstands. Starting with the May issue of *COMPUTE*, Gazette will be available by subscription only.

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The Death Adder is tyrannizing the people of Yuria. Only three heroes have the powers to stop him in *Golden Axe*. Then discover what happens in a toy factory after dark in *Night Shift*. Check out *Bell Term*, an 80-column terminal program for the 64.

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Machine Language G-20
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JANICE R. FARY

Beginner BASIC G-22
LARRY COTTON
Generate telephone tones on the 64, poke them into frequency control registers, and then have them dial your telephone. Learn about multidimensional arrays while you're at it.

Programmer's Page G-24
RANDY THOMPSON
Did you know that the 64 doesn't care whether a number or a string is put between the parentheses in a PEEK function? Did you know that you can dimension nonarray variables? It's time for more weird facts about the 64.

TYPE-IN PROGRAMS

Stronghold G-25
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You must pilot your ship beneath a planet's surface and through a treacherous alien stronghold as you try to rescue survivors of a wrecked spaceship. Dodge lasers, crushers, force fields, and mysterious aliens in this arcade-style game for the 64.

AlarmCalc G-29
KEITH GROCE
Why buy a multiple-events timer when this program and your 64 can monitor up to five events, each with different starting and stopping times?

Word Find 3-D G-30
MILTON JOHNSON
Generate two- and three-dimensional word puzzles. Words you enter are printed horizontally, vertically, and diagonally—hidden within a matrix of random letters. They're in plain sight, but they're tough to find. The 3-D version is for experts only.

Hangman 128 G-34
DAVID WILLIAMS
This popular pencil-and-paper game has been adapted several times for computers, but *Hangman 128* provides a few sophisticated twists for 128 owners. Use its list of tough-to-guess words or supply your own.

Chaos G-36
ROBERT C. TRAIN
Order and organization can be produced out of chaos by the repetition of simple but constant rules. Test this theory to see what emerges from seemingly chaotic sequences with these programs for the 64 and 128.

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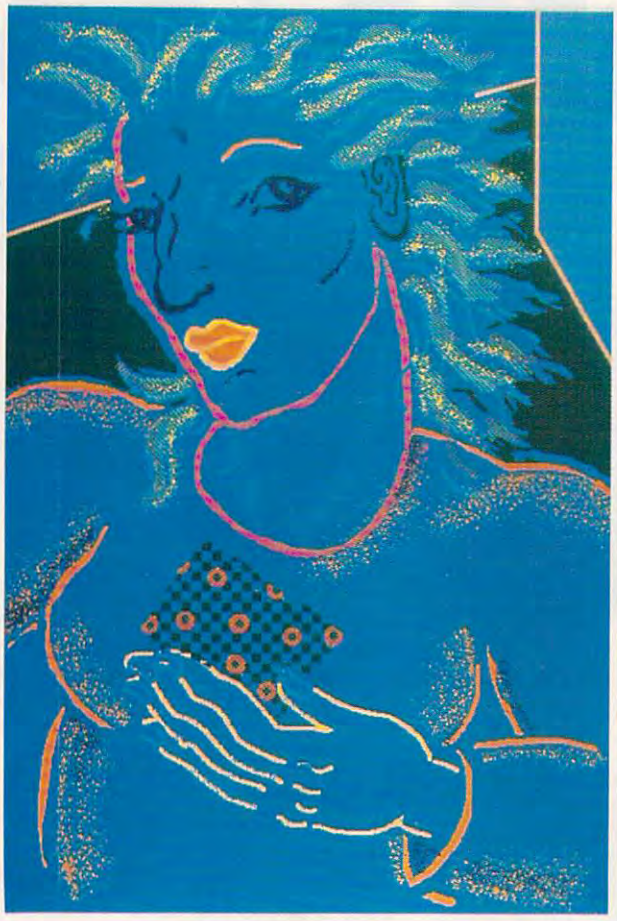
Modem transmissions cause a lot of confusion, even among otherwise informed computer and modem users.



ON THE COVER

Barbara Nessim, whose paintings and drawings have been shown in museums and galleries worldwide over the last 25 years, created the art on our April cover using an NEC PC 100 personal computer and that system's graphic software. Titled *The Gift*, the work was inspired by the Japanese custom of giving a small gift when meeting friends and acquaintances.

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KBD
Control your keys!
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Teach Scroll Lock a new trick.
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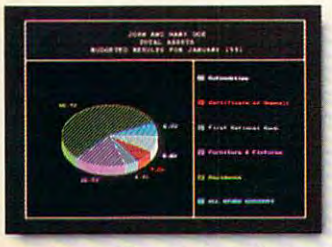

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EDITORIAL LICENSE

PETER SCISCO

Nothing puts a sinking feeling into your gut faster than a computer that won't boot or that shuts down in the middle of a save. All of a day's work—straight down the tubes. But a system crash need not be fatal. If you've taken precautions, if you've made backups of your data and applications, then you can bring your PC back from the dead with a minimum of loss.

Unfortunately, a lot of PC users don't think a system lockup will happen to them. A crash, like a car accident, is something that happens to the other guy. They're wrong. Nobody is immune to system failure. Horror stories about failed PCs are repeated at user group meetings, are posted on BBSs, and make the rounds at the office. They're part of computing community folklore, small lessons in the inevitable.

During my first job as a journalist, writing for a computer trade magazine in the Northeast, a colleague and I once put in a 12-hour marathon writing session, pulling together two lengthy feature articles scheduled to run in that week's issue. We finished late at night, giddy from staring into our CRTs, satisfied from having beaten the deadline once again. When we came to work the next morning, we discovered that one of the systems managers had accidentally dropped a printer on the disk that contained not just our stories, but the contents of the entire magazine. Luckily, a backup from the night before saved almost the entire issue—except for our articles, which we had stored on disk *after* the daily backup. We got a lot of sympathy from our co-workers, but that didn't save us from having to rewrite our articles from memory. It was a long day.

The adage that an ounce of prevention is worth a pound of cure was penned a long time before the personal computer came along, but a framed print of that advice should hang over every computer user's desk. If you want your system to recover from a crash, keep backup disks that you can recover from. Ideally, you should back up your entire system once a month and make backups of your data files weekly. You might think it's a pain in the neck to spend that much time in front of your computer swapping disks, but when your 60-meg hard disk slips into the ozone, you'll be glad you did.

You'll also want to read this month's article about system recovery, "Is There a Doctor in the House?" It can help you find the right strategy for getting a sick system back on its feet. If you're in the market for a commercial diagnostics program, it will help you there, too.

And now for something completely different. When Apple computer introduced last October a series of "low-cost" Macintosh computers, it sparked anticipation over the Cupertino computer maker's return to the home computer market. Since saving the Macintosh from extinction in the mid-eighties, John Sculley and company have succeeded in remaking Apple's image as a freewheeling entrepreneurial company that made machines for the masses into a serious contender in the corporate computing world. The Macintosh, dismissed glibly at first as a toy, became recognized for its technological edge in connectivity, graphics processing, and software implementation under a common user interface.

Midway through 1990, Apple found itself threatened again, this time by software and hardware developments in the MS-DOS world. The company countered with three Macintosh computers designed to recapture the excitement of the Mac's original intent—to bring computing power to the individual.

Amid reports that the Mac Classic is in short supply because of unexpected demand, Associate Editor David English examines what the new Macintoshes have to offer the home computer user. His discussions with consumer software publishers reveal a sincere level of commitment to Apple's flagship. For PC owners contemplating a second machine, stepping into the Mac world seems more possible today than ever before. ⊡

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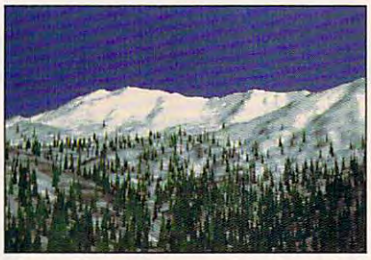
NEWS & NOTES

Virtual Reconnaissance

Let your computer do the walking—through enemy territory. Virtual reality technology, which has clear scientific and recreational potential, could also allow American forces to explore hostile terrain without fear of Scud missiles and enemy tanks. Susan Woeltjen of Virtual Reality Laboratories says that her company's virtual reality programs for the Amiga—*Vista* and *VistaPro*—are capable of using mapping data from the U.S. Geological Survey to simulate terrain from sea level up. The armed forces have access to similar mapping information for the entire planet, says Woeltjen. In fact, she said individuals in the military have already purchased



***Vista* offers a true-perspective 3-D projection engine and more.**

the programs. For more information about *Vista* ($99.95) or *VistaPro* ($149.95), contact Virtual Reality Laboratories, 2341 Ganador Court, San Luis Obispo, California 93401 (805-545-8515).

—MIKE HUDNALL

To Market, No Market

Bowing to strong public pressure, Lotus has announced that *MarketPlace:Households* and *MarketPlace:Business* would be withdrawn from sale. Although Lotus and Equifax (Lotus's partner in the venture aimed at small businesses) claimed adequate safeguards were in place, consumer rights groups feared the software/CD combination would result in wholesale invasion of privacy. Lotus president and CEO Jim Manzi stated, "Balancing the advantages of easier access to information with the individual's right to privacy is only the first of many new issues our industry will grapple with in the coming years."

—ROBERT BIXBY

Across the Sea

The European Computer Trade Show scheduled for April 14–16 in London is prepared to play host to more than 120 exhibitors, from hardware manufacturers to productivity and entertainment software developers.

As part of the show, COMPUTE will present five awards covering MS-DOS, Amiga, and Commodore 64 products. This year, *Windows* 3.0 (Best Productivity Program: MS-DOS), *Wing Commander* (Best Entertainment Program: MS-DOS), *GeoWorks Ensemble* (Best Technical Achievement: MS-DOS), *AmigaVision* (Best Product: Amiga), and the CMD HD Series Hard Drives (Best Product: Commodore 64) will take home the COMPUTE Choice prizes.

—PETER SCISCO

Control the Media

If you've been looking for a way to link your computer with your video equipment, Sony's new Vbox could be your dream come true. It's an inexpensive ($249.95) computer/video interface that works with Sony video decks and 8mm camcorders. Using Sony's ViSCA (Video System Control Architecture) protocol, the Vbox lets you handle complex video switching and synchronization from within your presentation or multimedia software.

Apple has endorsed the ViSCA standard, as have Farallon and MacroMind, makers of *Farallon MediaTracks* and *MacroMind Director.* Sony said that it is working with several developers to provide support for MS-DOS and *Windows* applications.

—DAVID ENGLISH

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LETTERS

Gratifying Graphics

Not since *Profiles* went belly up have I enjoyed a computer magazine as much as I enjoy *COMPUTE*. After *Profiles*, I tried several and thought there was one I liked but couldn't remember which one—all the names are alike. I've started and stopped several subscriptions. Then I just stopped reading them altogether. I've been bundling up my unread and old magazines for school libraries.

I just happened to take my December 1990 *COMPUTE* on a trip and discovered I like this magazine. You provide good information and have a nice graphic layout. (Does David Leich sell posters of his work or limited editions?) Your "Art Gallery" is great.

Although I never want to program, I do want to know all I can about how my computer works. An excellent example of an article that helps me do just that is George Campbell's discussion of the SET command ("Becoming a PC Environmentalist," p. PC-8). That was the kind of article I cherished in *Profiles*—computer tips for the nonprogrammer, ways to customize, shown clearly.

Like the typefaces in *Profiles*, the typefaces in *COMPUTE* are readably enhanced!

The only review I read—of *WordStar* 6.0—was too sweet. I would like to know more of the problems. Does Mike Hudnall work for WordStar?

I like your color-coded sections. I'm an MS-DOS user but like to know what Apple is up to.

Keep up the excellent work.

LANI MEIN
SAN FRANCISCO, CA

Mike Hudnall responds:
I do not work for WordStar, but I can understand your concern about the "sweet" praise for WordStar *6.0. Readers deserve to know the strengths and weaknesses of a product, especially when the investment is substantial. You'll get no argument on that point.*

With all that said, I believe WordStar *6.0 deserves high praise. It has improved some features and added others; while it wouldn't help for me to enumerate the shortcomings of past versions, I believe in giving credit where credit is due for this latest version of Wordstar. I mentioned the tremendous flexibility version 6.0 gives you over the writing process; this flexibility seems to me to be the result of the developers' listening to consumers and learning from experience. Previous versions did not offer the same degree of flexibility.*

I've heard complaints about WordStar*'s Ctrl-Key combinations, but I haven't had any trouble learning or using them. If you prefer using a mouse, the lack of better mouse support is problematic. However, as I pointed out in the review, this is a program primarily for touch-typists.*

In the review I tried to focus on what would help readers decide whether the product meets their particular needs.

As for the inquiry about our cover, I found that posters and prints are not available. However, I did come up with some information about the artist and the art on December's cover.

According to a representative of Rosebush Vision, the company that handles this art, the artist's name is Donald Leich, not David Leich, and he works at a New Jersey company called Intelligent Light. Donald, we apologize for the error.

Do you have questions or comments? Send your letter—with your name, address, and daytime phone number—to COMPUTE Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that because of the large volume of mail received, we can't respond individually to questions. We reserve the right to edit letters for clarity and length.▷

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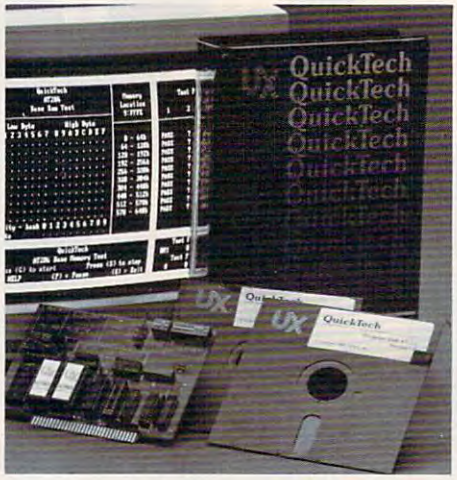

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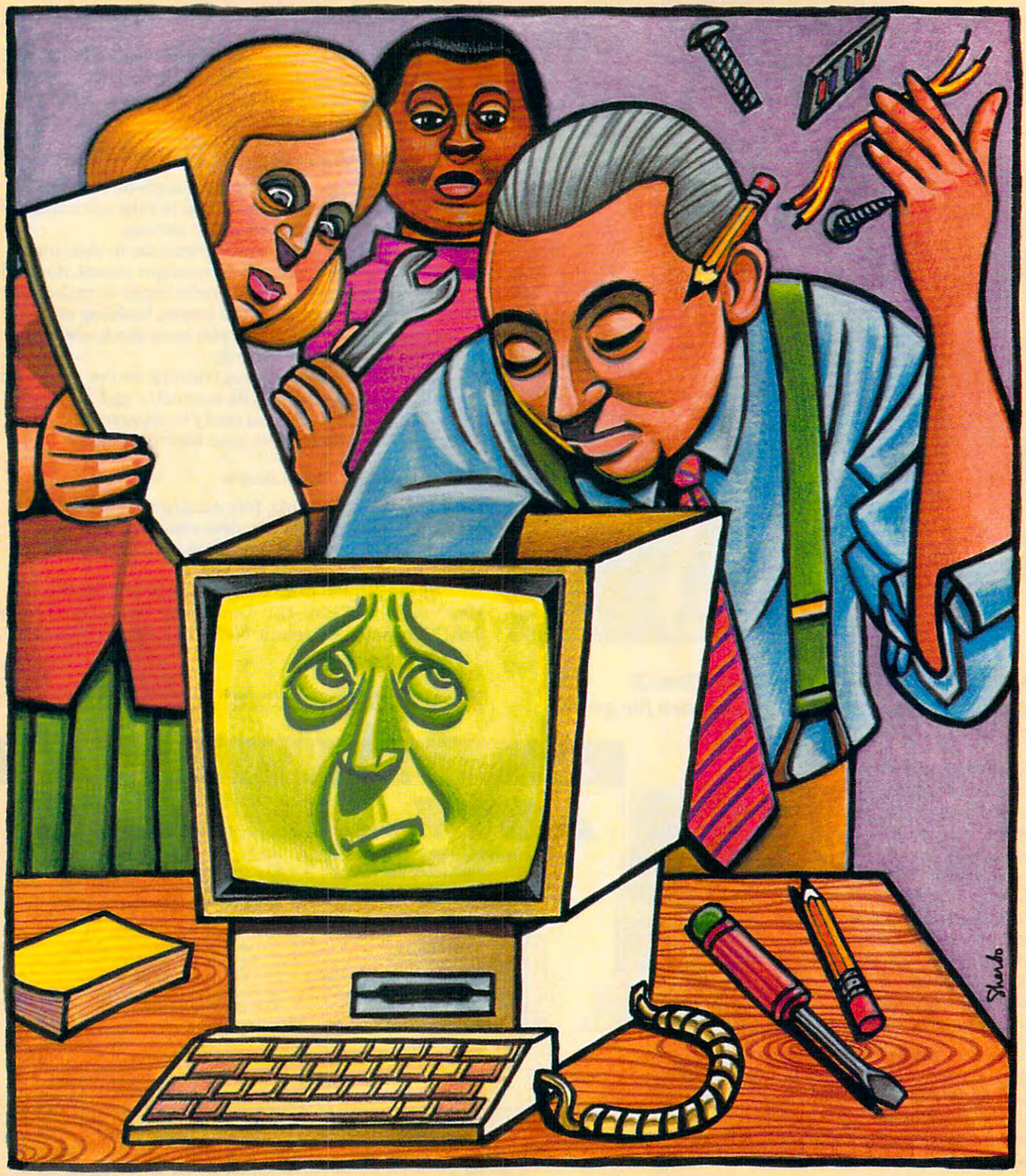

DAN SHERBO

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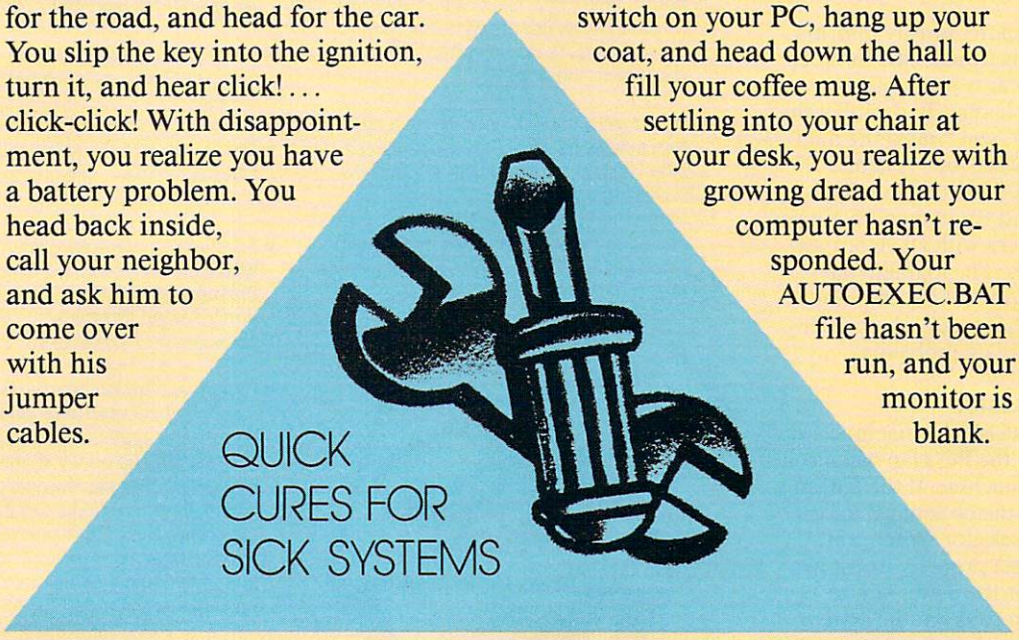
In The House?

Scenario 1:

You wake up late, throw on your clothes, grab a glass of orange juice for the road, and head for the car. You slip the key into the ignition, turn it, and hear click! . . . click-click! With disappointment, you realize you have a battery problem. You head back inside, call your neighbor, and ask him to come over with his jumper cables.

Scenario 2:

You arrive at work and follow your usual morning script. You flip the switch on your PC, hang up your coat, and head down the hall to fill your coffee mug. After settling into your chair at your desk, you realize with growing dread that your computer hasn't responded. Your AUTOEXEC.BAT file hasn't been run, and your monitor is blank.



In recent years, we've grown to count on our cars and our computers. Although both are more reliable now than in years past, both still break down. Most people, however, are better equipped to handle a malfunctioning car than a misbehaving computer. In most cases, computer problems aren't serious. A reasonably quick and inexpensive repair for most malfunctions is possible, provided you know what to look for and what to do. Experience is a good teacher, and this article will help give you a head start on that experience. ▷

TONY ROBERTS

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Power On!

Each time you switch on your system, it quickly runs through a series of tests that evaluate the hardware and make sure everything's operating properly. The disk drives spin briefly, you hear a beep, and a memory test is run.

In most cases, the system passes this Power-On Self Test (POST), and the computer dives into the AUTOEXEC.BAT file. By the time you look up from your desk calendar, the system is ready for you to begin work.

Sometimes, though, there's a problem. Perhaps you're brought to attention by a series of strident beeps, or maybe nothing happens at all.

If your system is totally unresponsive, start playing detective, and start with the obvious. Is everything plugged in? Is the power strip turned on? Are the brightness and contrast switches on the monitor adjusted properly?

If the computer noisily informs you that there is trouble, the number of beeps you hear is your clue to where the problem is. To decipher the beeps, however, you'll need the manual that came with your system.

The POST is part of your system's BIOS, and BIOS manufacturers are not consistent with all error messages and codes. The manual may have an appendix titled something like "Troubleshooting," which often can help you isolate problems.

Stop, Look, Listen

If the cables outside the machine are snug, listen for the PC's fan when you switch on the machine. If the fan isn't turning, check the back panel for a 110-/220-volt selector switch, and make sure it's set properly (most likely 110 volts) for the power you're using. If the fan runs but the system doesn't operate, it's time to open up the case and check the internal connections. (See "Working Inside Your PC" for instructions on how to safely open up and make internal adjustments to your computer.)

Check the connections from the power supply to the system board and from the power supply to the disk drives. Check the disk drive data cable connections on the disk drives and the disk controller. Check to see that all boards in the system are properly seated in the slots on the motherboard. And make sure all memory and system chips are snug in their positions.

If you have an AT-class computer, sooner or later you'll experience a CMOS RAM failure. CMOS RAM is a bit of memory, backed up by batteries, that remembers the system time and configuration. When the batteries run down, the data stored in CMOS RAM will be lost, and the system won't know how to boot itself. You may receive a warning of an impending CMOS RAM failure if your system clock loses time rapidly when the power is shut off. In other cases, CMOS RAM fails suddenly.

To correct the problem, run the setup program and give the computer all the information it needs to know about memory, disk drives, monitors, and the time and date. The computer will reboot, and everything will be fine until you shut it off again.

On most systems, the setup program is part of the system BIOS and is activated by a special key combination such as Ctrl-Alt-S. On some systems, the setup program is a separate program that can be kept in your hard disk's DOS directory and on a separate boot disk that can be used to start the system if it's impossible to access the hard disk.

If you had CMOS RAM problems today, chances are you'll experience the same trouble tomorrow and every day until you replace the batter-

Working Inside Your PC

Today's computer equipment is designed to be opened and modified. You're expected to change boards and add hardware. If your system is in trouble, don't despair: you're qualified to open it up and make the first attempt at repair.

There's no reason to fear that you'll damage your system if you follow a few simple precautions.

- Be careful of static electricity. Work in a noncarpeted room if possible, wear tennis shoes, and discharge yourself before touching any of the components inside the computer. While a static shock hardly harms a human, it could mean curtains for a computer chip. Also, remove jewelry and watches before reaching into the computer.

- Always turn off and unplug the system before opening it. Never try to insert or remove circuit boards with the system powered up. To do so invites permanent damage to the boards.

- Never even think of opening up a system's power supply. There's nothing inside you can fix. If a power supply fails, replace the whole unit. Also, don't be tempted to open up and work on a monitor. Even though the power may be off, there are power-storing capacitors inside that can deliver a nasty shock.

PC Tools

To get inside your computer, you'll need a screwdriver, most likely a Phillips head. A few systems use different schemes, but for most computers, remove five or six screws on the back of the case. No doubt you'll see many more screws than that, but most of them secure items such as the power supply to the system chassis. Opening the case requires removing only the screws at the edges of the system—the ones at the four corners and probably one at the top center.

After the screws are out and set aside in a safe place, slide the top off gently, being careful not to catch and pull any internal wires as you go.

If you're checking out a malfunctioning machine, run through the following checklist.

- Are the wires from the power supply plugged firmly into the motherboard?

- Are the wires from the power supply plugged firmly into each of the disk drives?

- Are the drive data cables plugged firmly into each drive at one end and into the disk controller card at the other?

- After you've made sure you're not loaded with static electricity, gently press each of the memory chips to make sure they're firmly seated. Do the same for the other chips on the motherboard.

- Reseat expansion boards. Remove the screw that secures each board to the back of the system. Grasp the board with both hands and gently lift the board straight up. Reseat the board by pushing it straight down into its slot and replacing the screw. During this process, be careful that the board you're working with doesn't scrape against or otherwise damage adjacent boards.

After you've checked your system's components, carefully replace the cover, plug the computer in, and give it a test. If the system doesn't boot, open it back up and go through the checklist again. It's not uncommon to inadvertently loosen a cable while working in the system.

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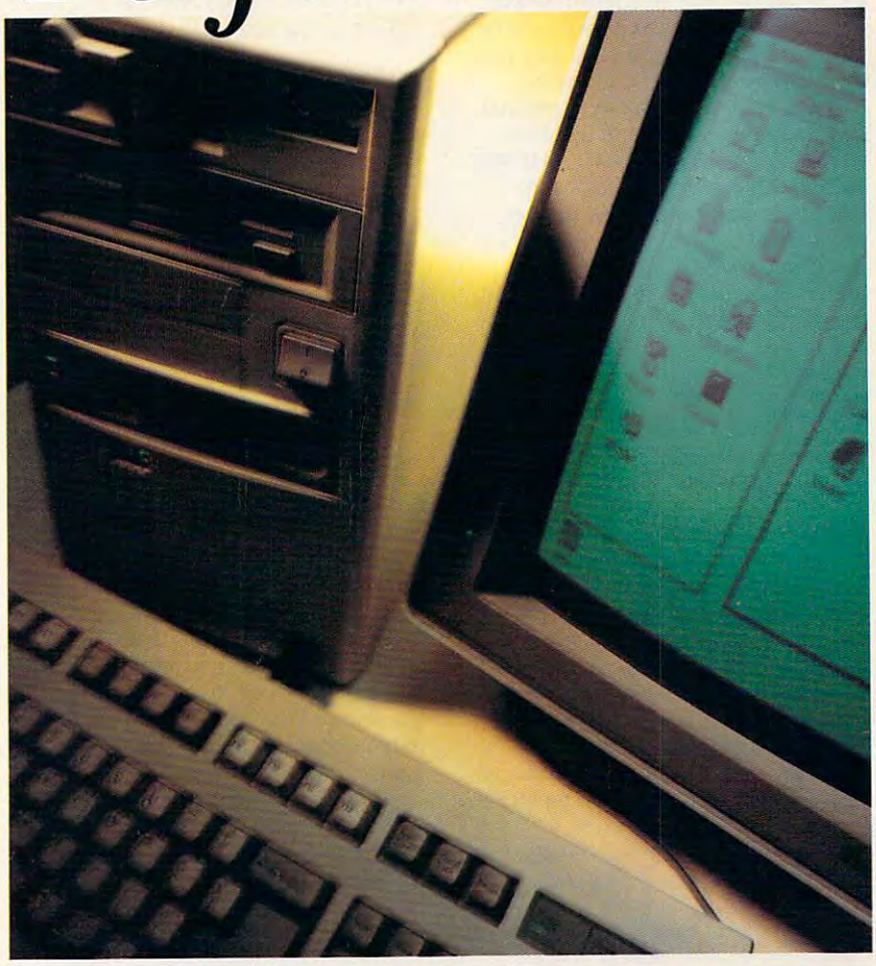

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ies that have worn down. There are several different battery configurations used to power CMOS RAM. Some systems use one or two lithium batteries; others use four standard 1.5-volt AA batteries. Lithium batteries last far longer than AA batteries, but they're correspondingly more expensive.

The next time you have your system open, note the type of batteries used to power CMOS RAM. That way you'll be able to buy the correct replacement easily when your battery starts to fail.

Some systems are built with a lithium battery soldered into place on the motherboard. Such motherboards also include a connection for an external battery should the original fail. Refer to your system documentation for the location of the connector and the jumper that needs to be switched to activate the external power source.

Software Solutions

Although this article deals mainly with hardware problems, don't overlook software as the culprit if your system starts misbehaving. If your machine starts acting erratically while you're at work, save your files and reboot the system. In most cases, a reboot will clear the problem.

Another behavioral problem might result from conflicting memory-resident utility programs. If you've recently added or upgraded your software in some way, you may have unknowingly added a conflict. Getting software to work together is a balancing act.

System software sometimes gets corrupted, and it can happen in a variety of ways. An electrical glitch can damage an important file, or an ill-mannered software installation program can throw a monkey wrench into your system. It's good insurance to make a boot disk that contains the system files of the DOS version you normally use, as well as copies of AUTOEXEC.BAT, CONFIG.SYS, any driver files installed by CONFIG.SYS, and important DOS commands (such as SYS, FORMAT, FDISK, and CHKDSK). Put the disk aside and use it only as a backup if your system appears to be corrupted.

Damaged data files also cause difficulties. Data files may become damaged when a program is terminated unexpectedly, such as when the power fails or a user simply shuts off the machine and heads home without exiting the program properly. A database that is suddenly unable to locate data may suffer from this problem. The DOS utility CHKDSK can identify and correct files whose pointers are no longer accurate. Running CHKDSK or a similar program regularly can help prevent this type of problem from popping up.

Hard Life

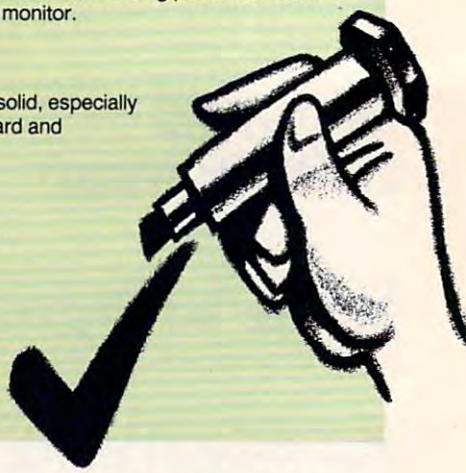
One of the most sickening moments in a computer user's life is the time the hard disk won't boot. At that moment, all your work hangs in the balance. Has the hard disk gone bad, or is it just resting?

First, try powering down the machine, waiting several seconds, and then rebooting. If there still is no response, boot the system using your boot disk; then, after the system is running, try to access your hard disk. If the system won't boot from a floppy disk either, you have a possible controller failure. Open the system and reseat the controller board; then try again.

If you're able to operate normally after booting from a floppy, your system has lost some of the information it needs to get going. If you see a message indicating there's been a boot

Disaster Checklist

- ☐ Is everything plugged in? Check all external connections, including power connections and connections to peripherals, especially your monitor.
- ☐ Is your 110-/220-volt selector set correctly?
- ☐ Open the case. Are all the internal connections solid, especially those from your power supply to the motherboard and from the disk controller to the disk drives?
- ☐ Are all the boards seated properly?
- ☐ Are the batteries that back up your CMOS OK?
- ☐ Are there conflicting TSRs in your system?
- ☐ Are the system files on your hard disk?
- ☐ Has the keyboard been locked out?



Computer Repair Toolkit

Simple troubleshooting work on a computer requires very few tools. But having the required tools handy when you need them makes the task much less frustrating and time consuming.

At the minimum, you'll need screwdrivers. Have at least one medium-size flat blade and one medium-size Phillips-head screwdriver. If possible, add a small flat-blade screwdriver as well. This is handy for attaching and detaching cables from the back of the system.

Other items for the tool box include a pair of tweezers, a small pen knife, and a small bottle or box for storing spare screws.

If you can't easily assemble this tool collection, consider buying one of the inexpensive tool kits you see advertised in nearly every computer mail-order catalog that comes your way. The kits contain screwdrivers, tweezers, chip extractors, and usually a very handy clawlike device that's great for picking up screws that slip from your fingers and fall down between expansion boards. On the software side, hardly anything is more comforting and time-saving than having good utility software on hand when you need it. Such software isn't used every day, but it can save hours of anguish.

A disk utility program of some kind is essential. Look for programs that can undelete files, analyze disks for bad sectors and move data to safe areas, restore the system files, and help rebuild data files. *The Norton Utilities* version 5.0 (which contains the *Norton Disk Doctor*) from Symantec, Central Point Software's *PC Tools Deluxe*, and Fifth Generation Systems' *Mace Gold* are among some of the most popular and trusted programs of this type. These generally are considered to be data-recovery tools.

It may also be helpful to have a system diagnostic program of some sort. These programs check out all areas of the system and can report on memory, the disk drives, and ports. These programs allow you to identify exactly what's inside a system without opening it up. *Check It* from Touchstone Software and *System Sleuth* from Dariana Technology are two candidates.

These programs can go beyond simple system troubleshooting and help you resolve such things as memory conflicts and interrupt conflicts. *System Sleuth* also includes extensive tutorials in its manual, helping you to understand the operation of your system as you check its components.

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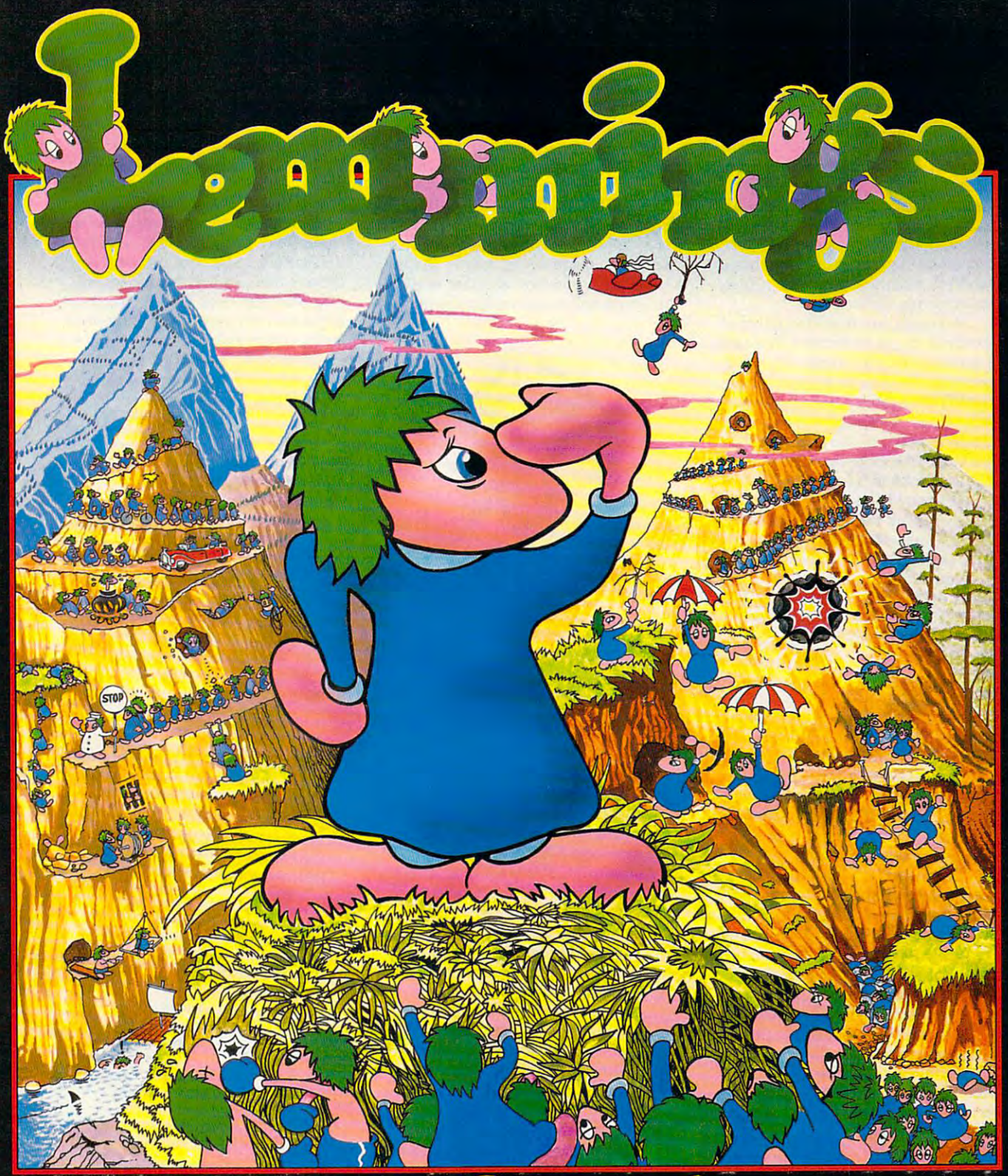

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disk failure, run setup to make sure the hard disk type is properly set.

If you receive the message *Non-system Disk,* the information that tells the system that the hard disk is a bootable device has been lost. To correct this problem, attempt to restore the system files by using the DOS SYS command from your boot floppy. If that fails, you can usually restore a disk to service by backing up all the data on the hard drive, reformatting the drive, installing new system files, and restoring the data files.

An easier solution than either of the above might be to run a disk utility program such as *Norton Disk Doctor* (from *The Norton Utilities*) to identify the problem and make repairs. If you have such a program handy, it can save you time and put you back to work with the confidence that the problem has been corrected.

If you have booted from the floppy disk but are unable to access the hard drive at all, you may be due for a drive replacement. Put your ear close to your machine and listen for the sound of the hard disk spinning. If you're not sure whether you hear the disk or the fan, switch off the power. The fan will stop spinning quickly while the hard disk will take several seconds to come to a stop. Similarly, when you turn on the power, you should be able to differentiate between the fan and the disk.

If the hard disk is not spinning, open the machine and check the power supply cable. If the power is properly connected but the hard disk does not spin, plan to buy a new one.

Sometimes it's possible to coax a reluctant drive into spinning up one more time by powering the system off and on a few times. If the drive comes back to life, though, don't expect it to last long. Back up all of your data now, and make arrangements to replace the disk. If you can't get the disk going again, all is not lost. A computer repair center may be able to get the drive going long enough to recover your data for you. If not, you'll have to rely on your backups, so make sure they're up to date.

Key Points

Another problem that plagues computer owners is a failure of the keyboard or one or more of its keys. If the entire keyboard is unresponsive, check to see that it's plugged in. Also consider whether someone has locked the keyboard with the key lock on the system unit.

Be aware that keyboards for XT- and AT-style computers differ. Many keyboards, however, have a switch on the underside that allows one keyboard to be used with either type of system. If your keyboard has such a switch, make sure it's properly set.

If another computer system is available, try exchanging keyboards with it. If your keyboard fails on the other system, the problem is either in your keyboard or in the cable, with the cable being the most likely source of the problem. If your keyboard works on the other system but the other system's keyboard does not work on yours, the problem may be in the keyboard connector; and that would require a trip to the service center.

Sometimes it's possible to coax a reluctant drive into spinning up one more time.

If only one or two keys are giving you trouble, you may be able to correct the problem with a little cleaning. First, grasp the offending key cap and attempt to pull it straight up and off of the key switch. If you are unable to remove the key cap with gentle pressure, try using a small screwdriver to gently pry the key cap off. If you continue to meet resistance, stop! Some key caps are not designed to be removed.

If you can remove the key cap, examine the area around the key switch for debris or dust. Use a cotton swab dipped in denatured alcohol to clean the area. In many cases, dirt or crumbs can interfere with the operation of the switch and can keep it from making proper electrical contact.

If you're unable to remove the key cap, you can perform the same cleaning operation, but you'll have to open the keyboard to do it. Turn off the computer and unplug the keyboard. Turn it upside down and set it on a soft surface, such as a towel. Remove the screws on the keyboard's bottom, and separate its top and bottom halves.

If the keyboard assembly is secured to the bottom half of the case, you'll be able to examine the area under the key caps and to use your cotton swab to brush away dirt. Otherwise, remove the screws that hold the keyboard to the top half of the case, lift out the keyboard, and then perform your cleaning.

If you're unable to get your keyboard working again, plan to buy a replacement. Few repair shops even attempt to fix a broken keyboard. Replacements are inexpensive, and chances are you can find a keyboard that's much more comfortable than the one that came with your system.

Northgate and Zeos replacement keyboards have excellent reputations, and you'll be able to get a new one for less than $100. When ordering a replacement, you can choose whether the function keys are on top or along the left side. You can buy models that click when you type, and if your office is cramped, you can find reduced-size keyboards that take up a little less precious desk space.

Having an idea how to troubleshoot minor system problems is a real confidence builder for computer users. Keep a log of your troubleshooting activities. Make notes of the troubles your computer experiences and how you solve the problems. Such records can be handy when your neighbors and office mates start calling on you to diagnose their computer ills. ⊡

For more information on the products discussed in this feature, contact the publishers at the addresses listed below.

Central Point Software
15220 NW Greenbrier Pkwy., Ste. 200
Beaverton, OR 97006
(503) 690-8090

Dariana Technology Group
7439 La Palma Ave., Ste. 278
Buena Park, CA 90620-2698
(714) 944-7400

Fifth Generation Systems
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Baton Rouge, LA 70809
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Northgate Computer Systems
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Eden Prairie, MN 55344
(800) 548-1993

Symantec
10201 Torre Ave.
Cupertino, CA 95014
(408) 253-9600

Touchstone Software
909 Electric Ave.
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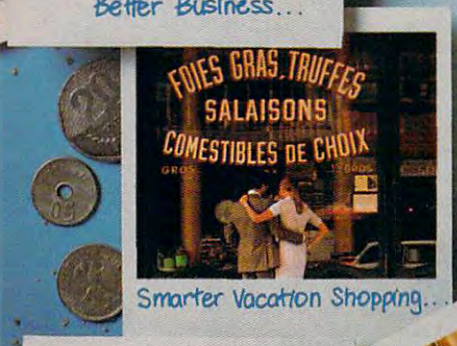

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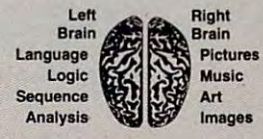
> "American managers with language skills open more doors."
> *Wall Street Journal Editorial*
> July 25, 1988



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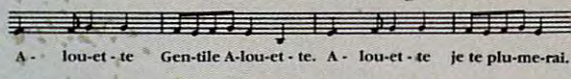

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> *The New York Times*
> September 5, 1988

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SHAREPAK

RICHARD C. LEINECKER

Since this month's issue talks about computing in Europe, we're bringing you a *SharePak* that will help you make the most of a European vacation. If you're not planning a European vacation, relax; this disk will give you some of what you might be missing. Start off with *Schedule*Master* and organize your preparations for a flawless departure. You can even use *Schedule*Master* to finish your work early so that you can get an early start on your vacation preparations. While at your recreation destination, collect all the recipes you can and enter them into *Meal-Master*. Then when you're back, you'll be able to recreate the culinary delights that you enjoyed the most. Once home, you can get even more exotic and experience an adventure on another world by playing *The Monuments of Mars!*.

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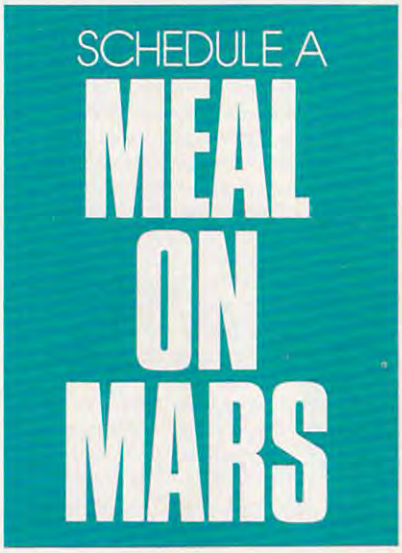
Schedule*Master

*Schedule*Master* is a powerful but easy-to-use system for managing your daily schedule and to-do list. Unlike other systems that can take weeks to master, you'll find that learning all the program has to offer takes almost no time at all.

Each schedule entry can have a note attached to it with further information. The note field can be up to five lines long. Store as many as 4000 records along with 4000 notes in the database file. Deleted items give up their space immediately so that the schedule file never needs to be compressed. Extensive searching capabilities let you find information once you've entered it. And mouse support gives it the final professional touch you'd expect in a quality program.

The program doesn't make a lot of demands on your hardware. Any system with at least 350K of free RAM will run *Schedule*Master*. It will take advantage of your hard drive but doesn't require one.

A printer configuration file lets you specify the parameters you'll need for perfect printouts. Don't worry, though; the program comes set up to work with IBM proprinters and Epson compatibles. That means most people are ready to go from the start.



If you want to get organized, get this program. You'll be able to maximize your efficiency and make time for other things, like vacations.

Meal-Master

Menu-driven *Meal-Master* is a database system especially created and tailored to manage recipes. With *Meal-Master*, you can store, update, and print your recipes in a variety of formats. But the real power of *Meal-Master* lies in its search and utility functions.

You can search for recipes using any combination of title, category, or ingredient criteria. Imagine being able to find all the recipes that can be made with a certain ingredient. Just change the number of servings a recipe makes, and all the individual ingredient amounts will be adjusted automatically.

To help in entire menu preparation, you can mark recipes as you select them. Then activate the shopping-list function. *Meal-Master* will find the ingredients for all the marked recipes, total the quantities of like items, and print a shopping list.

You won't have to spend much time learning how to use the program—it's menu driven. That means that all choices are clearly laid out and intuitive. And when you run it for the first time, it's smart enough to ask you several setup questions before proceeding. Your setup information is saved to disk, and you don't have to worry about it again.

Meal-Master not only replaces the dogeared, disorganized collection of index cards found in most kitchens; it also provides a valuable tool for meal selection and preparation.

The Monuments of Mars!

An arcade/adventure game set in the near future, *The Monuments of Mars!* lets you explore a secret underground city on Mars. In this volume you must survive 20 unique and challenging levels filled with puzzles, traps, creatures, and useful artifacts.

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If you suddenly vanish like previous explorers, you can start over. But you might get lucky, find the entrance to each monument, and discover the secrets hidden within. ⊡

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MACS FOR THE MASSES

THREE NEW MACS PRICED TO SELL

Computers for the rest of us? That's what Apple hopes it has with its three new Macs: the Classic, the LC, and the IIsi. With earnings down for the third quarter of 1990, Apple had been criticized for concentrating on its high-end models at the expense of its entry-level machines.

The new Macs are designed to shore up Apple's low end with a competitively priced black-and-white Mac, an entry-level color Mac that sells for less than half the price of any previous color Mac, and a new color Mac II that's $1,600 less than the model it replaces. With increased competition from *Windows* 3.0 and a barrage of cheap MS-DOS computers, Apple had to act and act decisively.

Up Close and Personal

The long-awaited Macintosh Classic can best be described as a Mac SE without the expansion slot—but at half the price. It replaces both the Plus and the SE in the product line. Like the SE, the Classic includes a 1.4MB SuperDrive that can read and write Mac, MS-DOS, OS/2, and Apple II ProDOS disks. The SuperDrive is now standard across the entire Macintosh line.

Apple had planned to sell the floppy disk version of the Classic for about $1,500 but decided just weeks before the announcement to offer it at a more competitive $999. That price matches the entry-level PS/1 from IBM, which is also black-and-white and has a single floppy drive. A 40MB hard disk version of the Classic increases the price to $1,499. The floppy disk version has 1MB of RAM, while the hard disk version has 2MB. Both can be expanded to 4MB.

Why drop the expansion slot? Apple argues that 90 percent of SE owners never used it, and eliminating the slot means the Classic can get by with a smaller logic board and a more modest power supply. Like the SE, the Classic has six ports along its back, including a SCSI (pronounced *scuzzy*) port that can connect up to seven SCSI devices and an ADB (Apple Desktop Bus) port that can connect up to three input devices (a mouse and keyboard are included). ▷

DAVID ENGLISH

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And you've just arrived on Mêlée Island seeking fame and fortune. Explaining to anyone who'll listen that you want to be a pirate.

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Lucasfilm Games set today's graphic standards with games like *Loom* and *Indiana Jones and the Last Crusade.* Now *The Secret of Monkey Island* ups the standards a few more notches with stunning 256-color VGA graphics (16-color EGA version also available), proportionally scaled animated characters, and cinematic pans and camera angles.

Our acclaimed point 'n' click interface has been improved even more. So have our sound effects, which are backed by a captivating calypso and reggae music track.

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If you can solve a few sneaky puzzles in a special demo of *The Secrets of Monkey Island,* you might just win one of the sweetest prizes since Captain Kidd's treasure chest. A Carnival Cruise for two, one of a hundred AdLib™ sound cards, or one of hundreds more prizes! You'll find the demo and complete rules in specially-marked boxes of 3M diskettes. Or send a self-addressed, stamped disk mailer to: Monkey Demo, PO Box 10228, San Rafael, CA 94912.

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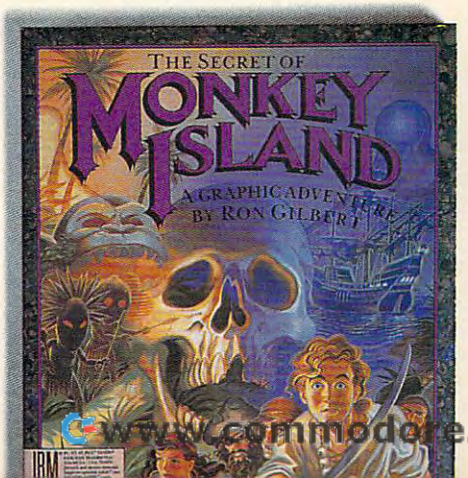

The Secret of Monkey Island is available for IBM and 100% compatibles in 16-color EGA and 256-color VGA versions. Visit your retailer or order directly with Visa/MC by calling 1-800-STARWARS (in Canada 1-800-828-7927). ™ and © 1990, LucasArts Entertainment Company. All rights reserved. IBM is a trademark of International Business Machines, Inc. 3M is a trademark of 3M Corp. AdLib is a trademark of AdLib, Inc. Cruise prize arranged with the "Fun Ships" of Carnival Cruise Lines, The Most Popular Cruise Line In The World; ship's registry: Bahamas and Liberia.

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No Anchovies

With the Macintosh LC, Apple has reduced the price of a complete color Mac system by a whopping $4,500. Though not officially a Mac II, the LC uses the same 16-MHz 68020 processor as the original Mac II. It's about the size of a small pizza box, weighs just 8.8 pounds, is expandable to 10MB of RAM, and has seven ports and 8-bit color built in (for 256 colors from a possible 16.7 million). Spend an additional $199 for a video-memory upgrade, and you can move up to the new 16-bit color (for 32,000 colors from 16.7 million). And like the other color Macs, the LC will be able to accept a 24-bit color card (for all 16.7 million colors).

One of the most interesting features of the LC is its ability to record sound. Both the LC and IIsi include a new sound-input port and a small microphone. The new System 6.0.7 adds the ability to record, play, and save sounds at any time, and a new *HyperCard* stack makes it easy to edit your sounds. Apple is encouraging software companies to integrate sound input into their existing applications.

A version of the LC with 2MB of RAM and a 40MB hard drive but no monitor has a suggested list price of $2,499. The street price of this model with a monitor is expected to be about $2,000. A second version, with one or two floppy drives but without a hard drive or monitor, will reportedly be available only to primary and secondary schools. Apple also plans to offer an inexpensive Apple IIe card for the LC's single 020 Direct Slot.

Silly Initials

Like the LC, the Macintosh IIsi has built-in sound input and 8-bit color. It also has eight built-in ports, uses a speedy 20-MHz 68030 processor (making it about six times faster than a Mac Plus), and can currently be expanded to 17MB of RAM.

The IIsi's single slot can take either a Mac II NuBus card or an SE/30 Direct Slot card—though both require an optional adapter card. Apple's adapter cards include a math coprocessor, but similar cards from PSI are available without the math chip.

The IIsi is available in two configurations: one with 2MB of RAM and a 40MB hard drive for $3,769, and the other with 5MB of RAM and an 80MB hard drive for $4,569. Neither price includes a monitor or keyboard, but expect both systems to be heavily discounted.

The Little Engine That Could

As part of Apple's aggressive move to fight back, the company is publishing the results of a study that shows the new Macs performing faster and costing less than comparable MS-DOS machines. The speed tests were performed by Ingram Laboratories using *Windows* 3.0 programs that run on both platforms.

Money Talks

Within days after the Apple announcement, dealers were already discounting the Classic. Prices averaged about $900 for the $999 floppy disk model and about $1,250 for the $1,499 40MB hard disk model. New York City's Computer Era led the way by slashing the price of the $999 model to $749.

By the second week, the California-based Connecting Point chain franchise had sold over 10,000 Classics and had 18,000 on back order. While Apple has back orders for all three new machines, nearly half of them are for the Classic.

The price comparisons included computers from IBM, Compaq, and Tandy—with the 8-MHz Classic compared to 10- and 12-MHz 80286 and 8086 machines, the 16-MHz LC compared to 16-MHz 80386SX and 10-MHz 80286 machines, and the 20-MHz IIsi compared to 20- and 25-MHz 80386 and 25-MHz 80486 machines. While the study makes a strong case for Apple against the big three, it doesn't mention that similar MS-DOS computers are available from many smaller vendors for much less.

Ultimately, sales will determine whether the new Macs will help Apple build on its 10-percent market share. Apple's market share, as a company, is about the same as IBM's, but only Apple produces Macs, while literally hundreds of companies put together IBM-compatible PCs. So far, Apple has been able to make it purely on innovation, but the enormous popularity of *Windows* 3.0 has cut into its lead. By making its Macs more price competitive—at least with machines from the other big-name computer manufacturers—Apple is adjusting to the new realities of the marketplace.

With software, the Mac is in a much stronger position. In terms of dollars, the Macintosh accounts for about 20 percent of all software sales. Because of Apple's previous push into the business community with its high-end Macs, there's already a good mix of high- and low-priced productivity software. But there are many more entertainment titles for the PC and many more educational titles for the Apple IIe. With the Classic priced aggressively for the home and the LC heavily discounted to the schools, will we soon see a deluge of games and educational programs for the Mac?

Shelf Life

If the experience at Electronic Arts (EA) and Sierra On-Line is typical, Mac owners will soon see a variety of games from some unfamiliar places. In the past, both companies had pretty much ignored the Mac. Now, according to Bing Gordon, EA's senior vice president of marketing and planning, the new machines have helped convince the company to develop both *PGA Tour Golf* and *Starflight 2* for the Mac. Likewise, Sierra has announced it will release 14 games for the Mac.

Educational software developers have eagerly awaited both the Classic and the LC. Because Apple provided Scholastic Software with the new machines 12 months before they were officially announced, Scholastic should have 16 Mac products available by the time you read this. Peter Kelman, Scholastic's publisher, predicts that the Mac will become "the school machine of the nineties." He says that schools are scrambling to change their Apple IIGS orders to orders for the Macintosh LC.

That same optimism is voiced by many industry analysts. Stewart Alsop, publisher of *P.C. Letter,* says, "Apple will do very well with its new product line." Jeffrey Tarter, publisher of *Soft•Letter,* goes even further. He says, "Apple is going to sell every one it can make, and it's going to be able to make lots of them."

While some Wall Street analysts have expressed concern about Apple's having to lower its prices, Tarter suggests that Apple has a lot to gain. "It's often said that you can find lots of people who have switched from DOS machines to Macs, but it's real hard to find someone who has switched from a Mac to a DOS machine. If Apple can start more people early on the cycle, they're more likely to move them up to the more expensive machines." ⊡

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THE HOT LITTLE GUI THAT CAN—AND WILL—WIN YOUR HEART WITH POWERFUL UTILITIES, ATTRACTIVE DISPLAYS, AND MULTITASKING

Howard Millman

In fairy tales the good guys invariably triumph. Recall, for instance, the fable about the little engine that hauled a line of freight cars up the mountainside and seemingly accomplished the impossible.

GeoWorks' GEOS (Graphical Environment Operating System) may prove the modern equivalent of that fable. Facing an uphill struggle as it tries to penetrate a field now dominated by *Microsoft Windows,* GEOS hopes to deliver the GUI goodies to the sizable market segment Microsoft seems to have overlooked.

Skinny Minimal

GEOS's minimum hardware requirements are indeed minimal. It operates on any PC-compatible computer system, including hard disk–equipped XTs with 512K of RAM, a mouse, and a monochrome or color graphics monitor. Estimates of the total number of XTs and 286s that can't do *Windows* right (*Windows* 3.0 was designed primarily for 80386-based computers) range as high as 20 million. GEOS may inherit this enormous market—providing that it survives. Considering the potential threat it poses to *Windows,* you have to wonder whether this kernel will take root and grow or wither in Microsoft's long, dark shadow.

The presence of expanded or extended memory will speed up disk-intensive operations, as will a fast hard disk (28 ms or less access time). Since *GeoWorks Ensemble* (the collection of programs and utilities

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FFICE

MARK WAGONER © 1991

GeoWorks has released to introduce the GEOS operating system) adheres to a standard known as *Motif,* its display screens comply with the Open Software Foundation's suggested standards for graphic interfaces. When compared with the *Windows* 3.0 interface, OSF/Motif's interface looks crisper, clearer.

Booting in its default configuration, *GeoWorks Ensemble* ($195 list, $150 street price) greets you with an inviting welcome screen that offers three large icons labeled *Appliances, Professional,* and *DOS Programs.*

Clicking on Appliances summons four deliberately innocent-looking software appliances: a standard (non-scientific) calculator, a Rolodex-like address book (with a built-in phone dialer), a handy calendar/date planner, and a notepad. No one requires detailed instructions on how to use a Rolodex or a calculator, so anyone can learn how to use these appliances within minutes.

From the Welcome screen, you can enter one of three interface areas.

The DOS Program button (naturally) leads to DOS. By default, this path guides you to only one destination—the DOS C> prompt. GeoWorks, however, enables you to subsequently set up your own selection of buttons, complete with representational icons, to launch BAT, COM, or EXE applications.

Working on a Professional Level

Clicking on the Professional button takes you to a screen that contains nine GEOS-specific programs including a word processor, a file manager, two telecommunications modules, and a draw program. These applications run in GEOS-supervised windows. The windows can be resized, minimized (collapsed to an icon), maximized (expanded to full screen), or moved by dragging the title bar with the mouse. Some windows elements, such as icons, can be dragged around to suit your preferences (or level of hostility).

Commands are selected with the mouse from GEOS's cascading (drop-down) menus. Most of the common commands have shortcut keys (usually a combination of Alt or Ctrl plus a mnemonic alpha key).

GeoWorks Ensemble's windows offer the expected complement of GUI features. Scroll bars and arrows in the right margin scroll the text up and down smoothly or screen by screen. Maximize and minimize buttons duplicate menu selections to expand or reduce the screen. With more than one window onscreen, you can switch between them by clicking inside of the window you want active. And finally, GEOS's omnipresent Express button provides a shortcut to switch between applications without first returning to a central file manager.

GeoWorks Ensemble employs preemptive multitasking (also called *time slicing*) to run multiple GEOS-specific applications in the background. GEOS prioritizes the running applications and then apportions time from the computer system's single CPU (whether the CPU is an 8088,

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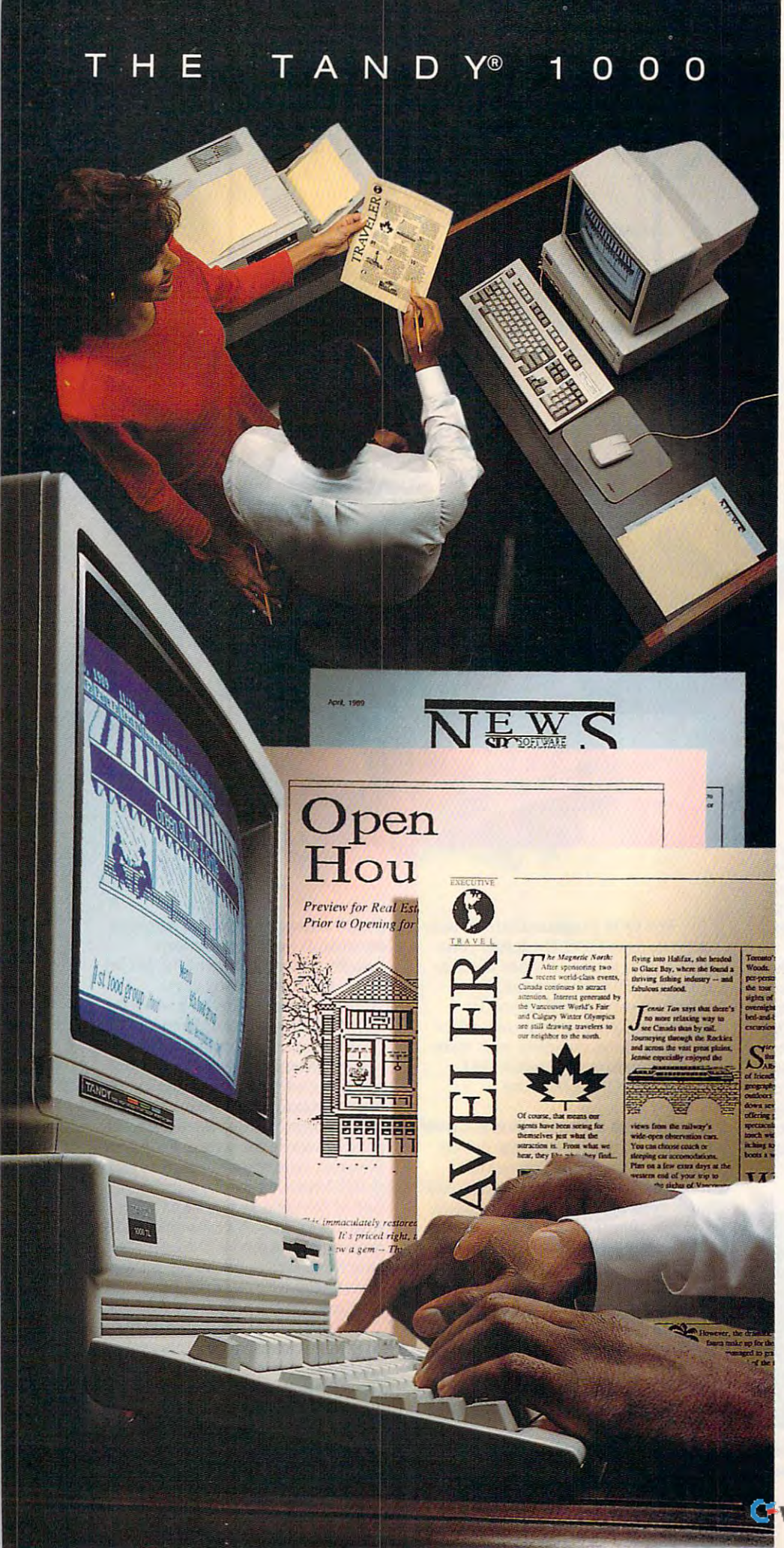

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8086, 80286, 80386, or 80486) to all applications in the queue. This makes for fast, efficient multitasking.

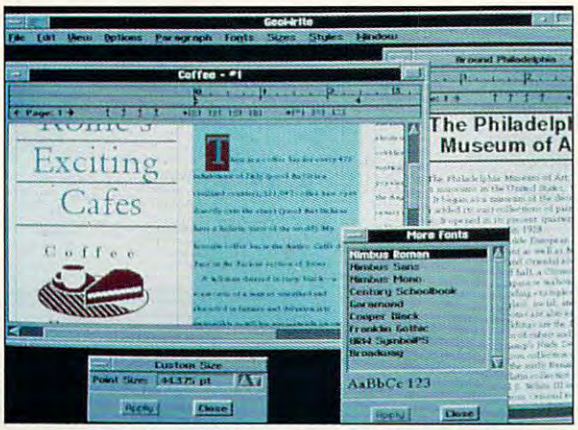
Built-In Applications

The GEOS operating system could do little but promise without *GeoWorks Ensemble,* a built-in suite of applications. After you've put them through the hoops, however, a couple of the programs will leave you with curiously mixed feelings. On one hand, these applications are very technically advanced. But at the same time they're unexpectedly incomplete.

Consider *GeoWrite,* a first-rate WYSIWYG word processor with a rich assortment of page-publishing features. *GeoWrite* supports (as do all *GeoWorks Ensemble* applications) multiple scalable fonts to deliver nearly 800 text sizes (from a tiny 4-point to a billboard-sized 792-point). Its PostScript-like type manager blends bitmap and outline fonts, thereby ensuring that the typeface and font you see on your screen will match the one your printer produces, regardless of whether it's a 9- or 24-pin dot-matrix printer or a PCL-based (Hewlett-Packard-compatible) laser printer.

A Pretty Face

In a product packed with innovative technology, *GeoWrite's* WYSIWYG display distinguishes itself. In addition to rendering manual leading (finely varying the spaces between lines) and positive/negative kerning (changing the space allocated to a character without changing its shape), *GeoWrite's* custom borders, drop shadows, and multiple columns enable you to enhance the appearance of even the most routine documents.



Multiple windows, incorporation of graphics, and fonts are just the beginning of *GeoWrite's* advantages.

So what's not to like? Well, it's not what *GeoWrite* includes that's the problem; it's what it's missing: macros, search-and-replace capability, a thesaurus, and a spelling checker. When compared to the advanced bells and whistles *GeoWrite* offers, these missing features are as basic as toast for breakfast.

Surprisingly, *GeoWorks Ensemble* also omits a spreadsheet and a database, two essential applications. A company representative, however, said GeoWorks plans to release both applications later this year. Registered purchasers of *GeoWorks Ensemble* version 1.0 will receive a free upgrade.

More Geology

The rest of *Ensemble's* built-in applications will fulfill reasonable expectations and needs.

As the centralized rendezvous for all Professional applications, *GeoManager's* primary mission is to shield novices and occasional users from DOS's jargon; it does that well while providing full functionality via pull-down menus. ▷

Advertorial

Face to Face With

Graphical User Interfaces

Power users are turning to graphical user interfaces (GUIs) for the ease of use they provide. But what about those of us ***without*** 386 VGA systems? Fortunately, there are GUIs designed to make computing easier on 8088, 8086 and 80286-based systems, and one of the most important decisions you'll make is choosing which GUI to work with.

Can We Talk?

First, you'll want to choose a GUI that "speaks" your language—English, plain and simple. That way you won't have to learn how to communicate with your computer before you start to use it—you'll already be on speaking terms.

Easy Operation

Second, your GUI should have neat, organized displays that present your options clearly and concisely. Easy-to-follow graphics make it simple for you to see exactly where you are in a program. Handy pull-down menus keep your options tucked away and out of sight until you call for them. And pop-up dialog boxes guide you through tasks, making sure that your computer does what *you* want it to.

Something in Common

GUIs provide a uniform operating environment, which alleviates the frustration and confusion of switching from one task to the next. Programs based on the same GUI have the same look and feel to them, making each new application easier to learn. Of course, you'll also want to choose a GUI supported by many of the leading software publishers. That way you'll be sure to find readily available software for home, school or business.

Those Little Extras

Another feature to look for in a GUI is a help function that's *context sensitive*—one that's able to "sense" which task you're currently running and provide help for that specific task.

For true convenience, your GUI should operate with just the point and click of a mouse cursor controller. The mouse makes it quick and easy for you to select your choices from menus and dialog boxes, taking the mazework out of getting around the many computing options your GUI offers.

Fortunately, there ***is*** *just such a user-friendly GUI: Tandy's DeskMate® Graphical User Interface. It's affordable, too—the proven format of DeskMate gives you instant convenience without having to upgrade your system memory beyond 384K. And it's available from over 7000 Radio Shack stores across the country. So take a scroll through DeskMate and discover for yourself just how easy computing can be.*

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Within *GeoManager,* disk directories are depicted graphically as folders. Folders, in turn, contain subdirectories or files or both. Drive icons streamline switching to other system drives and displaying their files. By default, a drive's contents will display graphically, or you can change it to a text listing (much like a standard DOS display).

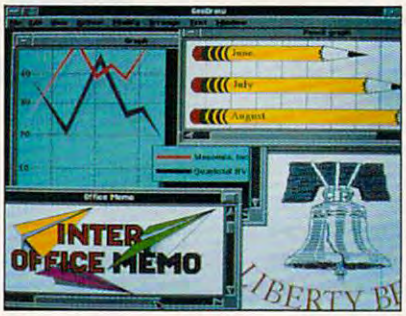
GeoDraw's eight tools enable you to create geometric primitives (ellipses, boxes, lines, and polygons) as well as text. *GeoDraw* imports and exports PCX and TIF images and can transfer them to *GeoWrite.* Since GEOS (and therefore all of its applications) is object oriented, fusing and separating image components are quick and easily mastered. Likewise, when you use GEOS's font manager, *GeoDraw's* text and drawings print out beautifully, even on a 9-pin dot-matrix printer. You can also print text in solid colors, reverse, several vector patterns, and increasingly translucent half tones, as well as at any angle.

Keeping Track

GeoDex is similar to the address book available under the Appliance icon except that it offers such additional features as text searching and multiple-viewing modes.

GeoPlanner tracks your appointments by organizing and searching through multiple daily, weekly, monthly, or annual events. Alarms alert you to appointments.

GeoComm delivers the requisite telecommunications features. The dedicated access software for America OnLine, a subset of *GeoComm,* adheres to the GEOS graphic interface, so the feel and flavor of the geographical display remain consistent throughout your online time.



***GeoDraw* provides object-oriented graphics for business or personal use.**

Seamless America

From my meanderings through its Teflon terrain, I would say that America OnLine holds promise as a low-cost, easy-to-use source of information and entertainment. For example, America OnLine's People to People forum invites you to drop in anytime and participate in its forever ongoing discussions. Also, peruse America OnLine's numerous high-quality entertainment, productivity, and utility downloads.

Unquestionably, GEOS faces a long uphill climb. Still, tiny GeoWorks is off to an astonishingly good start and running strong. Now that reminds me of another story I heard as a child. This one's about a mouse that roared. . . .

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

GeoWorks Ensemble

IBM PC and compatibles; 512K RAM; DOS 2.0 or higher; hard drive; CGA, EGA, VGA, or Hercules graphics adapter; mouse—$199.99

Package includes a 490-page manual, a quick-start manual, a customer-support handbook, a troubleshooting guide, a discount membership, some free time on America OnLine, and 3½- and 5¼-inch installation disks.

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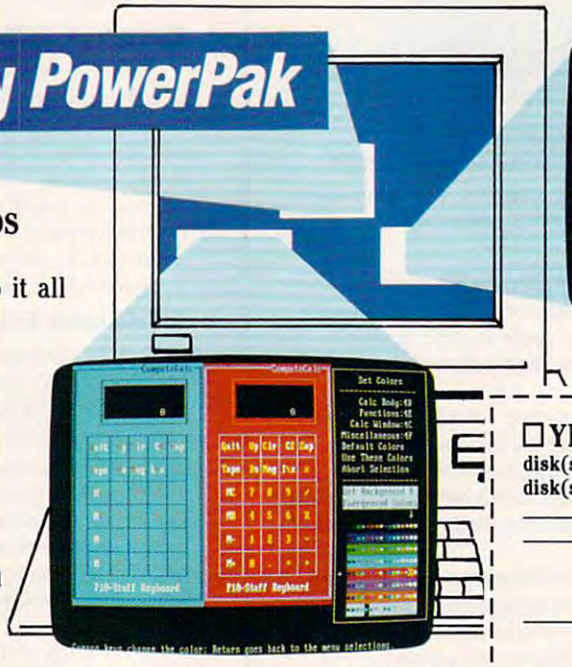

Packed with 38 PC batch-file extensions and power utilities, this easy-to-use disk includes individual help menus for every program. You don't have to be a computer maven—just press F1 for Help anytime!

The power utilities alone are worth many times the cost of this disk. Imagine! Programs to speed up your keyboard, edit disk files, edit and search memory, find a specific text string in disk files—plus memory-resident programs such as a pop-up calculator, a programmer's reference tool, an editable macro key program, and a graphic screen-capture utility, and more all included on this jam-packed disk.

Our batch-file extensions add new commands to standard batch-file language. Now you can easily **create menus, draw boxes, and write strings** in your choice of colors anywhere on the screen—**all with simple, easy-to-use commands.** Then, add some zest to your batch files with a command that lets you play a series of notes!

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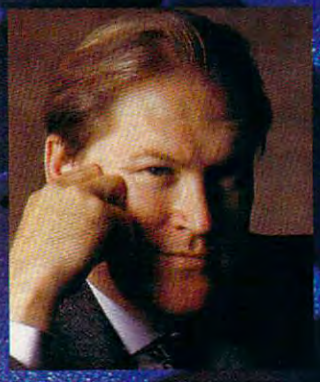

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IBM Screens Pictured.

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DANIEL JANAL

MONEY MONEY MONEY

There's this beach house I know of right on the ocean that has a view of the tide from every room. I want it. I want to open the floor-to-ceiling sliding-glass doors leading from the carpeted loft office onto the open-air deck overlooking the blue surf and breathe in the salty air as I earn my daily bread.

I want to hear the person on the other end of the phone say, "What's that noise in the background?" And I want to reply: "Noise? What noise? Oh, that. That's just the ocean, and it's high tide."

Now I have to see if I can afford it. I have two choices: I can call my tax advisor, who knows me, my investing temperament, my financial stability, and my tax situation. Or I can invest a couple of hundred dollars in software endorsed by celebrities.

I decided to give the celebrities the first shot. After all, if I live at the beach, the stars might be my neighbors. Why be rude to the neighbors?

Andrew Tobias' *Financial Calculator* published by MECA Ventures (203-226-2400) calculates mortgages quickly. I typed in the loan amount, interest rate, and number of years on the loan. I found that a 30-year, fixed-rate mortgage was quite affordable. For the fun of it, I changed the mortgage rate from the special 8 percent the bank offered to the prevailing 10 percent offered by the S & L . The computer took about two eye blinks to compute the difference. I blinked twice when I saw the savings that would result from that 2 percent difference. What a deal!

"Now," I thought, "if I make the down payment and the closing fees, I'm going to be strapped for a couple of months. Where can I get some extra income?"

Rather than think of ways to work harder (what's the point of working at the beach if you can't join the 5:00 p.m. volleyball game?), I wondered if I might be entitled to a tax refund. If the refund was sufficient, I wouldn't have a cash-flow dilemma to worry about.

I sought the advice of Sylvia Porter and her *Rapid Tax,* published by DacEasy (214-248-0205). This program computes your federal and state income taxes. If you don't know which forms to fill out, the program will ask you a series of more than 50 questions; your responses will indicate which forms to use. A lucid manual explains how to complete the forms. The manual is so clear, the IRS should issue it along with its forms.

First, I needed to find the dollar figures for all Sylvia's financial questions. Fortunately, this was not a taxing experience, since I keep all of my financial records on *Quicken* from Intuit (415-322-0573), a program that keeps running totals on my income and expenses based on my checks and deposits.

Both programs are easy to use. After filling out forms for nearly one hour, Sylvia told me I would get a refund of about three month's mortgage, maintenance, and taxes! I began to smell salt air.

This sounded too good to be true. I called my tax advisor and asked him to go over the numbers.

He figured the mortgage in about five eye blinks. He analyzed my tax return from the past year and asked about current income, assets, and anticipated income. He added the carry costs, taxes, mortgage payments and living expenses.

With steam rising from his calculator, Chet said, "You have a good chance of being approved for a mortgage and being able to pay for it each month." He also gave me investment advice, which the other programs could not do. He advised me to sell my condo (which I had expected to do). "You'll also save money because you won't have to pay for a vacation because your house is a vacation."

Hot diggedy! I could buy the beach house!

Only one question remains: Who won the battle between human and computer, or in this case, tax advisor and tax software? The software cost approximately $200, less at discount stores and mail order. I worked on it for two hours. My tax advisor spent about an hour, offered advice the computer programs couldn't possibly match, and charged me $125. The human wins! (Sounds like a line from a grade-B sci-fi flick.)

You won't go wrong by buying any of the programs I've mentioned here, however. All of them perform as promised: They forecasted my taxes and computed the mortgage on the beach house. They're excellent tools that I can use to double-check the advice of my financial advisor.

However, they can't replace a human being's acumen for deciding other factors, such as selling my condo to help raise the down payment on the beach house. Also, I'm sure that my tax preparer was better able than I to make sure I had used all the right forms, took all the entitled deductions, and paid the correct amount.

The lesson? Computers are very good at managing information and presenting it in a solid, usable manner, but they can't suggest financial plans and strategies that match the capabilities of a trained, seasoned, financial pro. Remember that the next time you want to run the financial side of your home business yourself.

Gotta run. Surf's up. ⊡

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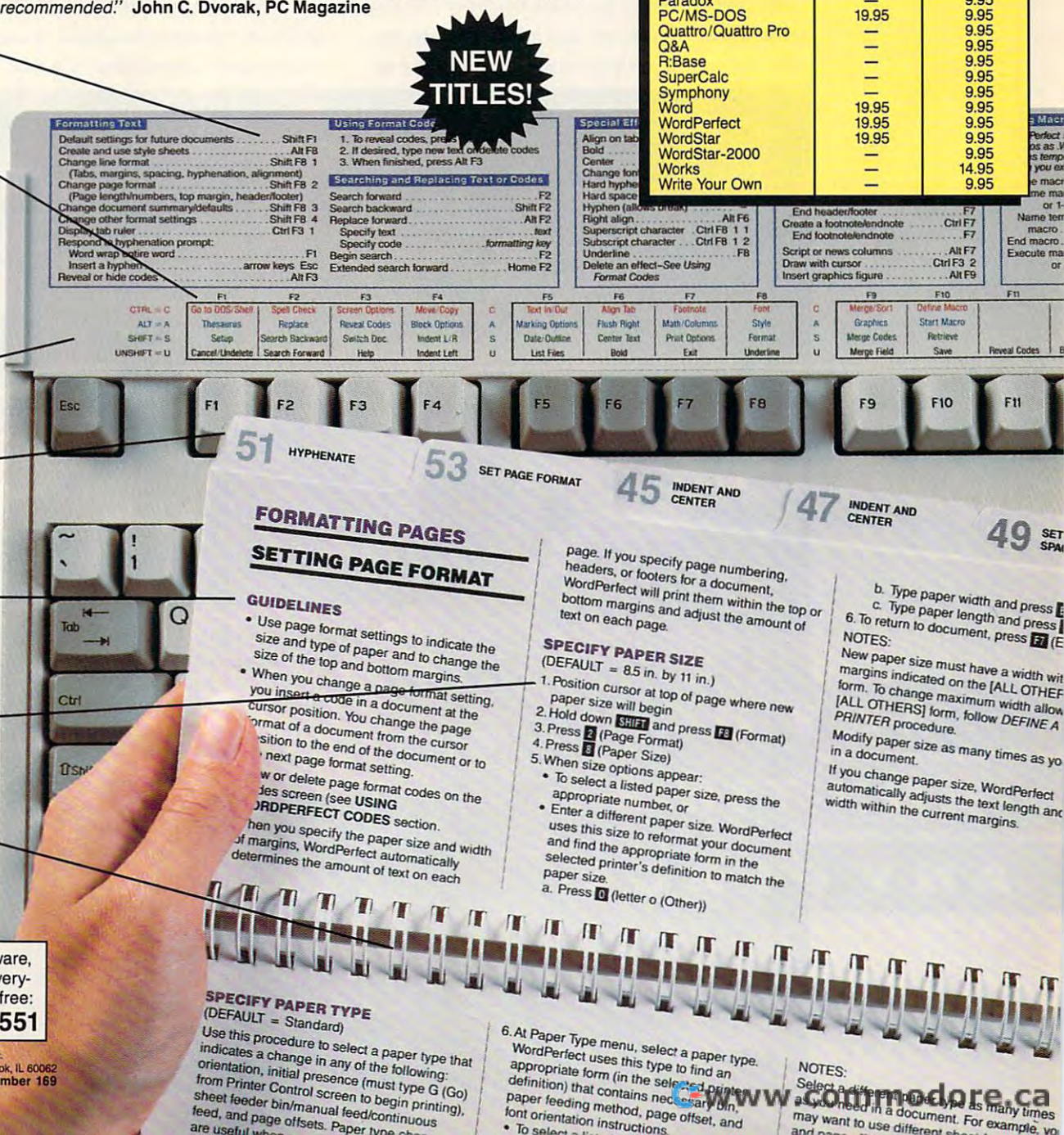

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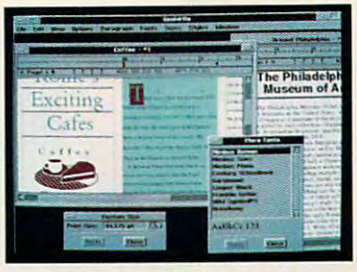

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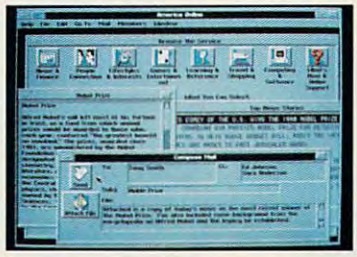

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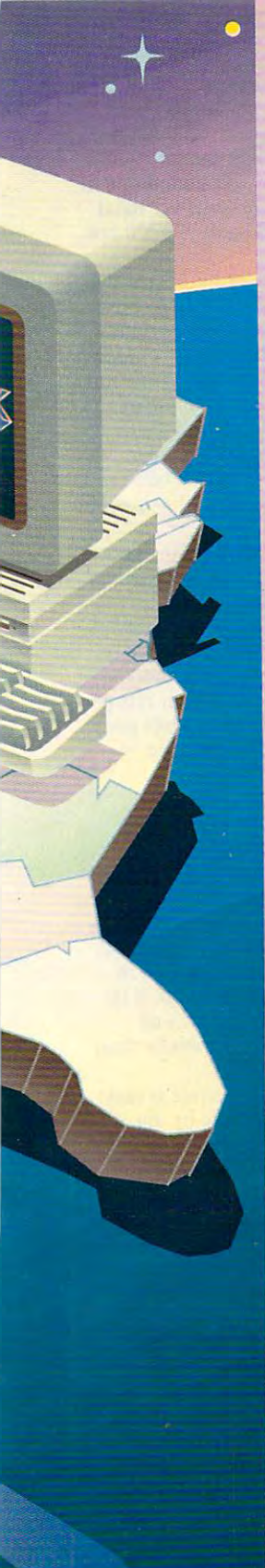

ROB SCHUSTER

MODEMS MADE EASY

MASTER THE MYSTERIES OF MODEM SPEEDS

Modem transmission speed is the source of a lot of confusion, even among otherwise informed computer and modem users. The problem stems from the interchangeable use of *baud* and *bits per second.* I suspect this is because it's easier to say *baud* than *bits per second,* though misinformation has a hand in it, too.

If you've ever found yourself confused by the relationship between bits and baud rate, or if you think that a modem's baud rate is the same as the number of bits or characters it transmits per second, read on.

Background Bits

Bits per second is a measure of the number of data bits (digital 0s and 1s) transmitted each second in a communications channel. This is often called the *bit rate.* Individual characters (letters, numbers, and so on), also referred to as *bytes,* are made up of a group of data bits.

Depending on its type, a character may be represented within a computer by a string of seven or eight bits. Seven-bit characters usually represent the 128 standard ASCII characters found on your computer keyboard.

In addition to the standard ASCII codes, 8-bit characters can represent control characters and special token or graphics characters peculiar to a specific machine. The line-drawing characters in the PC's extended character set are a good example.

Any character with an ASCII number higher than 128 is an 8-bit character. The number of bits sent for each character can change during transmission, as we'll see. (Again, the transmitted character is often referred to as a *byte,* or on older systems, a *data word.*)

While a modem's bit rate is related to its baud rate, the two numbers are not always the same.

Get Baudy

Baud rate is a measure of the number of times per second a signal in a communications channel varies, or changes states. States can be many things, including frequencies, voltage levels, or frequency phase angles. ▷

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One baud is one such change. So, a 300-baud modem's signal changes in state 300 times each second.

However, contrary to what you might expect, a 1200-baud modem's signal doesn't change state 1200 times per second. And that fact has an important bearing on why it is inaccurate to say *baud* when you mean *bps*.

Raw Bits

Depending on the modulation technique it uses, a modem can send one or more (or less) bits with each baud or change in state. To put it another way, one change of state can send one bit—or more or less than one bit. Thus, baud and bps are very different.

As mentioned earlier, the number of bits a modem transmits per second is based on the number of bauds (changes in signal) that take place each second.

The numbers for bps and baud are not always the same because one baud can represent one bit, more than one bit, or a fraction of a bit.

To illustrate this, first consider a modem with a baud rate of 300 using a transmission technique called *FSK* (Frequency Shift Keying, in which a signal changes to any of four different frequencies to represent digital 0 and 1 signals from both modems).

With FSK, each baud (which is, again, a change in the state of the signal) sends one bit. Only one change in state is required to send a bit. Thus, the modem's bps rate is also 300: 300 bauds per second × 1 bit per baud = 300 bps.

Similarly, if a modem operating at 1200 baud were to use one change in state to send each bit, that modem's bps rate would be 1200. (There are no 1200-baud modems, by the way. This is only a hypothetical example.)

Now, consider a hypothetical 300-baud modem using a modulation technique that requires two changes in state to send one bit, or half a bit per baud. This modem's bps rate would not be 300 bps, but 150 bps: 300 bauds per second × ½ baud per bit = 150 bps.

To look at it another way, bits per second can also be obtained by dividing the modem's baud rate by the number of changes in state, or bauds, required to send one bit.

Real Speed

Now let's move away from the hypothetical and into reality, as it exists in the world of modem modulation. First, lest you be misled into thinking any 1200-baud modem can operate at 2400 bps with a two-bits-per-baud modulation technique, remember that I said there are no 1200-baud modems.

Medium- and high-speed modems use baud rates lower than their bps rates. Along with this, however, they use something called *multiple-state modulation* to send more than one bit per baud.

For example, 1200-bps modems that conform to the Bell 212A standard (which includes most 1200-bps modems used in the U.S.) operate at 300 baud and use a modulation technique called *phase modulation* that transmits four bits per baud. These modems can operate at 1200 but not 2400 bps because they are not 1200-baud modems; they use a baud rate of 300. So, 300 baud × 4 bits per baud = 1200 bps, or 300 baud = 1200 bps × ¼ baud per bit.

Similarly, 2400-bps modems that conform to the CCITT V.22 recommendation (which includes virtually all 2400-bps modems) actually use a baud rate of 600 when they operate at 2400 bps. To achieve a bps rate of 2400, they use a modulation technique that transmits four bits per baud: 600 baud × 4 bits per baud = 2400 bps, or 600 baud = 2400 bps × ¼ baud per bit.

Thus, a 1200-bps modem is not a 1200-baud modem, nor is a 2400-bps modem a 2400-baud modem.

Now let's take a look at 9600-bps modems. Most of these operate at 2400 baud, but (again) use a modulation technique that yields four bits per baud. Thus: 2400 baud × 4 bits per baud = 9600 bps, or 2400 baud = 9600 bps × ¼ baud per bit.

Characters per Second

Usually abbreviated *cps, characters per second* is the number of characters (letters, numbers, spaces, symbols, or control or other 8-bit characters) transmitted by a modem in one second.

Cps is often the bottom line in rating data transmission speed. It is certainly a more effective way of thinking about text data transfer than baud- or bit-rate.

Determining the cps rate is easy: Simply divide the bps rate by the number of bits sent for each character. You must of course consider more than just the seven or eight bits that make up each character binary digit. In fact, as many as ten bits may be transmitted for each character during ASCII transfer, whether seven or eight data bits are used.

This is because the sending computer adds bits that mark the beginning and end of each character (called *start-* and *stop-bits*). In addition, the system usually adds a parity bit during 7-bit ASCII transmission. (The computer's serial port takes care of adding the extra bits as well as stripping them out at the receiving end.)

So, in asynchronous data communication, the number of bits per character is usually 10 (either seven data bits plus a parity bit, a start bit, and a stop bit, or eight data bits plus a start bit and a stop bit). Thus, using 10 bits per word:

300 bps = 30 characters per second
1200 bps = 120 characters per second
2400 bps = 240 characters per second

Analog vs. Digital Signals

Before your computer can send something over a modem, it must be translated from digital (or binary) to analog. Let's take a closer look at analog signals and why they're used in data communications.

What Is an Analog Signal?

Strictly defined, an analog signal is a signal that varies in a continuous manner. In contrast, a digital signal varies in a discontinuous manner. Analog signals vary continuously between their minimum and maximum values, while digital signals do not vary in the same way. A digital signal is always at either a minimum or a maximum level or value (or in one state or the other), with no in-between.

Analog signals, on the other hand, cover the entire range between maximum and minimum values. You can visualize an analog signal as a sine wave, while a digital, or binary, signal is in the form of a square wave.

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How Long Does It Take?

Using ten bits per character as a guideline, how long does it take to download a file from a BBS? You can use the formula (bps/10 * 60)/1024 to determine the number of kilobytes per minute. With this formula, you get values of 14K per minute at 2400 bps, 7K per minute at 1200 bps, and 1.75K per minute at 300 bps. Here's a table that shows how many minutes it would take to download files of 10K, 100K, and 500K, and how much this would cost at a rate of $12 per hour.

	10K	100K	500K
300 bps	5.71/$1.14	57.14/$11.43	285.71/$57.14
1200 bps	1.43/$0.29	14.29/$ 2.86	71.43/$14.29
2400 bps	0.71/$0.14	7.14/$ 1.43	35.71/$ 7.14
9600 bps	0.17/$0.04	1.79/$ 0.36	8.92/$ 1.79

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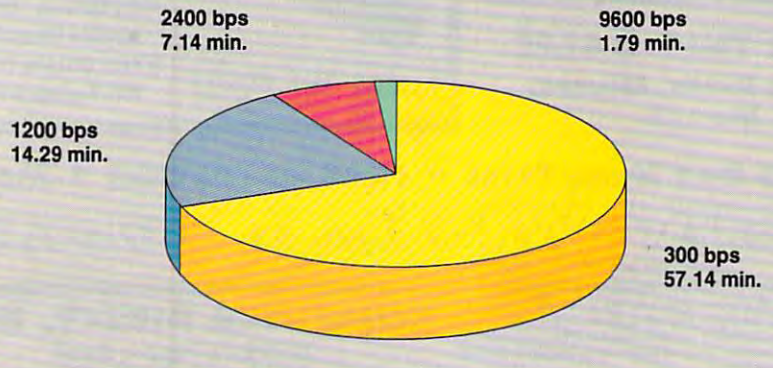

Common Speeds

The most commonly used communications rates for dial-up computer communications (including BBSs and online services like CompuServe, DELPHI, and GEnie) are 300, 1200, and 2400 bps.

Some older systems—especially Telex—communicate at 110 bps, but these are gradually going the way of the dinosaur. Modems with speeds of 4800 and 9600 bps are available, but at present few online services or BBS's accommodate them. This will be changing soon, however, as the cost of high-speed modem technology drops and the demand rises.

Super Fast

Modems with even higher bps rates (19,200 and up) exist, but these are not used with CompuServe, GEnie, America OnLine, and most other dial-up systems; 9600 bps is generally accepted as the upper limit on asynchronous data transmission via voice-grade telephone lines.

At present, using higher transmission rates requires special dedicated lines that are *conditioned* (that is, lines are shielded from outside interference) as well as expensive modulation and transmission equipment. ⊡

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ONLINE FREEDOM

Thomas Jefferson once said that the people are made safe by the information that they possess and that they're the sole guardians of religious and political freedom. Although it's two centuries old, his observation sums up the philosophy of perhaps the first political party to offer a computing-based vision of government.

The tiny Independent High Tech Party runs out of headquarters in Hopkinton, Massachusetts. Its prime mover is 38-year-old Leonard J. Umina, a good-natured Digital Equipment executive and former Republican who has never held public office. Umina and four associates recently offered themselves as candidates for Massachusetts's highest executive positions in last November's elections, with Umina himself running for governor.

Umina, an authentic political outsider, may well have the distinction of being one of the few computer-literate people ever to have run for governor of any state. But that's not what's interesting about him—or his party. He's grappling with a problem that soon may be a major issue.

Umina believes that Americans today are in danger of losing their freedom because they no longer have access to the information that guarantees it. In a democracy, the people themselves possess and control the information they need. This was something Jefferson understood. The Declaration of Independence was printed by small, independent presses, not the royal printers of King George.

However, even a democratic government can deny public information to ordinary citizens—or even to politicians within the system itself. In Massachusetts, says Umina, the state legislature had to invoke the Freedom of Information Act to find out from the governor's office what was in the state's checking account and how many employees were on the state payroll. This was plainly information that people had a right to know and that was available in the state's computerized accounting system, but it never had been made public.

A free press should guarantee the free flow of information that democracy requires. Today's computer systems, however, can interfere with press access to vital information.

Nonetheless, Umina believes that electronic technology is also the key to restoring the free spread of information, possible through a new program he and his party have proposed, called *Public Access Computerization.* This involves putting all government information—such as proceedings of legislative meetings, accurate income and expenditure figures for government programs, the full text of government contracts, and so on—on a mainframe that's freely accessible via modem or network from any computer. The mainframe would be run by an independent agency not controlled by any branch of government or political party. "With government's every action so visible, waste, corruption, theft, and dishonesty will be eliminated," he claims.

Furthermore, Umina would ensure the availability of computers in public areas, mainly libraries, so that anyone could access the government database. "I want every person to be able to examine any part of our state government's operation from the library, home, or school. I want high school and college classes to be able to study our government and its operation and to recommend alternatives and changes to programs, expenditures, and activities."

Public Access Computerization would help local governments as well. Massachusetts is currently suffering through a major recession, but the state government sat on the budgetary bad news as long as possible before making it public. This forced local officials to make last-minute guesses at future levels of state aid. Under Umina's system, state fiscal information would be visible at all times, making budgetary guesswork unnecessary and cutting waste.

In his public statements, Umina hasn't dealt with all the potential problems of Public Access Computerization. How much would it cost? Could it be implemented on a state level only, or would it have to be a national program to include all the federal information that states need to plan their own programs and budgets? How could it be protected from hackers and dirty tricksters? Could you convince the public to use it? Still, Public Access Computerization was the only truly new idea aired during the Massachusetts campaign season. It deserved serious examination.

It didn't get it, of course. Umina and his High Tech Party met the same fate suffered by most other fringe parties that nibble at the edges of U.S. politics. With no party organization, no political machine, no television advertising, and no money, Umina's bid for governor was bound to fail—and did, even in an election in which many voters expressed an intense dislike for both major candidates. The local press had a field day with the group, calling them "Boy Scouts," "Don Quixotes," and "hopelessly naive." It may be that offbeat candidates without major party backing can no longer win American elections or that freedom of information is too abstract an issue to have much voter appeal.

Judged by the honesty and forward-looking nature of the party platform, Umina and his Independent High Tech Party are onto something. Is anybody listening? ⊡

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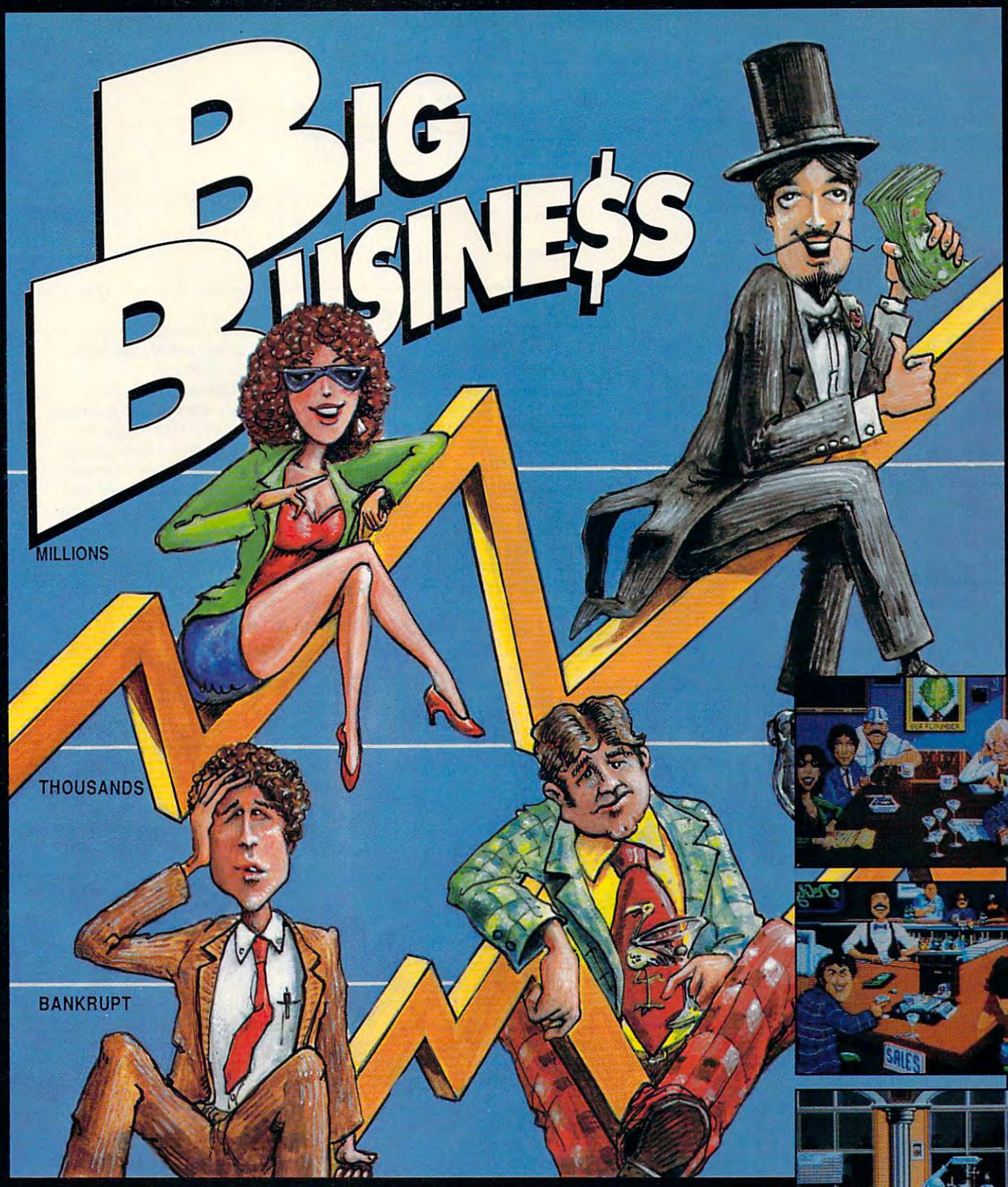

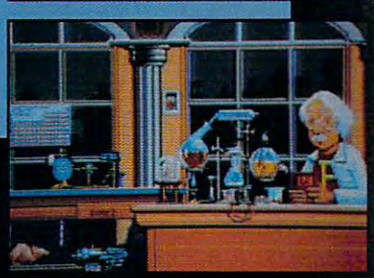

Actual VGA 256 color screens shown

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GAMEPLAY

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Games are the most demanding programs that your computer will ever run. A lot of things are going on all the time—not like with your word processor, which just sits there waiting for you to press a key. As much of the game as possible has to be in RAM because if the program has to keep going to the hard disk to get data, the game lurches along like a square-wheeled cart.

That's why gamewrights keep asking for more and more capability from your machine. They have increased the RAM requirements until now a lot of games demand a 640K machine. Some games even require (or at least the game's developer recommends) expanded or extended memory. To free up as much low memory as possible (all of the RAM below 640K), you may have to boot with a stripped-down configuration whenever you want to play. (I use *BootCon* from Modular Systems, a terrific little dirt-cheap program that gives you a menu of possible configurations every time you boot.)

But even with 640K, an EGA display, and a hard disk, the game publishers have hit a wall. How can they know which SVGA display you're using? Which expanded memory manager? Which sound board? They can't know.

Yet they *have* to know—because if they create a game that can only run on a marvelous machine owned by exactly 12 people in the world, they aren't going to be able to make a profit selling it for $49.95.

Every step upward in hardware requirements knocks out thousands of potential players that can't possibly buy the game. There's a constant risk of leaving the gaming audience behind, which must be balanced by the gamewright's temptation to push the hardware as far as it can go.

When the game publishers began to sell games that could only be played if you had a hard disk, when they first created games too complex to be ported to the Commodore 64, when they first published games that required more than 256K of RAM to run, when they first published games that *had* to have an EGA display or better, they went through as much pain as if they were passing the corporate equivalent of a kidney stone.

It isn't just the financial risk. Gamewrights are artists. They want their games to be perfect, but they also want their games to be widely available. I've never met an elitist gamewright. (I got a letter from one once, but I've never actually *met* one.)

OPEN YOUR WINDOWS TO GAMES

There's also a practical programming reason for staying away from high-end machines: standards. Those big mamas don't have any.

Back in the days when all the PC clones had 256K and a CGA display, a program that ran on one machine would run on all of them. But anybody who's used a 386 or 486 machine with extended memory and an SVGA display knows that no two models are exactly alike. I've had games that ran on my Hyundai 386 crash on my Northgate 486, and vice versa; and I've had programs do weird things on both—but *different* weird things.

It's not just a problem of game programmers' using suspect direct-memory-access schemes or kludges in order to speed up or enhance the game. The hardware itself isn't identical anymore. All 256K PCs with CGA displays were identical, from a programming point of view. But a programmer can't count on any two 386 machines handling extended memory or SVGA displays exactly the same way. That's the problem.

Gamewrights need to have a standard as they start reaching outside the 640K limit so if they follow the rules, they can count on their games' running smoothly on *every* machine.

The answer is already here, and it's in the software. Players only have to fork over 90 bucks, not 5,000, in order to get the environment the game requires. The answer is *Windows* 3.0.

I never liked the earlier incarnations of *Windows* because all my favorite software kept crashing, and I didn't like the software that *did* run.

But with the latest *Windows,* Microsoft has finally got it right. To my shock, *Windows* actually makes my non-*Windows* programs behave better. For instance, I'd been having trouble with *Glyphix* and *WordPerfect* locking up or giving me divide errors whenever I tried to print complex documents on my Laserjet. But when I run them under *Windows,* they behave perfectly.

Most of the games I've tried work fine under *Windows,* so at least it does no harm. And even some of the untidy crash-prone games are improved by running them under *Windows.* For instance, *Railroad Tycoon* always locked up or crashed on my machines at least once per playing session. Under *Windows* it still happens, but I get plenty of advance warning because the game acts weird for a while before it dies. *Windows* provides life support just long enough for me to save the game.

Windows should become the new game-development standard because it works and it works well. Gamemakers will have to spend a bunch of bucks tooling up to work with *Windows,* but it'll be worth it.

Two years from now, most PCs will run under *Windows.* The installed base will be huge. And game programmers will know that as long as they obey the *Windows* protocols, their games will be playable on *every* machine that has *Windows.*

It can't happen too soon for me. ⊡

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Aesthetics

Beauty may be in the eye of the beholder, but golf courses seem most appealing when they blend in with the natural terrain. Early designers didn't have much choice, but even modern designers with access to powerful bulldozers, graders, and scrapers, and the ability to move hundreds of tons of earth, strive to make it look as if the original land were created with a golf course in mind.

You would think it difficult to make the green turf of a golf course blend in with the desert, but Nicklaus' Renegade Course at Desert Mountain is almost invisible as you drive by only 100 yards from the fairway. Containing the entire course between natural rises accented with 100-year-old saguaro cactuses, Nicklaus used the indigenous plants and terrain as the predominant hazards on the course.

Course Routing Screen

You don't find straight lines or perfect circles in the woods, meadows, or mountains, and except for flagsticks and club shafts, you shouldn't find them on a golf course either. While "cookie-cutter" bunkers, greens, and tees were popular in the British Isles in the late 19th century, modern design favors a more free-form approach where each element seems to flow from the contours of the land.

Recent advances in turf management equipment have allowed more and more courses to take advantage of contour mowing for sculpted fairways. The days of the old and imprecise gang-mowers being pulled behind tractors is over, and the replacement allows more control over the shape and precision of the fairway. Contour mowing is more pleasing to the eye and can be used as a strategic element by altering the size of landing areas at various distances from the tee.

Routing the Holes

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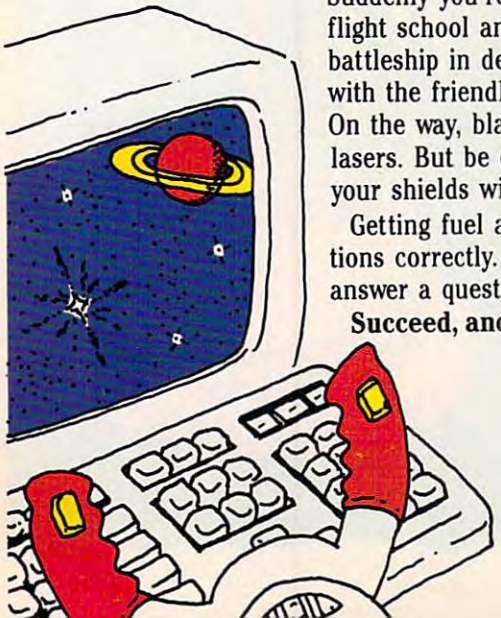

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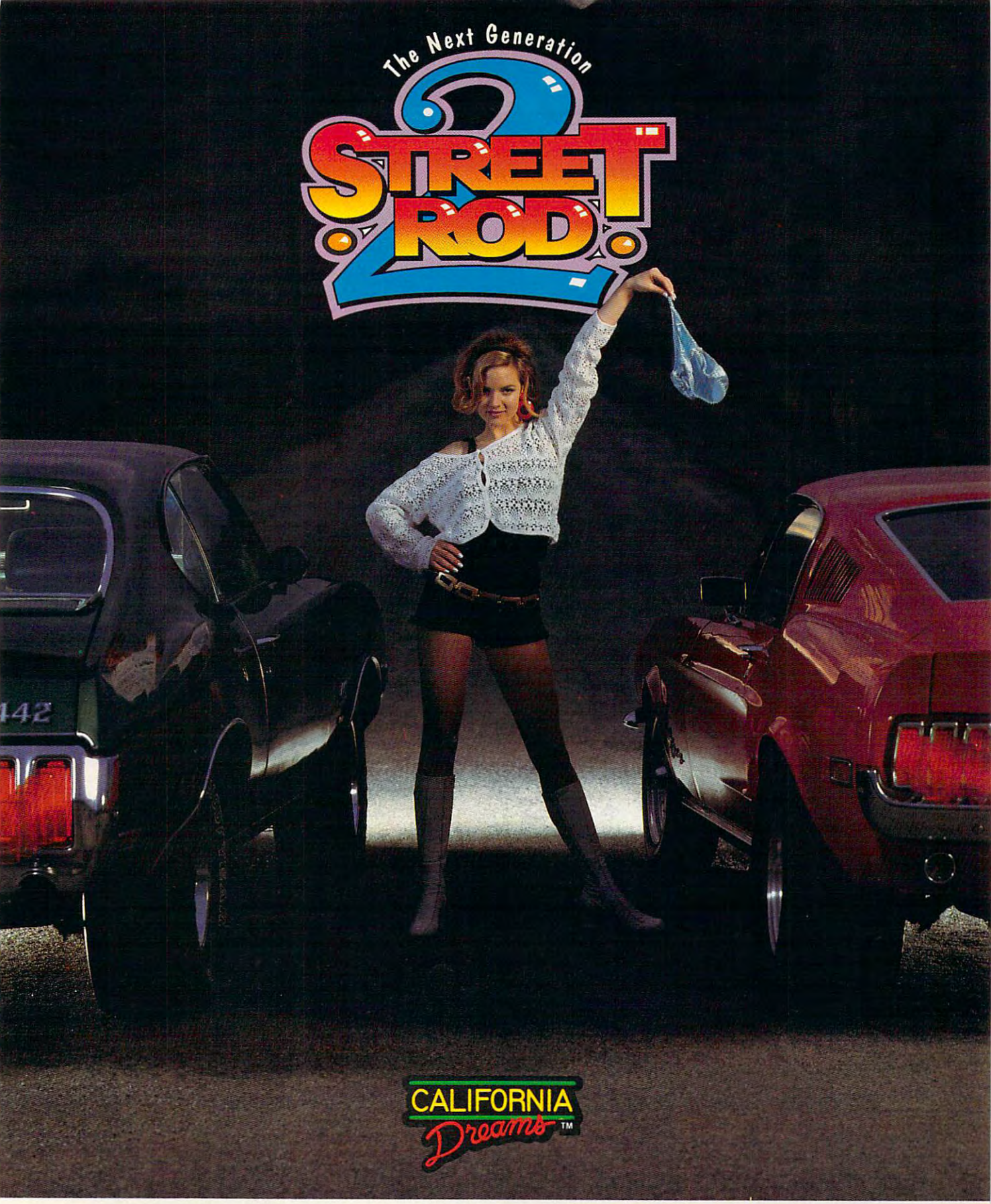

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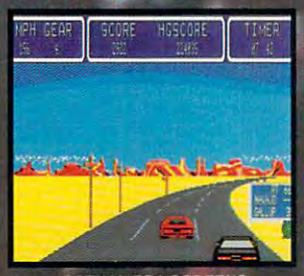

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and contour of the building site, but it has become almost standard practice to locate the 1st tee, 9th green, 10th tee, and 18th green next to the clubhouse, where golfers can visit the pro shop or grab a bite to eat. Careful designers also ensure that these same holes do not play into a rising or setting sun to slow down play.

Most designers avoid parallel fairways where errant shots could be dangerous to golfers walking or riding on other holes. When there's no way to avoid it, use trees to isolate one fairway from the other. One of the problems with early courses that played out in a straight line and then back in a straight line is that golfers only played with the wind blowing from two directions. Modern designers largely endorse a looping design where holes play in every conceivable direction over the 18 holes.

Keeping the interest level high is one of design's primary goals, and spacing the par 3s and 5s out over the round brings some variety to the game. It isn't etched in stone, and some fine courses have back-to-back short or long holes, but repetition isn't conducive to a championship layout.

Place Objects Screen

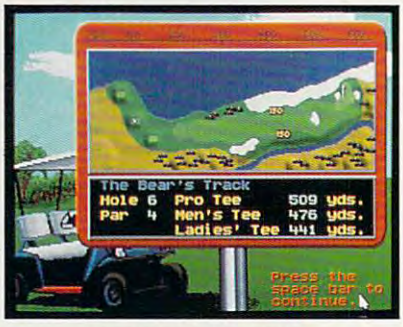
Edit Hole Screen

Bunkers

The first bunkers were carved out of the links grass by the winds along the Scottish coast, and these unkempt areas spelled real trouble for early golfers. Unless a designer is trying to re-create the ambiance of an early course, however, the design and placement of bunkers have become more of a craft than a natural occurrence.

Raised bunkers are the most common type on American courses, with the side facing the hole (the lip of the trap) at a higher elevation than the side facing the tee. It's an accepted practice to make the lip higher the closer you get to the green. In most cases, fairway bunkers are relatively shallow, while green-side bunkers have more depth. The thinking is that you've already penalized the golfers by making them hit from the sand, so give them a chance to advance the ball with a well-played shot.

When building fairway bunkers, use them to narrow the fairway and create a narrower landing area for the big hitter. By requiring accuracy on the long shots, you take away some of the "long-knockers" advantage during a round and provide a fairer test of golf. When adding sand near the greens, leave some grass between the green and bunker.



Hole Overview Screen

The theory behind the use of bunkers around the green could change in the future. The professionals have become so adept at playing from the sand that they sometimes intentionally hit into the bunkers rather than risk a lie in tall grass. Some designers add tall grass to the lip of the bunker to prevent that strategic move.

Greens and Pin Placement

Creating a test of a golfer's short game depends upon the careful consideration of the size and contour of the putting surface and the placement of the pin in relation to the slope. While wildly sloping greens are an obvious challenge to the game played on the dance floor, building subtle breaks into the shaved grass is an important aspect as well. In many ways, a barely perceptible break tests the golfer's ability to "read" the green more than a twisting one.

Fair pin placement becomes vital on greens with dramatic changes in elevation. It doesn't make sense to allow a player to hit a shot to the

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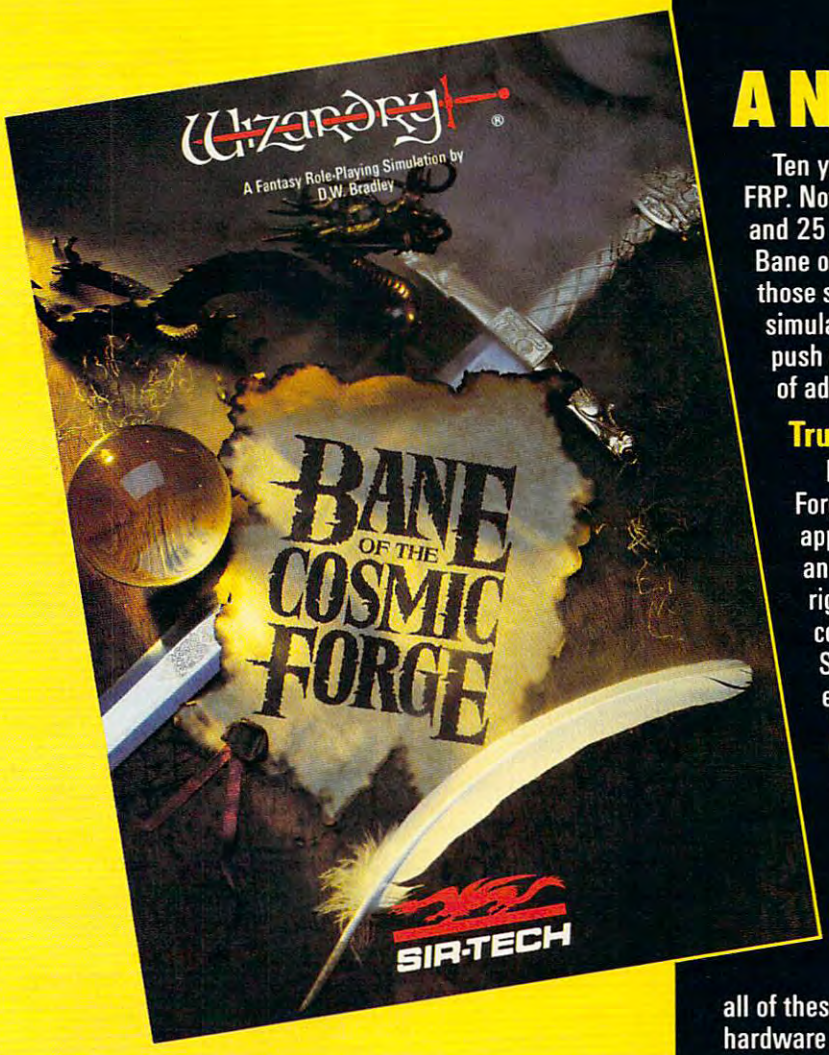

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green and then take away any chance of hitting the first putt near the hole. You can require that a perfect shot is the only way to keep it close, but when you build a two- or three-tiered green or add a steep section, don't place the hole too close to the bottom of the slope. Putting's tough enough without impossible pin placements.

Pin placement and the slope of the green affect more than putting, pitching, and chipping. You can tuck a pin close behind a sand trap when you've planned a par 4 hole for an approach shot with a high-flying wedge or 9-iron, but the same placement on a 210-yard par 3 where a boring 2- or 3-iron is required wouldn't create a proper opportunity for par.

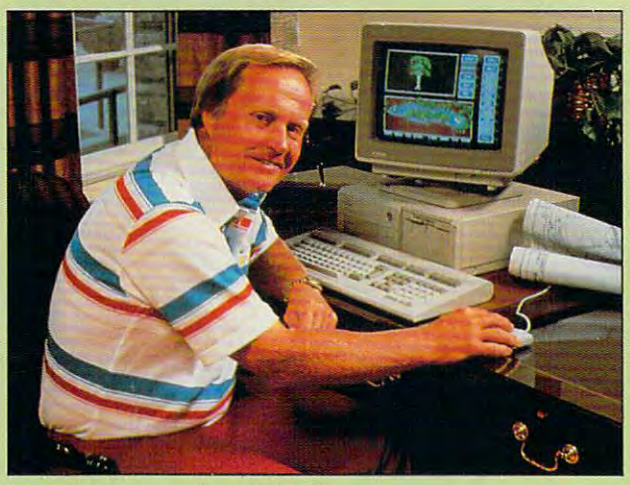
Wind Indicator

Break Grid Indicator

Course designers haven't come up with a specific formula for the size of greens. Robert Trent Jones, Sr. built enormous greens, while Nicklaus designs usually include small- to medium-sized putting surfaces. While size is affected by the severity of the hazards around a hole, many designers decrease the green size as approach shots become shorter. A 450-yard par 4 usually has a larger green than a 375-yard hole that follows. ⊡

This feature is an excerpt from *The Official Guide to Jack Nicklaus Computer Golf* by Mike Harrison. The book is available for $12.95 (plus $2.00 shipping) from COMPUTE Books, c/o CCC, 2500 McClellan Avenue, Pennsauken, New Jersey 08109.

Jack Nicklaus on Course Design



Currently commanding a $1 million fee for a design, Nicklaus is one of the world's most sought after architects, renowned for his flexibility in creating beautiful and challenging courses for all calibers of players. As history's greatest golfer and one of the innovators of modern course design, his comments on design theory are especially insightful.

- "Golf is a game of precision, not strength; it's a thinking man's game. There's no challenge in just whacking the ball. A golf course should be enjoyable and offer variety to every golfer, no matter what his level of skill or strength. My aim primarily is to test a golfer's accuracy. I try to use the richest possible mix of shot values—varied tests of precision."
- "With medium-to-small greens, you call on the player to hit more chips, pitches, and sand shots and require a successful golfer to master the finesse shots in addition to the rest of the game. Smaller greens also speed up the putting process, the slowest part of the game today, and the element most responsible for the five-hour rounds that destroy the enjoyment of the game."
- "Every hole should require the golfer to make one very good shot to make par and one great shot to make birdie. It's the essence of great design and the area where the early masters truly excelled."
- "Use whatever topographical features exist naturally to create holes that never become dull or stale no matter how many times you play them."
- "Utilize land roll, woodland, water, rough, and sand as hazards in a varied and balanced way throughout the 18 holes."
- "Strive to vary the location and configuration of fairway bunkers depending on the use to which the course will be put, creating them sometimes purely for directional purposes, sometimes purely for strategic purposes, and sometimes as a combination of both."
- "Every green should be tailored to the hole and to its surrounding land in size, shape, and contour. Every bunker should be tied to the flow of the green and its adjacent terrain."
- "Golf is more enjoyable, especially for the average player, when it is played primarily downhill rather than uphill, and with rather than against the flow of the terrain."
- "Avoid routing opening and finishing holes so that sun becomes a problem at the beginning or end of the day."
- "Direct as many holes as possible so that, under prevailing wind conditions, the course plays at its easiest, and is at its toughest when the wind comes from unexpected quarters."
- "When I design a par 4 hole, I try to emphasize tee placements so the average golfer will be playing the same club to the green as I would. I'm sure the average golfer is tired of playing every par 4 with two woods and an iron. On my par 4s, I try to create a need for thought and shotmaking precision, not power."
- "Too many of today's par 3 holes are just too long. A one-shot hole should be an accuracy hole, and for accuracy you use your irons. Most of the par 3s I've designed have been between 140 and 210 yards."
- "I've always believed that it's much more comfortable for the average golfer and the good player to have a golf ball collected rather than repelled. I like to feel as though my fairways are down, my greens are down, and the golf ball that hits the green is collected into the hole area."
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LETTERS *continued from page 10*

Where It's AT

I have been searching for a reasonably priced PC. I discovered that there are two different kinds: a PC and an AT. What are the differences between these two kinds of computer? Which is better? Which has the most software available for it?

AARON WESTER
SAN DIEGO, CA

Any software that will run on a PC- or an XT-compatible will almost certainly run on an AT. On the other hand, there is a large and growing body of software (particularly productivity software) that won't run well or won't run at all on a PC- or an XT-compatible. Therefore the AT has the most available software. The PC and XT are based on the Intel 8088 and 8086 computer chips. The AT is based on the 80286 chip. These microprocessors are very closely related, and the 80286 can be operated exactly like an 8088, only faster.

However, if you're considering a computer that you'll be using for a few years, do yourself a favor and take a good look at an 80386SX or 80386DX computer. These computers will run all PC, XT, and AT software, but they will run the software much faster. You'll find the 80386SX computers only a few hundred dollars more than a good AT. Software is already being introduced that will run only on an 80386 computer. Windows *3.0, for example, has many capabilities that you can use only on an 80386, including the ability to multitask DOS programs.*

But if you have some favorite software that will run on a PC- or XT-compatible computer and you never plan to upgrade the software or perform any other kind of work on the computer, you can save a lot of money by buying the lowest-level machine that you can. Not everyone is interested in working with cutting-edge software and hardware. That's why ten years after the PC's introduction there's still a healthy market for the machine.

Learning Early

My 14-year-old son is very interested in learning computer programming. He is a very talented artist and is particularly interested in graphics and animation. What type of computer system, additional hardware, and software would he need to become a serious graphics programmer?

DAVID L. CUNDIFF
SARDINIA, OH

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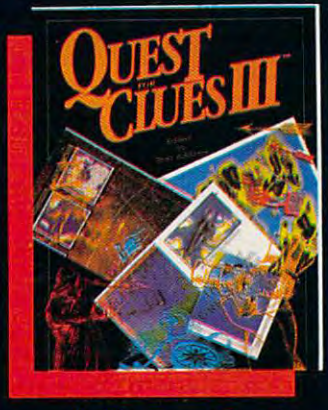

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Author

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International Business Machines Corporation

James E. Clark
AT&T Computer Systems

Samuel H. Fuller
Digital Equipment Corporation

John Markoff
The New York Times

WEST COAST TEAM

Heidi Roizen, Captain
T/Maker Company

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Intel Corporation

Ed Juge
Radio Shack

Philippe Kahn
Borland International Inc.

David E. Liddle
Metaphor Computer Systems

The Computer Bowl is a project to benefit the educational programs of The Computer Museum, 300 Congress Street, Boston, MA 02210.

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Pat Collins Nelson and Dr. Dave Nelson

Underwriter
Apple Computer, Inc.

"The Examiner"
Bill Gates
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LETTERS *continued from page 57*

The current standard in PC graphics output is PostScript. If your son learned the PostScript language and owned a PostScript laser printer (or a laser printer with a PostScript clone), he could create graphics on just about any kind of computer and print them out. The drawback of this kind of arrangement is that unless he is using a NeXT or other machine with Display PostScript, he would probably be unable to see the graphics on the computer screen before they were printed out. To create PostScript graphics on the PC with an interactive graphics program that would allow him to see onscreen what he is drawing, he could use Arts & Letters Graphic Editor, Micrografx Designer, *or* Corel Draw. *Each of these programs requires a PC,* Windows, *and a mouse in addition to a PostScript laser printer to create the best output. With regard to recommendations among PCs, the simple rule of thumb is The faster the better. Nothing eats up processing time like graphics, so your son will probably want something faster than the 12-MHz 80286 machines available in most discount retail stores.*

If you want to avoid purchasing Windows *and a PostScript laser printer, consider* DrawPerfect. *It will create the same high-quality printout on a PostScript or a non-PostScript laser printer, so it will save you some money, but it doesn't have as many features as the other two programs.* GEM Artline *is another non-*Windows *graphics program you should consider.*

All of the programs mentioned so far are called draw programs. *Each object you draw with one of these programs can be individually sized and moved without disturbing anything else in the drawing. There are a number of* paint *programs available as well. They are generally simpler to use, but they don't provide the clean printer output of a draw program, and it's difficult or impossible to move or adjust individual parts of a paint graphic without disturbing other objects, necessitating painstaking repairs.* DeluxePaint II *and* PC Paintbrush *are two popular paint programs.*

Animation programs grew out of paint programs. There are several animation programs for the PC, including Fantavision, DeluxePaint Animation, *and* Autodesk Animator. *To get the most out of them, you should use a VGA adapter.* ⊡

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PC VIEW

CLIFTON KARNES

T. S. Eliot was right: April *is* the cruelest month. And most of us know why. April is tax time, and income taxes have become an American institution regarded with double doses of fear and loathing.

A computer ought to be able to provide aid and comfort in these dreary days preceding April 15. But even though I've tried some good tax software, I've always wound up doing my taxes by hand—that is, with a pen, paper, and a pocket calculator. Until this year, that is.

This year is different because I've found the closest thing to the ideal tax program—*MacInTax* (Softview, 1721 Pacific Avenue, Suite 100, Oxnard, California 93033; 800-622-6829; $99).

As its name suggests, *MacInTax* was originally developed for the Macintosh, and it took full advantage of the Mac's graphic power. Now, *MacInTax* is out for PCs running *Windows* 3.0, and it's unbeatable.

What makes *MacInTax* so good? The answer is simple. It does one thing better than almost any other tax program: It shows you each Federal tax form from the 1040EZ to the 4952 exactly the way it appears on paper. And it prints forms on a dot-matrix or laser printer that are acceptable to the IRS.

MacInTax comes on two 3½-inch 720K disks or one 5¼-inch 1.2MB disk and includes a 165-page manual. Installation is quick and effortless. If you have a laser printer, the program comes complete with all the downloadable fonts (Futura and Helvetica) you'll need to produce a picture-perfect 1040.

When you run the program for the first time, the opening screen is simplicity itself. You'll see a small window called the Forms Guide that offers advice on whether you need to use the 1040EZ, 1040A, or 1040 form. To start your taxes anew, select your primary form from the FormSets menu, and you're off.

You'll see a 1040 form that's an exact replica of its official IRS paper counterpart. From here, you simply fill in the blanks. As you'd expect, the program does all the math and housekeeping automatically. If you don't understand a question, you double-click on it and *MacInTax* displays a help window of relevant information from the IRS instruction booklet. The entire instruction booklet is available this way as context-sensitive help.

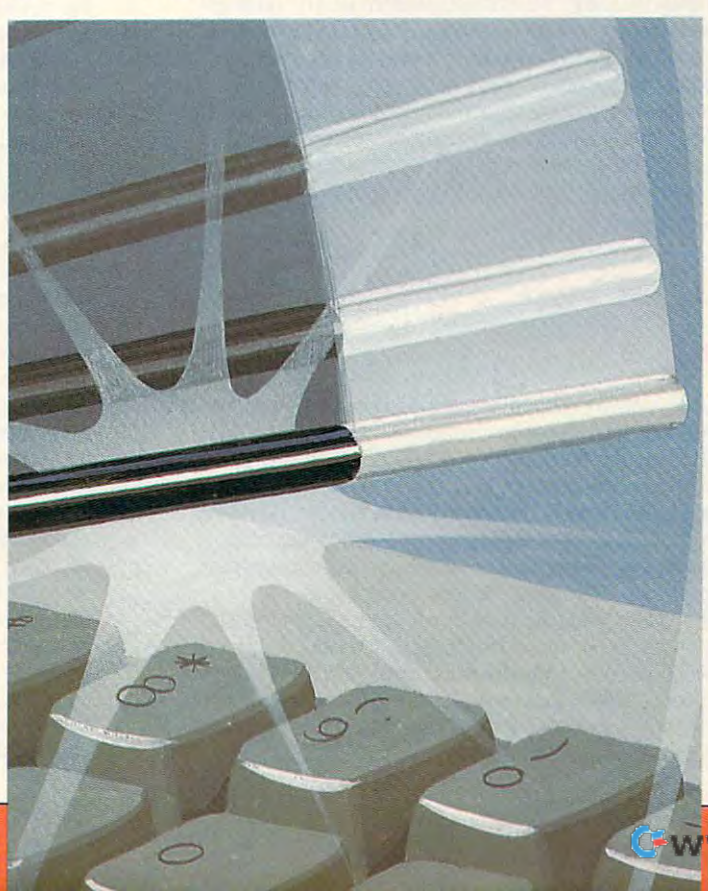
When you need to use a work sheet or another form, you go to the Forms or Worksheet menus and make your selection. Naturally, the work sheets and schedules are automatically linked to your 1040, so you don't have to manually enter totals computed on the supplemental sheets.

MacInTax is one of the best examples of the power and usefulness of a graphical user interface, or GUI, and it's one excellent result of a long battle to model the analog world in the digital terms of a computer.

Doing this modeling is tough. The real world presents itself to us in super-duper high resolution with zillions of colors. In the early days, the first personal computers had a limited arsenal of one color that was displayed by pixels the size of your fist. Technology has improved dramatically, and today super VGA, with its 800 × 600 resolution and 256 colors, is fast becoming the standard. We're still a long way from producing a digitized reality on a par with our perception of the real world, however.

To give an example from *MacInTax*, the 1040 form the IRS sends you has a resolution of something like 2400 dots per inch (dpi). The form you print with *MacInTax* on your dot-matrix or laser printer will be 300 dpi. And the image of the form you see on the screen will be close to 70 dpi. The amazing thing is how impressive a video resolution of 70 dpi and a printer resolution of 300 dpi are. But when video and printer resolutions come closer to 2400 dpi and when your printer's color capability approaches that of video, we'll see breathtaking examples of PCs modeling the real world.

Until we get there, *MacInTax* is one of the best examples of what is possible with the state of the art in PC hardware and operating systems. ◻



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NEWS & NOTES

The Business of Education

IBM chairman John F. Akers says business has committed to a 10-year effort to thoroughly reform the U.S. educational system and help reach the educational goals set by President Bush and the nation's governors. Speaking before an audience of high school and college educators at the College Board National Forum, Akers said, "Weakened education means a weakened work force, weakened international economic competitiveness, a weakened U.S. standard of living, and a weakened democracy. Business is prepared to do whatever it can to help."

Akers was a good choice for a speaker on this subject. IBM has shown a strong commitment to American education for years.

In his speech, Akers described the 10-year commitment of the Business Roundtable, 200 chief executive officers of major U.S.–based corporations, to stimulate education reform. Akers serves as chairman of the Business Roundtable's Education Task Force.

"Roundtable members are committed to roll up their sleeves, educate themselves, get into the nitty-gritty of the educational process, and work closely with every state government, as well as federal and local authorities, educators, parents, and community leaders," Akers said. "And, though the road will be long and hard, I know we can make progress."

Akers said parents need to act in the belief that education—particularly the teaching of ethical values—begins at home. He closed by suggesting two remedies for U.S. citizens who want to begin repairing the system: realism and discipline. He defined realism as an "unflinching resolution to face facts, ask tough questions, major on the basics," then went on to call for "discipline that leads parents to put their children—and their children's education—first, schools to commit themselves to turn out winners, corporations committed to eliminate shoddy work and achieve world-class efficiency and quality, and discipline that leads federal, state, and local politicians to look beyond today's comforts and next week's elections to the enduring good of this country."

Paradox: Winning the Database Wars?

Borland International's *Paradox* relational database management system is gaining ground—so much so that it reached the top of the heap in the database field during the third quarter of 1990. During that period, *Paradox* captured a 34-percent share of the market, compared to the 22-percent share held by its nearest competitor. The figures, gathered in an independent survey conducted by Computer Intelligence of La Jolla, California, showed that 44 percent of all relational database purchases made in September 1990 were *Paradox* purchases.

Computer Intelligence collects its data by surveying each month more than 1500 sites with 500 or more employees. It conducts interviews about actual PC computer software purchase activity. All sources of product, including retail, direct, and mail order, are included in the study. The maximum sampling error for the three-month average is ±2 percent with a confidence level of 95 percent.

A Six-Pack Writers Should Consider

Under most circumstances, serious writers should probably avoid six-packs when they're working. One exception might be the new *WritePro Sixpack.* It's the first product to contain all six available *WritePro* lessons, including the latest lessons, 5 and 6. *WritePro* is a highly acclaimed computer program that actually teaches creative writing techniques to beginners, intermediates, and published professionals.

WritePro's first four lessons, called *WritePro 1/2/3/4,* show users how to create rounded characters, well-developed plots, momentum, and suspense, as well as how to write beginnings that hook the reader and how to master point of view, description, narrative, immediate scenes, and dialogue. Lessons 5 and 6 show you how to make dialogue come alive, make writing visual, implement the secrets of cutting used by professionals, step up pace, root out clichés, increase tension, and become your own best editor at a time when book publishers no longer provide detailed editorial help. An innovation in the new lessons is the use of the computer itself to do *flab editing,* highlighting possibly unnecessary words so you can see your writing both with and without the words before deleting them. *WritePro 1/2/3/4,* with four lessons for IBM and compatible computers, lists for $79.95. The new *WritePro Sixpack,* with all six available lessons, lists for $119.95. If you're interested, contact WritePro at 43 Linden Circle, Scarborough, New York 10510. ▷

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NEWS & NOTES

From the Boardroom to the Bedroom

BedWare Unlimited has brought the computer age into the bedroom with an entirely new kind of spreadsheet. It goes on a bed, not in a disk drive.

BedWare is actually offering 50-percent cotton, 50-percent polyester percale bedsheets. Dubbed *The User Friendly Bedtime Program for Computer Lovers,* the sheets are printed with horizontal blue-and-white striping and vertical borders to simulate tractor-feed paper (the traditional computer printer paper with punched holes and perforated tear-off strips).

President and founder of BedWare Unlimited Scott R. Etheredge said, "The SpreadSheets themselves are only half the fun. They are packaged with entertaining, computer software–related graphics, plus captions and quotes that make them the computer lover's bedtime adventure. They're the perfect gift for both sexes ages 5 and up, and they look great in any bedroom." SpreadSheets package copy includes the tag line, *Design Engineered in Silicon Valley,* along with a pictorial series of tongue-in-cheek user testimonials "guaranteed to put you to sleep."

BedWare is also introducing HeadCrashers—separately packaged, standard-size pillowcase sets in the same design as those that accompany the full sets of SpreadSheets. SpreadSheets are available in complete twin and queen sets and are priced at $45 and $59 respectively. HeadCrashers, standard pillowcase-only sets, are $17. They can be ordered from BedWare Unlimited, 15720 Winchester Boulevard, Los Gatos, California 95030.

Still the King

Everybody wants to know what other people are up to—even computer users. According to a recent survey conducted by Fuji Photo Film U.S.A., most computer users still use their home computers for word processing. More than 91 percent of home office workers responding to the survey said they use computers in their homes for writing and related purposes. Spreadsheet manipulation, accounting, and bookkeeping (regular tasks of 71 percent of the respondents) together are the second most popular home computer application.

Entertainment and game-playing took a close third, indicating that home computer enthusiasts play as hard as they work. Other popular home computer uses include database management (62 percent), mailing lists (40 percent), desktop publishing (34 percent), and online interaction via a modem with computer services and other personal computers (28 percent). The survey accepted multiple responses.

A Tailless Mouse

Z-Nix has added a new twist to working with a mouse. With its new Cordless Super Mouse, you no longer have to worry about that long "tail" always getting in the way. Z-Nix didn't use a carving knife, either. The new Cordless Super Mouse uses the same infrared technology employed in VCR remote controls, with an effective range of up to eight feet. The two-button cordless mouse is the first ever to feature a long-life rechargeable battery for uninterrupted use.

The Cordless Super Mouse has a resolution of 400 dots per inch and can be operated at angles up to 45 degrees. It also features a built-in intelligent driver, allowing users to tailor the motion of the cursor to personal preference. The suggested retail price is $179. The Cordless Super Mouse will be sold through major Z-Nix retailers including Tandy, CompuAdd, CMS Enhancements, Headstart/Magnavox, Commodore Europe, and PC Brand.

The Next Scream You Hear

It may sound like some kind of joker's novelty, but the PC Screamer is serious business indeed. The PC Screamer is an electronic alternative to the old method of securing computer hardware with anchored cables and securing locks. Rather than physically tying down protected computer hardware, PC Screamer hides inside the computer and sets off an ear-piercing siren that will actually scream loudly while a would-be thief tries to carry the computer out the door.

Better yet, the PC Screamer can't be cut or easily tampered with. It can't even be seen easily because it adheres to the inside of the computer's case with a self-adhesive strip and plugs into a disk drive power cable. The power source is a long-life nine-volt alkaline battery. The PC Screamer is completely self-contained.

Fortunately, it's smart enough to know to keep quiet during normal computer use. If you're interested, write to Vantage Point Technologies, 1318 East Mission Road, Suite 376, San Marcos, California 92069. ⊡

"News & Notes" is by Alan R. Bechtold, editor of *Info-Mat Magazine,* an electronic news weekly published by BBS Press Service.

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How Macros Work

Macros work by intercepting certain keypresses and substituting others. You tell the program the specific keys you want to use and exactly what they should accomplish.

For example, you could have your macro program send the string DIR/P<Enter>, which gives a page-formatted directory listing, each time you press Ctrl-D at the DOS prompt. In macro parlance, Ctrl-D is called the *hot key,* and DIR/P<Enter> is the *macro.*

In some macro software, the number of commands you can apply to a single key is only limited by memory and personal creativity. You could use a macro to move a budget file onto a ramdisk, invoke your favorite spreadsheet, load in the budget, or activate another macro file with useful key substitutions—all at the press of a single key combination.

Another keypress might print several files generated after a specific date, save them from hard drive to floppy, exit your application, and unload the macro program itself.

DOS also has many complex and difficult-to-remember series of parameters (can you remember how to format a 720K 3½-inch disk in a 1.44MB drive, for example, or how to copy files with their archive bit set?). Applications have grown very powerful, but it's time-consuming to look up the parameters for all this in the documentation (assuming you don't first spend time looking for the documentation).

Macros present the perfect solution to these and other frequently used, complex commands. Create brief macros to match the common commands you'll need to issue, and file the documentation away.

Macro Marvels

Now that we've looked at some uses for macros, let's consider a few macro programs. The ones listed here are among the best, and they should be widely available (publishers' addresses are listed at the end of this article). Two of these, *PC Tools Deluxe* and *Superkey,* are commercial products. The others are shareware, available on many computerized bulletin boards. All offer good value, though each provides unique features that will be appreciated by users with specific needs.

If you subscribe to *COMPUTE's PC Disk* and want to give macros a try right now, see the section below on *SuperMAC,* the powerful macro program included on this issue's disk.

Anarkey. Macros are only a small part of *Anarkey's* features. It's a command line editor, especially helpful to the power user who wants more control over command entry in DOS. *Anarkey* supports multiple commands per line and storage and retrieval of past command lines. Although this feature (often called *command line history*) is available in other operating systems and programs such as Digital Research's DR DOS 5.0 and PC Kwik's *PCKKEY,* only *Anarkey* includes a completion key that finishes command line entries upon request, based on the contents of the history buffer. The program can be placed in expanded memory, and it supports all versions of the LIM EMS, including 3.2 and 4.0.

Anarkey doesn't intercept keystrokes the way several other macro programs do. It waits a little longer, reinterpreting the onscreen ASCII character according to your recorded instructions. You might redefine *d* as *dir.* It still looks like *d* on the command line, but it now invokes a directory listing of all files.

Only letter-key combinations can be substituted as macros (no function or special keys). The program also expects the first word or uninterrupted series of characters to form a command and will try to execute it. Within these limitations, *Anarkey* is a powerful and reliable performer.

Newkey. This program combines some clever macro programming concepts with useful batch functions. Unlike most key-reconfiguration utilities, *Newkey* doesn't require DOS command line entry for key substitution. It comes with a pop-up application screen that can be invoked within most applications. From it, you can create, display, load, and save macros.

Batch operations use Pascal-style parameter commands for integration with macros. {WAITANY} stops macro playback until a key is pressed. {SLOWTYPE} resolves the problem of applications that cannot process fast macro playback, resulting in discarded keys. {CTRL+[} creates a variable-length entry field—useful when you want to fill in the blank anywhere in a key substitution. A macro that starts *My dear esteemed colleague* will pause for your input and continue after you've pressed Enter with its predefined contents, *it has come to my attention. . . .*

Newkey also offers advanced features such as the ability to cut and paste between applications. When macro lists grow too long to keep in memory (yours, not the computer's),

How They Stack Up

Product Name	Default Macro Buffer (in characters)	RAM Use (conventional)	RAM Use* (expanded memory, conventional part first)	Commercial/Shareware	Cost	Configurable Keys	Notable Features
Anarkey 3.0	500	11K	1K/10K	Shareware	$25.00	All character-key combinations	Command line editor, command completion key
Newkey 5.0	1000	62K	33K/38K	Shareware	$43.00	All key combinations, function keys	Online demo, cut and paste, variable length fields
Superkey 1.0	8000 (can be enlarged to 65K)	128K when invoked, 63K when resident	Does not use expanded memory	Commercial	$99.95	All key combinations, function keys	Excellent documentation, menu interface, command line editor
PC Tools Deluxe 6.0 Desktop Module	To the limits of memory	360K when invoked, 40K when resident	40K/320K	Commercial	$149.00	All key combinations, function keys	Part of complete *PC Tools* product set
DKey	1024	3.1K	Does not use expanded memory	Shareware	Free	All single, function, and combination keys	Low memory consumption
Ansikey 1.0	None	None	Does not use expanded memory	Shareware	$10.00	All function keys, key combinations	No memory consumption, requires ANSI.SYS
SuperMAC	64,535	7K	Uses conventional memory only	Commercial	$ 9.95	All Ctrl, Alt, Shift, and function-key combinations	Hot key to uninstall, on/off toggle, up to 500 macros, easy reconfiguration

* Conventional and expanded RAM usage when expanded memory management is in effect.

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you can build colorful menus that display and configure them at the touch of a function key.

True, these are more advanced options that require a little effort. But *Newkey's* basic command structure is simple and intuitive. There's even an unexpected bonus: a guided tour online demo with very good abbreviated explanations of many features.

Superkey. None of these products are difficult to master, but Borland's macros are almost self-generating. After it has loaded, Alt-/ brings up the pull-down menu screen. Commands are activated when you select them from menus via scrolling or press a hot key for first-letter entry on every level. F1 calls up good, brief context-sensitive help screens at any time.

Like *Anarkey, Superkey* includes a command stack option, which shows the last 255 characters entered at the command line. Like *Newkey,* it configures a display menu to review all active macros. Unlike either, *Superkey* provides DES (Data Encryption Standards accepted by the National Bureau of Standards) encryption. Of course, encryption, too, can be executed on a file from a macro.

A layout editor displays your keyboard layout on the top half of the screen. You can then move and redefine any keys, creating a separate file with the LAY suffix. Load in this file, and your reconfigured keyboard will be displayed in the bottom half of the screen. Printing it gives you a handy reference to changes created for that keyboard layout.

PC Tools Deluxe. The macro editor is only a small part of *PC Tools Deluxe,* but (as with the rest of Central Point Software's package) there's no skimping. It includes an attractive menu interface, options for timed pauses, and both fixed- and variable-length entry fields. Macros can be configured for universal operation, *PC Tools* activity only, or non–*PC Tools* activity.

While you probably won't buy *PC Tools Deluxe* specifically for its macro editor, the editor is certainly a useful feature to have available along with the excellent hard disk–management utilities. Read up on it sometime, while you're busy defragmenting your drive.

DKey. If *Newkey, Superkey,* and especially *PC Tools Deluxe* are the lions among macroware, *DKey* is decidedly the mouse. But sometimes you don't want a lion for a task—especially when you have only a small memory hole in your 640K of conventional RAM to crawl through.

Even a few kilobytes of RAM can make the critical difference between success and a crashed program when you load some memory hogs. This is where *DKey's* 3.1K of RAM (including a default 1K macro buffer) is most welcome. There are no bells and whistles with this product—just simple, effective performance.

Ansikey. Huang's *Ansikey* is an outsider in this group. It uses the ANSI.SYS device driver that comes with DOS rather than RAM. The program reallocates up to 80 different key combinations, including F1–F12 and various key combinations with keywords [ALT], [CTL], and [SFT].

Since *Ansikey* functions outside memory, it won't work inside programs that use ROM BIOS interrupts for keyboard input. Any application that redefines these will negate *Ansikey's* changes until you return to DOS. Depending on your needs, this can be either a negative or a positive feature.

Be warned: There are many excellent ANSI.SYS substitute drivers on the market, and they don't always work like *Ansikey.* You'll discover this immediately because the commands simply won't work. But if you can put *Ansikey* to work for you, you'll have a driver that will provide a small, effective macro utility that completely avoids RAM drain.

Rules to Live Long and Macro By

1. To begin writing effective macros, keep a list for several weeks of your computer tasks. Simple tasks don't require much keyboard entry, and there's little reason to automate them. Look, instead, at tasks built out of *processes,* where the process is a series of commands.
2. Other good candidates for macros are commands with too many complex options to remember easily.
3. When you automate these tasks, choose key combinations not usually found in most applications. This will avoid potential key conflicts.
4. The time may come when you find yourself engulfed by macros (like potato chips, one is never enough). Group them into batch files arranged by application. Then execute just the file you need. When you're through with that set of macros, unload them from memory according to the utility's specification.
5. An alternate method of grouping batch files with macros is by user. This is especially handy if you share a work site or run a network. Remember to choose distinctive filenames: JSMITH.BAT is better than JAMES.BAT, for example, and JBSMITH.BAT is better still.
6. If you multitask, be sure to read the application's instructions about TSR utilities. *DESQview* disables some aspects of *PC-Kwik's* Power Pak, while leaving others (screen acceleration and RAM drive) intact. Note that *Microsoft Windows* provides its own reconfiguration platform via *Recorder,* though it's slower to program and run.
7. Another problem is potential conflicts with other TSRs. These conflicts can cause a variety of difficulties, including locked displays and macros that refuse to function. Try varying the order of your TSRs if this occurs.
8. Consider learning batch-file programming once you've become more familiar with macros. Batch language is relatively simple to learn. Once you know it, you'll be able to use a lot of inexpensive software utilities that expand your macro horizons.
9. Be sure to keep handy a list of all your key reconfiguration files with each macro and its changes. It's easy to forget specific key combinations, and pressing the wrong ones might have a variety of unpleasant effects.
10. As your needs change over time, go back and review your current computer use. Make sure your macros are serving you. Get rid of ones you never use, and continually review your computer use to see if you can add new ones.

SuperMAC

Getting on the macro bandwagon is easy with *SuperMAC,* included on this issue's disk. Written by Rick Leinecker, COMPUTE's programming manager, *SuperMAC* is a powerful program that goes head to head with the commercial and shareware products discussed above. If you subscribe to *PC Disk,* you'll find *SuperMAC* on this issue's installment. If you don't subscribe and you'd like to order the disk, see "On Disk" elsewhere in the magazine.

In *SuperMAC,* your macro definitions go in a text file, which you can create with a word processor in its ASCII mode or with a text editor. This text file needs to follow some simple syntax rules so *SuperMAC* will be able to interpret it. When *SuperMAC* runs, it loads your macro text file, converts it to a form that the computer understands, and then watches each keypress to see if one of your specified hot keys has been pressed.

There are two types of entries you can use in a macro. The first type is a special command. In the text file, these special commands must start with a < character and end with a > character. The second type of entry is a literal character. These characters

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become part of the macro exactly as they appear in the file.

Here's the list of special commands and brief descriptions of what they do. A *k* stands for an ASCII character or a function-key number.

BEGDEF	Specifies the beginning of a macro definition
ENDDEF	Specifies the end of a macro definition
TIME	Inserts the current time into the macro definition
DATE	Inserts the current date into the macro definition
CTRL*k*	Specifies a Control character
ESC	Inserts an Escape character into the macro definition
ALT*k*	Specifies an Alt character
LEFTSHIFT*k*	Specifies a Left Shift character
RIGHTSHIFT*k*	Specifies a Right Shift character
ENTER	Inserts an Enter character into the macro definition
F*k*	Specifies a function key
SHIFT*k*	Specifies a Shift character

Here's an example of a simple macro that gives a directory listing when you press Alt-1.

```
<BEGDEF><ALT1>DIR C:\DOS
<ENTER><ENDDEF>
```

Right after the BEGDEF directive, you specify the hot key that will activate your macro. Be careful when choosing these, since they may conflict with other hot keys and programs that you use. Notice that only the special commands are in brackets.

If you don't specify a filename, a file called SUPERMAC.MAC will be searched for in the current directory. You can specify a different filename by adding a command line argument with either a filename (that will be searched for in the current directory), a directory name (that will be searched for a file called SUPERMAC.MAC), or a full path and filename.

SuperMAC does have a limit of 500 macros. You also have to consider that each macro allocates memory. This means that besides that 500-macro limit, you'll want to set a reasonable limit based on the amount of free RAM you want to give up.

There are two special hot keys built into *SuperMAC*. One lets you uninstall the program by removing it from memory. The default hot key for this is Right Shift–Ctrl–F9. If it's not safe to uninstall (if another TSR is loaded after *SuperMAC* or you're in an application, for instance), you'll hear a series of beeps, and the program won't remove itself. To remedy the situation, you can try unloading other TSRs that were loaded after *SuperMAC* or quit your application and try again from the DOS prompt.

The other built-in hot key toggles the macro capability on and off. The default for this hot key is Left Shift–Ctrl–F10. You'll hear one of two frequencies of beeps here. The lower beep indicates that the program is inactive, and the higher one indicates that the program is active.

You can change these two hot keys by adding /h to the command line when you run *SuperMAC*. When the selection screen comes up, all you have to do to pick a new hot key is press the combination you want. The new configuration will be saved.

If you forget how to use *SuperMAC*, you can type SUPERMAC /? from the DOS prompt and get a brief set of instructions. ⊡

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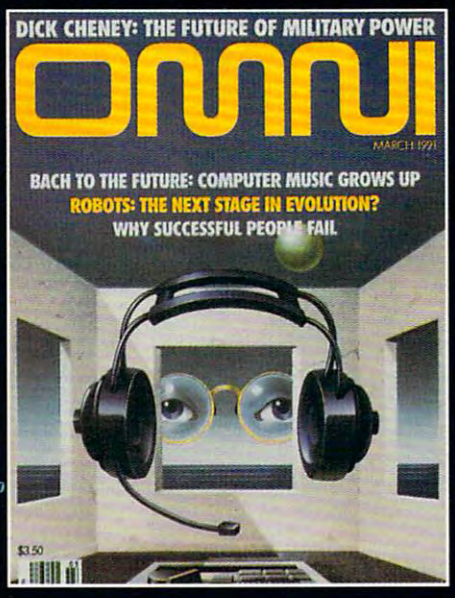

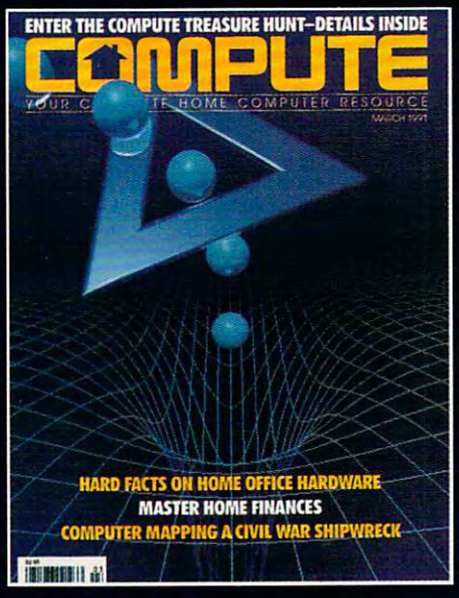

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FEEDBACK

QUESTIONS FROM OUR READERS

Beyond Sweet 16

I need a ramdisk with unlimited capacity. Multisoft offers the largest one I am aware of, at 16MB. I'd like to be able to create 32MB, 64MB, or even 96MB drives. I also need a program that would trigger a number of attached tape players at programmed times. I would appreciate any help I can get.

GUY STULLEY
WEST ALLIS, WI

Early PCs and XTs were configured with an 8-bit bus with 20 lines for memory access, while ATs (16-bit with 24 memory access lines) can address 16MB of memory. If you want seemingly unlimited continuous memory, take a look at the new 80386 and 80486 systems. Their 32-bit buses are capable of addressing up to four gigabytes of RAM. Of course, DOS still has a 640K limitation, but some systems that run in protected mode, such as OS/2, Xenix, and UNIX, let you address the memory above 640K and even let you multitask (run more than one program at a time).

Another way to access more memory is through the LIM EMS system created in a cooperative effort by Lotus, Intel, and Microsoft. This system allows even a PC or XT to address up to 32MB of expanded memory (the memory above 1MB). On 286, 386, and 486 systems, LIM EMS treats extra memory as extended memory with the right drivers.

To be able to access the extra memory, you need software applications that check for additional memory. Multisoft's ramdisk limit is set by the software, not the hardware. Multisoft PowerPak *version 1.59 contains the necessary code to access memory beyond 16MB on an i486 machine, but it hasn't been thoroughly tested yet, so any experimentation you do with it is at your own risk. Maybe someday software development will fall in step with the huge strides made recently in hardware development.*

In reply to your second question, in order to manage a number of tape players, you would have to use tape players equipped with control ports. Sony is one manufacturer of externally controllable videotape players equipped with 9-pin serial ports.

Each manufacturer of these devices has a unique protocol (sort of like a programming language) to use in controlling its equipment. For this reason, it would be wise to standardize, using one brand of machine. For more information, try calling your Sony regional office in Illinois at (708) 773-6000 (ask for the Professional Video Division).

Sony recommends that you use a dedicated audio tape controller (rather than a PC) for controlling banks of audio tape players. The tape players and controller should be the product of the same manufacturer to ensure compatibility.

On the Edge

I have an old Leading Edge Model D and am anxiously awaiting GEOS to be released. Why didn't Robert Bixby cover it in his GUI article (in the December 1990 issue of *COMPUTE*)?

JOSEPH A. BLIGH
LAKEWOOD, CA

Robert Bixby responds:
GEOS for the PC was thoroughly previewed in the October 1990 issue of COMPUTE. *It was not released to the public until late fall of 1990 and was not yet available in usable form when my GUI article was written.*

GEOS is specifically designed to multitask specially written GEOS programs at high speed on 8088 machines like yours (as well as 80286s and 80386s). The operating system shell comes with powerful utilities like a word processor, an object-oriented drawing program, a cardfile database, a telecommunications program, and several others.

Having worked with GEOS for the PC, I would rate it as highly as DeskMate *for speed and compatibility, and more highly for intuitiveness. As far as appearance is concerned, GEOS looks considerably better than* Windows *3.0 (and it's much faster). My only hesitation in recommending it for everyone is that, so far, it is very insular: No outside software has been written for it.*

GeoWrite, the word processor shipped with GeoWorks Ensemble, *is very intuitive and contains many features, but it lacks search and replace. GeoDraw is a very capable drawing program, but it can't create curves other than ellipses. The file switcher is fast and friendly, but it can't associate files (for example, there is no way to make it start up* Microsoft Word *when you click on a* Word *document icon). This indicates to me that GeoWorks (creator of GEOS) may be following the strategy of its progenitor, Berkeley Softworks, and a more fully functioning series of GEOS programs may be waiting in the wings. Many developers are interested in GEOS, so third-party software may also follow soon. In short, GEOS is very exciting and has tremendous potential. Look for a complete GEOS review in an upcoming issue.*

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DANIEL R. PALMATEER
CANTON, NY

If you want to learn Spanish, French, or German, you can order the necessary software from American Educational Computer at (800) 222-2811 or purchase it through a national software chain like Babbage's.

Swedish is more of a challenge,

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FEEDBACK *continued from page 76*

however. Tracking down a program that would teach Swedish to an English-speaking person led us through software distributors and publishers across the country; the Swedish Embassy in Washington, D.C.; the Swedish School in Virginia; and the Swedish Trade Consul in Chicago. Unfortunately, our long and difficult search proved fruitless. We could find no such software, even in Sweden.

Remember that software isn't your only option. Berlitz is another resource. Berlitz publishes self-teaching books and tapes for many languages, including Swedish. The number to call is (212) 425-3866.

If any of our readers are aware of software that teaches Swedish, please write to us, and we'll pass the information on to Mr. Palmateer.

Medical Alert

I work in a medical office, and I need a word processor with a good medical spelling dictionary. I have a hard disk, so the size of the program isn't a consideration. Do you have any recommendations?

LAWRENCE NIGHTINGALE
GREENSBORO, NC

WordPerfect *would be an excellent choice. Its base dictionary contains 20,000 medical terms. Because of the incredible popularity of this program, third-party developers have created extensions and add-ons that will provide virtually any capability. At least three specialized medical spelling dictionaries are available.*

Hansen's Drug Dictionary *provides a dictionary that contains 3,000 prescription and over-the-counter drugs; 1,000 psychiatric terms; hundreds of standard abbreviations; and about 40,000 other medical and pharmaceutical terms for $55 (plus $2 for postage and handling). You can order this product by writing to Hansen's Dictionaries, 1604 Maitland Court, Colorado Springs, Colorado 80919.*

Spellex has created a medical dictionary containing more than 27,000 words, none of which duplicate the 20,000 words in the original WordPerfect *speller, for $59.95. The product also works with* Microsoft Word. *Contact Spellex Development, P.O. Box 271264, Tampa, Florida 33688.*

Reference Software International has released Steadman's Medical Dictionary, *a 68,000-word medical dictionary that costs $89.00 (plus $8.50 shipping). It's updated every seven years. Since it's likely to become outdated over such a long period, a supplemental dictionary known as* Grebin's Medical Dictionary Word List *is released every six months for an additional $89.00.*

The latest update contains 15,000 words, and future updates will always contain at least 6,000 words. Purchase of Grebin's *entitles the purchaser to receive two additional updates. Write to Reference Software International, 330 Townsend Street, Suite 123, San Francisco, California 94107.*

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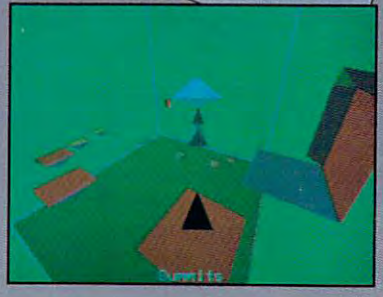

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HOT TIPS

HINTS AND TIPS FROM OUR READERS

When I first installed an internal modem and started downloading programs from bulletin boards, more than 50 percent of my downloads were interrupted because of line noise. I tried building a filter and contacted the local telephone company about the problem. The phone company technician listened to my line, and sure enough, there was a lot of line noise. The culprit was a cordless telephone. After I unplugged the cordless phone, I was relieved to discover that most of my downloads were successful.

David Eakins
Gozad, NE

Taming TSRs

I'd like to pass along a technique I use in loading TSRs in my system. DOS passes a copy of the environment to every program it runs. To save RAM, try to load TSRs before using the PATH or SET commands. I've found only one TSR that requires the COMSPEC variable, so some experimentation may be required. If you use several TSRs, quite a bit of RAM will be saved for programs by using this method.

Robert Parsons
Minneapolis, MN

File-Finding Command

I have an interesting tip for users of PC- and MS-DOS version 3.3 or higher. The ATTRIB command can be used to find a file on a disk. For those of you who don't own a file-finding utility, this tip could prove invaluable if your hard drive contains a lot of directories and files.

To use the ATTRIB commmand to find a file, enter ATTRIB *filespec* /s at the DOS prompt. The space before the /s is required for the command to work properly. This command will find all occurrences of *filespec* in or below the current directory. In other words, if you want to search your entire hard drive, the root directory should be the current directory before you issue the command.

Jeffrey Gorman
Sea Bright, NJ

Repeat and Delete

To place a block of text in several locations in a document in *WordPerfect* 5.0, highlight the block by placing the cursor at the beginning of the text, and press Alt-F4. Save the block by pressing Alt-F10. Press Enter at the prompt instead of entering a filename. Next, position the cursor at the location where you want the text placed. Press Shift-F10 and Enter to retrieve the block.

You can delete a block of text in *WordPerfect* by highlighting the text block and pressing the Del or backspace key. Press Y to delete the highlighted block. This is easier and faster than using the Move menu to delete a block of text.

Samuel Hampton
Asheville, NC

Timesaver

Here's a trick I discovered while programming in Borland's *Turbo Pascal* 5.0. If you want to place one of the special characters like an ASCII 4 (the diamond symbol) in a WRITELN statement and you're not sure whether a CHR(x) will print it, or if you don't want to type CHR every time you need a special character, just hold down the Alt key and press 4 on the numeric keypad (the numbers at the top of the keyboard won't work).

You can also enter characters with a value of 255 which look like spaces. Copy a file and name the destination by holding down the Alt key and entering 255. The resulting file appears to have no name.

You can use this little trick any time you want to print a special character—in a word processor, at the DOS command line, or in a batch file.

Shlomit Shaked
Hampton, VA

Playing with DOS

Here's a DOS command line tip that's not widely known. Many people know you can repeat the last command entered on the DOS command line by pressing F3.

A less well known feature of editing commands on the command line is that you can bring up the last command one character at a time and use the Ins and Del keys to insert and delete characters.

DIR /W C:\WP\LETTERS*.LTR

This command produces a wide listing of the files that have an LTR extension in the LETTERS directory under the WP directory. If you decide you want more file information but you don't want to retype the command, press the right-arrow key three times to bring up DIR. Press the Del key three times to delete the space and /W. Then press F3 to finish the command.

DIR C:\WP\LETTERS*.LTR

This gives you a long listing of the files, but it may scroll off the screen if the directory contains a large number of files with an LTR extension.

You can insert the /P switch to pause the listing between screens by pressing the right-arrow key three times and then pressing the Ins key. Enter /P followed by F3. You'll get the following command.

DIR /P C:\WP\LETTERS*.LTR

Press Enter to invoke the new DIR command. These features come in handy if you don't use a command-retrieval program such as *Retrieve* or *Stack* (*COMPUTE!'s PC Magazine*, January 1989).

Micah Voder
Salem, OR

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

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❑ **Checkmate (1102)** - A complete checkbook manager. Handles unlimited accounts and does reconciliation.

❑ **Business Kit (1656)** - Two programs for small businesses: Simple Bookkeeper and Billing Statement.

❑ **Solve-It! (1618)** - An excellent financial calculations package.

❑ **Invoice-It (1664)** - Keep track of invoices, merchandise, vendors and customers at the point of sale. HD

❑ **Names and Dates (1619,1620)** - An address book, calendar system, and mailing list combination. (2 disks) 512K

❑ **ZPAY 3 (1610, 1611)** - A simple-to-use, full-featured payroll package. HD

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❑ **Total Recall (1245)** - This program helps you quickly memorize words and information on any subject.

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❑ **Play n' Learn (1236)** - A collection of learning games for children. CGA

❑ **KinderMath (1262)** - An excellent math tutor for children. Three levels of difficulty. Very entertaining. CGA

❑ **WordWhiz (1252)** - A challenging word game that tests your vocabulary.

❑ **Word Gallery (1256)** - Teaches kids to link written words with objects. CGA

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❑ **Animated Shapes (1264)** - Teaches shapes and colors to pre-schoolers using animated graphics. 640K, EGA

UTILITIES

❑ **Auto Menu (1409)** - A professional hard disk menu system. Run any of your programs from a customized menu. HD

❑ **ViruScan (1440)** - Make sure your computer is virus-free with this valuable utility. Highly recommended!

❑ **Tree View (1418)** - A superior DOS command shell with pull-down menus.

❑ **Telix (1422)** - The best telecommunications program available. HD

SPREADSHEET

❑ **On Side (1506)** - Prints your spreadsheets (or any file) sideways.

❑ **As-Easy-As (1805)** - A fantastic Lotus 1-2-3 compatible spreadsheet.

❑ **Lotus Learning Sys. (1810,1811)** A complete package that makes it easy to learn Lotus 1-2-3. (2 disks) HD

MS WINDOWS 3.0

These programs require Windows 3.0.

❑ **Almanac (1470)** - An excellent calendar/information utility.

❑ **Icons Library (1481)** - Customize your Windows operating environment with this collection of over 300 icons.

❑ **Wallpaper (1484)** - A collection of wallpaper to decorate your Windows.

❑ **Active Life (1472)** - A powerful system for managing your active business and personal life.

❑ **Icondraw (1478)** - Create your own icons to use with Windows.

❑ **Command Post (1474)** - Allows you to create custom menus that can execute applications automatically.

❑ **Metz Desktop Applications (1485)** - Create menus and easily access files and directories.

❑ **Screen Peace (1486)** - A FANTASTIC screen saver with many beautiful and interesting variations.

❑ **Change Cursor Utility (1487)** - Allows you to design your own arrow and hourglass cursors to use with Windows.

HOME & FAMILY

❑ **Home Budget Manager (1103)** - Tracks all your household expenses and helps you set budgets and goals.

❑ **Home Inventory (1105)** - Keeps track of all your personal property.

❑ **Brother's Keeper (1120,1121)** - A great genealogy program that allows you to trace your family history. (2 disks)

❑ **Edna's Cookbook (1118,1119)** - An electronic cookbook with several great recipes - add your own! (2 disks)

❑ **Will Kit (1343)** - Create your own will valid in all 50 states.

❑ **C.A.R.S. (1126)** - Keeps a complete record of your auto expenses.

❑ **Cash Control (1127)** - Manage your bank accounts the fast and easy way with this great program. 320K

❑ **Topp's Grocery Program (1136)** - Helps you prepare grocery lists, manage coupons, and track savings. HD

WORD PROCESSING

❑ **WP 5.0/5.1 Clip Art (1875,1876)** - A large collection of clip art to add spice to your WP documents. (2 disks)

❑ **PC Write 3.03 (1851-1853)** - A very popular full-featured word processor. (3 disks) HD, 512K

❑ **WP 5.1 Learning System (1865-1867)** - Be a more proficient WP user. (3 disks) HD, 512K

❑ **Readability Plus (1340)** - A computerized writing style analyzer.

❑ **Grab Plus/Laser Label (1883, 1884)** Takes addresses from your word processor and sends it to the printer. HD

APPLICATIONS

❑ **Trip Planner (1331)** - A computerized road map. Computes best route. Very popular!

❑ **Melody Maker (1918)** - A fun and easy-to-use program for new or experienced music students. Comes with several songs.

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❑ **Lotto! (1313)** - Win the lottery with the help of your computer!

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❑ **The Electric Almanac (1341)** - A source for lots of useful information.

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GAMES

❑ **Double Blocks (1970)** - A TERRIFIC Tetris clone for 1 or 2 players. Records top scores. You will love this!!

❑ **Super Pinball (1941)** - Great sound and action in 5 different games. CGA

❑ **Video Poker/Ultima 21 (1945)** - The BEST poker and blackjack games!

❑ **Miramar Flight Simulator (1967)** - You are in control of all the speed and fire-power an F-18 has to offer! (will not work with Tandys) CGA

❑ **Pharaoh's Tomb (1974)** - Face monsters and traps as you explore the pyramid. Your goal is to survive.

❑ **SUPER Arcade I (1906)** - A collection of famous arcade hits like Q-Bert, Centipede, Pango, and more. CGA

❑ **SUPER Arcade II (1902)** - More arcade favorites! This disk contains clones of Jump Man, Frogger, and more! CGA

❑ **Insanity (1936)** - Find your way out of this maze before going insane! CGA

❑ **The Monuments of Mars! (1920)** - Many tough levels filled with puzzles, traps and creatures. 350K, CGA

VGA GAMES

❑ **Shooting Gallery (1990)** - Seven variations of a shooting range on your computer screen. VGA, mouse

❑ **VGA Sharks (1992)** - Recover lost treasure in shark infested waters in this action arcade game. VGA

❑ **Beyond Tetris/Joust (1997)** - Beyond is like Tetris with a twist. Joust is a VGA rendition of the classic. VGA

❑ **VGA Jigsaw (1993)** - Uses beautiful pictures to create puzzles for you to put back together. VGA

EGA GAMES

❑ **Bass Tour (1925)** - An amazing game with excellent graphics. Fish in your choice of lakes. Very realistic. EGA

❑ **Frac (1991)** - A three-dimensional Tetris-like game. Challenging! EGA

❑ **EGA Golf (1929)** - A challenging golf game with beautiful graphics. EGA

❑ **Poker Slot (1989)** - Plays just like the video poker machines you see in casinos. Great graphics! EGA, mouse

❑ **Commander Keen (1986)** - One of the best games we have ever seen. Exceptional play and graphics. EGA

❑ **Snarf (1987)** - Travel through various mazes while you pick up treasures and avoid the Snarfs. EGA

IMPORTANT

CGA = Requires Color Computer
HD = Requires Hard Drive
512K = Requires 512K RAM
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INTRODOS

TONY ROBERTS

If you'd prefer having major dental work to doing battle with DOS's infamous FDISK, you're not alone. From time to time, however, hard disks must be reformatted, and the task is not a heinous one if you approach it logically.

First, there are two levels of formatting for hard disks—low and high. To understand the difference, first imagine an empty field that's the future site for a football field. This is the physical hard disk. Second, contractors are hired, the field is cleaned up and leveled off, and a beautiful stand of grass is planted. This is the low-level format. Finally, a grid work of white lines is laid on the grass to indicate field position, fair territory, out of bounds, and end zones. This is the high-level format.

Several times a season, the field is relined so that the game can be properly contained. Every few years, however, hard play will have broken down the field, and a low-level reformatting will be required. The sod must be torn up, fresh soil added, and the surface rebuilt.

Occasionally, when working with floppy disks, you'll find a disk that doesn't hold data. You reformat it, and if that doesn't solve the problem, you toss the disk out with yesterday's junk mail. Hard disks are another story, though.

Because of the expense involved, trashing a hard disk is not a palatable option, but a low-level reformat can often return a flaky hard disk to full productivity.

To format a hard disk from scratch, you must perform a low-level format, partition the disk with FDISK, and perform a high-level format (with /S if the hard disk is to be bootable). Obviously, reformatting a hard disk means that you'll wipe out all the data stored there. Make at least one full backup of your system, and have more than one copy of any irreplaceable programs or data.

To perform a low-level format, you'll need a special program, since DOS doesn't provide software to handle this chore. The setup disk that came with your system may have such a program. If not, you may need a commercial or shareware utility.

When you perform a low-level format, you're asked to enter information about any known bad tracks. This information is provided by the disk manufacturer and is often taped to the top of the hard drive.

If you don't have this bad-track information, you can perform a surface analysis to locate physical defects on the disk's surface and cordon them off. The surface analysis takes quite a while, but it gets the job done.

DON'T BE AFRAID TO **FORMAT YOUR HARD DISK**

Next, proceed with the low-level format. When the low-level format is complete, reboot from a floppy containing the DOS version you want installed on the hard disk and run FDISK to set up your disk for use with DOS.

If you have a disk larger than 32 megabytes and you're using DOS 3.3 or lower, you'll have to partition your disk into two or more logical units. This is done with FDISK.

The first step is to create the DOS partition. Next, you'll add any extended DOS partitions. And finally, you'll need to assign drive letter names to the extended DOS partitions.

FDISK prompts you through this process. With DOS 4.01, the 32-megabyte barrier was eliminated so larger hard disks can be set up in a single partition.

Once FDISK has done its work, the drive can be high-level formatted with the DOS FORMAT command. Each logical drive, or partition, is formatted separately.

Use FORMAT /S for the primary bootable partition and FORMAT for the others. Once the formatting is done, restore the data from your backups.

FDISK is a frightening command for many PC users because it can wipe out hard disks. But it shouldn't cause fearful reactions. After all, it's supposed to wipe out data. Just make sure everything is backed up properly before using FDISK to change the structure of your hard disks.

Many computer users first face FDISK when upgrading from DOS 3.3 to DOS 4.01 to take advantage of the feature allowing larger partitions. This process involves backing up each partition of the existing hard disk, rebooting from a floppy containing the new DOS, using FDISK to remove existing DOS partitions, using FDISK to create a new primary DOS partition, formatting the hard drive with FORMAT /S, installing the new DOS files on the hard disk, and restoring data from the backups, being careful not to overwrite the new DOS files with the old ones.

As in the case above, it isn't always necessary to perform a low-level reformat when changing the structure of a disk. If you question the disk's ability to hold data, though, I'd recommend it.

Hard disks have come down drastically in price in the last few years, and they are definitely becoming more common. In many systems, one hard disk isn't enough to handle today's huge programs and data files. These changes increase the likelihood that someday you'll be faced with reformatting a hard drive. There's nothing to fear; just back up your files, take your time, and work step by step. ⊡

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BASIC TRAINING

TOM CAMPBELL

A TIMELY LOOK AT POKE AND PEEK

Just a few years ago no serious microcomputer BASIC programmer would have been without a dogeared list of POKE and PEEK locations. Nowadays, POKE and PEEK commands are less often used, thanks to progress made by programming languages like *QuickBASIC*.

For those who aren't familiar with these commands, POKE writes a byte to memory, and PEEK returns the value of a byte in memory. POKE, as you might imagine, has the potential to crash a program with a single misstep. PEEK is harmless, but it's useful only if you know exactly what you're looking for. Both of these commands are complicated by the 8086's segmented addressing scheme.

As you probably know, the 8086 thinks in terms of 64K *segments*. You'll see the results of this everywhere. COM files, for example, must be 64K or less in size; until recently, *QuickBASIC* itself was limited to 64K of data, including strings; EMS memory can bank-switch only 64K of memory at a time; and so on. POKE and PEEK are no different. The statement

```
'Don't try this yet
POKE &H4F0,1
```

writes the value 1 to the memory location at offset 04F0h (don't try this POKE yet). Because POKE writes to a byte value, you can only poke a value of 0–255 into a single location. The PEEK function does the opposite: It lets you read the value of a byte in memory. This prints the value of the byte at offset 04F0h:

```
PRINT PEEK(&H4F0)
```

Early versions of BASIC had to fit into 4K, and a user was lucky to have 16K of RAM installed. Much of what we now take for granted in the BASIC language, like graphics and music, was unavailable. Users had to add to BASIC by writing machine-language routines with an assembler that would be poked into memory and executed directly with CALL.

This practice is now discouraged because it almost guarantees that the program won't work on other computers—or even your own, if the operating system changes.

Many pokes are obsolete under OS/2, with the exception of video memory and some system variable locations.

With these caveats aside, there are still good reasons to use POKE and PEEK. One such reason is demonstrated in this month's program, which times the execution of programs from the DOS command line.

The timer program (which appears at the end of this column) has two parameters: START and STOP. TIMER START pokes the current time into a small section of memory called, with typical IBM grandiosity, the *Intra-Application Communications area,* or IAC, a scratch pad of 16 bytes for use in situations just like this one. I must warn you that all applications have equal access to this region of memory, so some programs will corrupt the IAC and make *Timer* fail by feeding it bad information.

Enter the command TIMER START; then run whatever program (or programs) you wish to time. When the program has run, issue a TIMER STOP command at the DOS command line to retrieve those bytes; they're both converted to time values, and the difference (the elapsed time) is displayed onscreen. What's great about this method is that it requires zero bytes of your free RAM.

Note that the largest address you can POKE or PEEK is 0FFFFh, or 65,535 decimal. The 64K barrier strikes again. Limiting POKE to the first 64K of memory is unacceptable now, but back in 1980, when the PC's BASIC was being written, it made sense. The 64K POKE provided a certain measure of compatibility with existing BASIC programs. But earlier versions of Microsoft BASIC were for 8-bit machines with only 64K of address space, so how could the new BASIC address the PC's megabyte of RAM?

The solution was DEF SEG. The mysterious DEF SEG gives us a way to read or write anywhere in memory. On the 8086, an address always consists of a segment and an offset. The segment is a 16-bit value that you multiply by 16 and add to the offset. DEF SEG lets you set the segment to write to with POKE or read from with PEEK. This is easier to explain through examples.

In the first example, we'll set the segment address to 0B000h, which is the start of video memory for monochrome monitors, or 0B800h, the start of color memory. As you may know, video memory consists of a byte for each character on the screen plus a byte for its attribute (bold, blinking, colors, and so forth). The character bytes and attribute bytes alternate. The following will burn 80 happy faces directly into screen memory, using the current video attribute.

```
' (Change this to &HB800 for
' color systems.)
DEF SEG = &HB000
' Starting at the base of video
' memory,
```


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Marvel Trilogy	-	25	30	-	-
Spellcasting 101	-	-	34x	-	-
Starglider II	-	23	18x	27	-
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Midwinter	-	-	30x	-	28
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Harpoon Battle Set 2	-	-	22	-	22
Harpoon Battle Set 3	-	-	22	-	22
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BASIC TRAINING

```
FOR N = 0 TO 159 STEP 2
   ' Poke a happy face into
   ' each screen location,
   ' skipping every other
   ' byte, where the attribute
   ' appears.
   POKE N, 1
   ' Loop through the entire line.
   ' 0-159 represents 160 locations.
   ' 160/2 is 80, the number of
   ' columns across.
NEXT
```

To see PEEK in action, let's examine the date of your computer's ROM BIOS. All true compatibles put this date where IBM put it, which is in ASCII form in the eight bytes starting at segment 0F000h, offset 0FFF5h.

Such addresses are customarily written as two 16-bit numbers with a colon between them, as in F000:FFF5. Our program must convert these byte values to a string using CHR$, which takes an ASCII byte and returns its character representation. Here's the program.

```
PRINT "The ROM date ";
PRINT "of this computer"
PRINT "is: ";
' The address to search starts at
' hex F000:FFF5, so set the segment
' accordingly:
DEF SEG = &HF000
' The offset is FFF5h; it's
' eight bytes' worth.
FOR N = &HFFF5 TO &HFFFC
   ' PEEK returns a number
   ' in the range 0-255 in
   ' memory location at
   ' F000h, with an offset of N.
   ' CHR$ makes it a character.
   PRINT CHR$(PEEK(N));
NEXT
```

In the case of my ancient IBM AT, purchased in 1985, this program prints

```
The ROM date of this computer
is: 01/10/84
```

On my trusty 386 clone, my 24th birthday appears

```
The ROM date of this computer
is: 03/11/86
```

Back to *Timer*. Compile the program to an EXE file, and find a program whose execution you want to time.

TIMER

```
' TIMER.BAS -- Command line utility to time program execution

' Use this segment for POKEs and PEEKs.
DEF SEG = 0
' Offset address of the Intra-Application Communications area--IBM's
' 16-byte scratchpad for programs like this.
CONST IAC% = &H4F0

' Force the command line to uppercase.
SELECT CASE UCASE$(COMMAND$)

  ' "START" means start the timer and poke the time into the IPC.
  CASE "START"
    ' Strip the colons out of the time, which is in the format
    ' "HH:MM:SS".  Leading 0s guarantee this format.
    StartTime$ = LEFT$(TIME$, 2) + MID$(TIME$, 4, 2) + RIGHT$(TIME$, 2)
    ' Loop through the string, poking the ASCII values into the start
    ' of the IPC.
    FOR Index = 0 TO 5
      ' ASC converts each letter in the string to a 1-byte value.
      ' Since strings start at index 1, not 0, add 1 to Index.
      POKE IAC% + Index, ASC(MID$(StartTime$, Index + 1, 1))
    NEXT Index

  ' "STOP" reads the starting value from the IPC back into a string
  ' variable, then splits out the hours, minutes, and seconds.
  CASE "STOP"
    ' Capture the ending time of the program execution.
    StopTime$ = TIME$
    ' Initialize the string to be built up from the poked ASCII values.
    StartTime$ = ""
    FOR Index = 0 TO 5
      ' PEEK gets each character of the string as a binary (ASCII) value.
      ' CHR$ converts it to a character so it can be concatenated to
      ' the string.
      StartTime$ = StartTime$ + CHR$(PEEK(IAC% + Index))
    NEXT Index

    ' Convert the starting and ending times to seconds, subtract,
    ' then convert to Hours, Minutes, and Seconds
    BeginTime = VAL(LEFT$(StartTime$, 2)) * 3600 + VAL(MID$(StartTime$, 3, 2))
* 60 + VAL(RIGHT$(StartTime$, 2))
    EndTime = VAL(LEFT$(StopTime$, 2)) * 3600 + VAL(MID$(StopTime$, 4, 2)) * 60
+ VAL(RIGHT$(StopTime$, 2))
    Seconds = EndTime - BeginTime
    Hours = INT(Seconds / 3600): Seconds = Seconds - Hours * 3600
    Minutes = INT(Seconds / 60): Seconds = Seconds - Minutes * 60

    ' Only print hours if not 0.
    IF Hours > 0 THEN
      PRINT Hours;
      ' Make sure there's subject/verb agreement; avoid cases like
      '" 1 hours".

      IF Hours = 1 THEN PRINT "hour";  ELSE PRINT "hours";
    END IF


    ' A little tricker: print a comma after the hours only if hours were
    ' printed.  Then print minutes, if not 0.
    IF Minutes > 0 THEN
      IF Hours > 0 THEN PRINT ",";
      PRINT Minutes;
      IF Minutes = 1 THEN PRINT "minute";  ELSE PRINT "minutes";
    END IF


    ' Again, use a leading comma only if a)  there's not already a
    ' comma, and b) one is needed.  If both hours and minutes are
    ' 0, no comma is needed.
    IF Seconds > 0 THEN
      IF NOT ((Hours = 0) AND (Minutes = 0)) THEN PRINT ",";
      PRINT Seconds;
      IF Seconds = 1 THEN PRINT "second" ELSE PRINT "seconds"
    END IF


  CASE ELSE
    PRINT "TIMER by COMPUTE times a program's execution from the comand line."
    PRINT
    PRINT "Use TIMER START before running the program, and TIMER STOP after."
    PRINT
    PRINT "Example:"
    PRINT
    PRINT "  REM First, initialize the timer:"
    PRINT "  C:\>TIMER START"
    PRINT
    PRINT "  Next, run a program:"
    PRINT "  C:\>SORT < DATABASE.PRN > NEWBASE.PRN"
    PRINT
    PRINT "  Finally, display the execution time:"
    PRINT "  C:\>TIMER STOP"
    PRINT

END SELECT
```


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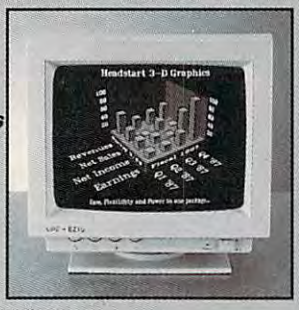

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ON DISK

GEORGE CAMPBELL

The IBM-compatible disk for this issue of *COMPUTE* contains an unbeatable collection of programs for every PC user. There's an excellent program for creating banners, signs, and calendars, plus a group of powerful utilities designed to make your PC more productive. We've also included a special bonus program that runs under *Microsoft Windows* 3.0.

If you received the disk with your copy of *COMPUTE,* you're already set up to try this issue's offerings. If you bought your copy of *COMPUTE* at a newsstand, you'll definitely want to order this disk. You can find ordering information in the third column of the second page of this article.

PrintPartner

Our featured application for this issue, *PrintPartner,* is a powerful, easy-to-use program that lets you create and print banners, signs, and calendars. Like similar commercial programs, *PrintPartner* combines text and graphics to help you produce attention-getting printouts on your dot-matrix printer.

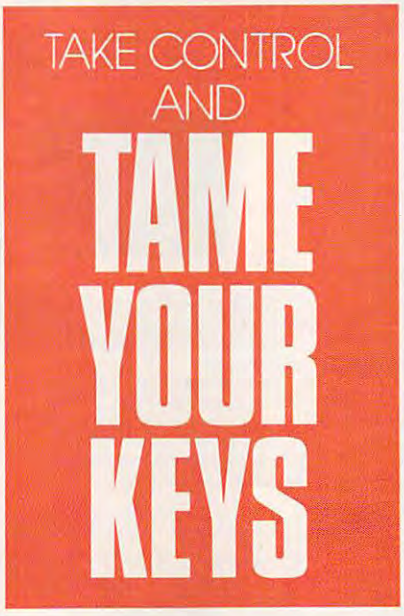
Written by California programmer Robert Bequette, *PrintPartner* uses simple menus for all its functions. You decide whether to create a banner, sign, or calendar; then the fun starts. Your creation can use any of 11 text fonts in three sizes. You then add your choice of exciting graphic images, which you can preview first on the screen.

If you're creating a sign, each line of type can appear in a different font, and you can use as many copies of the graphics as you like. Banners can have your choice of graphics at the beginning and end of your text. If you're creating a calendar, you can choose any year from 1980 to 2098 and select a font for the calendar's heading.

Once you've designed your production, *PrintPartner* can print it on just about any popular dot-matrix printer. The program's special smoothing features make the text and graphics attractive and easy to read.

PrintPartner includes a wide selection of graphic images, but you're not limited to just those included with the program. A separate program can convert graphics designed for the commercial *PrintMaster+* program for use with *PrintPartner.* Collections of graphics in *PrintMaster+* format are available on BBS's everywhere.

PrintPartner is a shareware program with a registration fee of $20. If you use it regularly, you should register your copy. Registered users receive the latest version of the program, along with a collection of additional fonts and graphics.



KBD

The keyboard is your entry point into any PC. Without it, you're at a complete loss. Today's keyboards offer many options, but occasionally you need to automate some keyboard functions. Mark Perkel's *KBD* program is the only tool you need to customize the way your keyboard works.

Designed to be used at the DOS prompt or in batch files, *KBD* lets you turn the Caps Lock, Num Lock, and Scroll Lock keys on and off. You can also use *KBD* to alter the speed of your keyboard's repeat rate or to send characters directly to the keyboard. A final feature allows you to lock the keyboard for security. When your keyboard is locked, only a complete reboot will unlock it.

All *KBD* commands are simple and easy to remember. For example, to shut off the Num Lock key, just give the command

KBD NumOff

You can combine multiple commands on a single line. By including a *KBD* command in your AUTOEXEC.BAT file, you can customize the way your keyboard works every time you boot up.

KBD is a shareware program with a low registration fee of $10. Once you use it, you'll wonder how you ever managed without it.

SCROLOCK

Anyone who has ever used a PC for long has been frustrated by text scrolling off the screen before it can be read. While pressing Ctrl-S can stop the display, it's an inconvenient keystroke to use.

New York programmer Daniel Schwartz offers *SCROLOCK* as a solution to this persistent problem. This tiny memory-resident utility makes your Scroll Lock key work the way you always thought it should.

After you've loaded *SCROLOCK,* you can press the Scroll Lock key anytime to stop information from scrolling off the screen. Press the key again, and normal scrolling continues. It's that simple.

SCROLOCK is free, but if you use it, consider sending a contribution to its author. You'll encourage him to create other programs as useful as this one.

NewFiles

Searching for files is a common activity for every PC user, but finding just the file you want can take several minutes. Worse yet, DOS offers no way for users to locate files based on the date they were created. ▷

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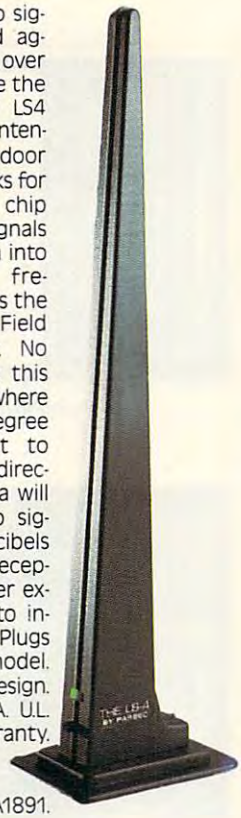

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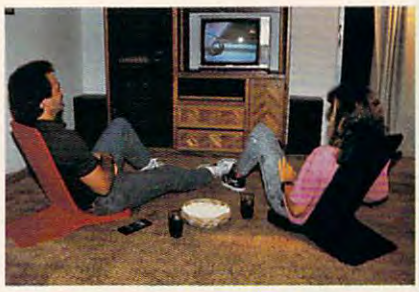

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Disks available only for IBM PC and compatible computers. Offer good while supplies last.

NewFiles, written by Georgia's Lawrence Spiwak, is the perfect solution. Using it, you can instantly find any file you've created within the past 30 days.

Suppose, for example, you wanted a list of files created today. Just give the command

NEWFILES 0

To see all the files created in the past week, enter the command

NEWFILES 7

Additional parameters let you look for files on other disk drives or just in the current directory and its subdirectories. You can even send your list to the printer.

NewFiles is a shareware program with a registration fee of $20. Source code for the program is also available for a small additional fee.

File Hunter 1.9

Since we're featuring file-locating utilities on this issue's disk, we didn't want to leave out *Windows* 3.0 users. *File Hunter,* a *Windows* application by Peter Eddy, is a full-featured file finder for that graphical interface.

File Hunter uses all the features of *Windows* to help you locate the files you need. It can find files on one or more disk drives, searching for a filename or for text within the file itself. *File Hunter* is fast and gives you a detailed listing of the files it locates.

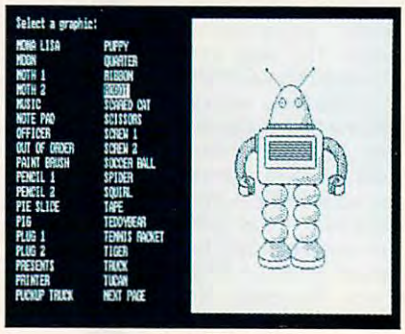
All instructions for using *File Hunter* can be read while inside the program, and its well-planned use of the mouse speeds your work.

A shareware program with a registration fee of $30, *File Hunter* will quickly become one of your most-used *Windows* 3.0 utilities.

SuperMAC

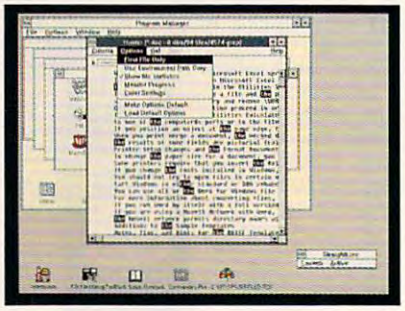
The final program on this issue's disk is *SuperMAC,* written by *COMPUTE's* own Rick Leinecker. It's a powerful, commercial-quality keyboard macro program which can program your keyboard to convert long commands to a single keystroke. Best of all, *SuperMAC* stores your macros in easy-to-edit ASCII files.

You'll find complete information on *SuperMAC* in "Keyboard Magic," elsewhere in this issue. ⊡



PrintPartner

NewFiles



File Hunter

SuperMAC

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64/128 VIEW

TOM NETSEL

I have an important message for Commodore 64 and 128 owners who buy *COMPUTE* at the newsstand. This is the last issue in which the Gazette section will be packaged with *COMPUTE*.

Please note that this applies only to the U.S. newsstand edition of *COMPUTE*. The Gazette section will continue to be available with *COMPUTE* on newsstands in Canada and other countries.

This will not affect those who subscribe to the Gazette edition. Subscribers will still receive *COMPUTE* each month with its multiplatform coverage, including all the Gazette columns, features, type-in programs, and the latest information about the 8-bit Commodore market.

Despite the downturn in that market, we vow to continue serving our many loyal Gazette readers, most of whom already are subscribers. By targeting our coverage, we can better serve the needs of those readers. We know that this step will not be popular with those who buy the magazine at a newsstand, but it makes us more effective. So if you are not already a Gazette subscriber and you want to receive the best Commodore 64 and 128 information each month, subscribe now.

Fill out the subscription card found elsewhere in the magazine. Be sure to write *Gazette Edition* on the card and drop it in a mailbox. You can also subscribe by calling our subscription department; that toll-free number is (800) 727-6937. Tell the operator you want the Gazette edition, and you'll be billed $12.97, which is a savings of 63 percent off the newsstand price.

While I hope everyone concerned will read this, I know we'll miss getting the word to some people. Since we can't contact those who buy the magazine from the newsstand, I hope some of you will post this information on your favorite BBS and share it with members of your user group.

Speaking of user groups, we'd like to hear from yours. We're in the process of updating our list of Commodore user groups. I know there have been some changes, what with new ones forming and old ones disbanding. We've sent letters to all the groups on our list, asking for address corrections and BBS information.

If your group does not return the letter we sent, we'll assume it has disbanded and drop it from our listing. Even if there have been no changes during the past year, you must return the letter to remain on our list. If we don't hear from you, your group will not be included in this year's listing. If you are a member of a Commodore 64/128 user group and your group hasn't received a letter from COMPUTE Publications, contact us immediately with your group's name, mailing address, and BBS telephone number (if applicable). We want our list to include user groups in the U.S. and all other countries, and we want it to be as complete as possible.

User groups are an important resource for any Commodore owner, and if you don't belong to one, I strongly urge you to seek out one near you. Of course, if you don't know the name of your nearest group, check with Gazette. We'll print the complete list later this summer.

Due to a production error, the Gazette Readership Survey didn't appear in the issue when I announced it. Several of you felt strongly enough to write letters, voicing your opinions, likes, and dislikes about the magazine. Since the survey finally was printed in the February edition, your responses have been pouring in.

Our receptionist, Cynthia Giles, takes time out from greeting visitors and answering calls at her busy switchboard to compile your responses. She's doing an outstanding job. Just as soon as the replies stop coming in and we get the figures tabulated, I'll report the findings here.

I'd like to thank all of you who took the time to fill out the survey, write letters, and add additional pages of information. Your views help shape the magazine, and since we share this information with interested software companies, they also help influence the type of software that reaches the Commodore market. ⊡

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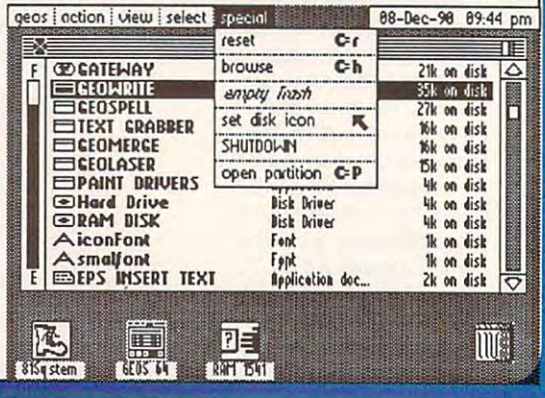
Note: The gateWay requires a Commodore 64 or 128, minimum of one disk drive, a mouse or joystick and GEOS 2.0 for operation.



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Shipping: US: **$5.00** (Cartridge), **$3.00** (Cable), **$6.00** (Both). Canada add **$4.50.**

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The STEREO SID Cartridge effectively adds a second complete SID chip to your Commodore 64 or 128, giving you a total of 6 separately controllable voices. SID SYMPHONY may be attached to your home stereo or most amplified speaker systems to provide you with whole new dimension in sound. Create your own stereo music using the Robert Stoerrle's Stereo Editor (which we include free with *Compute!'s Enhanced SID Player* book), or just enjoy the many hundreds of available songs by using Mark A. Dickenson's Stereo Player software (included free with the SID SYMPHONY Cartridge). If you're interested in creating your own music files, be sure to get a copy of *Compute's Music System for the Commodore 128 and 64: The Enhanced SID Player.*

SID SYMPHONY Cartridge $39.95 Compute's Music System Book $22.95

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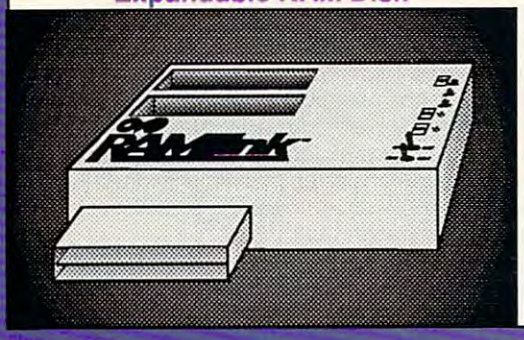

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REU's). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software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

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

RAMLink (w/out internal RAM)	$149.95	RAMLink Battery back-up unit	$24.95
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*Add $90.00 per Mb for additional RAM up to 4Mb. Higher capacities - CALL. Prices and specifications subject to change without notice.

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Both RAMLink and RAMDrive Include RL-DOS

- Allows commercial software to access all available RAM as a high-performance RAM Disk.
- gateWay software for GEOS use available at no additional charge.
- RL DOS performs up to 20 times faster than Commodore RAMDOS, up to 400 times faster than a stock 1541 and provides full DOS command compatibility.
- Up to 31 1541/1571/1581 emulation or Native mode partitions, plus true subdirectories.
- Includes built-in JiffyDOS Kernal for high-speed access to JiffyDOS equipped disk drives.
- Software for copying files (FCOPY) and complete disks (MCOPY) included.
- Many other features, including CMD's exclusive device number SWAP functions.

RAMLink or RAMDrive - Which one is right for you?

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

RAMDrive - A High Performance Battery Backed RAM Cartridge

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

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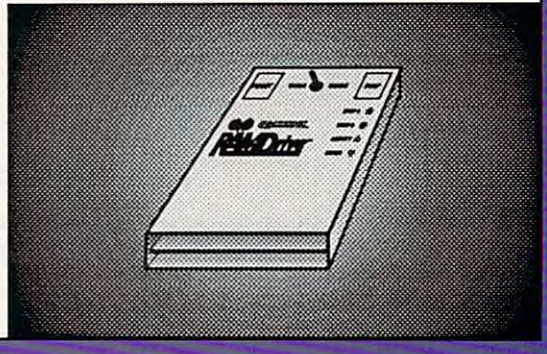

- Compatible with vast amounts of commercial software as an ultra-fast RAM disk.
- Power back-up eliminates the loss of files upon powering down the computer while the built-in battery protects data during transportation or power outages.
- Available in 512K, 1 Mb and 2 Mb models at incredibly low prices.
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NEWS & NOTES

Another Bell Online

D & D Services announces *Bell-Term* ($29.95) for the 64. This full-featured terminal program, distributed by Parsec (P.O. Box 111, Salem, Massachusetts 01970-0111) offers an 80-column mode for the 64, Y-Modem for batch transfers, and ARC.MOD to unarc files during downloads.

Other features include compatability with the SwiftLink-232 cartridge for transfer speeds up to 19.2K baud, a split-screen chat mode, and a hi-res viewer/printer.

A Shadow of Evil

The Death Adder is tyrannizing the people of Yuria. Only three heroes have the powers to stop this ruthless tyrant and regain the throne in *Golden Axe* ($34.95). Tyris-Flare, a beautiful and powerful amazon, is empowered by a special magic fire. Gilius-Thunderhead has an astonishing combination of lightning power and gymnastics. The Axe-Battler has sharpened his giant sword for battle. You must chose which challenger to send into battle against the Death Adder.

Chose your weapons wizely. You'll face Skeleton Swordsmen, Twin Brutes, and Lizard Women as you attempt to undo the evil Adder. The fate of the people of Yuria depends upon your skills. Weapons range from razor-sharp swords to curtains of fire. You can even joust with your foes from the back of a bizarrian, stolen from an unsaddled Adder ally. Force alone may not be the answer, however; remember, one dose of magic can wipe out an acre of evil.

Electronic Arts (1810 Gateway Drive, San Mateo, California 94404) distributes this arcade hit from Sega of America.

Amish Road

***Amish Road* by Michael Juliano of Davie, Florida, is this disk's Picture of the Month.**

Welcome to "Gazette Gallery." Each month *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay $50 for each piece of art we accept and an extra $50 for the one selected as Picture of the Month. Send your original artwork to Gazette Gallery, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

Industrial Might & Logic

Lucasfilm Games (P.O. Box 10307, San Rafael, California 94912) announced that *Night Shift* ($29.95) will soon be available for the 64 market. This arcade-style simulation is about a toy factory called Industrial Might & Logic. Perhaps not too surprisingly, it makes Star Wars and Indiana Jones toys.

Demand for the toys is so great that the company hires a night-shift worker who must contend with ever-increasing quotas, equipment failures, lawyers, lemmings, and a surly boss. Things do not go well for the hapless hireling as he tries to turn industrial waste into baby Darth Vader dolls, C3POs, R2D2s, Indiana Jones, and Zak McKrackens.

The game's intricate engineering of the toy machine and its intensity and pressure should appeal to a broad audience. ⊡

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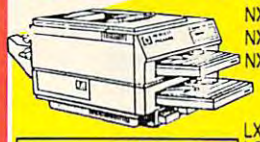

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Confessions of a Software Maniac

DOUG BUCHANAN

My name is Doug and I'm a software addict. There, I've said it. I'm a compulsive software consumer—helpless, spineless, capable of absolutely no self-control. Now that it's out in the open, maybe others will recognize themselves and find solace in the knowledge that they're not alone.

A Tale of Woe

I became aware of my problem back in 1982, shortly after purchasing my first computer, a trusty old 16K Radio Shack Color Computer. Of course, way back then, there wasn't the magnitude of software that exists today and, consequently, not nearly the temptation. What was available loaded and saved by a painfully slow (and sometimes less-than-perfect) process—the cassette recorder.

Of course, there were those elegant Program-Paks. But overall, software development for home computers was still in its infancy. So I learned BASIC and wrote most of what I needed. Because BASIC (and my own limitations) restricted the complexity of my programs, I immediately became infatuated with each and every packaged program. Even at this early stage of my zeal for computers, I could already recognize the hunger building for more and more software.

August 1983 found me in possession of my first 64—it was love at first sight. Imagine, a computer with 64K, one on which you could actually edit a line! In retrospect, I guess that was the genesis of my journey into software madness. Like all obsessions, it began deceptively, creeping slowly like a thief in the night. First, a couple of games to generate envy among my computer compatriots for my state-of-the-art machine—*BeachHead* to flaunt its sound and graphics, *Jumpman* to solidify their covetousness. Next, a good word processor so I could watch them *oooh* and *aaah* while I deftly manipulated, inserted, and deleted expanses of data. Each time I braved a software boutique, I found something that I needed just a little more than the package I'd bought the previous month. I was on a quest for the perfect program—the ultimate union of bits and bytes. A simple trip to the computer shop took on the aura of a spiritual pilgrimage.

Before long, I was hanging out in department stores, cruising the aisles for any and all software. I would lurk for hours, waiting for stock crews to place the incoming packages on shelves. Whether or not I had a need for the software was inconsequential. Store clerks began eyeballing me suspiciously as if I were the carrier of some frightful affliction. Everywhere I looked I saw something I wanted. My passion for software became ravenous. I began frequenting user groups in the hopes of obtaining even outmoded, uninspired programs.

By 1984, everyone seemed to be writing programs for the 64. Software flowed in numbers I had never imagined possible. Software that would do anything and everything you could envision—and some things that you couldn't. I was hooked! As a member of the military community, my assignments took me to virtually every part of the U.S., Europe, and the Orient, affording me an anonymity which allowed me to keep my growing habit a secret. There were programs to do everything from personal finance to designing custom pinball games, and I had them all. Even though I'm not

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ions

Do you have a craving for software? In this moving testimonial, one reader relates the humiliation and suffering this insidious disease has caused him.

JANICE R. FARY

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a "gamer," nor have I ever been, my library consists of virtually every 64 game from *Aztec* to *Zork*.

My productivityware embodies virtually every database, spreadsheet, word processor, assembler, and graphics program that's been written. With these, I'm capable of publishing anything from a modest birthday card to a comprehensive, unabridged version of *War and Peace* (in Russian with illustrations!), and thanks to a second drive and an REU, I still have enough memory to operate the traffic lights for the town of Malone, New York.

But am I satisfied? Certainly not. A day doesn't go by that I don't run across that special program that promises to accomplish the very thing I so desperately needed yesterday. And so, I buy it.

No sooner does a new product hit the shelf than my avarice rears its ugly head. I have countless programs which I may use once every couple of years or never use at all. For example, I own *GeoProgrammer* and the *Official GEOS Programmer's Reference Guide* even though my grasp of assembly language is limited to the knowledge that memory location 49152 translates to C000 hex. Simply put: If it's for the 64, I have to have it. Unfortunately, my credit cards are beginning to show signs of early aging.

Those You Love the Most

My family is aware of my weakness. And they are supportive of me, but my shame is their shame. They try to shelter me as best as they can. When a neighbor asks if that was me in the software section of the local department store, my wife will invariably reply that it was probably Mr. Collins from down the block, who looks a lot like me from behind. But they all suspect the truth. (Mr. Collins doesn't even own a computer.)

Not being the 64 buff that I am, my family can't relate to my problem. To the unversed, the 64 is just another computer. It's hard to imagine civilized humans in the nineties capable of such gnarled thinking.

Whenever I hint at a trip to the mall, I hear the murmurs behind closed doors. I sense the foreboding as we pass Toys "R" Us or approach the Electronics Boutique. I feel the accusatory grimaces when our base exchange here in Germany receives a shipment of software goodies. I have, on occasion, even resorted to sneaking a newly purchased program into the house. Admittedly, I am helpless to the call. I have developed an uncanny sixth sense when it comes to software. My motto is "You can never have too many databases."

My craving is not limited to commercial software. In addition to my endless supply of program disks (which I would estimate to be somewhere around 3200 programs), I also own virtually every copy of *COMPUTE!'s Gazette* dating from the early 1980s and a healthy storehouse of other 64 publications and books. Much to my wife's dismay, I steadfastly refuse to allow even the oldest of these to be thrown out. After all, who knows when I'll want to read the article "GEOS Update: One Year Old and Growing Fast" from the July 1987 issue of *Gazette?* I guard my publications. I'm even considering a vibration alarm next to my library to thwart any attempts at unauthorized entry.

A Creeping Social Menace

I recognize from limited volunteer work that my compulsion will never be totally eradicated. And so, I live from day to day, constantly fighting it. With the assistance and encouragement of my friends and family, I may have a sporting chance. But the lure is still overwhelming.

And it's just so easy for anyone to obtain software. Everywhere, I see preteens openly buying adventure games and businessmen procuring new and improved recordkeeping programs. Even preschoolers are not exempt. They are unremittingly bombarded with programs to help them learn shapes and numbers. Where will it end? People from every social stratum fall victim daily. Software madness doesn't respect race, religion, national origin, or financial status. It can strike anyone wherever software is peddled, seducing even the thriftiest of consumers.

What can be done to combat this newest social malaise? Perhaps a Software Compulsives Anonymous (SCA) could be formed to provide group support. At SCA, people with similar problems would be able to discuss their addiction openly, secure in the knowledge that they weren't alone. Members could monitor each other's progress using a buddy system. A 24-hour SCA hotline could be instituted for those whose self-imposed restraints are constantly tested by names like Electronic Arts, Abacus, and Mindscape.

I have a long way to go to recovery. But a journey of a thousand miles begins with a single step. Yes, I'm a software compulsive, but I've met the enemy and I know that I can lick this in time. If you're like me or know someone like me, I counsel you to remember that 1 program is too much and 50 programs are not enough. Once you give in, you open the floodgate. So hang tough and fight the urge. Just say *No!* ⊡

Doug Buchanan has been a software "user" for many years. In deference to his family, he requests that we reveal nothing more about him than this. We wish Doug success in controlling his habit.

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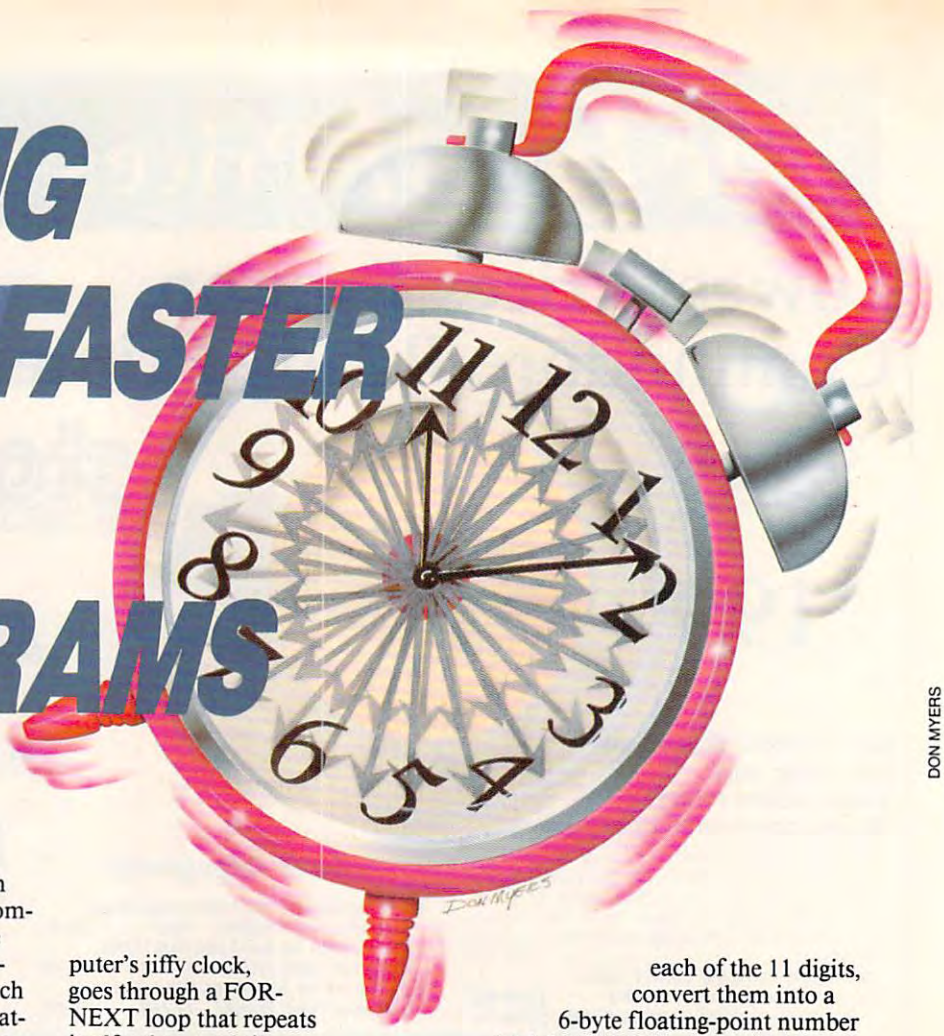
WRITING FASTER BASIC PROGRAMS



DON MYERS

Programs that are written in BASIC often run slowly compared to machine language programs. The BASIC interpreter has to spend time reading each line of the program and then translating it into the correct set of machine language codes for the computer to perform the instruction. If instructions have to be repeated many times (for example, inside a FOR-NEXT loop), the time delays add up and really become noticeable.

In this article, we'll discuss how you can write or even rewrite BASIC programs to make them run faster. To see how much time the different instructions take, enter the following simple timing program.

```
10 REM TIMETEST
100 A=1:B=2:C=3:D=4:E=5:F=6:G=7:H=8
110 I=9:J=10:K=11:L=12:M=13:N=14:O=15
120 P=16:Q=17:R=18:S=19:T=20:U=21
130 V=22:W=23:X=24:Y=25:Y%=26
140 Z=.00134796247
160 TS=TI
200 FORI=1TO1000
300 NEXT
310 TF=TI:TT=INT((TF-TS)/6)/10
320 PRINT"TIME WAS";TT-1;"SECONDS"
330 LIST 200-300
```

After you've set up some variables, this test program reads the computer's jiffy clock, goes through a FOR-NEXT loop that repeats itself a thousand times, and reads the jiffy clock again. The empty loop, without any instructions inside, takes about one second to run. There's room to insert additional instructions between lines 200 and 300, and the difference between the two clock readings minus one is the time it takes to repeat the inserted instruction 1000 times, or the time in thousandths of a second (milliseconds) to execute the instruction once.

This program uses the 64's TI function to read the start and finish times. For other models of computer, a different command may be required to access the internal clock.

Run the program, and you'll see the final message giving a time of 0 seconds. Now try adding a line inside the loop.

```
210 V=V+.00134796247
```

It takes 46.3 seconds to execute this statement 1000 times. (Your time may vary slightly.) Each time BASIC encounters the number in line 210, it has to read the decimal point and each of the 11 digits, convert them into a 6-byte floating-point number (+1.34796247 E-3), and add that number to the value assigned to V.

Assign Constants to Variables

BASIC can handle variables much faster than it can handle numbers. This is the most important timesaver of all. Replace line 210 with

```
210 V=V+Z
```

Because the variable Z has already been set to a value of .00134796247 in line 140, this new line performs the same operation. Running the program shows a time of 5.1 seconds—nine times faster.

When the variable Z was assigned in line 140, BASIC converted the value into a 6-byte floating-point number and stored it in a list of variables. Each time BASIC reads line 210, it has only to read one character, Z, instead of a decimal point and 11 digits. Having read Z, it then looks up the floating-point value directly from the list of variables. This avoids having to perform the cumbersome floating-point conversion 1000 times. ▷

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