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The #1 Apple II Magazine

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MORE SPEED, POWER FOR THE IIGS

GETTING STARTED
WITH YOUR FIRST APPLE II SYSTEM

APPLEFEST REPORT
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REVIEWS
Alien Mind
Defender of the Crown
Mixed-Up Mother Goose
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COVER STORY BY MIKE MARKOWITZ

GETTING STARTED

Plugging into Apple II Computing

You finally did it. You bought an Apple II. Or maybe you were so good all year that Santa brought you one. All the pieces are out of their boxes and hooked up. You sit there proudly, surrounded by styrofoam package inserts, users' manuals, and dreams.

Those glittering displays in the computer stores and glossy advertisements in the magazines are clamoring for your few remaining dollars. Is that a faint twinge of panic at the back of your mind, saying, "OK, What now?"

Relax. The collective experience of several million Apple II users is waiting to guide you. You already have the right computer; all you need to do now is build the perfect system—the right mix of hardware and software for your needs.

Whether you're a writer or a hard-nosed home-business operator, a teacher or a student, a creative artist or a musician, you should establish a few logical priorities, consider some basic choices, and avoid common but costly mistakes.

PRODUCTIVITY

Many buy a computer simply as a replacement for two antique appliances: the typewriter and the desktop calculator. I bought my first computer intending to play games and dabble in BASIC programming. I never expected it to turn into a writing career.

A personal computer creates an environment that lets you streamline your writing or home-management or home-business operations. You enter a world of files and folders that take up almost no space and never get lost (well, hardly ever). The computer gives you a magical ledger in which laborious calculations are performed and recorded as fast as you can punch in

All you need to do now is build the perfect system—the right mix of hardware and software.

the numbers. The computer can even provide you with the most powerful implement of civilization, a printing press.

Software is not inexpensive, especially when you add the value of your learning time to the purchase price. An integrated software package, which combines several different application programs that all work together, is often the most economical solution.

If you need to write, work with numbers, or manage lists, consider AppleWorks. Combining word-processing, spreadsheet, and database modules in one package, it is one of the best-selling personal-computer programs of all time. Originally marketed by Apple, the program is now sold and supported by Claris Corporation.

AppleWorks has spawned an industry of add-ons and enhancements. Depending on your needs, you might add pop-up desk accessories, a spelling checker, a program that gives you fancy fonts, or even a program that lets you "paste" pictures into your documents.

A new alternative is GEOS (Graphic Environment Operating System), published by Berkeley Softworks. Like the Apple Macintosh, or Microsoft Windows on the IBM PC, GEOS provides you with a graphic representation of your computer system, instead of using a text-based interface. Graphic "icons" represent files, disk drives, and other devices.

You execute most commands by pointing the mouse cursor at "pull-down" menu selections and clicking the mouse button. The advantage of this approach is that it gives you access to different typefaces, or "fonts," and lets you freely mix text and graphics. The main drawback is slower operation.

GEOS includes a word-processing program with a spelling check-

From toy to tool: Connecting with the power and performance potential of your first Apple II system

er, a monochrome (black-and-white) paint program, and various utility programs. Berkeley Softworks plans database and spreadsheet programs and a programming language for use with GEOS.

Like a Swiss Army knife, an integrated software package provides a handy, versatile collection of tools. Your particular requirement, however, might demand the brute power of a chain saw or the delicate precision of a surgical instrument. In that case, you may want a dedicated application program.

Word Processing

You may want a separate word-processing program if you don't plan to work with numbers, but word-processing programs are not all created equal. Almost everyone works with words, but

the best word-processing choices for a high school student, an electrical engineer, and a video-script writer are quite different.

Bank Street Writer, for example, is a simple word-processing program for beginners that lets you write, edit, save, and print short documents. For everyday correspondence, school assignments, or grocery lists, it is a good choice. WordPerfect is a professional word-processing program with advanced features that students will appreciate, including automatic footnote formatting, a spelling checker, and a thesaurus. Other word-processing programs, such as WordBench, include an "outliner" that helps you organize ideas. Many programs allow multiple documents to be "open" at one time, allowing you easily to cut text from one document and paste it into another.

Computers and Printers

Never buy a word-processing program unless you are sure that it works properly with your printer. Some software publishers list the printers with which their product works, on the outside of the package, but the safest course is to test the program in the store before you buy.

A mistake common to users who are trading up from a typewriter is buying a "daisy-wheel" or letter-quality printer. Slow and noisy, these printers produce copy that looks typed, but they cannot print graphics. Unless you absolutely require the look of typewritten text, a good dot-matrix printer, equally adept with text and graphics, is the best choice. Many Apple IIGS programs work only with Apple's own ImageWriter dot-matrix printer. For older Apple II software, Epson or "Epson-compatible" printers are a safe choice.

At the high end of the spectrum, word-processing programs merge with "desktop-publishing" applications. Desktop publishing lets you combine graphics with a variety of text styles and formats. Most of these programs work with popular dot-matrix printers, but you should look for programs that also let you print with an Apple LaserWriter printer. You may not be able to afford one of these costly devices, but more and more neighborhood copy shops and mail-order companies are offering laser-printing services. No Apple II program has emerged yet as a standard for desktop publishing (see *A+* September 1988).

If you aren't well organized, don't expect miracles from 'personal finance' programs.

Financial Management

For simple computations, a pop-up "desk accessory" calculator is ideal (Pinpoint Publishing's accessories for the IIe and StyleWare's DeskWorks for the IIGS are examples). You can call on desk accessories, small programs that reside in memory, from within other applications to do simple tasks. For more ambitious number crunching, you need a spreadsheet program.

The Apple II's first mass-market success came in 1979, with the release of VisiCalc, the first personal-computer spreadsheet program. A spreadsheet consists of "cells" arranged in rows and columns. A cell can contain a label, a number, or a mathematical formula that acts on the contents of other cells. Since the entries in a spreadsheet are easy to change, it is a powerful tool for playing numerical and financial "what if?" games. A complex spreadsheet with many interacting variables is often called a "model," since it is a tiny replica of the dynamics of a real business or project. If we increase our sales by 5% and cut our costs by 3%, how much will our quarterly profit change? Punch the numbers into the spreadsheet, and the program instantly recalculates the bottom line.

The AppleWorks spreadsheet module theoretically offers 999 rows of 127 columns each, or 126,873 cells. The practical limits depend on how much memory you have—a 128K system runs out of memory after you fill about 6,000 cells. Nineteen different mathematical operations and functions built into the spreadsheet module can be combined in formulas to perform more complex calculations. AppleWorks can "import" spreadsheet data from other programs in several different formats. AppleWorks may be suitable for working on simple models, but at least two more powerful alternatives are available. VIP Professional closely emulates the standard MS-DOS business spreadsheet program, Lotus 1-2-3, and SuperCalc 3a is an option for users who need a more powerful spreadsheet program than that of AppleWorks. If you need to exchange files with other computers, be sure your spreadsheet program can handle the right kind of file transfers. For best performance, you should use a powerful spreadsheet program in conjunction with an accelerator card (such as the TransWarp) and plenty of memory.

Personal Finance

If you aren't already well organized, don't expect miracles from a "personal finance" program—often a well-intentioned purchase that winds up on the shelf, unused. If you don't already understand the basic principles of bookkeeping, don't expect to master them by struggling with the complexities of an accounting program!

Many easy-to-use programs are adequate for maintaining simple tax and business records. Managing Your Money and Tax Preparer are popular examples. On Balance and Quicken are based on the metaphor of a checkbook register; you can even use them with special pin-feed blank forms to print your checks. You can also get public-domain AppleWorks spreadsheet templates from almost any users' group to manage your household budget.

Database Options

Most Apple II database users maintain mailing lists. The simplest application is to print out mailing labels. "Mail merge," a more complex application, involves pulling a group of entries out of a database and inserting them sequentially into a word-processor document. Other database users manage small-business inventories or library or museum collections. Some database programs gain speed by loading the entire database into memory. For such programs, you may need to expand your computer's RAM (random-access memory). A big database can quickly outgrow the storage limitations of floppy disks—if you expect

JOHN GALLOWAY

One-Man Band

JOHN GALLOWAY

The house lights in Saginaw, Michigan's Pit and Balcony Theater dim. The audience buzz quiets to an expectant low hum and then breaks into applause as the conductor strides out into the orchestra pit. He gives his audience a dignified bow, turns toward an orchestra that must be hidden in the lowered pit, and raises his baton. As it falls, the first, jubilant notes of *My Fair Lady* fill the theater. Conductor Jeff Whitmill knows that his orchestra will not falter or allow one sour note during this performance. It will play exactly as he has programmed it to play, each instrument unerringly on cue, precisely tuned, and correctly modulated. Nothing except an unexpected power outage could mar the evening's musical perfection, because Whitmill's orchestra—usually listed on the program as Chip Silicon—is his Apple IIe.

"This has been a godsend to me," says Whitmill about his electronic orchestra. "It's what I've been waiting for all my life."

This particular bent of his career started when Whitmill quit his teaching job of 35 years and moved his family from Texas to the small community of Saginaw. Accepting an invitation to conduct a local theater production, he set out in search of commitments from members of local orchestras. "I found one trombone player who said 'maybe,'" says Whitmill. It was at that point that he turned to his Apple. Now his IIe, one floppy-disk drive, four synthesizers, two drum machines, a couple of mixers, a reverb unit, and Passports' Master Tracks Pro composition software sit behind the curtains of the darkened theater, awaiting not the fall of his baton, but the simple press of an Apple key.

Whitmill composes and records soundtracks for his theater productions, church choir, and commercials in a home studio crammed with musical equipment. Attached to his IIe equipped with a Passport MIDI interface and single Comrex CR1000 external disk drive is a MIDI thrubox that transmits his Apple signals to four synthesizers: a Roland D-50; two Yamaha TX81Zs; and his "big mama," a Kurzweil 1000PX. Two of the synthesizers are attached to drum machines. Using Master Tracks Pro, which he calls "the best program for the II series, period," he inputs his music on the Roland D-50 keyboard, which is connected back through the thrubox to the IIe. Master Tracks Pro is number-intensive: What Whitmill is actually recording as he creates his full-orchestra sound tracks is digital information in the form of 1s and 0s, and he emphasizes that this level of computer-aided music-making requires training. But the precise control that the software affords him, combined with his array of music-making hardware, allows him to create the very specific sounds he's looking for in his compositions.

Before he hears the sound of the 1s and 0s he has recorded, Whitmill sends the output from all four synthesizers through a Yamaha KM802 mixer and from there through an effects circuit (reverb unit). It adds the final touch of a slight echo, or "presence," as Whitmill calls it, to the soundtrack and then sends the information back to the mixer. Finally, Whitmill is ready to hear it and sends the music from the mixer to a pair of Boss MA-12 powered speakers. "There's no greater high," he says. —*Leslie Steere*

to deal with more than 800K of files at a time, you need a hard-disk drive.

DB Master, version 5, is regarded as the most powerful Apple II database program (see *A+* November 1988). With its 450-page manual, it is not for beginners. For the IIGS, Notes•n•Files is a simple personal file manager, based on icons of file cabinets, folders, and stationery. GS File is a more full-featured database program. No current Apple II database option includes a programming language for building customized applications.

EDUCATION

With more than a million IIs in schools, a range of educational-software products cover every level, from preschool to university.

For the youngest learners, programs that teach shape recognition, number concepts, and the alphabet are good examples. Reader Rabbit, for ages 5–7, is an excellent example of a program that helps develop early reading skills. Drill-and-practice software has a useful role in many subjects, such as mathematics, spelling, and foreign languages. Many educators, however, value the greater interactivity and motivation of role-playing or simulation programs. The Carmen Sandiego series—a game that teaches geography by involving players in a detective story—is a popular example.

Parents evaluating educational software for younger kids should avoid "electronic page turners" that have a lot of text and not much interaction. Look for programs that have staying power, that can be played repeatedly without becoming stale. Look for software that has lots of options—software that can be used at different levels of difficulty, with or without a time limit, alone or in a small group.

For home educational purposes, you may want to consider a variety of peripheral hardware. For instance, a color printer such as an ImageWriter II is worth having because it can help you make the most out of programs such as The Print Shop, which kids can use creatively to express their own ideas. Younger children may require an alternative to the keyboard. The best educational software increasingly uses the mouse interface, and

Something about computer graphics brings out latent artistic talent.

plug-in tablets such as the Koala-Pad and Muppet Learning Keys can help tiny fingers overcome the keyboard barrier.

CREATIVITY

Drawing and Painting

As a medium for graphic art, the computer gives you the ultimate eraser. You can change any line or modify any color without getting your hands dirty or spilling paint on the rug. Something about computer graphics brings out latent artistic talent in many adults and children, perhaps because the software can draw perfect circles, patterns, and lines.

The Apple II world suffers from a proliferation of incompatible graphics formats. Also, there are two fundamentally different ways to create graphics on a computer: bit-mapped graphics from paint programs and object-oriented graphics from drawing programs. Most creative artists prefer bit-mapped graphics for their color-mixing capabilities and control down to the level of a single pixel. Two of the best paint programs for the IIGS are DeluxePaint II and Paintworks Gold. If you don't have a IIGS, 816/Paint and Dazzle Draw are good bets. Designers and architects prefer object-oriented graphics, such as those offered by TopDraw and Draw *Plus*, which more closely resemble traditional drafting tools and let you measure exact dimensions.

You can't really sketch or do freehand drawing with a mouse or joystick—for that you need a tablet or bit-pad. And, affordable color hard-copy options for Apple II are limited to the ImageWriter II color ribbon or photographing the monitor screen.

Music

Like many left-handers, I was frustrated by my early attempts to master the right-handed guitar. The nice thing about computer music is that it overcomes some of the technical limitations of fingers, frets, lungs, reeds, and metronomes. The software already knows how to produce every note and chord perfectly. It can keep time precisely, to the microsecond. It never needs to practice.

Music software lets you play with sound, and computer-music hardware is beginning to put the resources of an electronic orchestra and recording studio within the reach of ordinary users.

The 8-bit Apples are pretty hopeless as music machines—the single internal voice can only beep at different frequencies. The IIGS, with its built-in Ensoniq synthesizer chip and new add-on Apple MIDI interface, is more promising. Look for software and hardware that works with MIDI (Musical Instrument Digital Interface)—the industry standard.

Whether you compose, perform, or just listen, you'll need some music software. Programs such as MusicWriter and The Music Studio are to music what word-processing programs are to text. They let you edit and print sheet music and can play that music through the computer's speaker. For high-quality sound, a stereo card and a pair of external speakers are essential. A composer or arranger also needs a graphics printer and software that can print legible sheet music.

Anything You Want It to Be

After the invention of the printing press, more than a century passed before ordinary people could afford books. The entire history of electronic computing takes up less than 50 years, and computers inexpensive enough for individuals to own have been with us for little more than 10 years. The longevity of the Apple II series—in the face of competition from faster, cheaper, and more powerful machines—is remarkable. The simple explanation is that the Apple II is very good at enabling people to do what they want to do with information. When you take it out of the box and join a worldwide community of users, its technical limitations become strangely irrelevant. An Apple can be anything you want it to be. ✚

Mike Markowitz is a computer engineer and has been writing about Apple II computing since 1983.

FRANK LUSK

Art in the Big Apple

Catherine Tower doesn't even remember what she was thinking about the day before she "just fell into computer graphics" more than six years ago. She was simply one of the hundreds of artists struggling to survive in the competitive art world of New York City, wishing she had the commercial background and immediately marketable skills that would let her take her own bite of the Big Apple.

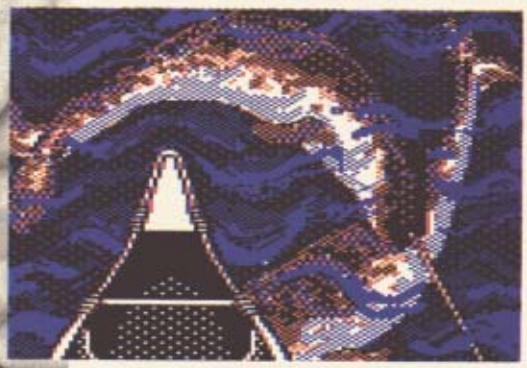
It's fitting, then, that a couple of Apples came to her rescue. Today, Tower is a free-lance graphic artist and an art teacher at New York's New School, where she teaches painting and illustrating on the Apple IIe and IIGS. Because there is such a high demand for Apple II art for educational software, Tower's graphic-art career consists primarily of creating hi-res still graphics and animation with her IIe. Although she has a IIGS, Tower doesn't take much advantage of its highest resolution because educational-software publishers generally commission work for the IIe.

Her system includes an Apple Graphics Tablet, two monitors—one color and one monochrome—1.5Mb of RAM, and two 5¼-inch disk drives. On the GS she has extra memory, a 5¼-inch drive, and a 3.5-inch drive, but she uses the mouse instead of a tablet for drawing. She often runs both machines at the same time, each with a different software package. She uses an ImageWriter at home for black-and-white work and uses color and laser printers at the school.

No single piece of software meets all of Tower's needs. For her educational-software clients, she uses Blazing Paddles, the Computer Graphics System, and Graphics Magician. She also likes Alphaplot's cut-and-paste feature, because it tells you the cursor's exact postition on the x-y axis, is not limited to byte boundaries—you can cut and paste as large or small an area as you like—and gives you the option of pasting either an opaque or transparent image. For personal projects, Tower favors DeluxePaint on the IIGS.

For her present projects, Tower looks for free-hand drawing packages that give her access to two pages of graphics and let her toggle between the two, cut and paste from one to the other, and save either one. She also likes to be able to magnify images, to have both opaque and transparent stamping modes, and to have an XOR option for combining images. But since her true forte is animation, she dreams of the day when digitizing the percussive sounds of her feet and dancing on a touch-sensitive surface would let her affect a computer-screen image. That, Tower says, "would be a true transition" in the arena of human-computer interaction. —*Brenda McLaughlin*

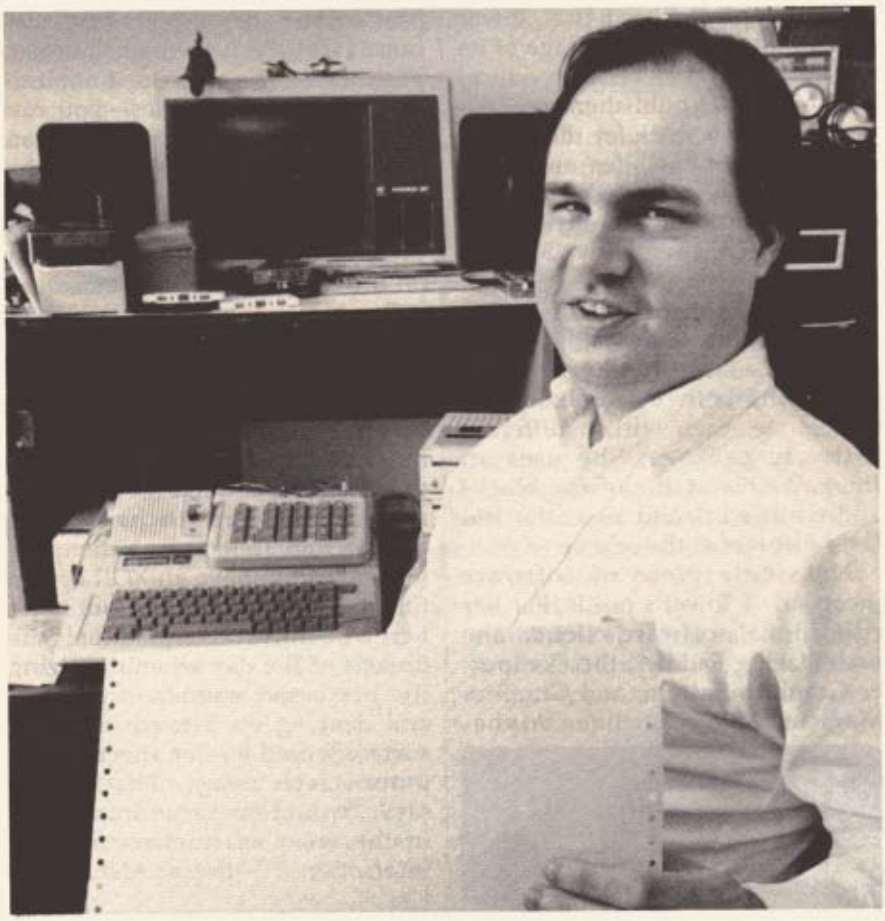
FRANK LUSK



GRAPHICS © 1988 SCHOLASTIC, INC.

Tower used the combined capabilities of her IIe and IIGS to create "Bear" and "Narwhale" for Scholastic's Microzene program Quest for the Pole.

IIe to See



MICHAEL JUSTICE

Nick Dotson calls himself an "information junkie." He begins a typical day by turning on his Apple IIe and calling his mailboxes on PC Pursuit, GEnie, CompuServe, and The Source and downloading, reading, and answering any mail that has come in during the night. After a workday as technical-support specialist at VTEK, Inc., a Los Angeles-based manufacturer of computer-related products for the handicapped, he returns home to download and read his daily on-line mail. Then he may settle down with a beer to pay his bills, reconcile his bank account, type out his correspondence, work on improving his Assembler and BASIC programming skills, and maybe play a text-based computer game or two. Sounds similar to the way any other Apple-addicted individual might spend a day and evening, with one exception: Dotson has been blind since birth.

Dotson credits computers with turning his life in a positive direction. With an Apple at his fingertips, he's in touch with a world of people who seek his advice and technical expertise, and he's able to help develop and promote products to help the blind community worldwide. One of his current at-home projects, for example, is contacting manufacturers of computer-related products to ask them to make their documentation available on disk, so that blind computer users won't have to call on sighted friends to read manuals to them or spend the hundreds of dollars it costs for out-of-date braille Apple reference books.

Dotson uses an enhanced Apple IIe with two serial ports, an Echo 2 Speech Synthesizer, a TransWarp accelerator card, a memory-expansion card, two 5¼-inch disk drives, two 3.5-inch drives, and a 20Mb hard-disk drive. A 256K buffer attached to a Black Box ABCDE Switch allows Dotson to switch easily between his daisy-wheel printer and his "baby," a VTEK MBOSS-1 braille printer that just printed its 40,000th page of braille. Dotson adapted the buffer's membrane switches for his use with "a beautiful little low-tech product" called LOC-DOTs. LOC-DOTs are round pieces of plastic with raised braille dots that adhere to membrane switches or keys.

Dotson reads his daisy-wheel nonbraille printouts and other written correspondence with an Opticon optical tactile convertor, a hand-held camera that translates black dots of printed material into piezoelectric readouts that activate a matrix of pins in a cradle beneath the user's index finger, duplicating in raised array whatever the camera is scanning.

Of the myriad ways computers have changed his life, Dotson cites one as a major turning point. Hal Carter, creator of the public-domain check-writing program Bankin', recently converted the program to speech and made a template to help the blind aim their check signatures. Talking Bankin' allows Dotson for the first time to keep his financial records private and to maintain them without hours of frustration. Talking Bankin' lets him form-feed checks into his printer, listen to information in his check file, print reports for his accountant, and print braille reports of his bank records for his own use.

Dotson says that the blind culture is dividing between those who are computer-knowledgeable and those who are not, and the result is that "too much importance and stress is placed on the tool and not the rationale behind buying the tool. Sometimes you forget to tell people what a horribly steep and involved learning curve it is." Anyone who would like Dotson's help climbing that curve can reach him through The Source at ID-BBB569, GEnie at Nick.Dotson, or CompuServe at 73250,1064.

Leslie Steere

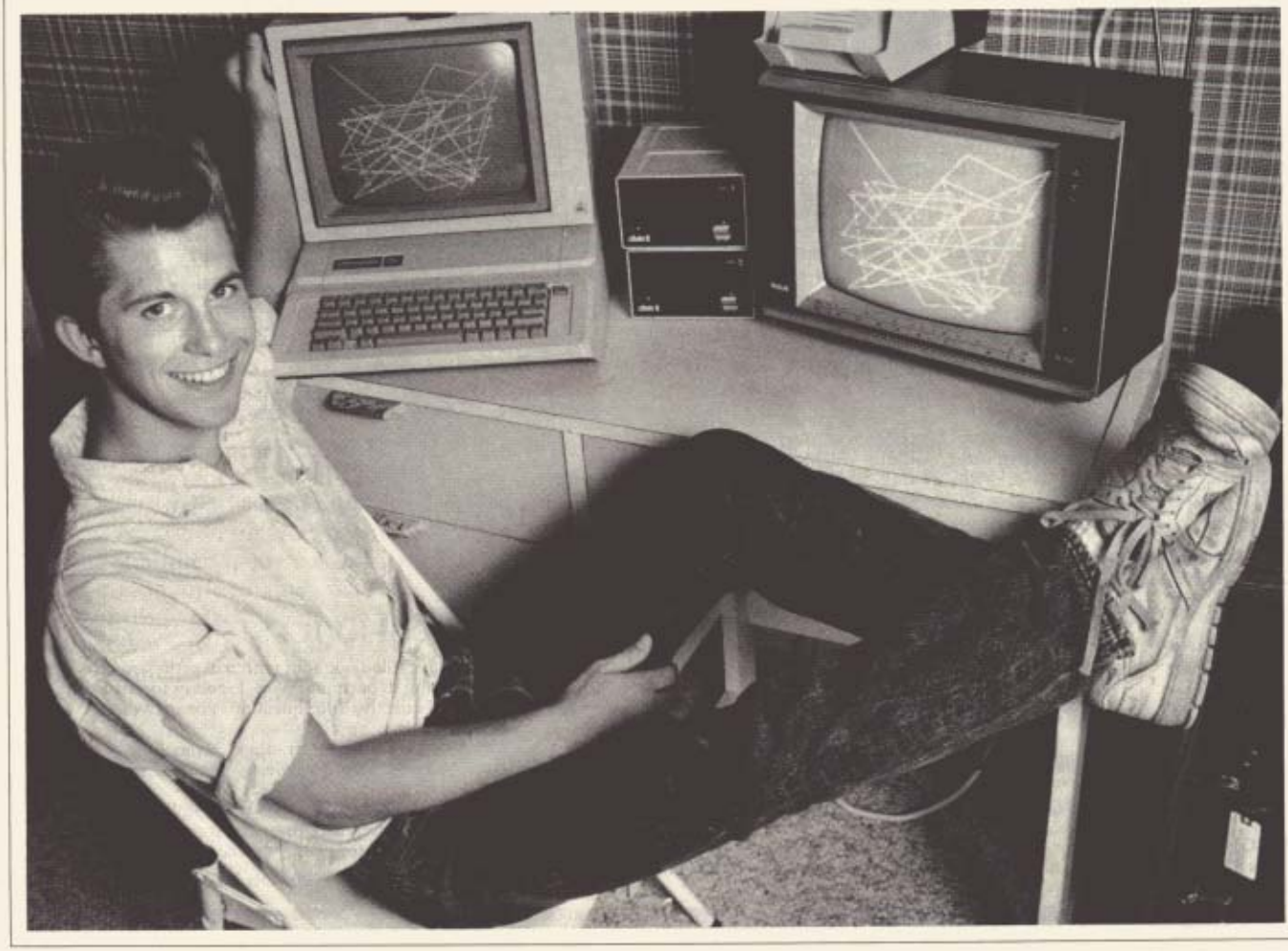
Apple Adolescence

When Joseph Stahley was 14 years old, his parents gave him a gift any kid could envy: Packed into their pristine white boxes with Apple logos on the side were an Apple IIe with an 80-column card, two 5¼-inch disk drives, and a Scribe printer. His mother told him to wait until Monday to set the system up, in case he needed dealer assistance. But Joseph was a normal 14-year-old: He didn't listen. He took the boxes up to his room, and "about 5 minutes later," he had the system up and running.

In no time, Joseph was using his word-processing program to catalog his extensive baseball-card collection (to date he has 25,000 cards) and playing arcade games such as Frogger, Pac-Man, and Lady Tut. When the Granada Hills, California, grammar school he'd attended got two Apple IIe computers with external drives and printers that year, they called Joseph in to set them up and teach them how to operate the basic system.

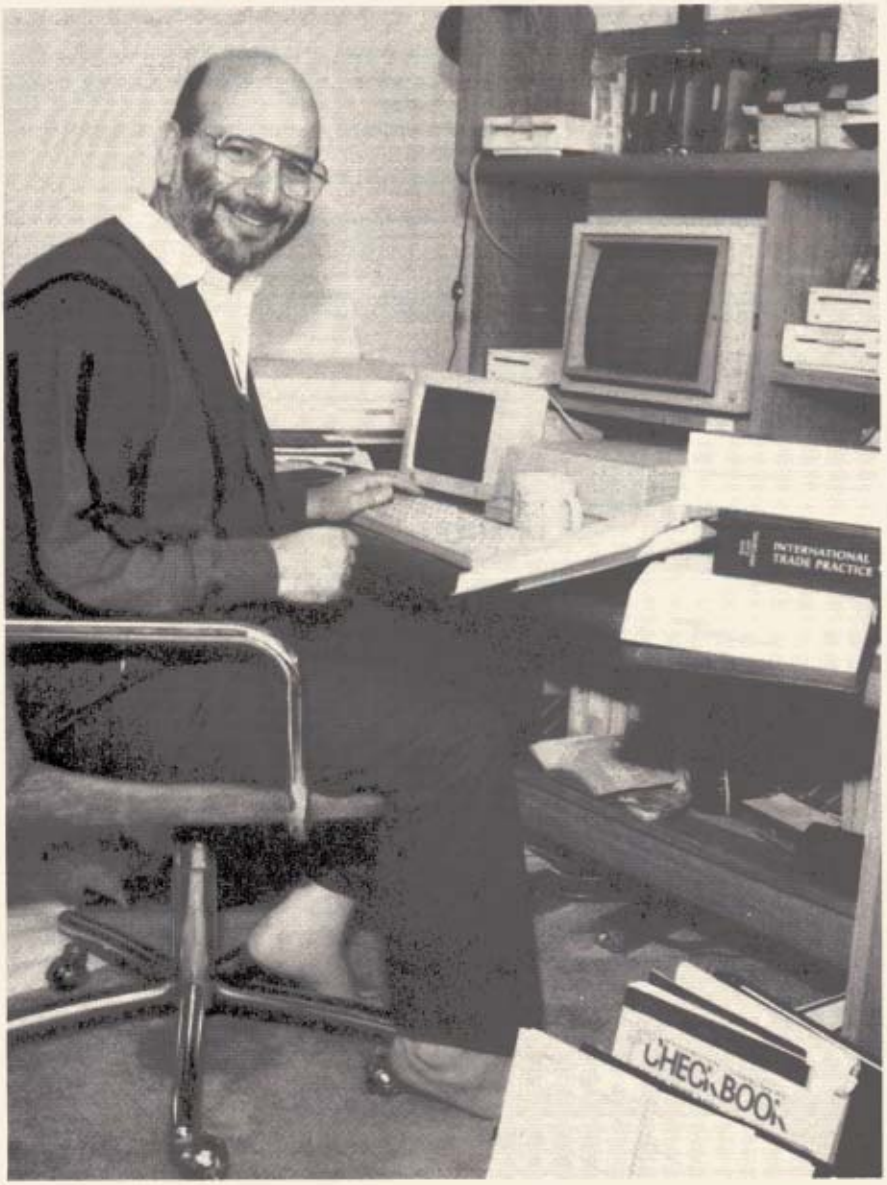
Now 18, Joseph is using the same system he configured four years ago, with one recent addition: a modem that he's "just using to death" exploring on-line services. "When I got my computer, it was just kind of a toy," he says. "But now when I'm working at my computer, I'm usually doing something constructive. It's much more of a productivity tool." A student at Pierce Junior College in Southern California, Joseph continues to write his term papers and reports with his IIe and Sierra On-Line's HomeWord and to keep track of his grades with The Apple Grade Book, from J&S Software. The only problem he's had with his four-year-old Scribe thermal-transfer printer (which Apple no longer makes) is that "it goes through ribbons too fast."

Joseph still pursues his passion for collecting baseball cards. He learned "enough BASIC to get by" from a next-door neighbor and has written a BASIC program that lets him sort his baseball cards by the name of the card, its year, condition, or value; see the entire list of cards; or edit the list. He also uses BASIC to write "little tiny" macros that make it easier for him do such things as getting into his catalogs. As a full-time student and a cashier at a local drugstore, however, Joseph doesn't have much time to play arcade-style games these days. He's working to save money for the necessary accessories to connect his synthesizer and drum machine to his Apple. Then he can bring his other hobby, music, to his trusty IIe. —*Leslie Steere*



MICHAEL JUSTICE

Apple Caseload



Harvey Kaye lives in Bethesda, Maryland, but is an attorney associated with the Boston firm of Cohen and Burg. How does he handle this seemingly impossible commute? He doesn't. He stays at home and lets his work do the traveling, using a IIGS and MCI Mail.

Kaye practices computer and copyright law from his home, where he has an Apple IIGS set up with a password so he can access its hard disk from anywhere he happens to be. He takes an Apple IIc with him on business calls, to the library, and everywhere else he needs to take notes or work on briefs. He carries a modem and an Apple LCD display in his litigation case, which is the same height and length as a standard attaché case but about three times as wide. Whatever he generates on the IIc he sends via MCI Mail to the IIGS, so he always has a backup of his work on his home hard disk. For drafts he runs an ImageWriter I and for final copy a daisy-wheel printer.

His rather unusual work style does initiate a lot of conversations. "When I go to the library, people invariably come by and wonder what I'm doing. I think people are still a little afraid of it," Kaye says. But he credits his system with getting him organized and saving him a great deal of time.

Recently, for example, he spent the afternoon at a client's house revising a legal agreement. He carried his IIc with him and entered all of the revisions directly into his Apple. When he got home, all he had to do was boot up and print out the new agreement. Gone forever are the hours he once spent dictating or writing things in longhand, waiting for them to be typed and proofed and sent back and forth by courier.

Kaye rarely leaves AppleWorks when he's working with his Apples. He handles correspondence and writes briefs using the word-processing module. He put TimeOut UltraMacros to work to create his own templates for brief and pleading formats and uses another TimeOut product, QuickSpell, with a custom legal dictionary.

He keeps his docket and file lists in an AppleWorks database file that's organized for searching on any of 12 different pieces of information, such as file date or serial number, a structure he finds "invaluable." Kaye also uses the database module to track his time, logging in each project's name, date, and file, and the amount and kinds of time he spends on it.

Kaye communicates with the Boston office of his firm, as well as with other attorneys, by accessing MCI Mail with MouseTalk. Similarly, rather than dedicating a machine to receive telexes, Kaye has a Western Union electronic mailbox, which he checks daily.

And recently the world opened up to instant communication with his Apples. Through MCI, he now can send information from his computer to anyone's facsimile machine. Just think: With attorneys such as Kaye, the next time a recalcitrant child scoffs at you for threatening again to change your will, you can have a revised testament in hand before the argument is over.

Brenda McLaughlin

LORI SUE MARTIN

For Further Information

816/Paint
Baudville, Inc.
5380 52nd Street SE
Grand Rapids, MI 49508
(616) 698-0888

Alphaplot
Beagle Bros, Inc.
6215 Ferris Square, Ste. 100
San Diego, CA 92121
(619) 452-5500

The Apple Grade Book
J&S Software
135 Haven Avenue
Port Washington, NY 11050
(516) 944-9304

AppleWorks
Claris Corporation
440 Clyde Avenue
Mountain View, CA 94043
(415) 960-1500

Bank Street Writer III
Scholastic Software
730 Broadway
New York, NY 10003
(212) 505-3000

Black Box ABCDE Switch
Black Box
P.O. Box 12800
Pittsburgh, PA 15241
(412) 746-5500

Complete Graphics System
Polarware
1055 Paramount Pkwy.
Batavia, IL 60510
(312) 232-1984

DB Master
Stone Edge Technologies
P.O. Box 200
Maple Glen, PA 19002
(215) 641-1825

Dazzle Draw
Brøderbund Software
17 Paul Drive
San Rafael, CA 94903-2101
(415) 492-3500

DeluxePaint II
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171

DeskWorks
StyleWare
440 Clyde Avenue
Mountain View, CA 94043
(415) 960-1500

Draw *Plus*
Activision, Inc.
3885 Bohannon Drive
Menlo Park, CA 94025
(415) 329-0500

Echo 2 Speech Synthesizer
Street Electronics Corp.
6420 Via Real
Carpinteria, CA 93013
(805) 684-4593

GEOS
Berkeley Softworks
2150 Shattuck Avenue
Suite 13/Penthouse
Berkeley, CA 94704
(415) 644-0883

Graphics Magician
Polarware
1055 Paramount Pkwy.
Batavia, IL 60510
(312) 232-1984

GS File
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BY VINCENT D. O'CONNOR

Five types of problems and how to prevent them

TAKING CARE of YOUR APPLE

A wise old flier of kites once noted that an ounce of prevention was worth a pound of cure. Although it's highly unlikely Benjamin Franklin had your Apple II in mind at the time, it applies equally well to your computers and peripherals.

Computer users often overlook or ignore conditions that lead to malfunctions and failures. Simple and inexpensive maintenance can reduce or eliminate those conditions, however, and extend the life of your computer as well as improve its overall performance and reduce repair costs. This article takes a detailed look at five types of problems and what steps you can take to avoid them.

Dirt and Contamination

Your Apple is exposed to a wide variety of dirt and other contaminants daily: dust, soot, tobacco smoke, bits of food, fiber particles, pieces of printer paper, oxide from disks, and loose printer-ribbon threads. Contaminants such as these find their way onto and into your computer.

Dirt on external surfaces is annoying. Dirty screens are difficult to read; dirty housings are unsightly; dirty keys feel uncomfortable. Contaminants on internal surfaces are much more serious, though.

Contaminants blocking cooling vents and fan filters can cause heat buildup, which leads to component failure. Contaminants such as graphite particles from pencils, magnetic oxides, and soot, can create short circuits that cause erratic operation and component failure. Contaminated cables, connectors, and switches can fail to make good contact. As a result, data can be garbled, especially when you're using a modem to transmit or receive it. Contaminated drives can cause data misreads that show themselves as I/O errors, damaged disk surfaces, and random errors.

The best cure for dirt and contamination is preventive maintenace. Don't smoke or allow smoking near your computer. Don't eat or drink while using your computer. And keep your hands clean. Dirt on your hands almost always ends up on your computer.

If you have a wood stove or kerosene heater, keep the computer away from it. Even modern wood stoves release smoke, ash, and soot. Kerosene heaters are worse, depositing a mist that condenses on disks, drive heads, screens, and circuit boards. The mist is greasy, conducts electricity, and is difficult to remove. In time, it eats into the plastic casing of your computer.

Clean Up Your Act

Clean your system on a regular basis. How often depends on how dirty the environment is, but once a month should be sufficient in most cases. You can buy commercial cleaning kits, but many common home items work just as well.

Wipe outer surfaces with a household cleaner such as Fantastik or Formula 409. Don't use petroleum-based cleaners, since they can damage painted surfaces. You can clean most monitor screens with any household glass cleaner and a paper towel or lint-free cloth. Beware, however, of antiglare screens and monitors with antiglare coatings, such as the old Ap-

ILLUSTRATIONS BY DAVID FLAHERTY

ple monitor III. Glass cleaners tend to remove the coatings on these screens, destroying the antiglare properties and making the display difficult to read. Clean them only with a lint-free cloth or a cleaner approved by the manufacturer.

Never spray the cleaner directly onto the computer or monitor screen. Apply the cleaner to a paper towel or lint-free cloth so that it's damp but not soaking wet; then wipe. This method prevents excess cleaner from getting into disk drives or cooling vents.

Clean between the keys with one of the commercially available cleaning swabs or a cotton swab moistened with isopropyl alcohol. A can of compressed air with a narrow nozzle will blow away most contaminants underneath the key caps. You can find compressed air at most photo supply stores or purchase it from a company that makes or distributes computer cleaning supplies.

If your keyboard is really *grimy*, you may want to pry the key caps off with a bent paper clip and soak them in water with a mild detergent. If you must operate your system in less-than-ideal surroundings, investigate the SafeSkin from Merritt, a see-through protective plastic cover for your keyboard.

Cleanse disk-drive heads periodically with a low-abrasive cleaning diskette and cleaner. For $19.95, ThirdWare Technology's VeriClean software automates the process by manipulating the read-write heads for optimal cleaning. Alternatively, you can open the drives and clean the heads carefully with a cotton swab and either isopropyl or denatured alcohol. You do need to take care when opening the drives, though, and doing so usually voids any warranty.

Don't forget to clean your printer. Use a small vacuum cleaner to remove accumulated dust and paper particles. Use isopropyl or denatured alcohol and a paper towel or lint-free cloth to clean the print rails (the metal bars that the print head "rides" on). Once you've cleaned it, apply a few drops of silicone spray or a lightweight oil such as 3-in-1 or sewing-machine oil on a paper towel or lint-free cloth, and lubricate the rails. Clean the platen (the black roller over which the paper feeds) with denatured alcohol to remove any ink and gloss that builds up over time. Remove the print head (see your printer manual for instructions) and soak it with the pins down in isopropyl alcohol for about half an hour.

Static Charges

If you've ever walked across a carpet and gotten a shock when you touched a door handle, you've felt the power of static electricity. A person can feel a static charge only when it reaches about 2,500 volts; far less can damage or destroy electronic parts, however. Studies at the 3M Corporation have shown that the build-up of static electricity of a person walking across a carpeted floor is about 12,000 volts; under the same conditions, the average accumulation when you walk across a vinyl-tile floor is 4,000 volts.

Static can not only damage electronic components, but it can also alter or delete the contents of RAM and disks, blank the monitor's display, cause unwanted printer carriage returns, and more. Cables connecting peripherals such as printers, disk drives, and modems are especially vulnerable: A person walking over a cable can cause static to discharge into it.

Static can't be eliminated, but you can reduce it. Ideally, you should keep the humidity at about 50% and remove carpets and rugs from the work area. Make sure all equipment is properly grounded. Don't defeat three-pronged cords by using a two-prong adapter without connecting the grounding wire or by cutting or bending the third prong on the cord.

Place antistatic mats under chairs and anywhere people walk by and can touch the computer. The best mats have a grounding wire that conducts static away from the area, but they work only if they're properly grounded. You should route connecting cables under antistatic mats or place them where you can't touch or step on them. You can also use antistatic sprays or wipes, but they are effective only for a short time. You must reapply them at regular intervals.

Problems

Power problems come primarily in three categories: power surges, power drops and failures, and line noise. Most are caused by lightning strikes on lines and transformers; damage to underground cables; power switching; and appliances such as washers, refrigerators, and the like. Line noise can garble data, whereas power surges can damage or even destroy components.

Surge and noise protectors can prevent problems due to power surges and line noise and come in various sizes and capacities. Some plug into the wall, and others are built into power strips and come with their own circuit breakers. More powerful (and more expensive) are line conditioners, secondary power supplies that watch for overvoltage and undervoltage.

When you're deciding what type of surge/noise protector to buy, there are four values you should be concerned with: response time, noise rejection, peak current, and maximum transient voltage. Response time is how quickly the protector reacts after sensing a power surge. It is usually rated in nanoseconds or picoseconds, with picoseconds being the faster response time. Noise rejection is measured in decibels (db) and frequency range. The higher the decibel number, the more the noise that's eliminated. Thus a noise reduction of 60db is better than a noise reduction of 20db. The frequency range indicates the frequencies of noise the filter rejects; the wider the range, the better the filtering. Finally, the peak current and maximum-transient-voltage ratings indicate the maximum suppressible current. The ratings are in amps; the higher the number, the better the protector.

If you need to protect against power drops and loss, you need a standby or an uninterruptible power supply (UPS). A standby power supply automatically kicks in in the event of a power loss or severe low-voltage condition. An uninterruptible power supply differs in that it always powers the computer, charging its own internal batteries while there is incoming power, and continuing to supply battery power to the computer (and sometimes peripherals) when line power fails. Both standby and uninterruptible power supplies usually contain surge and noise protectors as well.

A UPS is generally more expensive than a standby power supply because it's designed to provide power constantly. The advantage is that the power is always regulated, providing protection against low-voltage conditions that aren't severe. It also has no switching transients that can damage sensitive

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equipment or add-on cards. Typically, neither type of external power supply provides electricity for more than five to ten minutes, just long enough to allow you to save your work in progress, exit from the application, and shut down your system.

Both standby and uninterruptible power supplies begin at 200 watts and can go to megawatts. Before you buy, make sure you know how much power your total system consumes and allow for items such as new printers, add-on boards, and other peripherals you may purchase in the future.

Magnetic Fields

Every electrical or electronic device generates some kind of electromagnetic field. Items such as motors, bells, buzzers, stereo speakers, and transformers contain either permanent magnets or electromagnets. Many common metal objects—paper clips, scissors, screwdrivers and other tools, even staples—may be magnetized. Your Apple generates magnetic fields as well, from the disk-drive motors and transformers in the monitor.

Damage from magnetic fields can be hard to pinpoint. It can manifest itself as garbled or lost data from disks, altered monitor displays, and transmission errors in networks. You should keep your computer three to six feet from potential sources of stray magnetism including phones with mechanical bells, photocopiers, standby and uninterruptible power supplies, and audio speakers. For example, locating Bose RoomMate speakers close to a monitor can cause the colors on the screen to warp or wash out. Another problem common primarily to Apple IIc owners is disk-drive errors that result from placing the computer directly under the monitor.

Store floppy disks in a closed box or case away from your computer. Don't place disks on top of the monitor or disk drives, and don't store them any closer than three feet from the computer or other potential sources of stray magnetism.

Heat Buildup

If you read the manual for any of the components that make up your computer system, you'll notice that each item has a specified operating and nonoper-

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Flight notes # 2B

Wrapping Up Europe - The deadline for entering our "Find Red Square" contest was November 15th, 1988. Current plans call for a mid-December drawing to determine the contest winner. This contest, requiring you to use **Flight Simulator** or **Jet** to locate Red Square on our new **"Western European Tour" Scenery Disk,** was as much fun for us as it was for you! Watch for another Scenery Disk promo contest next year.

The ThunderChopper/SubLOGIC Connection - ActionSoft Corporation was originally set up as a separate marketing arm for SubLOGIC-engineered, quickly-produced, low-cost simulations specifically designed for mass market channels. We soon discovered that SubLOGIC engineering is incapabable of cutting corners when it comes to developing new products. Instead, they spent many months turning ThunderChopper into a very different and desirable type of helicopter simulation. In a departure from most wargame-type scenarios, ThunderChopper assigns you first to aerodynamic flight training, and then to rescue missions. Even combat missions are defensively oriented in that your primary assignment is to escort your combat units. You only get to "shoot-'em-up" when defending your troops from enemy attack. Colonel Jack Rosenow, President of ActionSoft, was the helicopter flight instructor at the University of Illinois. He provided us with the insight (as well as the ultimatum) to make ThunderChopper's vertical flight characteristics the most accurate of any helicopter simulator on the market. This makes it unusually nice to fly.

Its Back! Not advertised since early 1984, the classic **Night Mission Pinball** will be back in production once again by the time you read this. Priced at only $29.95, now everyone can afford to add this classic to their software collection. If you're a family person like myself, be prepared to be without your computer for extended periods of time. Pinball's uncanny realism and general appeal has a way of captivating everyone.

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ating temperature range. Staying within the specified range is important. If the temperature drops too low, mechanical operations such as printing and disk access can become sluggish. If the temperature goes too high, the life of the electronic components can be shortened, causing more-frequent failures and intermittent errors.

Correct placement of your computer is the key to keeping it cool. Never install it where it will be exposed to direct sunlight for extended periods of time. Overheating can occur rapidly when direct sunlight falls on the computer. You should also keep it at least six feet from heating vents and radiators, including space heaters. Never allow heating vents to blow directly on any part of the computer.

Make sure all cooling vents on the computer and peripherals are clear and free of dirt and other contamination. Don't place your computer against a wall, and don't stack components. Too many people stack their disk drives on top of the computer and then the monitor on top of the disk drives. This practice concentrates the rising heat in the uppermost component and blocks a significant portion of the cooling vents.

For all Apples except the IIc, it's wise to add a cooling fan to circulate air, especially if your slots are full of add-on cards. Internal cards add their own heat and increase the heat the power supply generates, because of the greater drain they place on it. Laser 128 and Apple IIc owners should always prop their systems up, using the handles on the back of the computer to promote convection cooling.

The rewards for keeping your computer in top condition may not be readily identifiable, but spending the time and effort will improve the chances that you and your computer will have a long and happy relationship. ✚

Vince O'Connor is a free-lance writer, programmer, and co-owner of MAH Software Services, which provides training, consulting, and custom programming for small businesses.

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GS/OS OPERATING SYSTEM

GS/OS, Apple Computer's new 16-bit native-mode operating system for the Apple IIGS, is finally here. Introduced at the San Francisco AppleFest last September, this new operating system is the successor to ProDOS 16, the operating system Apple released with the IIGS two years ago. GS/OS is significantly faster and better than ProDOS 16, and nearly everyone with a IIGS should make the switch. If you're nervous about sacrificing your investment in application software, don't be. All ProDOS 16-based programs should run under GS/OS.

GS/OS is part of a $39.95 package called Apple IIGS System Software Update Version 4.0 (product code A2D6013). The package includes two disks (System Disk and System Tools) and two manuals—*Apple IIGS System Disk User's Guide* and *Apple IIGS System Tools*—that describe the new system and its utility programs. Apple lets authorized dealers and licensed users' groups update older system disks at no charge. Take advantage of this service only if you can survive without the manuals, however. Buyers of new IIGS systems will find System Disk 4.0 included in the box with the computer.

To use GS/OS you need 512K of memory and ROM version 01. If the ROM version number doesn't appear at the bottom of the screen when you turn on your IIGS, you've got the original ROM and should upgrade. The upgrade is free at authorized Apple dealers.

NEW OPERATING-SYSTEM FEATURES IN BRIEF

- Faster boot time to the Finder desktop
- Faster disk and file copying
- Accelerated disk read and write operation
- Thermometer progress display during file operations
- More flexible and complete peripheral support, including AppleCD SC drives, Epson printers, and MIDI interfaces
- Unlimited active volumes and open files
- SCSI hard-disk partitioning utility
- An Erase without Reformat disk command
- Improved resources for hard-disk file handling

Cruising with GS/OS

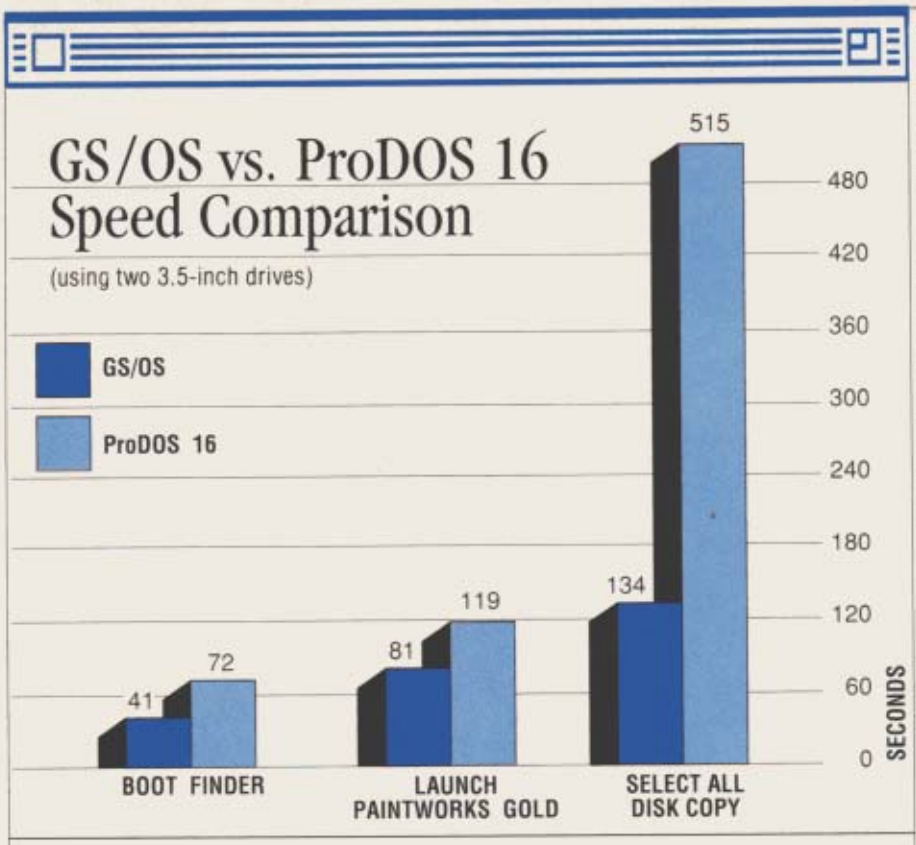
The first noticeable feature of GS/OS is its remarkable speed (see chart). Booting to the Finder desktop takes a fraction of the time it did under ProDOS 16. Standard disk reading and writing operations are also significantly faster.

There are several reasons for the speed increase.

First, GS/OS is written in fast 16-bit 65816 assembly language. Unlike ProDOS 16, GS/OS is not just a shell that sends commands to a slow 8-bit ProDOS 8 core.

Also, GS/OS uses a disk-caching scheme, setting aside a portion of RAM where it stores frequently accessed disk blocks for quick retrieval from memory rather than disk. The default cache size is 32K, and you can change it in 32K increments, using a New Desk Accessory called Disk Cache. The bigger the cache, the better the performance, provided you've left enough memory for your applications.

PHOTOGRAPHY BY TOM UPTON



The GS/OS disk input/output code is so efficient that in one disk revolution it can read (or write) all the blocks in a track, even if the blocks are twice as close together as they are on a standard ProDOS 16-formatted disk. Putting blocks closer together results in shorter disk-seek times and faster file I/O operations. GS/OS puts the blocks closer together when it formats a disk, using a formatting option called 2:1 block interleave. Both ProDOS 8 and ProDOS 16 can read disks created in this manner, but not as efficiently as GS/OS does.

File System Translators

We all know how awkward it can be to exchange files with non-Apple II computers. Since these systems don't use ProDOS-compatible file systems, you can't just put another computer's disk into your drive and read it. Instead, you have to telecommunicate files, transfer them over a network, or use special conversion utilities such as Apple File Exchange.

This situation will change with GS/OS. It uses software modules called file system translators (FSTs) to allow any GS/OS application to access data files on disks formatted for foreign operating systems. An FST accepts standard GS/OS commands, performs the operations necessary for the foreign operating system in question, and then returns results in GS/OS form. All these actions happen transparently—neither you nor the application needs to know what type of file system it is dealing with.

At present, GS/OS comes with only three FSTs. One is for the ProDOS file system the GS/OS system disk uses, and another is for the High Sierra file system adopted for use on CD-ROMs. The third is an FST for character-oriented devices such as the keyboard and the video display. It lets GS/OS applications deal with character devices almost as if they were disk devices with files. Users won't be aware of the "behind the scenes" work this FST does, but programmers are sure to appreciate the way it simplifies I/O operations.

You can certainly expect to see other FSTs in the future. At the top of the wish list is an FST that would allow GS/OS to communicate with an AppleShare file server. Right now, GS/OS does not work with AppleShare, so you still have to use ProDOS 16 if your computer is connected to a AppleTalk Network System (see *A+*, May 1988). GS/OS does allow you to use AppleTalk as a means of accessing network printers, however. Another valuable FST would be one that handled Macintosh HFS (Hierarchical File System) disks. Of course, a Mac FST would allow the IIGS only to exchange data files, not to execute Macintosh programs.

An FST for MS-DOS may not be too useful, since MS-DOS disk formatting involves a recording technique that is not compatible with the one that Apple drives use. Theoretically, an MS-DOS FST would work, if a disk driver existed for nonstandard drives capable of reading MS-DOS disks, such as the Envoy drives from Asky (see *A+*, August 1988).

Device Drivers

The SYSTEM/DRIVERS/ subdirectory on the GS/OS boot disk contains drivers for most of the disk devices you're likely to use. When you boot GS/OS, it scans the system, looking for disk devices; when it identifies one for which a driver exists, it loads the driver into memory and installs it. If it can't find a driver for a 3.5-inch disk drive, it generates one on the fly. GS/OS doesn't generate drivers for SCSI (Small Computer System Interface) hard-disk drives or 5¼-inch floppy-disk drives, however, so you must be sure to install the necessary driver files with the GS/OS Installer program (see "Utility Programs," which accompanies this article).

GS/OS also uses drivers to communicate with character devices. The Console Driver, for example, manages keyboard input and text-screen video output.

Having a separate file for each driver allows you to remove the ones you don't need from your boot disk. If drivers were part of the main operating-system file, you couldn't do so, and you'd end up with increased boot times and less free space on the disk. Also, as new drivers are released and old ones modified, updating your disks will be easier.

Device Identification

GS/OS assigns a unique device number and name to each device it finds in the system. It assigns numbers consecutively, beginning with 1; names begin with a period and can be up to 31 characters long. A few examples are .DEV3, .APPLEDISK3.5A, and .SCSI1. You can use device names instead of specific volume names when you need to

APPLE II OPERATING SYSTEMS: A HISTORY

In the winter of 1977–78, Steve Wozniak, the inventor of the Apple II, designed a controller card for a disk-drive unit that would later be named the Disk II. At the same time, other engineers at Apple were busy writing a disk-operating system programmers could use to create, organize, and access files on the 5¼-inch floppy disks the Disk II would use.

The Disk II, the controller card, and the first released version of the operating system, called DOS 3.1, shipped early in the summer of 1978. (The Disk II was later renamed the UniDisk and then the Apple 5.25 Drive.)

Apple programmers made several changes to DOS 3.1 in the months following its initial release. It finally stabilized at version 3.2.1 in mid-1979. This early version of DOS formatted 5¼-inch disks with 35 data tracks, with 13 256-byte data sectors per track, for a total of 113.75K of storage (1K = 1,024 bytes). The program in ROM on the controller card could boot only disks using this 13-sector format.

Apple also released its Pascal operating system, which is still available today, in 1979. This system manages files quite differently than DOS and ProDOS do, so you need special utility programs to transfer files between Pascal and DOS.

Apple modified DOS 3.2.1 in 1980 so it would work with the Apple Pascal 16-sector-per-track formatting scheme. The result was DOS 3.3, a version that was still current when Apple released ProDOS in early 1984. The formatting change also forced a change in the ROM-boot program on the disk-controller card. The main advantage of switching to the new formatting scheme was that 5¼-inch disks could hold an additional 16.25K of information (for a total of 140K). The main disadvantages were that DOS 3.3 could not read files directly from a DOS 3.2.1-formatted disk and that DOS 3.2.1 disks could not boot directly. Apple supplied a program called MUFFIN for transferring files from the old disk format to the new one and a program called BOOT13 for booting DOS 3.2.1 disks with a 16-sector drive controller.

Apple first released ProDOS 8, then called simply ProDOS, in January 1984. With this release, Apple served notice that it would no longer release new software products that used DOS 3.3 and urged independent software developers to follow suit. Nevertheless, DOS 3.3 remains a popular operating system, particularly among developers of educational software, and new programs that use it are still common.

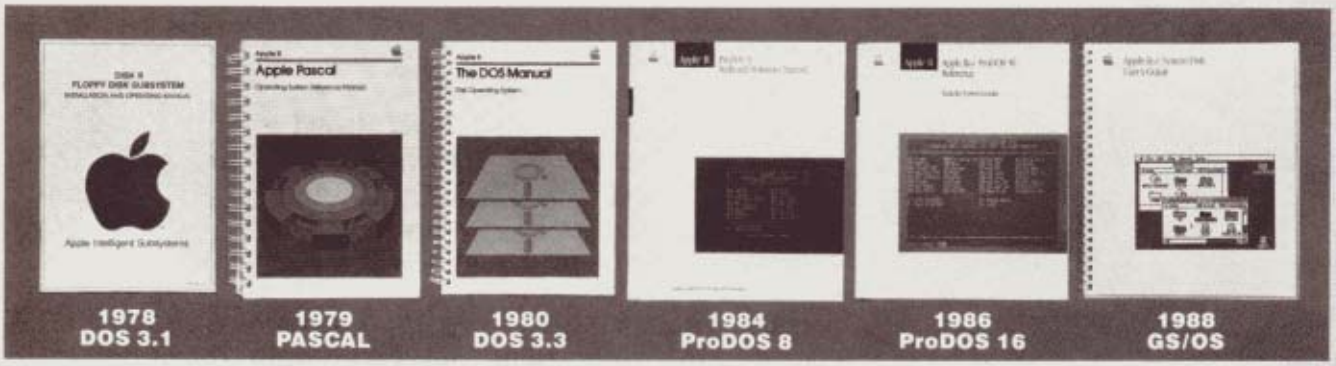
Also in January 1984 came a ProDOS 8-compatible controller card for the 5Mb ProFile hard-disk drive that Apple had released a couple of years earlier for use with its Apple III system. Apple later replaced the ProFile with the 20Mb HD20SC hard-disk drive, a SCSI (Small Computer Systems Interface) device. It connects to the system through the Apple II SCSI Card.

In September 1985, the UniDisk 3.5 drive made its first appearance. Its medium is a 3.5-inch, removable, hard-shell disk with a storage capacity of 800K. Simultaneously, Apple came out with the Apple II Memory Expansion card (a RAM-disk device).

When Apple announced the Apple IIGS in September 1986, it changed the name of the original ProDOS to ProDOS 8 and released ProDOS 16, an operating system designed specifically for the IIGS. Although ProDOS 16 formats disks and stores files on disk in exactly the same way ProDOS 8 does (meaning the two can coexist on one disk), they are incompatible with each other at the programming level.

With the IIGS came the Apple 3.5 Drive, another drive that used 800K, 3.5-inch, hard-shell disks. The difference between it and the UniDisk 3.5 is that it doesn't have an intelligent processor built in, as the UniDisk 3.5 does, and it works on the Macintosh and IIGS only.

Finally, in September 1988, Apple began providing GS/OS, the successor to ProDOS 16, as the primary operating system for the Apple IIGS.



provide a full pathname to an application. Unlike ProDOS 8, GS/OS does not use slot and drive numbers to identify disk devices.

Extended Files

ProDOS uses two different file structures, one for directory files and the other for general data files. GS/OS works with these two structures and adds a third for extended files, the type of file the Macintosh HFS operating system uses.

An extended file contains two logical segments, the data fork and the resource fork. The data fork generally contains application-specific information (such as the program code itself), and the resource fork generally contains data structures that define such user-interface elements as menu items, dia-

GS/OS GOODIES: UTILITY PROGRAMS

The GS/OS operating system comes packaged with three major utility programs: the Finder, Advanced Disk Utility, and the Installer.

THE FINDER

As most Apple IIGS users know, the Finder is a utility program you can use to perform a myriad of useful disk- and file-maintenance operations—copying, deleting, renaming, formatting, and so on—and to launch applications. It uses a standard Apple desktop interface, complete with windows, pull-down menus, and icons.

The new GS/OS version (1.2) of the Finder is significantly better than the one that came with ProDOS 16 for the past year; it has several new features and has been rewritten to use the more powerful GS/OS commands.

The most impressive feature of the new Finder is that it copies groups of files much faster than its predecessor did, using the GS/OS Session Copy command (see chart). When you're copying files under other operating systems, the disk read/write head frequently moves between directory blocks and a file's data blocks, a relatively time-consuming operation. This Session Copy command saves time by minimizing movement of the disk read/write head during a multiple-file-copying operation by deferring all directory-write operations until the end of the session.

The Finder now keeps you better informed of the progress of multiple-file operations, such as copying, deleting, and validating. It displays the relevant filename, along with a thermometer gauge that gradually fills with red ink as an operation proceeds (see figure 1), completely filling up just as the operation ends.

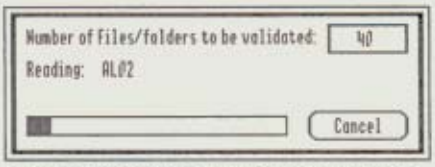


Figure 1: The Finder uses a thermometer gauge to indicate the status of a multiple-file operation.

There are three new Finder commands. Verify Volume lets you check whether each block on a disk volume is readable. Validate lets you check the integrity of a file or a group of files. Shut Down lets you gracefully quit the Finder so that you can either power down (do a "frigid" boot) or restart (do a "cold" boot)—see figure 2. A frigid boot destroys the contents of the IIGS RAM disk and forces you to reinitialize it, just as if you had turned the power off and on. A cold boot doesn't destroy the RAM disk unless you tell it to by setting a Finder Preferences flag.

Figure 2: This Finder dialog box shows the options available when you select the Shut Down command.

ADVANCED DISK UTILITY

The Advanced Disk Utility program on the GS/OS System Tools disk lets you perform four volume-preparation tasks: initializing a disk, erasing a disk, zeroing a disk, and creating multiple partitions on a SCSI hard disk (see figure 3).

Initializing a disk involves formatting the disk medium so that GS/OS can access it (which takes about 45 seconds for an 800K 3.5-inch disk) and writing out an empty volume directory. If you know a disk is already formatted, you can just erase or zero it instead, thus saving the formatting time. Both erasing and zeroing involve writing out an empty volume directory. Zeroing goes a step further, though, writing the new directory only after zeros have been written to every block on the disk. Zeroing is for the security-conscious: It means that no one can use disk-block readers to determine what used to be on the disk.

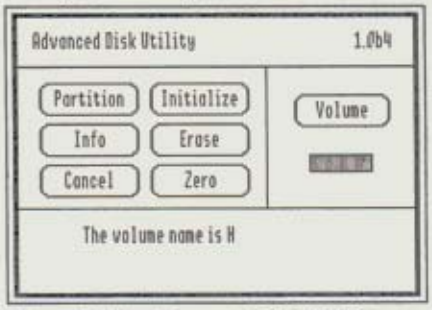


Figure 3: The Advanced Disk Utility program lets you perform several disk-related commands.

The partitioning command lets you subdivide one physical hard disk into several logical volumes. You will want to do so for very large disks because GS/OS recognizes ProDOS-formatted volumes only up to 32 Mb. You may also want to partition a hard disk and dedicate different volumes to distinct projects or applications.

log-box templates, cursor shapes, text strings, and so on.

A programmer can use extended files to separate the code for a program from the data structures the program uses, which simplifies customizing the look and feel of a

THE INSTALLER

GS/OS comprises many different files arranged in many different subdirectories on two disks. Installing these files on your favorite boot disk (such as a hard disk) is no easy feat if you have to do it manually. First, you have to transfer every file in each directory on the System Disk to the boot disk. Then you have to figure out which of the optional driver files on the System Tools disk you might need and transfer them to the boot disk as well.

Happily, Apple has included an Installer program that automates boot-disk updating. When you start the Installer, it displays the names of several installation scripts in a window (see figure 4). A script is a set of instructions the Installer follows to transfer a file or a set of related files from one volume to another.

One script is for installing the basic GS/OS system, and the other scripts are for installing optional printer drivers, disk drivers, and file-system translators. In order to install the correct files, all you have to do is select the desired target disk and the appropriate script. After installation, your disk will be updated, and any custom desk accessories, fonts, and startup files that were on the disk will still be there.

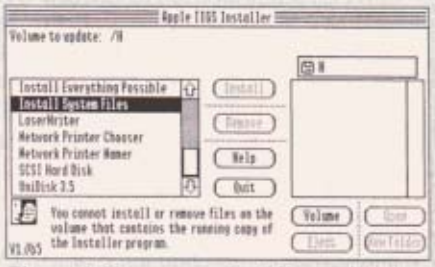


Figure 4: You can use Installer scripts to add operating-system files automatically to your standard boot disk.

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program or localizing it for use in foreign countries.

When Apple starts defining the structures of resource elements, we will begin to see more and more applications using extended files. We can also hope to see the emergence of resource editors you can use to personalize programs by changing the names of menu commands, the appearance of dialog boxes, and so on.

Other Improvements

GS/OS has several other important capabilities that ProDOS 16 does not:

- GS/OS allows an unlimited number of open files and active volumes. ProDOS 16 allows only 8 open files, 14 active volumes, and 2 devices per slot.
- GS/OS processes interrupts more quickly than does ProDOS 16.
- GS/OS has 32 user-definable prefixes, whereas ProDOS 16 has only 16.
- GS/OS allows fast "session" copying (see "Utility Programs").
- All GS/OS error-message strings are in one file on disk, which makes it easier to translate GS/OS into other languages.

Something to Get Excited About

It is usually difficult to get excited about an operating system, especially if you aren't a programmer. After all, an operating system works anonymously backstage, while attention focuses on application programs performing front and center.

But you should be excited about GS/OS. First and foremost, it's fast. The efficient assembly-language code and disk-caching technique speed information wherever it needs to go, improving the performance not only of operating-system functions but also of application programs. Other facets of GS/OS, such as the Advanced Disk Utilities and the improved Finder, both add new features and make the system easier to use. And the new extended file format and file system translators hold the promise of an exciting future. ✚

Gary Little, a former editor of A+ magazine, is now manager in the Developer Tools Group at Apple Computer. His new book, Exploring Apple GS/OS and ProDOS 8, *is due out this winter from Addison-Wesley Publishing Company.*

THE OTHER SIDE OF GS/OS

Although GS/OS gives programmers nifty new tools and owners a speedier machine-language operating environment, it also calls attention to and fails to solve several software/hardware problems.

Although GS/OS provides a degree of acceleration (see benchmark chart), the IIGS's disk access and screen redrawing can remain sluggish, particularly with the larger and more complex programs being created for the IIGS. Maximum disk-access speed is available only if programs use new GS/OS resources.

The new File System Translators (FSTs) provide a potential link to other disk formats. Without a disk drive capable of reading foreign formats, notably MS-DOS, however, IIGS owners still must resort to null-modem and telecommunications links or file-conversion programs to share data with many other computers. Until a more versatile Apple disk drive, such as the 1.44Mb FDHD external drive announced concurrently with the new Mac IIx, is generally available, FST offers only half a solution.

With the High Sierra FST, GS owners can now access a wide range of compact discs, using the AppleCD SC CD-ROM drive. Unfortunately, most of these discs contain data that only MS-DOS applications can read. Without subsequent file conversion, the ability to copy these files to the GS is meaningless. Unless disc publishers format data as ASCII text files or someone develops appropriate translators for IBM-format files, the AppleCD SC will remain useful only as an overpriced audio compact-disc player.

Finally, the inability of GS/OS to function on computers networked with AppleTalk to an AppleShare file server is a serious shortcoming. Although Apple recognizes the need for an AppleShare-compatible version of GS/OS, networked users will have to get by with ProDOS 16 until Apple releases such an update. *–BL & OWL*

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