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A+

The #1 Apple II Magazine

JUNE 1987
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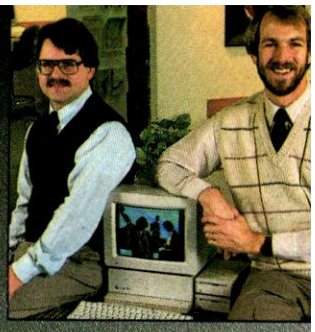

Creating the IIGS Sales Demo

Apple IIe

How To Make MONEY With Your Apple II

RIBBONS
How to Get New Life From Old Printer Ribbons

ENTERTAINMENT
Championship Wrestling, Moonmist, Infiltrator, Battle of Antietam, Shanghai

SECRET RAMDISK
Where to Find a Bonus RAMDisk in ProDOS

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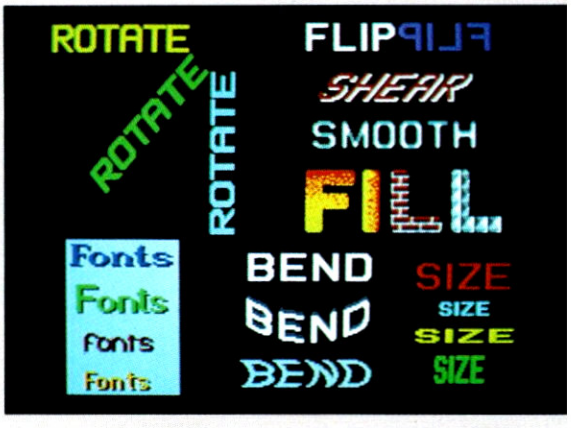

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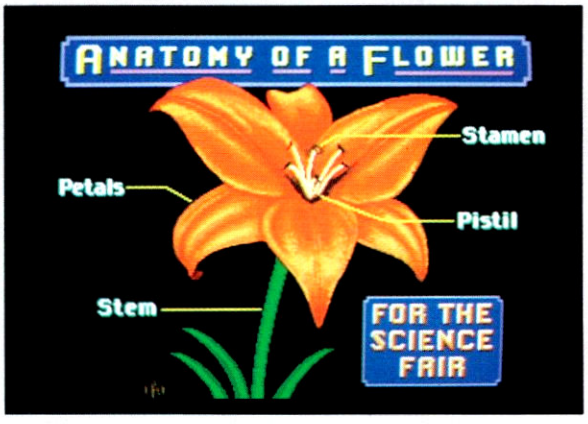

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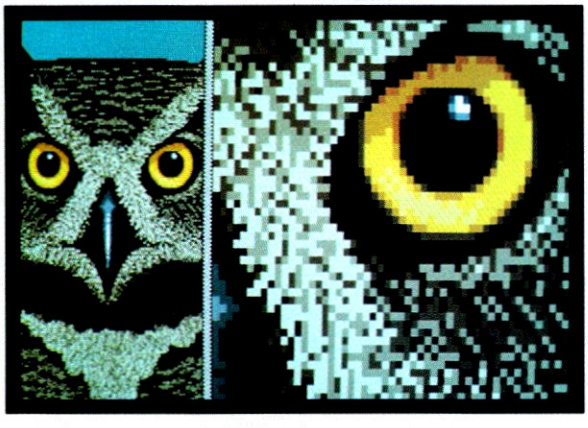
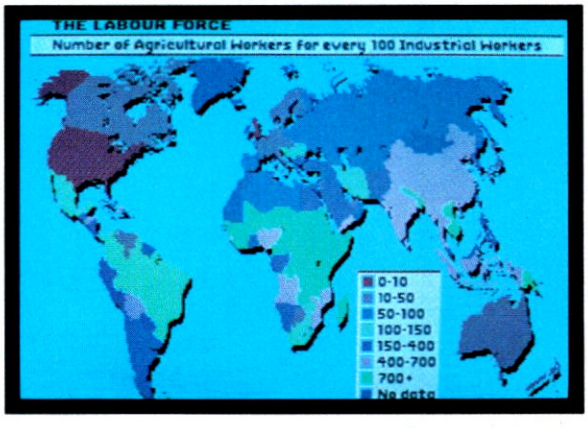


Zoom in through four levels of magnification and put the gleam in the owl's eye.



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If you jumped the gun and bought Paintworks Plus™—or any other Apple IIGS paint program—here's your chance to get the best for HALF PRICE! Just send us $49.95 and the front manual cover from your current program before July 31, 1987, and we'll send you DeluxePaint II. (You save $50!) We'll even give you a 30-day, no-questions-asked, 100% money-back guarantee on this upgrade offer if you're not completely satisfied. How's that for backing our claim?

DeluxePaint II requires 768K of RAM. The upgrade offer is only available directly from Electronic Arts. Send check or money order for $49.95 (or VISA/Mastercard information) AND THE FRONT COVER OF ANY APPLE IIGS PAINT PROGRAM MANUAL (no facsimiles accepted) to ELECTRONIC ARTS, DELUXEPAINT IIGS UPGRADE, 1820 Gateway Drive, San Mateo, CA 94404. Allow 4-6 weeks for delivery.

TO ORDER DELUXEPAINT II: Visit your retailer. If you can't find DeluxePaint II there, call 800-245-4525 (in CA 800-562-1112), and place a direct order on your VISA or Mastercard. To order by mail, send check, money order, or VISA/Mastercard information to Electronic Arts Direct Sales, P.O. Box 7530, San Mateo, CA 94403. The regular direct-order price is $99.95; add $3 for shipping and handling ($5 Canadian). There is a 30-day money-back guarantee on direct orders. Allow 6-8 weeks for delivery. Apple IIGS is a trademark of Apple Computer, Inc. Paintworks Plus is a trademark of Activision, Inc. DeluxePaint II is a trademark of Electronic Arts.

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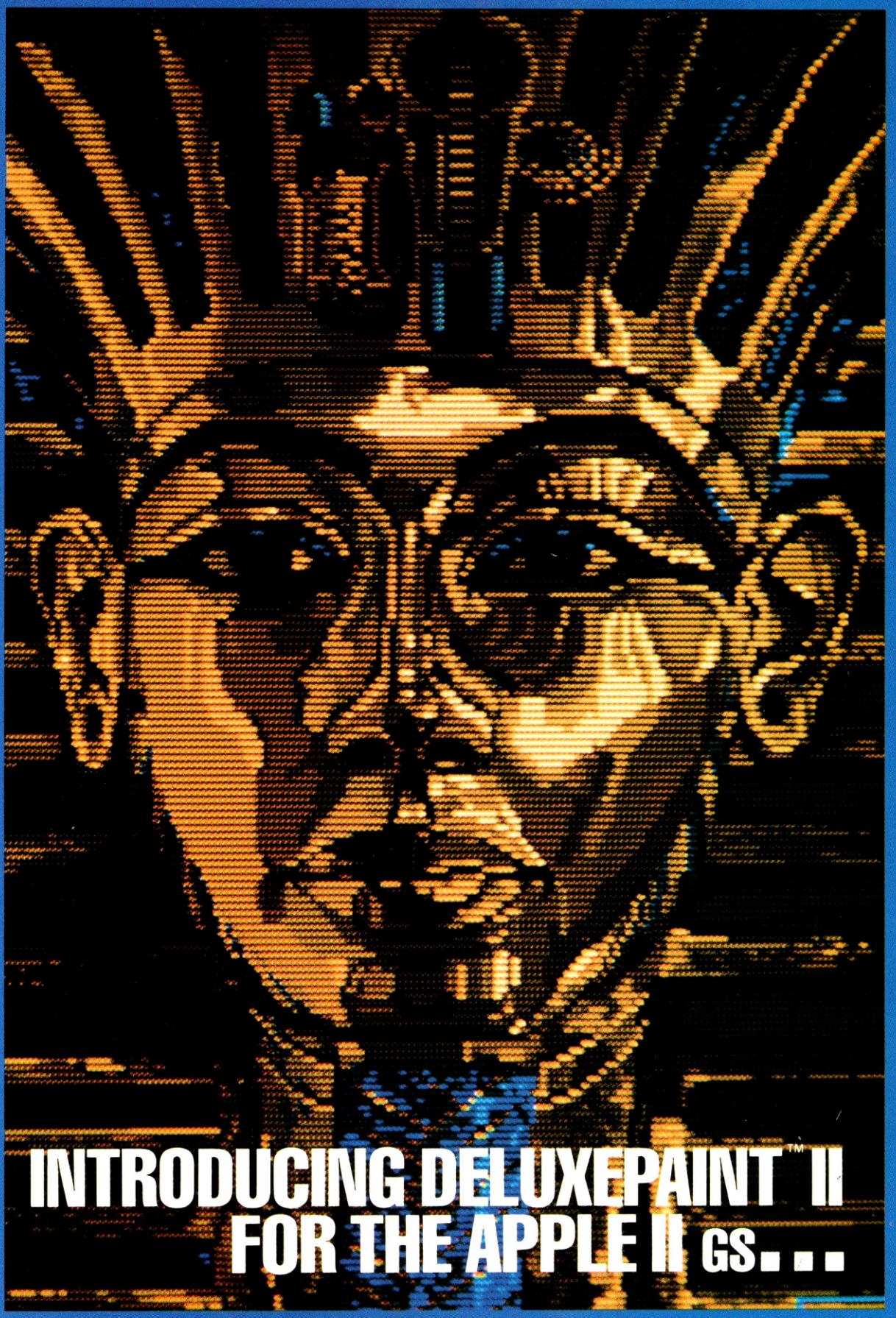
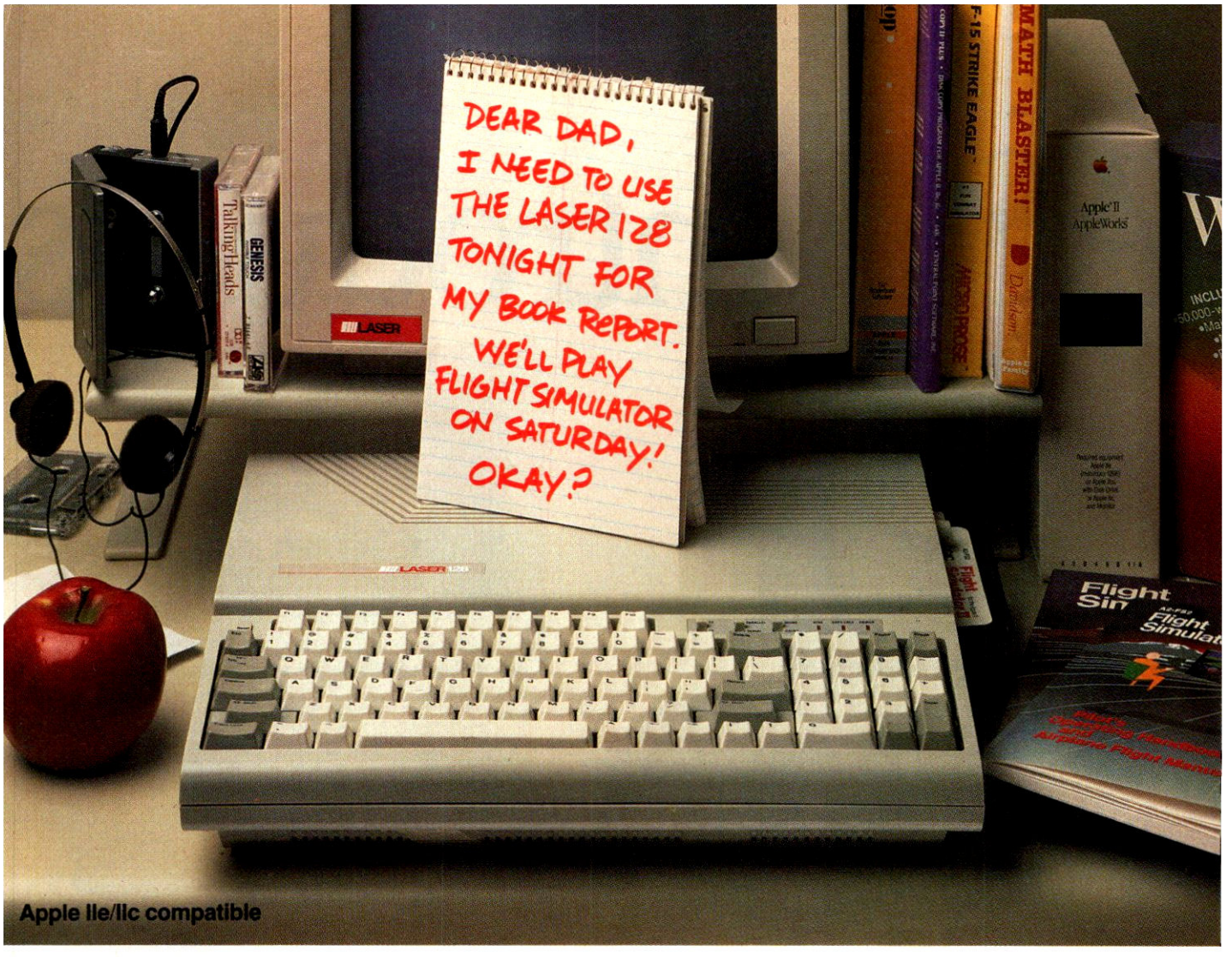

INTRODUCING DELUXEPAINT™ II
FOR THE APPLE II GS...



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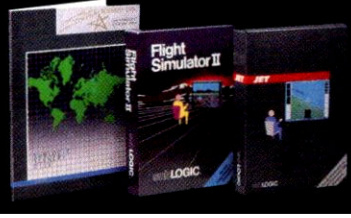

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Turn Your Child's Summer into a Valuable Learning Experience!

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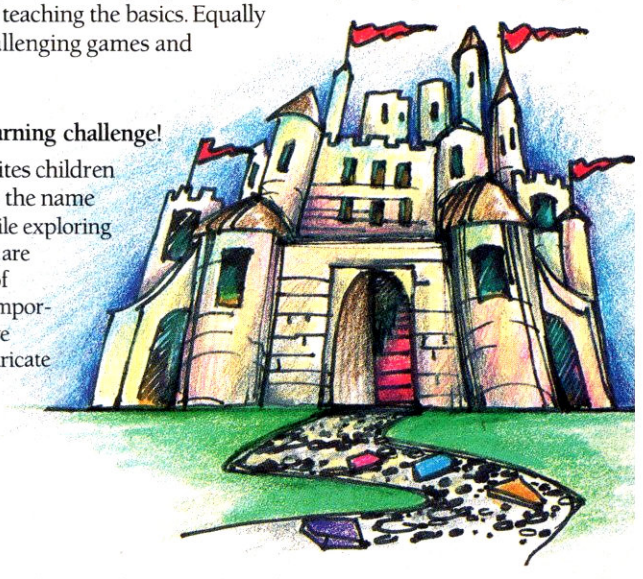

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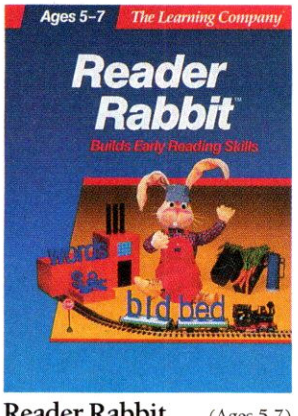
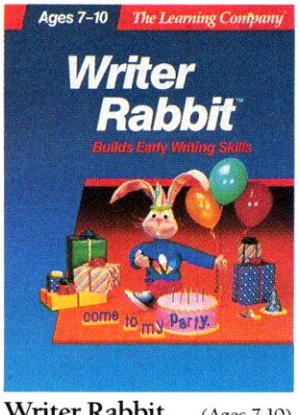


Reader Rabbit (Ages 5-7)
Winner of the Critics' Choice Award.
—Family Computing
Apple II Family $39.95



Writer Rabbit (Ages 7-10)
"Writer Rabbit is a perfect example of high-quality educational software."
—Apple Education Newsletter
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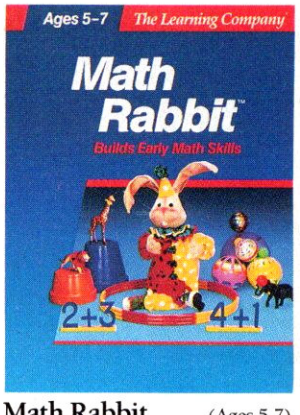

Math Rabbit (Ages 5-7)
"Math Rabbit is the first program that truly captivated my 5-year-old son's interest!" —Allen Richardson
Apple II Family $39.95

New *"talking"* version of Reader Rabbit for the Apple IIGS ($49.95) will be available this Summer.

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JUNE 1987/VOLUME 5/ISSUE 6

COVER STORY

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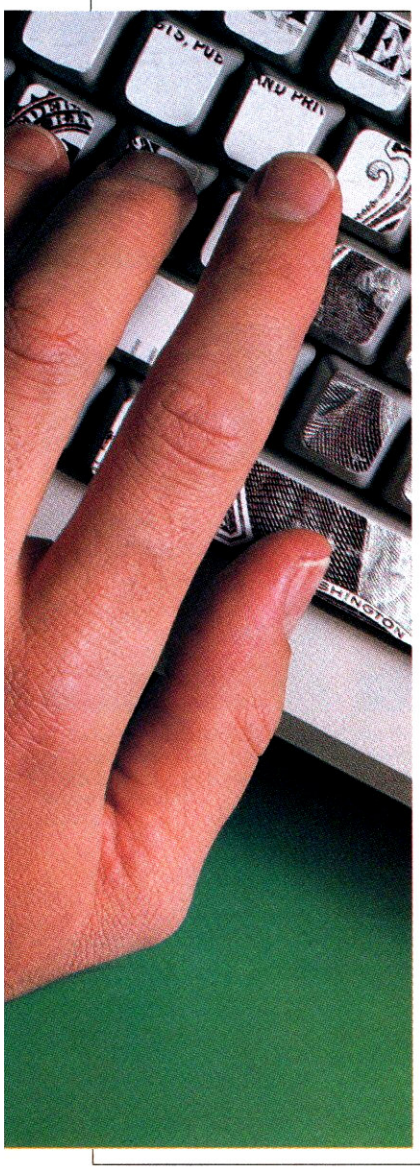
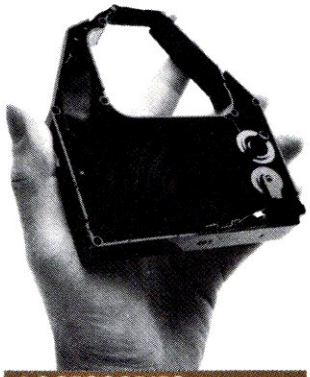
HOW TO MAKE MONEY WITH YOUR APPLE II
BY DAN GUTMAN
With a little ingenuity and the right products, you too can make big bucks and spare change with your Apple II system.





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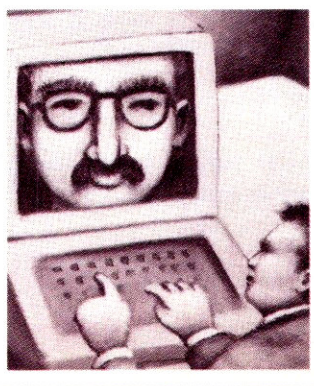

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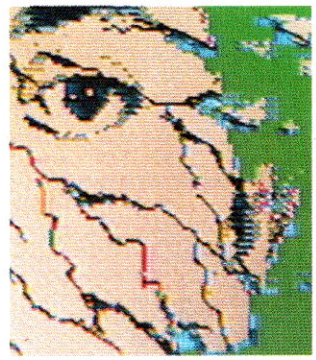

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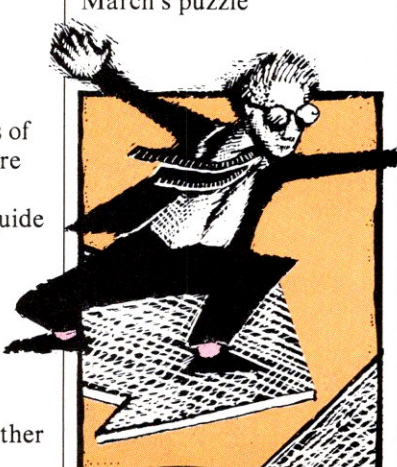

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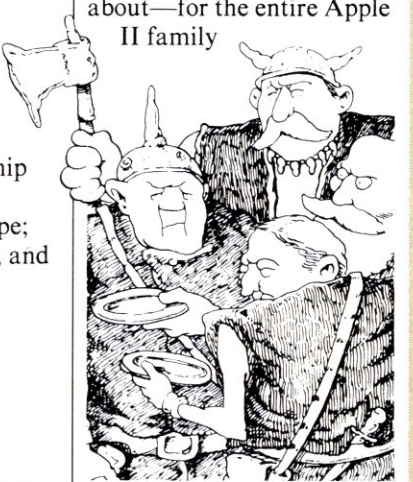

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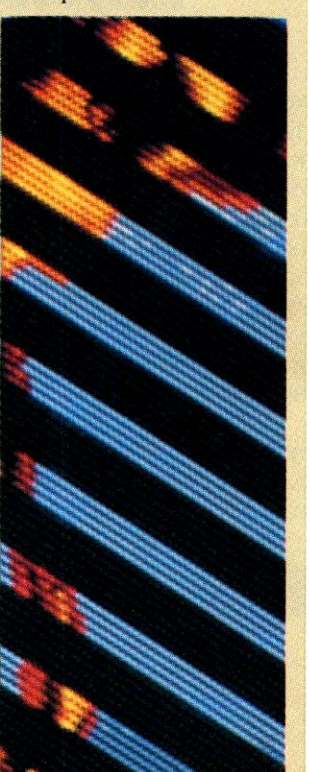
BY RON LICHTY AND TOM CROSLEY
Programmers Lichty and Crosley wrote the sound-and-graphics sales demonstration that you can see in any store that sells the IIGS. In this article they share some of the programming strategies and techniques that made the demo possible.



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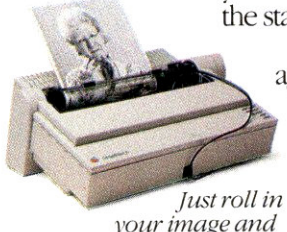
INTRODUCING THUNDERSCAN® FOR APPLE II.

For years, Apple II and graphics were rarely mentioned in the same circles. It just wasn't appropriate. But now ThunderScan, the best-selling scanner for Macintosh, works with the entire Apple II family. So you can take any printed image, roll it into any ImageWriter™ and zap it into your IIe, IIc or IIGS.



Just roll in your image and ThunderScan does the rest.

ThunderScan is compatible with AppleWorks™ using Pinpoint GraphMerge.™ So now you can include professional, high-resolution, Macintosh-style images in your reports and documents. Images you'd never be able to draw yourself or find on a clip art disk. Even personal, one-of-a-kind items like your logo, your portrait or your Great Aunt Besse. And that's just the start.

Once you've scanned an image, you can use your painting software like Dazzle Draw™ and MousePaint™ to change and enhance it to your artistic liking. Then print it out in color or black and white. What's more, images can be larger than the screen and can be displayed in any display mode.

ThunderScan simply replaces ImageWriter's ribbon cartridge.

Use ThunderScan for reports, newsletters, greeting cards and more.

Now you can get quality, high-resolution graphics into your IIe, IIc or IIGS.

Whether you use your Apple at home, at school or in business, you'll find hundreds of uses for ThunderScan. And at just $219, you've just found one great reason to order yours now. Available in July.

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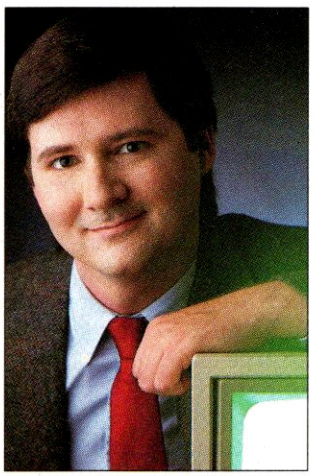

The Apple II family offers the best price/performance ratio of any personal computer because so much easy-to-use business software is available for it.

THE OFFICE APPLIANCE

Apple has been so busy promoting the Macintosh as an office computer over the last few years that it has lost sight of how important the Apple II can be as a general-purpose office appliance. Although the Mac series is certainly the state-of-the-art group of personal computers, using it can be an overkill business strategy that carries too high a price tag. You can perform many office tasks well, and much less expensively, on an Apple II. Indeed, the Apple II family offers the best price/performance ratio of any personal computer because so much easy-to-use business software is available for it. Instead of spending all its energy on getting offices to replace IBM PCs and their clones with Macintoshes, Apple should also make a push to get businesses to replace their typewriters, adding machines, and file-card systems with Apple II-series computers.

A good electric typewriter costs more than $1000, and all it can do is type. For about the same money, you can get an Apple IIe system, and it can type, correct spelling, create complex form letters, calculate, store information, and lots more. Information typed on a typewriter is stored only on the printed page, whereas information typed on an Apple II can be stored, edited, reused, or transmitted to a Macintosh for desktop publishing, database and spreadsheet consolidation, or other purposes.

Apple and other companies are working on ways to interconnect Apple IIs and Macintoshes via AppleTalk (the IIGS has AppleTalk built in, and I suspect we'll see AppleTalk for the IIe somewhere down the road), and you can already connect the two families of computers via SCSI, serial connections, and modems. Using Apple IIs for data entry and other tasks while using Macintoshes for print serving, maintenance of large databases, and other sophisticated tasks can be a cost-effective business strategy for many customers. In the world of corporate data processing, this type of resource sharing is known as distributed processing. Considering that the new Macintosh II can run the UNIX operating system, perhaps Apple IIs can serve as intelligent-terminal workstations connected to a UNIX-based Mac II for very advanced business applications.

Right now many businesses are buying IBM PC clones because they want an inexpensive yet reliable business-computing setup. Even though the price of a clone may seem low, however, once you add monitors, add-in boards, software, and so on, the price of a PC clone becomes much higher than that of a genuine Apple-labeled Apple II-series computer. And really budget-conscious clone buyers will discover that Apple clones such as the excellent Laser 128 are even less expensive. Another advantage of Apple II-series computers over PC clones is that they are much easier to use than IBM PC-series computers or compatibles. The Apple II series has easy-to-use software for all the major business-software categories: databases, word-processing, spreadsheets, and telecommunications. And the Apple II series can also boast venerable software titles, such as WordPerfect, SuperCalc, and Omnis, usually associated with more expensive systems.

I recently saw an ad for an "electronic typewriter/wordprocessor" system from a well-known typewriter company. The system costs about $1500 and offers only one software application, a word-processing program that is not as good as those available for the Apple II series. For the same (or less) money, you can buy an Apple II-series computer (or clone) and either an inexpensive daisy-wheel printer or a low-cost electronic typewriter that doubles as a printer—a much more versatile, expandable, and serviceable system.

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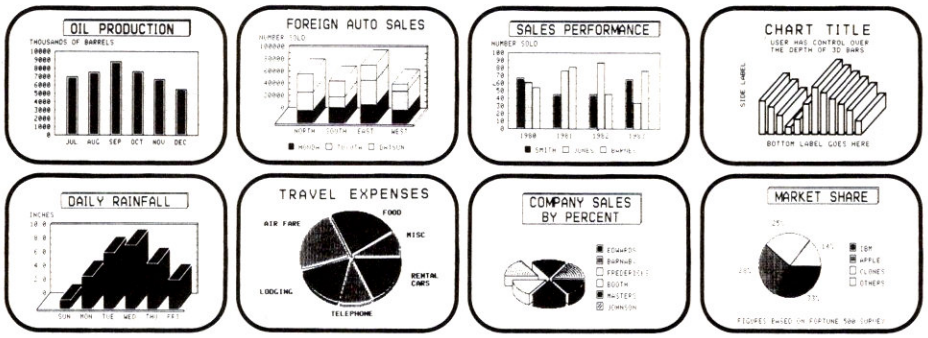

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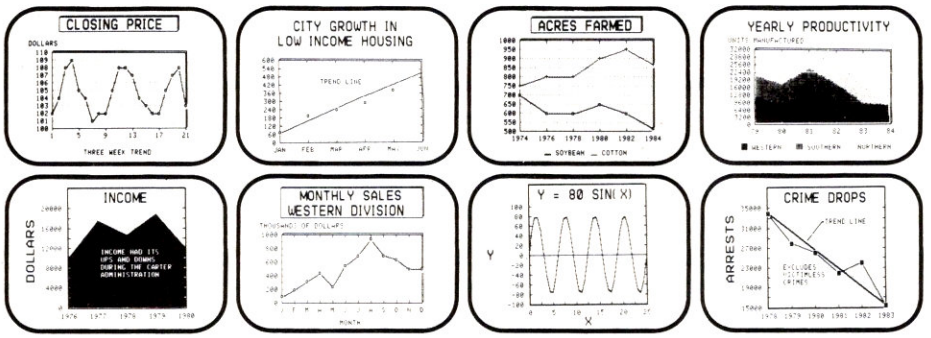

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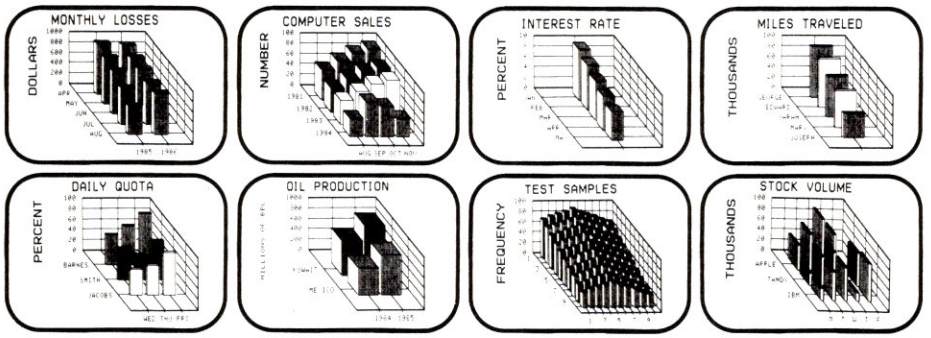

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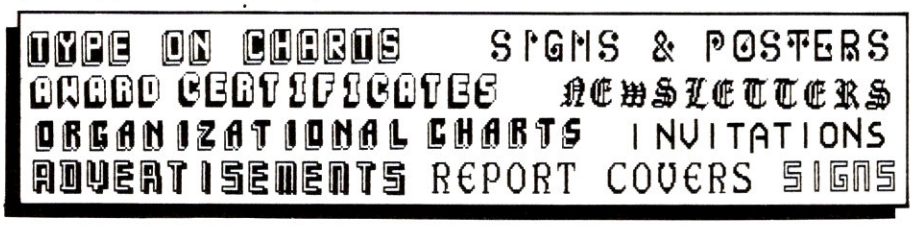

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So, let's start a movement to replace those antiquated typewriters, adding machines, and file cards with the all-purpose office appliance, the Apple II.

Hooray for Us!

Once in a while, it's appropriate to toot your own horn a bit, so here goes: *A+* recently won the award for Best Computer Magazine from the Citizen America/Computer Press Association at its second annual Computer Press Awards. The association received more than 700 entries in 16 different categories that covered magazines, newspapers, books, and on-line publications. According to the Computer Press Association, the awards were given for the best editorial content ". . . based on accuracy, exceptional writing, and ability to convey the theme with true clarity."

The Computer Press Awards are cosponsored by printer and peripheral manufacturer Citizen America and the Computer Press Association, a nonprofit organization representing journalists around the world. This award is not the first *A+* has received; in 1984, after our first year of publication, we won the award for Best New Consumer Publication in a competition against all other magazines, not just computer titles.

I want to take this opportunity to congratulate the entire *A+* staff and all of our contributing editors, writers, and artists around the country who have helped *A+* earn this honored distinction. *A+* is a group effort, and, as this award goes to show, we have one of the top teams of any computer publication. I really feel lucky to work with these people. And thanks to all of you readers who give us an audience for our efforts each month; without you folks there wouldn't be an *A+* Magazine.

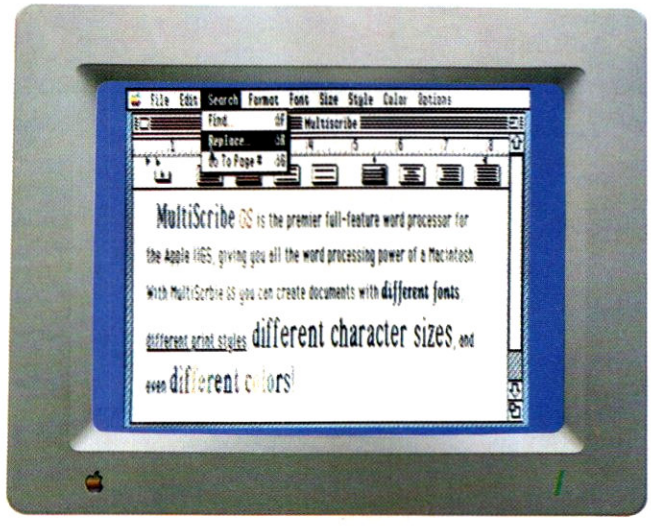
So, are we going to rest on our laurels? No way! We've got lots of exciting plans for *A+* that we'll be revealing in the months to come. If you have any suggestions or comments, you can write to me here at *A+*, 11 Davis Drive, Belmont, CA 94002. Read on and enjoy! ✚

FREDERIC E. DAVIS/**EDITOR IN CHIEF**

Spectacular Vernacular.

MultiScribe GS™

StyleWare introduces **MultiScribe** GS, the first of a new generation of word processors for the 512K Apple® IIGS.™ Like other StyleWare products, this new program was designed for ease of use, versatility and creativity. Using the super high resolution bit-mapped graphics, enhanced processor speed, and expanded memory of the IIGS, **MultiScribe** GS gives you advanced features such as multiple windowing, color printing and enlarged document size capabilities (print documents as large as memory allows!), creating spectacular writing possibilities.



The hand is almost as quick as the eye!

The fast, easy to use pull-down menus, scroll bars, windows, and dialog boxes of the famous Macintosh™ interface let you change your document as easily as you change your mind. Choose from a variety of type styles, character sizes, fonts, and colors to fit your needs.

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Each character size and print style appears on screen exactly as it will when printed. And **MultiScribe** GS offers near letter quality font-based printing on an ImageWriter II™ and near typeset quality with a LaserWriter™ – giving your work a clean, neat, professional appearance.

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Designed with the serious user in mind, **MultiScribe** GS is the only word processor you'll ever need for the IIGS:

- AppleWorks™ compatible
- Works with all major Apple IIGS graphics programs including **TopDraw** and Deluxe Paint™
- Print in color on an ImageWriter II

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For those thoughts that just can't be put into words, StyleWare has created **TopDraw**. Like **MultiScribe** GS, **TopDraw** is designed to challenge the capabilities of Apple's new IIGS. And **TopDraw** does it with even more color – 4096 colors to be exact!

The shape of things to come!

The first object-oriented graphics program for the IIGS, **TopDraw** gives you the ability to create drawings based on shapes, or objects, which can be moved, edited and duplicated – giving you virtually limitless drawing potential.

The color of creativity!

Use **TopDraw**'s editing function to edit colors and patterns. Draw with up to 16 colors at once, using color patterns as pen colors or fill patterns, and create millions of color combinations. And because creativity isn't always limited to an 8½ x 11 inch page, **TopDraw** lets you print your creations up to 8 pages in length and width.

Get serious.

TopDraw is complete with user-defined rulers (metric and English), grids, pens, ellipses, rectangles, rounded rectangles, polygons and freehand objects, horizontal, vertical, diagonal lines, free-form lines, and arcs – and lets you print in multiple colors on an ImageWriter II. And because **TopDraw** uses object-oriented graphics, its professional-quality LaserWriter output is superior to that of the bit-mapped graphics of paint programs.

Seeing is believing!

See **TopDraw**, **MultiScribe** GS, and all the other creative StyleWare products at your authorized StyleWare dealer.

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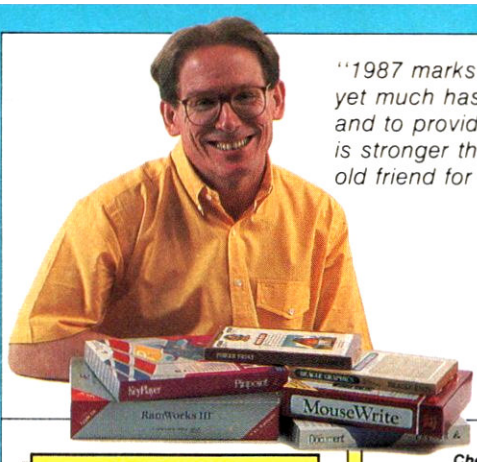

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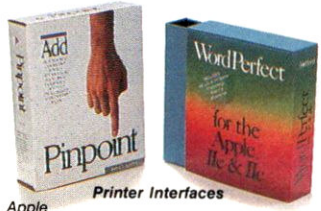

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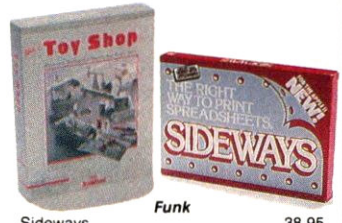

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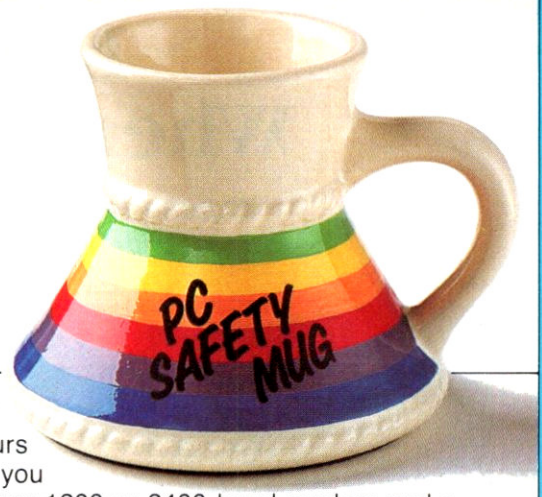

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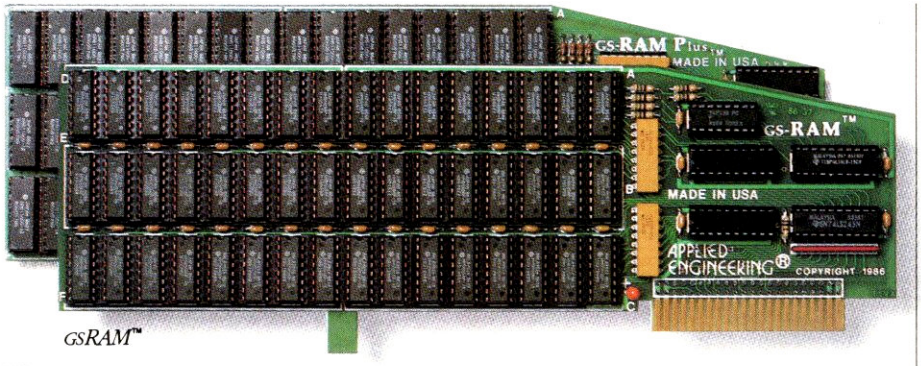

GSRAM™

Remember the 16K cards for the II+ and the 64K cards for the IIe? At the time, that much memory seemed like a lot. But when the owners of these memory cards came to us for more memory, many had to throw away their smaller Apple memory cards or try to sell them. Most of our customers told us that had they known about Applied Engineering's larger memory cards when they bought their Apple, they would have purchased them at the same time.

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- Made in USA

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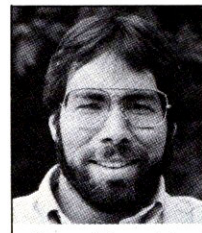

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Steve Wozniak, the creator of Apple Computer

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Letters

We invite your comments.

GUARD THAT MANUAL

Dear *A+*: I have been reading the letters you have printed about piracy, and I find a lot of very good answers to the problem, except I feel that disk piracy is just not the problem we are making of it.

When I first got my Apple IIe, I got a lot of free copies from my friends, and I thought, "I will never need to buy a program!" I had a large file with all of these "good" free programs, and I knew I was set for life. It didn't take me long to find out that a program on a disk without the manual for that program is a waste of time and effort to try to use. The only thing I gained from the use of these free programs was that I found the programs that were no good or wouldn't do my work, and I saved a lot of money by not having to buy a bunch of junk I couldn't use.

I have a couple of good dealer friends who have let me take some programs home to use so I could see if they would fill my needs, but that is sure not the luck that everybody has. Did I copy these disks? You bet I did! The ones I couldn't copy I didn't even try to use. I didn't want to mess up these programs I had on loan.

Then some time ago I went through my files of disks, and anything I didn't have the manual for got reformatted, and now I have something I can really use, empty disks. How do you get the manuals? Buy the programs. I think that being able to copy a disk to see what it can do would be encouraged by software manufacturers, but keep that manual under armed guard.

H. Gail Eilebrecht
Elephant Butte, NM

UPGRADE FOR A WORKHORSE

Dear *A+*: I would like to add my voice to those of the *A+* editorial staff, H.G. Payne Jr., and Glen Seigler concerning Apple's lack of upgrade plans for II Plus and IIc owners. I am in an even worse fix as an owner of an old Apple II, without a *Plus*, *e*, or *c*. This little workhorse has given me nearly seven years of faithful service, but its 64K of memory and lack of Applesoft in ROM have rendered it just this side of obsolete.

I would sell it and buy a IIe or IIGS, but I've grown rather fond of the little beggar. What I would like is some kind of upgrade route, at least to the capabilities of a IIe. I bought the Apple because of its software support and out of admiration for the Apple philosophy. Apple's one weak point has been in not offering enhancement opportunities to its faithful owners of older II computers. Unfortunately, Apple does not seem to be doing much to rectify the situation.

Danial L. Hocson
Tacoma, WA

THE IIc: A REAL COMPUTER

Dear *A+*: RIGHT ON!! for Mark Strothman (February "Letters") and his support for the IIc. My IIc is upgraded with a UniDisk 3.5; ZRAM-Ultra3; Video7 RGB interface; Princeton Graphics HX9 monitor; Grappler IIc parallel interface; and an absolute gem of a printer (which nobody seems to hear about), the Hewlett-Packard ThinkJet. This configuration allows me to run several types of Pascal, including TURBO; I can run COBOL, FORTRAN, C, Forth—certainly anything that will run on a IIe—plus I consider the Dvorak keyboard worth learning.

It's not a IIGS, true, but if somebody out there with a little imagination wanted to give us IIc owners a motherboard with a faster (6 MHz) clock and IBM PGA-like graphics, we would have what the GS *should* have been.

Make no mistake about it, the IIc is a *real* computer, and it is as open and powerful as Apple, or Applied Engineering, or anybody else wants to make it. Let's hear it—APPLE IIc FOREVER!!

John C. Brown
Reno, NV

NON-APPLE DISK DRIVES

Dear *A+*: Your recent article on Apple disk drives was both helpful and informative. The mention of non-Apple drives rounded out your article nicely. There is a serious problem with two of the non-Apple drives you mentioned (and a third you did not mention), however, that potential buyers must consider.

The Maple Technology half-height and the Laser drive have a fixed drive speed that is inalterable (even by a technician). They are manufactured without the usual "pot "that allows a drive to be calibrated to any other speed. I have discovered a third brand, Tecmate, with the identical problem.

Two months ago I purchased a pair of the Maple drives for a client's system. The preset speed allowed reading and booting of standard DOS 3.3 disks but had difficulties booting both Apple Pascal 1.3 format and ProDOS as well as commercial software that used the timing of the drive as part of its copy-protection scheme. Significant difficulties occurred when data disks written by slower-running Apple drives on the client's home system were edited with the Maple drives on the office system. The Maple drive's faster

speed during the write process clobbered sectoring and the catalog.

I did disk repair for two other clients running the Laser as an external drive for their IIc systems. Both had problems reading and writing disks formatted by slower-running drives.

I purchased the Tecmate brand half-height drive by mail-order for my niece and nephew for Christmas as their primary boot drive. It failed to boot several new games from Activision and clobbered a Fischer-Price math program during storage of a high score. The same week my parents purchased a Maple as an add-on and had difficulty booting and reading ProDOS. Every one of these drives indicated a faster-than-normal speed (though within the upper limits of tolerance) when checked with special software.

It is my personal opinion from these experiences involving six different drives from three manufacturers that a disk drive that does not have the capacity for speed adjustment should be considered a read-only device and only for standard DOS format. I would not recommend any of these drives as a second add-on to an existing system. A backed-up disk produced by the faster drive may not be readable.

Ironically, the Maple and Tecmate drives both have holes on the bottom of the case for access to a drive-speed pot, but the circuit board below is missing this component. The boards are identical (SERVO China SPC-001).

The Mitac half-height and Asuki half-height do have speed adjust, and my experiences with these have been positive. The TEAC may also be OK, but I have not seen one personally. When you purchase a "generic" compatible through mail-order, however, you don't know what you'll get.

Cheryl Berthelsen
Ontario, CA

WORD-PROCESSING BARGAIN

Dear *A+*: As an avid, longtime word-processing user, I've appreciated the coverage that you have devoted to current Apple text-processing programs in past issues (*A+* October 1986, cover stories). Since I have used several of the programs you reviewed, I was pleased that your assessment and "rank ordering" corresponded to mine!

I was disappointed, however, that a fine and extremely professional word-processing program was not listed under the category of "budget word-processing programs"! The Ski Writer word-processing program was written by Ken Skier and is being marketed by Mastertronic. It comes on a double-sided diskette with a ProDOS version for the Apple IIe/IIc on the front and a Commodore 64/128 version on the back. Unlike Apple SpeedScript, the Apple version of the Ski Writer program works with 80-column display and allows both indenting and full justification.

I recently purchased a copy of Ski Writer for $14.95 at a Waldenbooks bookstore. I cannot imagine a better Apple word-processing program on the basis of performance/price, and I believe your readers would be well served by a complete review of this excellent, inexpensive program.

Karl R. Beach
Shoreview, MN

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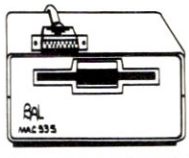

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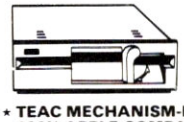

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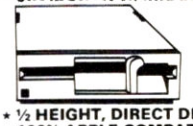

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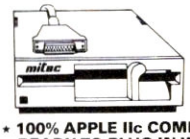

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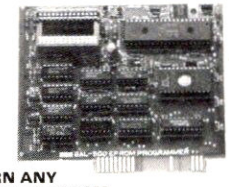

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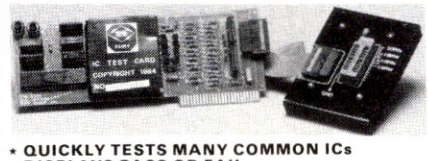

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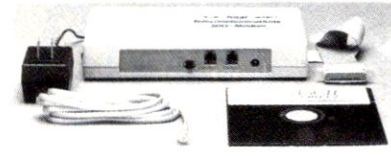

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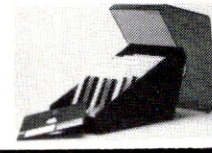

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CIRCLE 167 ON READER SERVICE CARD

TIMELY INFORMATION

Dear *A+*: I finally have some time to sit down and write to you to express my appreciation for the information your magazine has consistently provided for my use. In every issue you publish, there is *always* at least one article I find very useful. In two specific cases, I needed specific information, and the timing of two of your issues was perfect in answering my questions. I wish to describe these two instances.

In March 1986, I was in need of a telecommunications program for my modem, and I began to research the various products that were available. I soon realized that this was not going to be an easy task, especially since I was a novice on this subject. But, you came to the rescue with your article entitled "Telecommunications Software" in the April issue. It certainly answered all of the questions I had about communications, and I used the information to decide which package to buy (I purchased Apple Access II).

In late June, I was interested in the features of a RAM board and an accelerator board for my Apple IIe. You came to the rescue again! Your August issue had a very interesting article entitled "Turbocharging Your Apple IIe." Even though I did not purchase any of these products (I will have my IIe upgraded to a IIGS, at which time I will purchase these items), the article certainly improved my knowledge of the various products available.

On another subject, I want to relay my appreciation for the *excellent* service I recently received from a mail-order company called Computer Network. On December 8, I ordered two software products from them, and I received them on December 15! This company advertises every month in *A+*, but one of the primary reasons why I placed my order with it was (you guessed it) the information in your magazine. In the September issue, you printed a letter from a reader in Wilmington, Delaware, entitled "Mail-Order Success," in which the writer described his successful dealings with Computer Network.

All of this clearly shows that your magazine is indeed "The #1 Apple II Magazine." Keep up the good work!

Arthur M. Kent
Federal Way, WA

17 Meg IIe/1 Meg IIc

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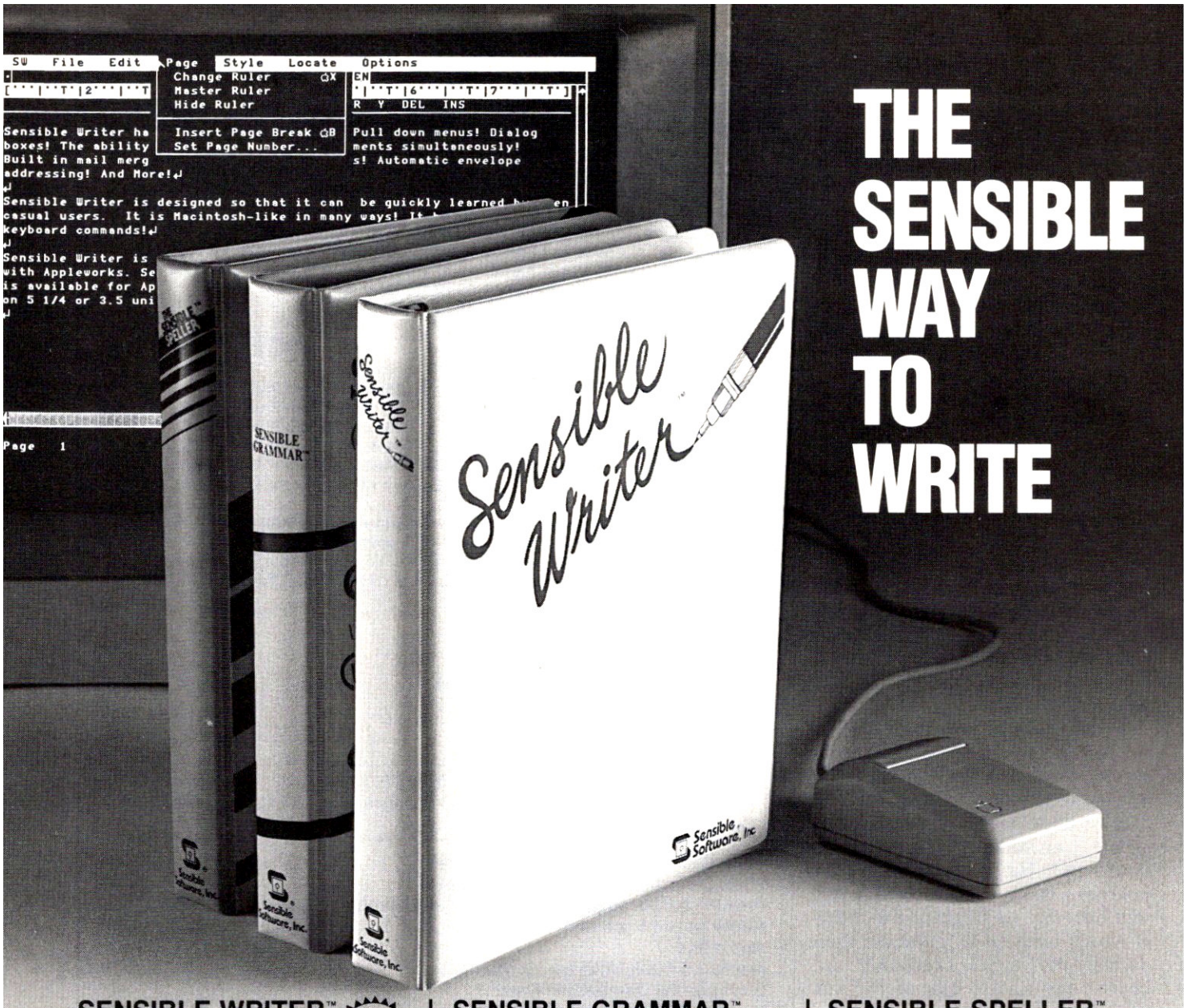

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CIRCLE 165 ON READER SERVICE CARD

BY LISA RALEIGH

NewsPlus

A new technology brings full-motion video to CD-ROM.

THE TALK OF THE TOWN

The town in this case is Seattle, and the event that got people talking was a technology announcement at Microsoft's recent CD-ROM conference. On the second day of that week-long conference, GE/RCA announced Digital Video Interactive (DVI), a technology that makes it possible to store full-motion video on a compact disc. Up to now, CD-ROM technology (which provides read-only storage) hasn't been able to handle this kind of video because of video's massive storage requirements—a compact disc capable of holding more than 500 megabytes of data can hold only 30 seconds of traditional digital video because it demands so much space. GE's RCA Laboratories has devised a compression/decompression scheme, however, that can squeeze more than an hour's worth of full-motion video onto a single disc.

FLIGHT SIMULATION (ABOVE) AND AUTO REPAIR (RIGHT) ARE TWO POSSIBLE DVI APPLICATIONS. IN AUTO REPAIR, FOR EXAMPLE, A FULL-MOTION VIDEO OF A PROCEDURE CAN BE SHOWN ALONG WITH A 3-D MODEL OF A PART.

At the conference, GE/RCA was showing off the technology but made it clear that its marketing plans are wide open. It might license its compression algorithms to an interested party who might turn that into a commercial system or service. Or it might license the pair of VLSI chips that perform the decompression magic and speedily display video images. Or GE/RCA might itself sell finished add-on boards to the public. Or any of the above or none of the above. No matter how it's marketed, though, the significance is that a technology line has been crossed, and compact-disc technology doesn't have to suffer under the limitations that once seemed inherent in it.

So what's the big deal about full-motion video? It makes it possible to convey a sense of kinetic realism not possible with just computer graphics or animated sequences. That realism and immediacy is especially important in educational and training applications. A demo from the Children's Television Workshop contained, for instance, a screen with several windows with vocabulary words that, when selected, pulled up a "Sesame Street" video associated with them. Other applications might include medicine, aviation, auto mechanics, real estate, and other creative pursuits. Stay tuned. Breakthrough developments (and acronyms) seem to fly fast and loose in the

NewsPlus

optical-technology industry, so this year's watershed announcements might be supplanted by something else when next year's conference rolls around.

APPLE IN THE WINGS

Predictably, the exhibits at the CD-ROM conference featured drives and databases running on IBM PCs or workalikes. But upstairs, in the Apple suite, visitors could get a look at the new Macintoshes (the Mac SE and Mac II), and even a IIGS, hooked up to CDs with graphics and sound demos. Although the demos were limited and not really representative of the CD applications that will eventually emerge for these machines, it was significant that Apple was making an appearance and indicating that it would provide technical support to developers with CD applications in the wings.

On the Mac side of things, Apple is already furnishing a driver that lets the Mac communicate with SCSI CD drives. Next, Apple will develop software for the Mac's Hierarchical File System that will let users treat CD drives as if they were any other peripheral.

As far as the Apple II is concerned, Apple encourages developers to focus on the IIGS, with its advanced graphic and sound capabilities. Currently, Apple is working on an upgraded ROM for its SCSI interface card that will let Apple II systems work with SCSI CD-ROM devices. When that project is completed, you'll be able to read native ProDOS file systems on CD-ROM discs. For both Mac and Apple II developers, Apple plans to use the High Sierra standard, which allows any CPU that follows the standard to read any High Sierra-formatted data. Once the standard is set, Apple will furnish system software to its developers that works with the High Sierra scheme.

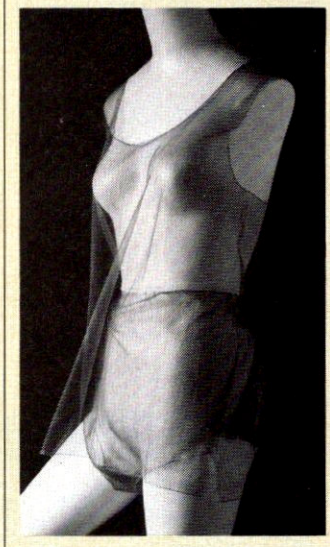
MAKE MINE A MITSUBISHI (OR A IIGS)

Mitsubishi Motors is touring the country with a half dozen Apple IIc computers in tow. At the end of this jaunt, the Japanese car manufacturer plans to hold a sweepstakes that will award Apple IIGS computers as first and second prizes. (The grand prize, as you might expect, is a Mitsubishi automobile.)

In its cross-country tour, Mitsubishi is setting up presentations in shopping malls to entice you into your local Mitsubishi dealership. The Apple IIc computers provide part of the enticement with an interactive color-graphics program that lets you "build your own" Mitsubishi. Essentially, the software lets you choose what you want from a list of options and then gives you a printout resembling the window sticker you'd see in the showroom, complete with suggested price. Not surprisingly, the software also asks for your name and address, which will end up at the local dealer, along with your dream-car specifications. But wait—before you enter the name and address of the office sleazeball instead of your own (to keep the car salesmen out of your hair)—keep in mind that the software also automatically enters you in the sweepstakes when you provide this information. The chance to win a IIGS might be worth enduring a sales pitch. At the time of this writing, the tour had been going on for a couple of months, but in May and June it was still scheduled to visit Houston; Austin; Manchester, New Hampshire; Montebello, California; Santa Rosa, California; Victor, New York; Tuscon; Tacoma; Kansas City; and North Palm Beach, Jacksonville, and Orlando, Florida.

PROTECT YOURSELF

Every cloud has a silver lining, and so should every computer user. So says Silver Lining, a company that makes "personal electric field shielding"—undergarments made out of silver-plated nylon mesh. These skivvies protect "you and your future children from the electric fields" of computers, televisions, microwave devices, and radios, the company claims. Silver Lining provides protective garments for both men and women in a variety of sizes and styles. The silver-mesh material is purportedly comfortable and washable. For further information, contact Silver Lining, 2209 S.W. Park Avenue, Des Moines, IA 50321; (515)282-8928.



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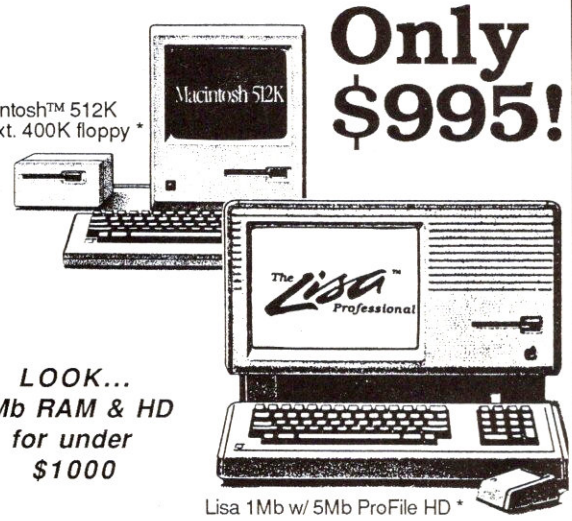

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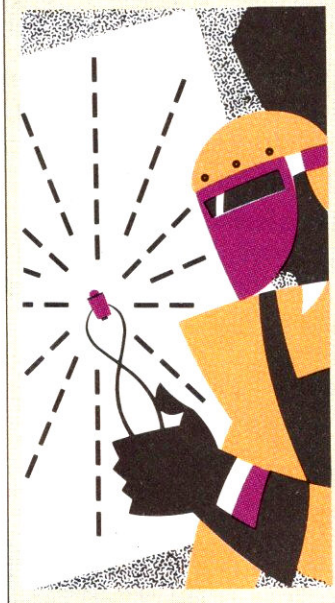
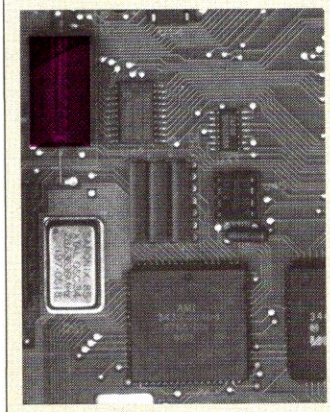
NewsPlus



A WORD TO THE WISE

You probably won't have occasion to remove the battery from the motherboard of your Apple IIGS, but just in case you must—be careful. This is no run-of-the-mill battery, but a lithium thionyl



THE IIGS BATTERY REQUIRES CAREFUL HANDLING.

chloride battery that could explode if improperly handled. One of the battery's active ingredients, lithium, reacts violently if it comes in contact with water. Apple is cautioning its dealers about the correct procedure for disposing of these explosive little bundles when they "die"—namely to treat them as hazardous waste. Apple asks its dealers to remove dead batteries, clip the lead wires off, and send them back to Apple in their original, zip-locked packaging. Apple will then dispose of the batteries according to Environmental Protection Agency guidelines.

LAWSUIT SETTLEMENT

With so many lawsuits cropping up in the industry, it's a refreshing change of pace to hear of a settlement—even a partial one. Franklin Computer Corporation has dropped its motion to obtain an preliminary injunction against Video Technology and Central Point Software to prevent those companies from bringing the Laser 128 into this country from Hong Kong. At issue was the boot code in the Laser 128, which Franklin claimed violated Franklin's copyright. Although Video Technology still claims it wasn't infringing, it hired a contractor to rewrite that code. That action satisfied Franklin, at least as far as the injunction was concerned, and it has dropped its efforts to prevent sales of the Laser. Franklin still plans, though, to pursue the liability and damages part of the suit.

ILLUSTRATION BY ROBERT PIZZO

NewsPlus

UPGRADE UPDATE

In April's "NewsPlus," we reported that the new "platinum" Apple IIe had a revamped keyboard that Apple said was "functionally equivalent to the IIGS keyboard." Apple redesigned the keyboard to "facilitate upgrading" from an Apple IIe to a IIGS.

Unfortunately, though, *functionally equivalent* doesn't mean *completely equivalent*. Apple is informing its dealers that they will need to modify the platinum IIe keyboard if a customer wants to install a IIGS upgrade motherboard. Apple has also discovered that some older Apple IIe computers may require a new case that the upgrade kit doesn't include.

APPLEWORKS CONTEST

Educators, take note. K-12 MicroMedia Publishing, Inc., publisher of SchoolWorks, is holding a contest that will award $100 each to ten educators judged to have the most innovative AppleWorks applications. The deadline for the contest is coming up soon: June 30, 1987. For further information or an entry form, write to AppleWorks Great Idea Contest, c/o K-12 MicroMedia Publishing, 6 Arrow Road, Ramsey, NJ 07446; (201) 825-8888. ✚

BY DEDINI

LAUGHTRACK

"I love your printouts, Blanchford. They lie like hell."

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Five Stars for your Apple IIGS™

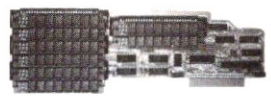
Conserver™
Cooling Fan, Surge Suppression, and More... $129.95

Introducing the Conserver – an integrated unit giving you everything you need in one compact unit (see picture above). Conserver has six switched AC outlets, surge protection, and a super quiet fan (no need to worry about those "electrically noisy" internal fans). It cleverly holds one or two Apple 3.5 Drives (special diskette holder included for owners with one 3.5 drive), and also acts as a monitor stand.

OctoRam™
256K to 8 Meg Memory Expansion Card 256K $149.95 / 1 meg $349.95

Get the ultimate IIGS memory expansion card!!! OctoRam. Comes with 256K yet can be easily upgraded to a whopping 8 megabytes on a single card – no piggybacking necessary, no new card necessary when upgrading memory, no confusion. OctoRam utilizes SIMMs, the most technically advanced memory packaging available. These are the same memory modules used in the Macintosh Plus™ and the new Macintosh SE™ and Macintosh II™. So don't settle for less, get OctoRam.

OctoRam 2 meg.



OctoRam ESP™
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Tired of waiting and waiting while the IIGS is booting up your application or desktop? Supercharge your IIGS with the new OctoRam ESP expansion board. OctoRam ESP (Extended Static-ram Pack) stores up to 512K of programs for instant access. Store AppleWorks™, Visualizer IIGS™, the IIGS desktop, ProDOS™, or virtually anything you want for immediate access. The IIGS sees OctoRam ESP as a ROM disk, therefore you can use it as the startup disk. Your programs are always in RAM, backed up by a rechargeable battery. Better than ROM packs (reads *and writes*), faster than EEPROM (100s X when writing). OctoRam ESP 128K – $179.95 (requires OctoRam).

SuperSonic™
IIGS Stereo Card $59.95

Get a SuperSonic stereo card and turn your IIGS into a hi-fidelity stereo powerhouse. Plug in your Bose RoomMates®, stereophonic headphones, home stereo or "boom box", and even low power non-amplified speakers and your IIGS will surround you with stereo sound. The SuperSonic is capable of near compact disk clarity. Connects directly to the Ensoniq® sound chip and provides stereo with popular stereo software from Accolade, Activision®, Broderbund, Electronic Arts®, Great Wave Software . . .

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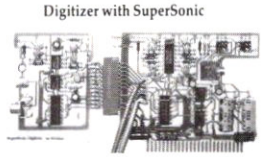

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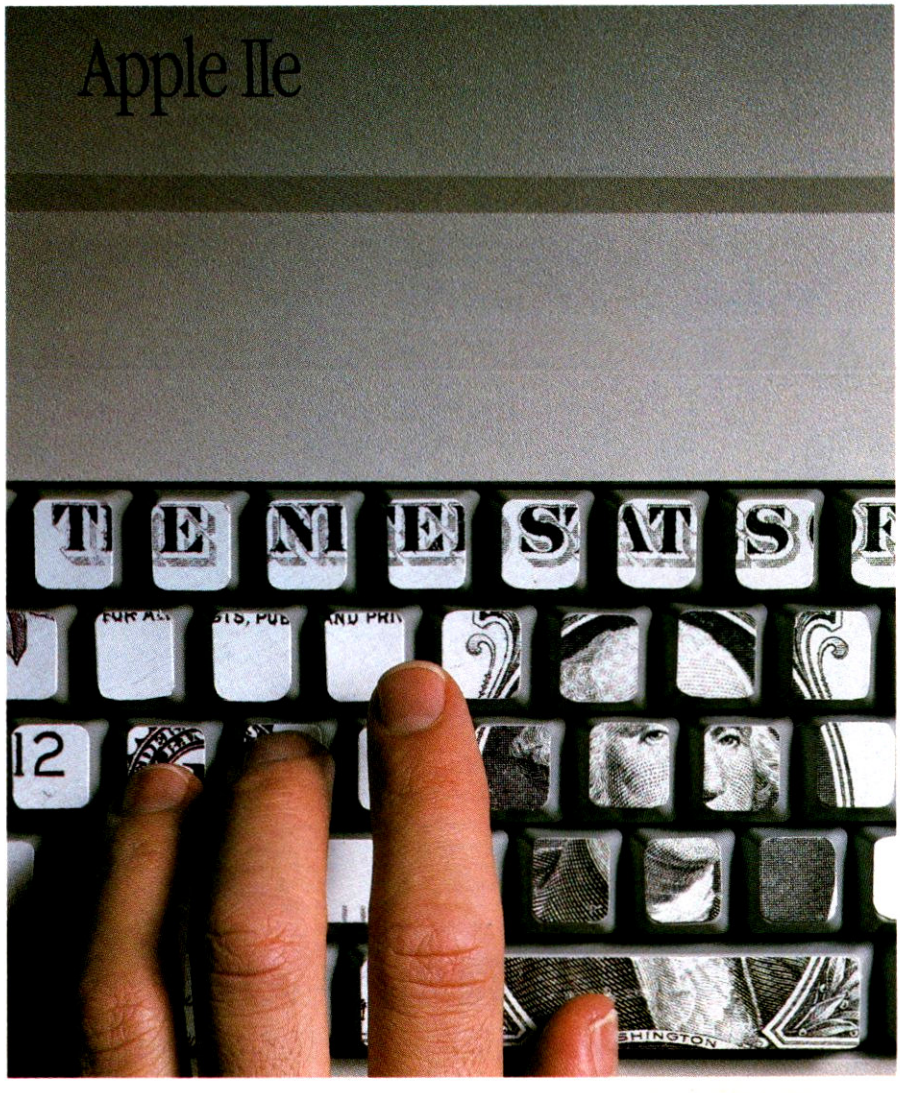
COVER STORY *BY DAN GUTMAN*

With a little ingenuity and the right hardware and software, you too can discover

How to make



CARTER DOW PHOTOGRAPHY

One day in 1896, George Carmack dipped his pan into Bonanza Creek in the Yukon and pulled up a few gold nuggets. Word spread quickly, and gold fever shot across America. Husbands left their wives and children. Soldiers deserted their troops. Families headed west with dreams of gold so plentiful you could pick it up off the street. Within two years, 18,000 prospectors had arrived at the Klondike hoping to strike it rich.

These days, you can almost hear the cries of "There's gold in them thar laser printers!" The personal computer is the get-rich-quick scheme of the 1980s. The difference is that it's for real. Only 4% of the prospectors found any gold, but you can really make money with your computer—and you don't have to go to Alaska to do it.

That Apple sitting on your desk may be your obsession, your hobby, your entertainment, and your link with the world. You can also think of it as a money-making machine. It's never as easy as they say, but there is money out there if you've got persistence, ingenuity, and the right software.

The secret to making money with your computer is simple and lies in the size of the noncomputing world: Only a minority of the households in the U.S. own a computer, and

MONEY

with your Apple II

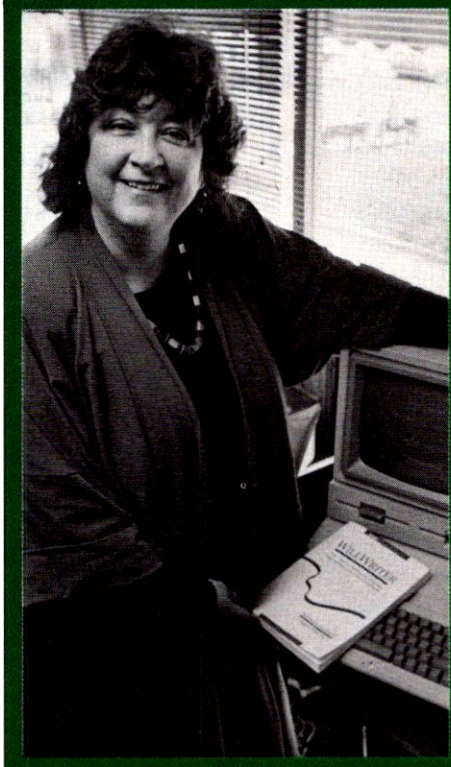
many small businesses have been slow to computerize. The noncomputing world still has no idea how easy it is to accomplish tasks with a computer. An overwhelming job for a noncomputer person may take you five minutes on your Apple II, and you'll find that noncomputer people pay good money to avoid doing these jobs themselves.

Even though we might wish the rest of the world would get hip to computing, until that happens the market is wide open for those of us who are. Any reasonably computer-proficient person can find a gold mine out there. If you own a computer, the start-up costs for a business are ridiculously low. Hundreds are discovering that they can earn some spare change—or full-time income—by pounding on a keyboard.

I know what you're thinking. You love computing for its own sake, not for the love of money. Information should be freely shared for the good of all—the hacker ethic. That's fine, but do you have any idea how much a hard-disk drive costs these days? Computing is an expensive hobby, and there's nothing wrong with selling your services and expertise to pay for your pleasure in it.

There's not much chance Ed McMahon will be sending you a check for a million dollars in the next few weeks. Think about it.

Mathewson charges $80 to create a last will and testament.



Consulting: Where There's a Will

Many people are still terrified of computers and will pay good money to have you help them or do the dirty work for them.

Glynda Mathewson of Oakland, California, uses her Apple IIe to word-process wills. As director of Divorce Center, a low-cost paralegal clinic, Mathewson charges customers $80 to create a last will and testament on-screen with a program called WillWriter (Nolo Press).

Mathewson is using her computer knowledge to act as a consultant for others who don't have that knowledge. "We don't make decisions for people," she says, "but we put their will on the disk and return [it] to them."

A will written with WillWriter is perfectly legal, and it's also legal to make money writing wills with the program. Nolo Press asks only that you provide each customer with the book that comes in the program, as it explains some of the complexities of wills.

Terri Spencer tutors groups of adults, children, and families on Apples set up in her home. Her rate is $20 per lesson, and she gives the sixth lesson free if you sign up for five in advance.

If you've got computer experience, you can sell it. You can give classes, advise people on what com-

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For instance, with WordPerfect 1.1 you can do footnotes, with automatic numbering and placement at the bottom of the page. And you can create macros, do a mail merge, set headers and footers, and check your spelling with WordPerfect's 50,000-word dictionary (115,000 words on Apple IIGS).

Plus text entry and display on WordPerfect 1.1 is twice as fast as on the previous version. And WordPerfect now supports true proportional printing for both HMI and microspacing printers.

WordPerfect 1.1 features include:

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- Align on any character
- Automatic formatting on screen
- Automatic page numbering
- Block features (bold, delete, move, save, underline, etc.)
- Bold and underline text
- Center text
- Chaining of macros
- Comprehensive file management
- Date set/format/insertion
- Extensive printer/font definition
- Flush right
- Footnotes
- Headers and footers
- Hyphenation, automatic prompting
- Indent left and left/right
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- And more.

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For all its capabilities and functions, WordPerfect 1.1 is remarkably easy to learn and use. By utilizing designated function keys and a template, WordPerfect doesn't require you to memorize strings of keystrokes. Features like bold, underline and center are easy to locate and just a couple of simple keystrokes away.

In addition, WordPerfect's newly revised step-by-step manual contains thorough learning examples for beginners and a complete reference section for experienced users. And on-line help screens are provided for easy assistance with individual functions.

An install program is also included to let you take advantage of expanded memory and other ProDOS-compatible hardware.

Harvest the Power.

Give your Apple a power boost today. Get WordPerfect 1.1 for the Apple IIe/IIc and IIGS. It's the perfect way to squeeze the most out of your Apple.

For more information, call or write WordPerfect Corporation, 288 West Center St., Orem, Utah 84057 (801) 227-4000.

*Runs under ProDOS-16.

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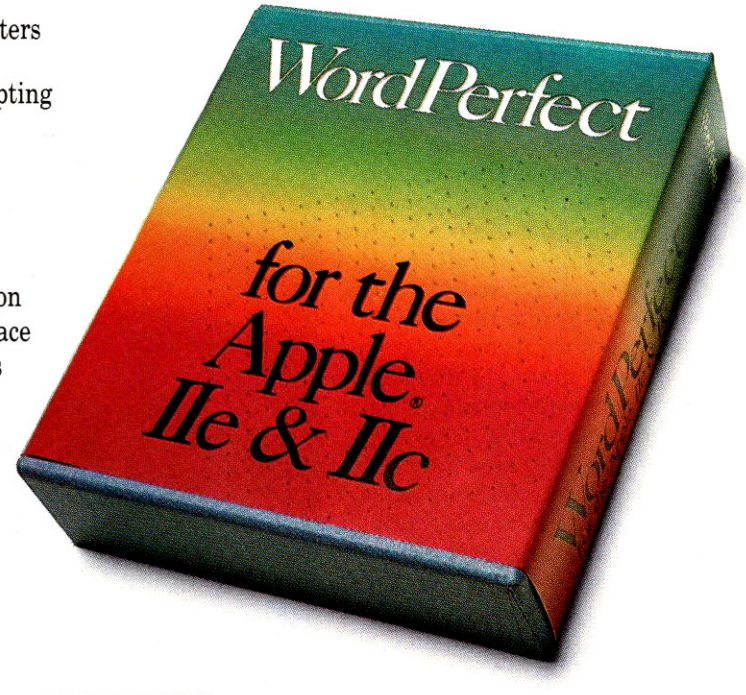

CIRCLE 118 ON READER SERVICE CARD

Terry Spencer tutors groups of adults and children.

SCOTT PIPER

puter equipment they should buy, or even buy it for them. You can fix Apples, sell Apples, or rent time on your Apple.

If you love sports, you can make money calculating statistics for your local baseball team or bowling league. If you love children, get a copy of PartyWare (Hi-Tech Expressions) and throw computer parties for kids. If you believe in astrology, put your computer to work charting horoscopes at a county fair or flea market.

Even if you've spent the last ten years playing Zork, think of all the poor unfortunates who can't even figure out how to open the trapdoor. Some people make a good living writing and selling hint books to all the adventure-game illiterates out there.

It used to be said that time is money. Today information is money. You provide the information, and somebody will give you money.

Word Processing: Typing for $$

Jim Smith gets paid ten cents for typing a mailing label on his Apple II Plus and IIc—not much money, but those labels go quickly. Jim is putting himself through the graduate program in educational psychology at Eastern Michigan University, ten cents at a time. Smith works out of his den in Dexter, Michigan, sorting mailing lists by ZIP code or state and printing them out on his ImageWriter II.

It's one of the fundamental rules of the universe: Almost everybody hates to type. No matter how easy it is to process words with a computer, many people would rather walk over hot coals than run their fingers over a keyboard. You can make between $1 and $2 per page typing reports, résumés, term papers, and dissertations. If you live near a college town, start warming up your ImageWriter.

Typing has been a money-making venture for more than a century, but in the last two years, something else has come along that may be the biggest earning opportunity you can take advantage of today.

Desktop Publishing: 1980s Gold

The plates on Don Lancaster's VW Microbus read 6502, which should give you some idea of what Lancaster's all about. He has set up his own printing company at home in rural Thatcher, Arizona. The printing press consists of an Apple IIe and a LaserWriter. For $6, Lancaster will print up six custom-made bumper stickers or 40 business cards for you. If you ask, he'll print badges, chain letters, birth announcements, or letterhead. Last year, he even typeset a book for a woman who couldn't interest a traditional publisher in it. To spread the word about his service, Lancaster throws his Apple and LaserWriter into the van and hits the local county fairs.

Lots of people are doing grassroots publishing with Macintosh computers, but Lancaster prefers the Apple II. "You just can't get Apple Writer-quality graphics out of a Macintosh. It can't be done," he says. "The Apple gives you far and away the finest laser graphics you can get anywhere."

Lancaster also shuns off-the-shelf software, preferring to write his own PostScript routines with AppleWriter. "It can run wheels around virtually all the desktop-publishing software today," he claims. "These other programs offer speed and convenience, but there's no comparison when it comes to quality. I wouldn't touch 'em with a ten-foot pole."

To hear Lancaster talk, you can just about use a LaserWriter to print money. "A laser printer can pay for itself in about one weekend," claims Lancaster. "The opportunity is overwhelming." If you haven't priced laser printers lately, he's talking about approximately $4000.

Almost all publishing used to be the domain of professional printers and typesetters. The quality of laser printing isn't quite as good as that of typesetting, but the savings in time and money are enormous. It costs about $10 to have a type shop set a page of text, and it usually requires 24 hours. Lancaster makes a good profit charging $1 per page, and he can turn it around while you wait.

You know desktop publishing has trickled down to the noncomputer world when you start seeing computer-printed fliers on store windows and slipped under windshield wipers. People are discovering that this high-quality printing is very inexpensive, and they want to print their documents the same way. Organizations are tripping over each other in a rush to desktop-publish their newsletters. Often they prefer to hire a computer person to do the job instead of doing it themselves. You're in a position to do this work

and earn good money too.

Even young children can close up their lemonade stands and earn a few dollars with the help of desktop publishing. Most *A+* readers are familiar with Springboard's The Newsroom, which is a sort of newsletter processor, and Brøderbund Software's The Print Shop, which makes greeting cards, signs, and banners. A young person with a little creativity can also create personalized certificates (Certificate Maker, Springboard), toys (The Toy Shop, Brøderbund), and even clothing (T-Shirt Shop, Spinnaker).

Desktop Creativity: Blank Slate

Hair Odyssey in Coral Springs, Florida, is not your run-of-the-mill haircutting salon. Before he cuts your hair, Vito Blancato digitizes your face. He's got more than 100 hairstyles stored on floppy disks, and he can superimpose any of them over the image of your head.

"This way I can show my clients exactly what they're going to look like," explains Blancato. "If it looks good in the computer, I go ahead and do it for them."

Blancato says he came up with the idea because people are always unhappy with their hairstyles. "I was into computers, and being a hairstylist all my life gave me the idea to put it all together."

For the use of the technology, Blancato charges $25 over the price of the haircut. The computer is set up right in front of Hair Odyssey, so it brings in passersby and entertains the regular clientele.

"It's been tremendously popular," Blancato asserts. "We're bringing them in from miles around." His next plan is to sell the idea nationally. He has been doing the process with a Macintosh but is now looking for color and is thus considering converting to an Apple IIGS with an AST-VisionPlus digitizer.

I'm not suggesting you run out and open a hair salon, but Vito Blancato is one person who is translating his creativity and computer know-how into income. For some people, computer imaging and desktop publishing are bringing in some handy pocket change. For others, they're the start of a new business or career.

Does your favorite restaurant have old, tattered menus? Offer to design a new one on your Apple. With good graphics software, it's easy to print posters, brochures, announcements, theater programs, greeting cards, ads, banners, or signs for store windows.

With a little imagination, you can make up dummy baseball cards or magazine covers with people's faces on them. If you have a digitizer hooked up to your Apple, you can sell digitized portraits of people at a flea market or fair.

Financial Services: Manage Money

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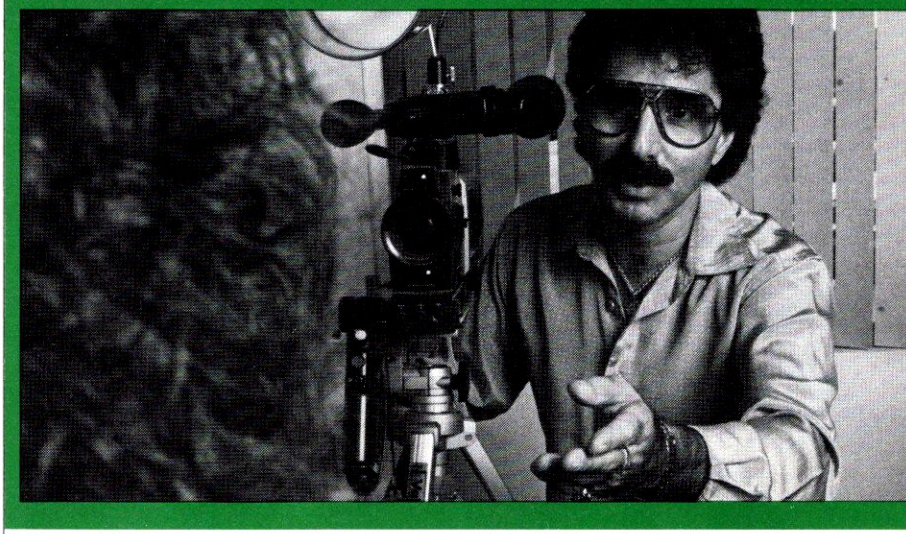
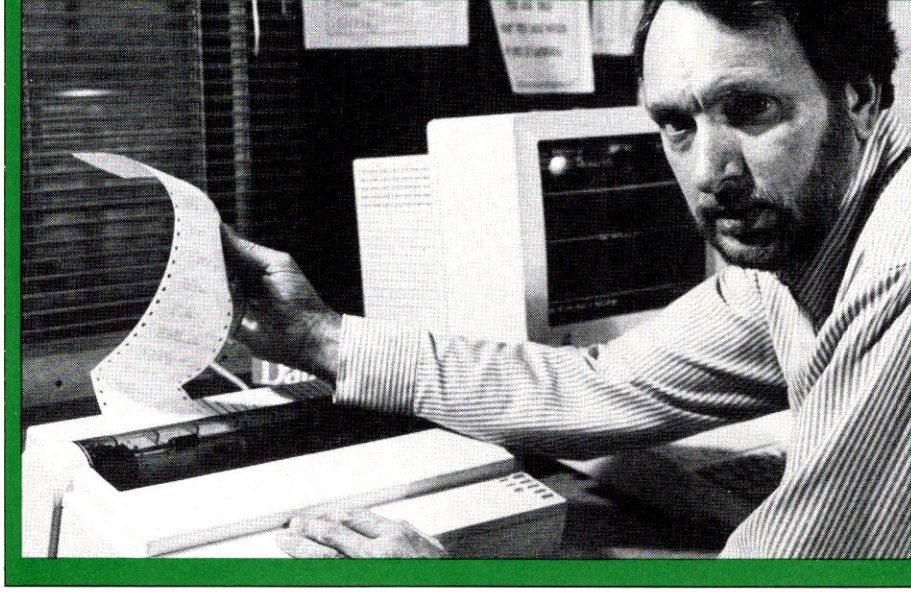
"I don't make big bucks from it, but I just started doing it for fun," Conelly says. He recently added a

Before he cuts your hair, Vito digitizes your face.



RICH MAHAN

Jim Smith gets 10 cents per typed mailing label.



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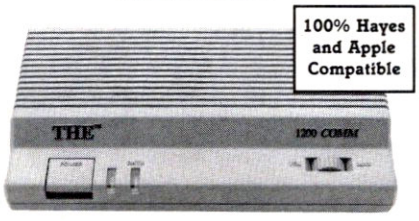

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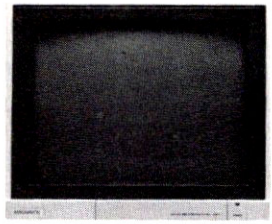

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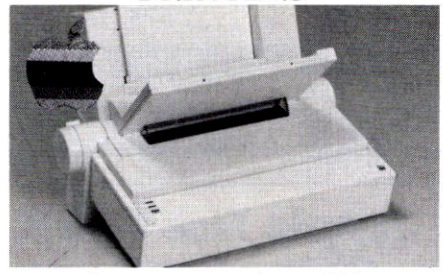

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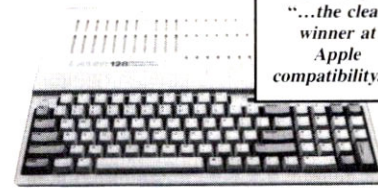

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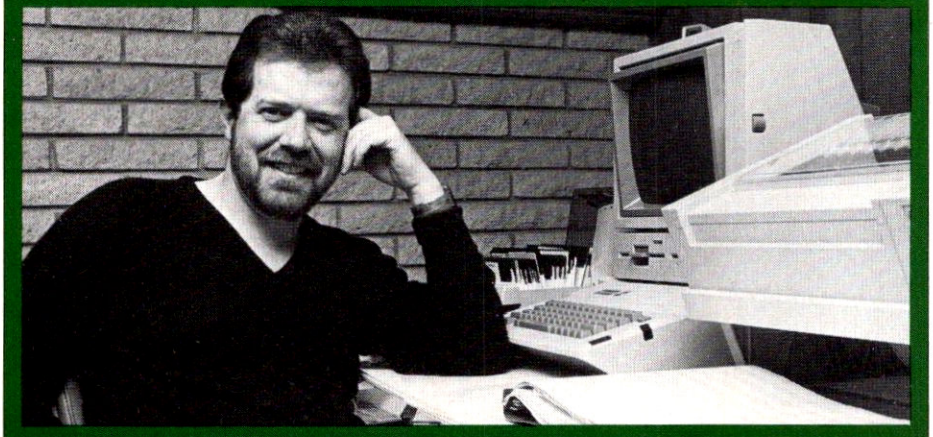
'I don't make big bucks,' says Conelly. 'I started it for fun.'



GEORGE GRYZENIA

megabyte of storage to his Apple and is looking to expand his new business.

Crunching numbers is another area where you can make money doing what other people hate to do. The small businesses in your area may appreciate a trustworthy and reliable computer person who does their payroll, accounts receivable, billing, forecasting, and other financial chores for them. Individuals may hire you to manage their money, calculate mortgages, and help them figure out whether they should buy a new car or house. A good way to start is to get ahold of one of the many tax programs available and set yourself up helping people do their income taxes.

Phineas Fiske, a certified financial planner in New York, does it another way. Rather than help people individually, he's designed an AppleWorks template—which he sells for $21.95—to help people do their own taxes on their computer.

One warning here: If you start doing business and taxes, you run the risk of lawsuits, should you make mistakes. A spokesman for the IRS told us, "The individual is responsible for the accuracy of his own tax form. But if he wants to sue you and take you to court, that's another thing."

Telecommunications: Dialing for $$

Jon Badeaux started his "databoard" two years ago, when readers of his newsletter, *Computer Entertainer*, couldn't locate software for the recently orphaned Adam computer. The board has grown and now offers news and reviews of all kinds of programs, as well as a way for people to purchase videotapes and computer software right from their computers.

"We make it clear that the products mentioned on the board can be ordered on-line," says Badeaux, "but we don't shove it down anyone's throat."

Computer Entertainer now runs on an Apple IIe and a hard disk, with the substantial help of a BBS program called Let's Talk (Russ Systems). The venture has proven successful, and Badeaux and his staff are finally moving the business out of the house and into a real office.

"Having a computer and modem is the easiest way to tap into the mass market," says Badeaux.

Thousands of bulletin boards are out there that people can use for free, so making money by charging people for access to your BBS is difficult. If you have a service or products that people want to buy, however, there is money to be made, and if you attract a large enough audience, you may even be able to charge local businesses to advertise on your board.

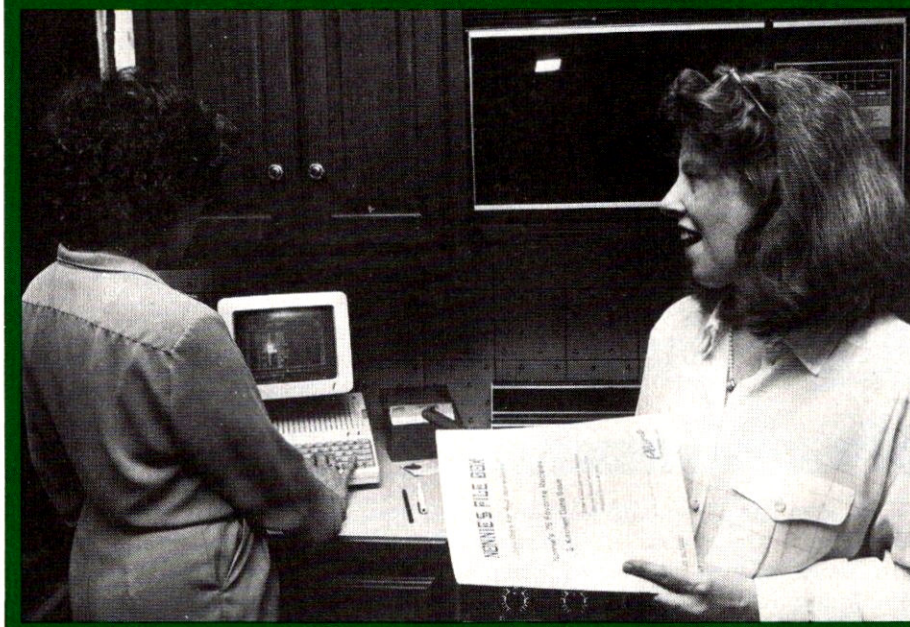
A word of warning: Running a bulletin-board system is not the easiest way to make money with a computer. It's a lot of hard work, and disk drives are not made to run continuously. You should expect equipment breakdowns.

An easier way to make money through telecommunications is by setting yourself up as an "information broker." That is, you can charge people and businesses to do library research for them. Instead of going

Jon Badeaux started his 'databoard' two years ago.

ANDRE MILLER

Recipe templates come from a IIc in Plume Software's kitchen.



MOMENTS PHOTOGRAPHY

to the library, you go to a network such as Dialog, which has hundreds of on-line research databases. If somebody needs a particular article in the June 1967 issue of *Harvard Business Review*, for instance, you can find it in seconds. Don't be surprised when a major corporation pays you $100 an hour for this kind of service.

Build Your Own Empire

Then there's the ultimate money-making plan: start your own computer company. In 1982, Cheryll Schomber and Mary K. DeLeo were housewives in Altoona, Pennsylvania. Today they're still housewives, and they still live in Altoona, but they're also the co-owners of Plume Software. Plume sells a $25 AppleWorks template called Nonnie's File Box, which contains recipes.

"Cheryll always wanted to write a cookbook, and somebody told her I was into computers, so the partnership grew out of that," DeLeo says.

The partners use DeLeo's Apple IIc to design programs, duplicate disks, print mailing labels, and run every aspect of the business. "Cheryll has learned a lot about computers," remarks DeLeo, "but I'm not sure that I learned anything about cooking."

Plume Software has yet to give rise to a new Silicon Valley in Altoona. In fact, it has yet to move out of Mary K. DeLeo's kitchen—but she's working on it. The next Plume release will be a matchmaking program to bring boys and girls together at dances and socials.

For Love or Money

As I've shown, you can use an Apple in dozens of ways to make money, but not one of the people I interviewed for this article said, "I don't like computers. I'm only in it for the money." Most of them would do what they were doing even if they didn't get paid a cent.

The trick is to take what you love doing anyway and see if you can merge it with computing and market it.

You're never too small. Don't think you can't compete with the big boys. Computing may be the last industry left where you can. Just about every major computer company started with vision, dreams, and the sweat of a just a few people.

Let's not forget that just ten years ago a couple of guys named Steve took what they knew about computers and started a little company in a garage. They made a few bucks doing it too. ✚

Dan Gutman is a syndicated computer columnist and author of I Didn't Know You Could Do THAT With A Computer! *(Compute! Books, $14.95).*

BOOKS ON MAKING BUCKS

Computer Ready, Jon Kolstad (520 Holden Road, Towson, MD 21204, $10 plus $2.50 (shipping and handling)

How to Make Money with Computers: A Guide to Thirty High-Profit, Low Capital Computer Business & Investment Opportunities, Jerry Felsen (CDS Publishers, 1979, $20)

How to Make Money with Your Home Computer, Clement C. Richard (Warner Books, 1984, $3.95)

How to Make Money with Your Micro, Herman Holtz (Wiley, 1984, $14.95)

How to Make Money with Your Personal Computer, Paul & Sarah Edwards (Alfred Publishers, 1984, $3.50)

The Incredible Secret Money Machine, Don Lancaster (746 First Street, Box 809, Thatcher AZ 85552; 1979, $5.95)

The Information Brokers: How to Start and Operate Your Own Fee Based Service. Kelly Warnken (R.R. Bowker Co., 1981, $15.95)

A.I.M.S. Personal Computer Business Books (Computer Information Limited, 1987, various prices)

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(415) 479-1700
List Price: The Print Shop, $49.95; The Toy Shop, $59.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM

T-Shirt Shop
Spinnaker Software
One Kendall Square
Cambridge, MA 02139
(617) 494-1200
List Price: $49.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM

CIRCLE 368 ON READER SERVICE CARD

Computer Entertainer
12115 Magnolia Blvd. #126
North Hollywood, CA 91607
(818) 761-1516

CIRCLE 369 ON READER SERVICE CARD

Let's Talk
Russ Systems
1344 Pacific Avenue, Suite 103
Santa Cruz, CA 95060
(408) 458-5080
List Price: $175
Requires: Apple IIe or IIc, two disk drives, intelligent modem (special cable required to work with the Apple Personal Modem)

CIRCLE 370 ON READER SERVICE CARD

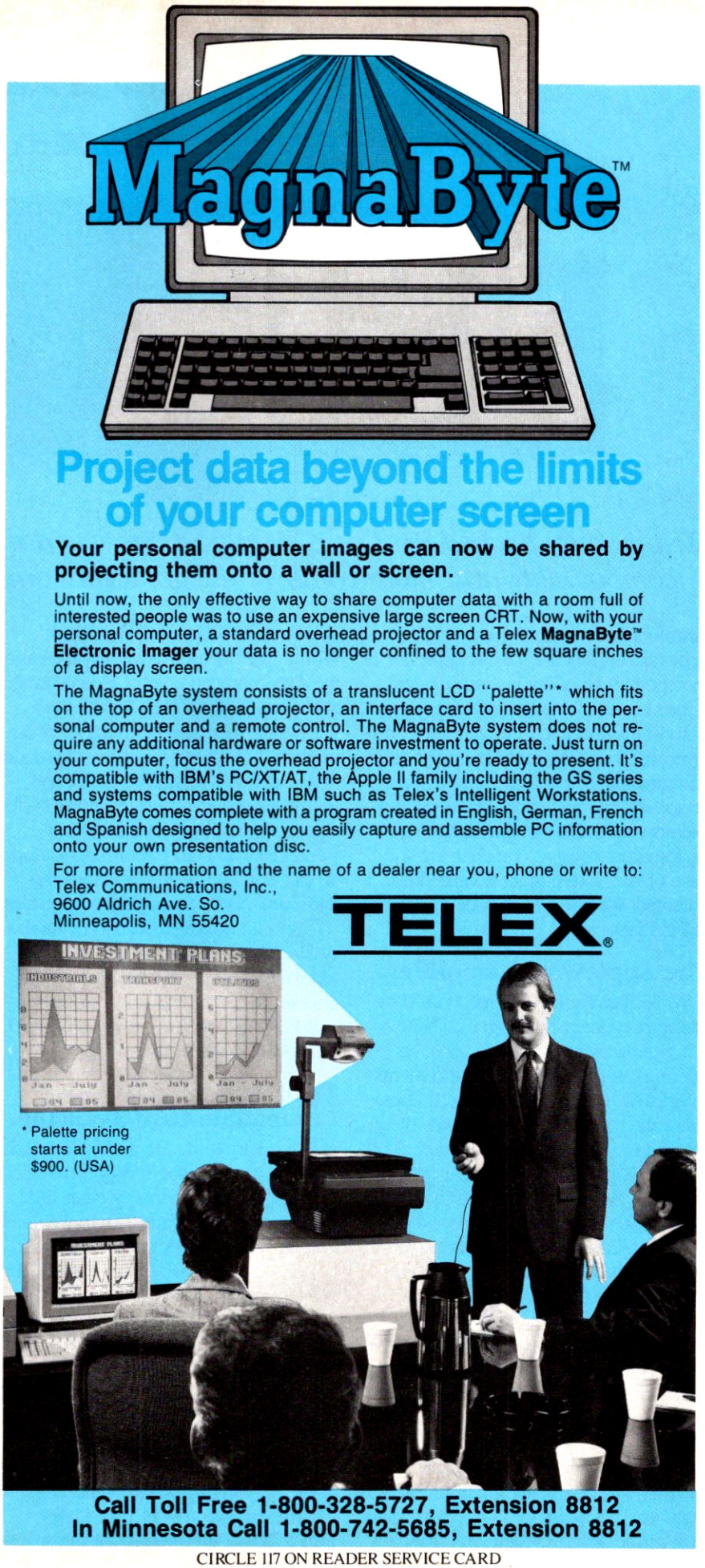
AST-VisionPlus
AST Research
2121 Alton Avenue
Irvine, CA 92714
(714) 553-0340
List Price: $295
Requires: Apple IIGS; 512K RAM; 3.5-inch disk drive; video camera (color optional), VCR, or any other NTSC-compatible device

CIRCLE 371 ON READER SERVICE CARD

AppleWorks 2.0
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
List Price: $249
Requires: Apple IIe with Extended 80-Column Card, IIc, or IIGS; 128K RAM; one disk drive

Nonnie's File Box
Plume Software
P.O. Box 2209
Altoona, PA 16603
(814) 942-7058
List Price: $25

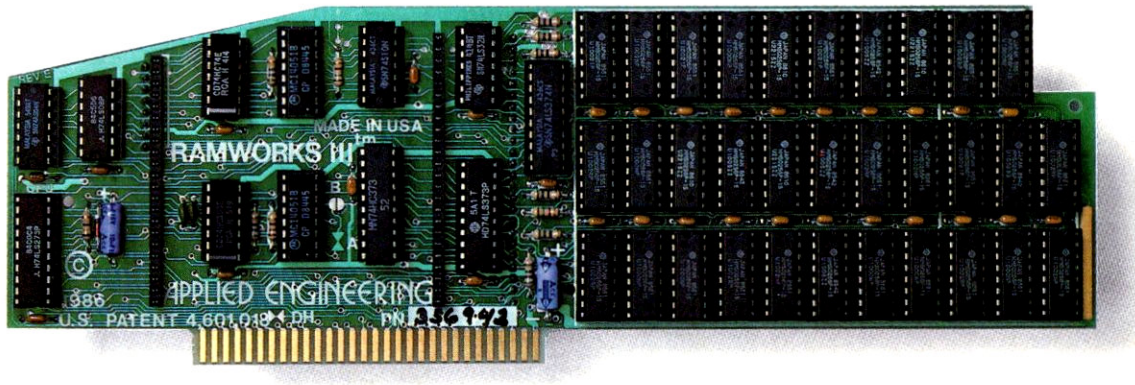
CIRCLE 372 ON READER SERVICE CARD



CIRCLE 117 ON READER SERVICE CARD

RamWorks® III

Patented Performance from the Recognized Leader



With battery backed RAM port, RGB port, increased memory capacity, full software compatibility and more compact design, RamWorks III is a generation ahead.

RamWorks III is the newest 3rd generation RAM card for the Apple IIe. It incorporates all of the technology and improvements that years of experience and over a hundred thousand sales have given us. By selling more memory cards than anyone else and listening to our customers, we were able to design a memory card that has the ultimate in performance, quality, compatibility and ease of use. A design so advanced it's patented. We call it RamWorks III, you'll call it awesome!

The AppleWorks Amplifier.

While RamWorks III is recognized by all memory intensive programs, NO other expansion card comes close to offering the multitude of enhancements to AppleWorks that RamWorks III does. Naturally, you'd expect RamWorks III to expand the available desktop, after all Applied Engineering was a year ahead of everyone else *including Apple* in offering more than 55K, and we still provide the largest AppleWorks desktops available. But a larger desktop is just part of the story. Look at all the AppleWorks enhancements that even Apple's own card does not provide and *only* RamWorks III does. With a 256K or larger RamWorks III, *all* of AppleWorks (including printer routines) will automatically load itself into RAM dramatically increasing speed by eliminating the time required to access the program disk drive. Switch from word processing to spreadsheet to database at the speed of light with no wear on disk drives.

Only RamWorks eliminates AppleWorks' internal memory limits, increasing the maximum number of records available from 1,350 to over 25,000. *Only* RamWorks increases the number of lines permitted in the word processing mode from 2,250 to over 15,000. And *only* RamWorks offers a built-in printer buffer, so you won't have to wait for your printer to stop before returning to AppleWorks. RamWorks even expands the clipboard. And auto segments large files so they can be saved on two or more disks. You can even have Pinpoint or MacroWorks and your favorite spelling checker in RAM for instant response.

RamWorks, nothing comes close to enhancing AppleWorks so much.

The Most Friendly, Most Compatible Card Available.

Using RamWorks III couldn't be easier because it's compatible with more off-the-shelf software than any other RAM card. Popular programs like AppleWorks, Pinpoint, Catalyst, MouseDesk, Howard-Soft, FlashCalc, Pro-Filer, Managing Your Money, SuperCalc 3a, and MagiCalc to name a few (and *all* hardware add on's like ProFile and Sider hard disks). RamWorks is even compatible with software written for Apple cards. But unlike other cards, RamWorks plugs into the IIe auxiliary slot providing our super sharp 80 column text (U.S. Patent #4601081) in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

RamWorks III is compatible with all Apple IIe's, enhanced, unenhanced, American or European versions.

Highest Memory Expansion.

Applied Engineering has always offered the largest memory for the IIe and RamWorks III continues that tradition by expanding to 1 full MEG on the main card using standard RAMs, more than most will ever need (1 meg is about 500 pages of text)...but if you do ever need more than 1 MEG, RamWorks III has the widest selection of expander cards available. Additional 512K, 2 MEG, or 16 MEG cards just snap directly onto RamWorks III by plugging into the industry's only low profile (no slot 1 interference) fully decoded memory expansion connector. You can also choose non-volatile, power independent expanders allowing permanent storage for up to 20 years.

It Even Corrects Mistakes.

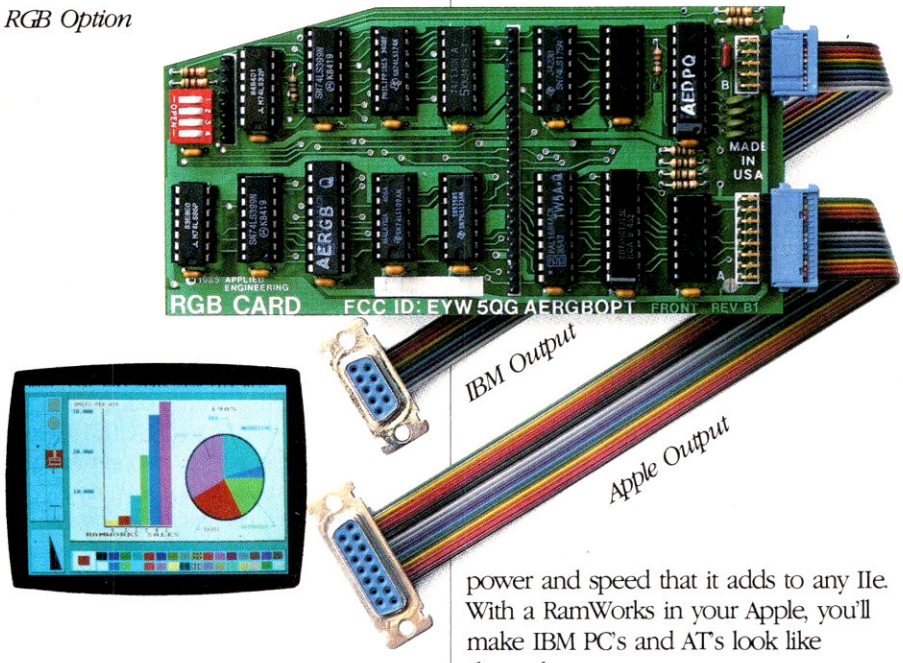
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

RGB color is an option on RamWorks and with good reason. Some others combine RGB color output with their memory cards, but that's unfair for those who don't need RGB *and* for those that do. Because if you don't need RGB

Applied Engineering doesn't make you buy it, but if you want RGB output you're in for a nice surprise because the RamWorks RGB option offers better color graphics plus a more readable 80 column text (that blows away any composite color monitor). For only $129 it can be added to RamWorks giving you a razor sharp, vivid brilliance that most claim is the best they have ever seen. You'll also appreciate the multiple text colors (others only have green) that come standard. But the RamWorks RGB option is more than just the ultimate in color output because unlike others, it's fully compatible with all the Apple standards for RGB output control, making it more compatible with off-the-shelf software. With its FCC certified design, you can use almost any RGB monitor because only the new RamWorks RGB option provides both Apple standard and IBM standard RGB outputs (cables included). The RGB option plugs into the back of RamWorks with no slot 1 interference and remember you can order the RGB option with your RamWorks or add it on at a later date.

RGB Option



True 65C816 16 Bit Power.

RamWorks III has a built-in 65C816 CPU port for direct connection to our optional 65C816 card. The only one capable of linearly addressing more than 1 meg of memory for power applications like running the Lotus 1-2-3™ compatible program, VIP Professional. Our 65C816 card does not use another slot but replaces the 65C02 yet maintains full 8 bit compatibility.

Endorsed by the Experts.

A+ magazine said "Applied Engineering's RamWorks is a boon to those who must use large files with AppleWorks...I like the product so much that I am buying one for my own system." inCider magazine said "RamWorks is the most powerful auxiliary slot memory card available for your IIe, and I rate it four stars...For my money, Applied Engineering's RamWorks is king of the hill."

"I wanted a memory card for my Apple that was fast, easy to use, and very compatible; so I bought RamWorks."

Steve Wozniak, the creator of Apple Computer

Apple experts everywhere are impressed by RamWorks's expandability, versatility, ease of use, and the sheer power and speed that it adds to any IIe. With a RamWorks in your Apple, you'll make IBM PC's and AT's look like slowpokes.

Quality and Support of the Industry Leader

RamWorks III is from Applied Engineering, the largest, most well supported manufacturer of Apple peripherals and the inventor of large RAM cards for the Apple. With our 5 year no hassle warranty and outstanding technical support, you're assured of the most trouble free product you can buy.

It's Got It All

- 15 day money back guarantee
- 5 year hassle free warranty
- Built-in super sharp 80 column display, (U.S. Patent #4601081)
- Expandable to 1 MEG on main card
- Expandable to 16 meg with expander cards, with NO slot 1 interference
- Can use 64K or 256K RAMs
- Powerful linear addressing 16 bit coprocessor port
- Automatic AppleWorks expansion up to 3017K desktop
- Accelerates AppleWorks
- Built-in AppleWorks printer buffer
- The only large RAM card that's 100% compatible with all IIe software
- RamDrive™ the ultimate disk emulation software included free
- Memory is easily partitioned allowing many programs in memory at once
- Compatible, RGB option featuring ultra high resolution color graphics and multiple text colors, with cables for both Apple and IBM type monitors
- Built-in self diagnostics software
- Lowest power consumption (U.S. Patent #4601081)
- Takes only one slot (auxiliary) even when fully expanded
- Socketed and user upgradeable
- Software industry standard
- Advanced Computer Aided Design
- Used by Apple Computer, Steve Wozniak and virtually all software companies
- Displays date and time on the AppleWorks screen with any PRO-DOS compatible clock
- Much, much more!

RamWorks III with 64K	**$179**
RamWorks III with 256K	**$199**
RamWorks III with 512K	**$239**
RamWorks III with 1 MEG	**$319**
RamWorks III with 1.5 MEG	**$489**
RamWorks III with 2 to 16 MEG	**CALL**
65C816 16 Bit Card	**$159**
RGB Option	**$129**
Optional Software:	
Pinpoint with RAM Enhancement Software	**$79**
VIP Professional	**$219**

RamWorks III. The industry standard for memory expansion of the Apple IIe. ORDER YOUR RamWorks III TODAY. See your dealer or call (214) 241-6060, 9 a.m. to 11 p.m., 7 days, or send check or money order to Applied Engineering.

MasterCard, Visa and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 if outside U.S.A.

Applied Engineering™

P.O. Box 798, Carrollton, TX 75006
(214) 241-6060

PICK OF THE CROP *BY DENISE CARUSO*

Utilities, SCSI drives, compilers, cleaners, and games—a collection of useful products for you and your Apple

PRODUCT SPOTLIGHT

UTILITY PLAYER

A good set of utility programs can make efficient computing a joy rather than a chore and can save your posterior when you've made a big mistake. PROSEL (PROgram SELector) and its utilities, written by Glen Bredon and available for a ridiculously low price, may be just the ticket.

Among other things, PROSEL operates under ProDOS and lets you move between applications without typing all the prefixes and pathnames you usually have to type to get out of a program running under ProDOS. It allows you to create menu selections that represent pathnames to any application program. Whenever you exit from an application, this menu comes up.

These utilities work with Apple's mouse or without—and, unlike many other programs, are smart enough to know when you're using the mouse. (Lots of other programs require you to tell them if you'll be mousing around.)

Miscellaneous utilities include a password program for protection of your hard disk and a head-parker for Sider hard disks. The DOS. HEADER utility lets you run DOS 3.3 programs directly from PROSEL with correct hardware.

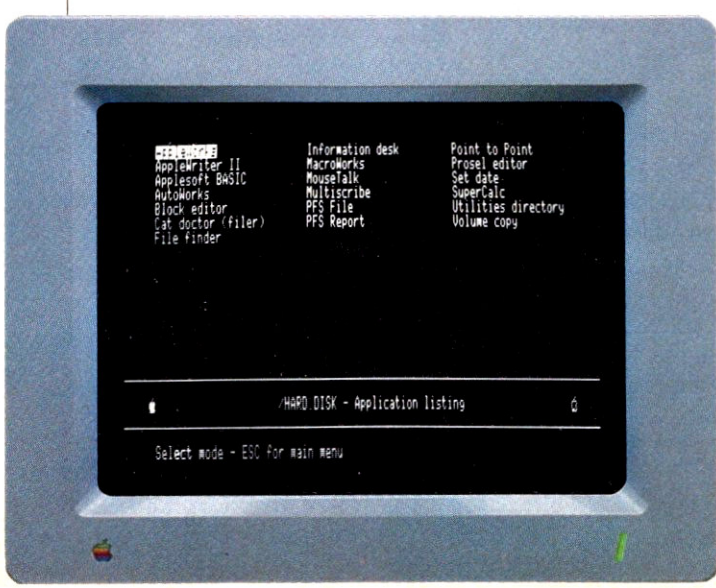
Just to make sure you don't get bored, the PROSEL package also includes a clock driver; an automatic program queue; an application scheduler that runs your programs at a specified time; a hard disk or RAM backup program (and a program to restore the hard disk to its original condition if a catastrophe destroys the volume); a fast floppy-disk copier; a RAM volume driver; a directory sorter that lets you sort alphabetically, by creation date, by modification date, or by file type; and a directory-repair utility.

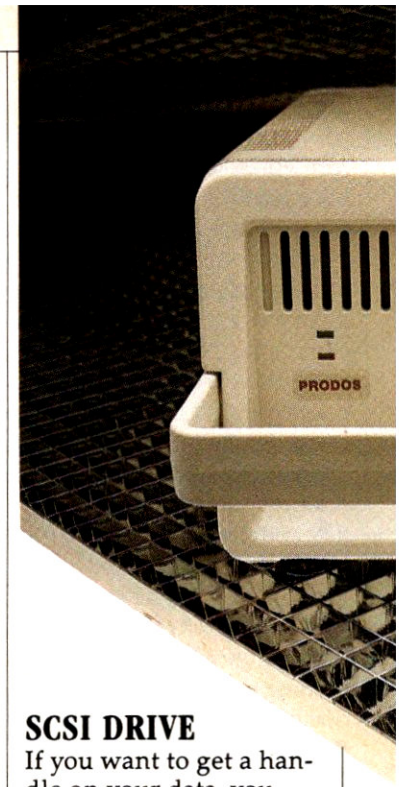
There's a ton more, but you get the idea. *(List Price: $40)*

Requires: Apple II Plus with Videoterm card, IIe, IIc, or IIGS. Most programs require 64K RAM; some require 128K. Recommended for use with hard-disk drives, 800K disks, or large RAM cards, but has some applicability in other systems.

PROSEL
Glen E. Bredon
521 State Road
Princeton, NJ 08540
(609) 924-5976

CIRCLE READER SERVICE NO. **400**





SCSI DRIVE

If you want to get a handle on your data, you might check into the S40 SCSI hard-disk subsystem from CMS Enhancements. Configured for ProDOS, the system has a usable capacity of almost 39 megabytes.

The system—which sports a nifty handle for moving it around—may be a boon to small offices that need disk- and file-sharing capabilities and for people who want to run multiuser bulletin boards. That's because you can install SCSI interface cards in two separate computers so both can share the hard disk without fear of directory damage when writing to the same volume at the same time. (Instructions with the interface card even show you how to connect three computers—including Macs and IBM PCs—to the hard disk.)

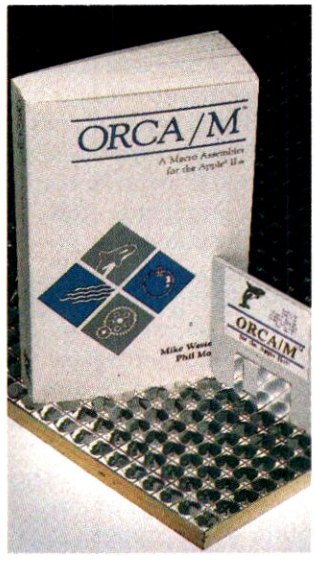
The SCSI interface cards aren't included in the package, but you can buy them from CMS if you need them. Included on the disk itself are SCSI utilities for formatting, initializing, driver installation, bus-condition testing, and bus searches.

(List Price: hard-disk drive, $1795; interface cards, $129 each)
Requires: Apple IIe or IIGS with SCSI interface card
S40 SCSI hard-disk subsystem
CMS Enhancements, Inc.
1372 Valencia Avenue
Tustin, CA 92680
(714) 259-9555
CIRCLE READER SERVICE NO. **401**

RIGHT OF ASSEMBLY

If you want to buy *the* compiler for the IIGS, you'll be happy to know that Byte Works has released its GS version of ORCA/M, based on the ORCA/M macro assembler for Apple II. Everyone's raving about this one. Apple commissioned ORCA/M as the development system for the IIGS and is selling the product itself under the name Apple IIGS Programmer's Workshop. Western Design Center, which designed the CPU for the Apple IIGS, chose ORCA as the standard assembler for the 65816 central processor. It's the only assembler to fully use Western Design's recommended syntax.

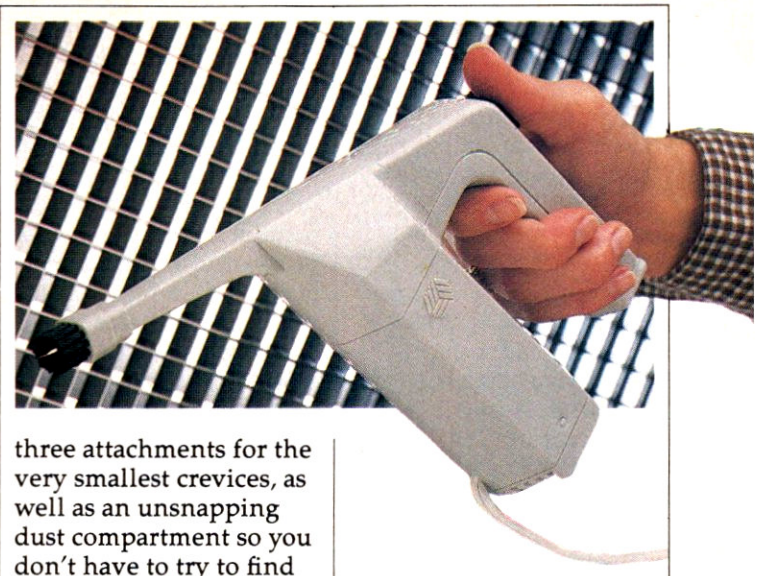
It's also upward-compatible with ORCA/M 4.0 for eight-bit Apple computers, uses the GS's built-in clock, uses a full-screen editor with commands similar to those of AppleWorks, and contains in its libraries many 65816 and Apple IIGS-specific macros. *(List Price: 69.95)*
Requires: Apple IIGS or IIe with upgrade kit, 256K additional RAM, 3.5-inch disk drive or hard-disk drive
ORCA/M, IIGS version
Byte Works, Inc.
4700 Irving Blvd. NW
Suite 207
Albuquerque, NM 87114
(505) 898-8183
CIRCLE READER SERVICE NO. **402**



A CLEAN SWEEP

If you're a believer in the early-warning system of computer maintenance, check out the System Sweeper. Instead of just blowing the dirt around as freon compressed-air canisters do, this product is actually a vacuum cleaner with itsy-bitsy attachments to suck the grime right out of your computer, printer, or typewriter before the dust motes work their dastardly deeds on your circuitry.

System Sweeper has three attachments for the very smallest crevices, as well as an unsnapping dust compartment so you don't have to try to find three-inch vacuum-cleaner bags. It runs on standard 110-volt current. *(List Price: $39.95)*
Requires: dust
System Sweeper
MicroComputer Accessories, Inc.
Dept. L
5405 Jandy Place
P. O. Box 66911
Los Angeles, CA 90066-0911
(213) 301-9400
CIRCLE READER SERVICE NO. **403**



AND THE ANSWER IS . . .

Creative minds will leap at the possibilities of Advanced Ideas' upgraded version of its popular educational package The Game Show. The New Game Show—with "vastly improved" graphics, sound, and authoring capabilities, according to the company—is focused toward teaching kids everything from science to language arts, via a game format modeled on the TV game show "Password." Most promising, though, are the program's extensive capabilities for creating custom topics and clues.

Imagine going wild setting up games such as "New Wave Bands of the Past Decade," "Apple Trivia," or even "Arcane Disk Utilities"—in addition to letting your kids learn the intricacies of topics ranging from the solar system to mythology to geology to movie and TV stars from the 1930s to today.

The main program disk comes with 40 cur-

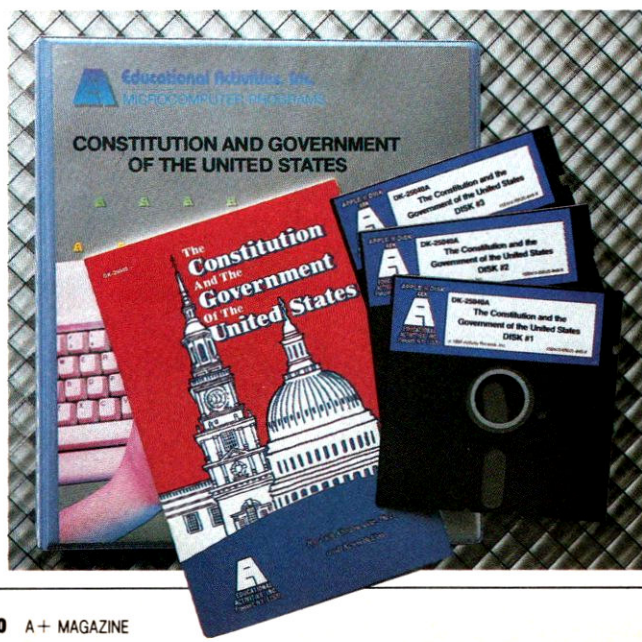
riculum topics on math, science, language/vocabulary, and social studies for grades 3–8. Extra LearningWare subject diskettes are available too. *(List Price: $39.95; LearningWare diskettes, $19.95 each. Upgrades to The New Game Show are available for $15—which includes tax and postage—plus original diskette.)*
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM; one disk drive
The New Game Show
Advanced Ideas, Inc.
2902 San Pablo Avenue
Berkeley, CA 94702
(415) 526-9100
CIRCLE READER SERVICE NO. **404**

RUGGED CONSTITUTION

While political careers are being made and broken in the basement of the White House, the 200th birthday of the U.S. Constitution is approaching, just in time to remind us of the strength and resilience of that singular document.

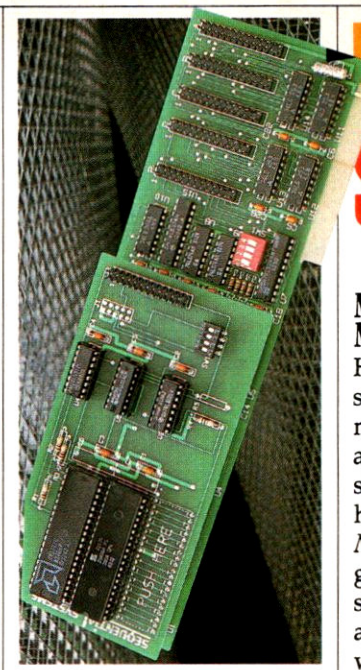
What better time for junior-high and high-school students to get a chance to explore the Constitution with a program called The Constitution and the Government of the United States?

Although the name sounds schoolbook dry, the three-disk tutorial is interactive and lets students examine case studies and learn the workings of the U.S. Supreme Court by trying to parallel its decisions. The program also illustrates our government's power structure and helps students study the first four amendments to the Constitution. *(List Price: $179—includes three disks, three backups, five text-booklets, management, and documentation)*
Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM; one disk drive
The Constitution and the Government of the United States
Educational Activities
1937 Grand Avenue
Baldwin, NY 11510
(516) 223-4666
CIRCLE READER SERVICE NO. **405**



QUEUING UP FOR THE PRINTER

If you want to eke more performance out of your computers-and-printer setup and are tired of dealing with switch boxes, check out the Q-Card. This auto-queuing print spooler resides on a card in a host computer and lets you connect as many as four CPUs to a single printer. Files that



are sent to the printer queue up according to who sent them first. As a bonus, the card's 64K buffer allows each user 16K of print buffer and lets users ship off files to the printer without locking up their individual systems. If material being sent is larger than 16K, then the computer freezes as it normally does during printout.

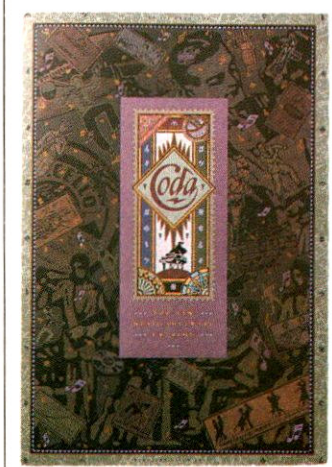
The Q-Card works with parallel-interface cards and printers, and the company also provides parallel-to-serial converters if you're using an ImageWriter or another serial printer.

In fact, the configuration for serial operation costs less than setting up a serial switch box, according to the company, because you don't need to buy serial adapters for each computer on the system—only for the host's Q-Card. *(List Price: $249.95; printer cables, $9.95 each; serial adapter, $99.95)*
Q-Card
Sequential Systems, Inc.
1200 Diamond Circle
Suite M2
Lafayette, CO 80026
(303) 666-4549
CIRCLE READER SERVICE NO. **406**

PRODUCT SPOTLIGHT

MUSIC FOR MODERNS

Here's one of the most visually appealing, not to mention comprehensive and shockingly inexpensive, catalogs in recent history. *Coda, the New Music Software Catalog*, is a gorgeous item, colored in striking art-deco style and categorizing "software that sings" for Apple II and Macintosh computers, as well as for Commodore, IBM, Atari, and Amiga. Sound cartridges and cassettes, MIDI interfaces, computer music accessories,



videos, and books are included in the 500-item listing, too. It's everything you always wanted to know about music software but didn't know whom to ask. *(List Price: $4; order with credit card by phone [800] 843-1337)*
Coda, the New Music Software Catalog
Wenger Corporation
1401 East 79th Street
Bloomington, MN 55420
(612) 854-9554
(call collect);
or (800) 843-1337
CIRCLE READER SERVICE NO. **407**

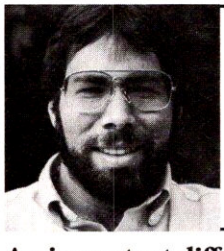
To boldly go at speeds no man has gone before.

With the TransWarp™ accelerator, your IIe™ or II+™ is 40% faster than the IIGS!

Computing at warp speed!

It's an experience you shouldn't miss. And with TransWarp, you won't have to. Because TransWarp will run your IIe or II+ software *3.6 times faster* —that's 40% faster than Apple's IIGS!

No more yawning while your Apple™ slowly rearranges text or calculates spreadsheets. With 256K of ultra-fast RAM, TransWarp speeds up *all* Apple software—including AppleWorks, and all educational software, graphics and games. And it's compatible with all standard peripheral cards (such as RamWorks and Apple memory cards), hard disks, 3½" UniDisks, 80-column cards, modems, clock cards, mouses and more! You name it, TransWarp accelerates it. There's even a 16 bit upgrade chip available.



"TransWarp is great! I have replaced all my other accelerators with it!"

Steve Wozniak, the creator of Apple Computer

An important difference.

With TransWarp, software runs up to three times faster than with other cards, since the others can't accelerate programs in auxiliary memory. That's why TransWarp is so much faster than the rest. Nearly all of today's more powerful programs run partially or completely in auxiliary memory: programs like AppleWorks, Pinpoint, Managing Your Money, SuperCalc 3a, BPI and Pascal, to name a few. Why settle for a card that accelerates only part of the memory?

There's one more important difference. Since TransWarp doesn't use memory caching, you get *consistent* high speed performance.

A cinch to use.

Simply plug TransWarp into any slot in your Apple II, II+ or IIe—including slot 3 in the IIe. Instantly you'll be computing at speeds you only dreamed about before. And should you ever wish to run at normal speed, simply press the ESC key while turning your Apple on.

Since TransWarp is completely transparent, you won't need preboot disks or special software. It's ready to go right out of the package!

Speed = Productivity

Imagine the productivity gains you'll achieve when your programs are running over three times faster. TransWarp is so powerful, your Apple will make IBM PCs™ and even ATs™ look like slowpokes.

- 3.6 MHZ 65C02
- 256K of ultra-fast on-board RAM
- Accelerates main *and* auxiliary memory
- Low power consumption for cool operation
- Totally transparent operation with all software
- Plugs into any slot, including slot 3 on the Apple IIe
- Accelerated 16 bit option available
- 5-year warranty

Satisfaction guaranteed!

Give *your* Apple the TransWarp advantage. With our risk-free 15-day money back guarantee, you have nothing to lose but wasted time. Call today!

TransWarp accelerator $279
16 bit upgrade (may add later) $89

For fast response:

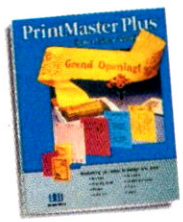
Call Applied Engineering, 9 a.m. to 11 p.m., 7 days at (214) 241-6060. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 if outside U.S.A. *Or mail* check or money order to Applied Engineering, P.O. Box 798, Carrollton, TX 75006.

Applied Engineering

The Apple enhancement experts.

P. O. Box 798, Carrollton, TX 75006 (214) 241-6060

PrintMaster Plu advance in freed



Spread the word.

New PrintMaster Plus is an incredible advance in specialty printing software. It gives you *twice* the number of graphics, plus more type fonts and options for getting your message across than the other leading printing shop program. It's even vastly advanced over its own predecessor, PrintMaster.

You get 122 graphic elements, not to mention 9 type fonts in upper and lower case and 11 borders. And with PrintMaster Plus, one program does it all: cards, banners, posters, stationery and even calendars.

Before we say more, we have to tell you about the unique PrintMaster Plus previewing capability. While other programs let you preview a project at the end, PrintMaster Plus lets you select design elements in any order and preview your creation at any time, exactly as it will appear printed — truly the ultimate in creative freedom.

With PrintMaster Plus one program does it all — cards, banners, posters, stationery, even calendars.

As an added bonus, you can mix two different graphic elements on posters and banners (while other programs may limit you to one). Each font can be sized small or large. There's even a special, small-sized font so you can fit more lines of text into your masterpiece.

PrintMaster Plus lets you create, preview, and make changes at any step.

If you like freedom of expression, insist on PrintMaster Plus the next time you visit your software dealer. When all is said and done, you'll be glad you did.

What you see here is the biggest selection of graph in a single printing shop package. Take th

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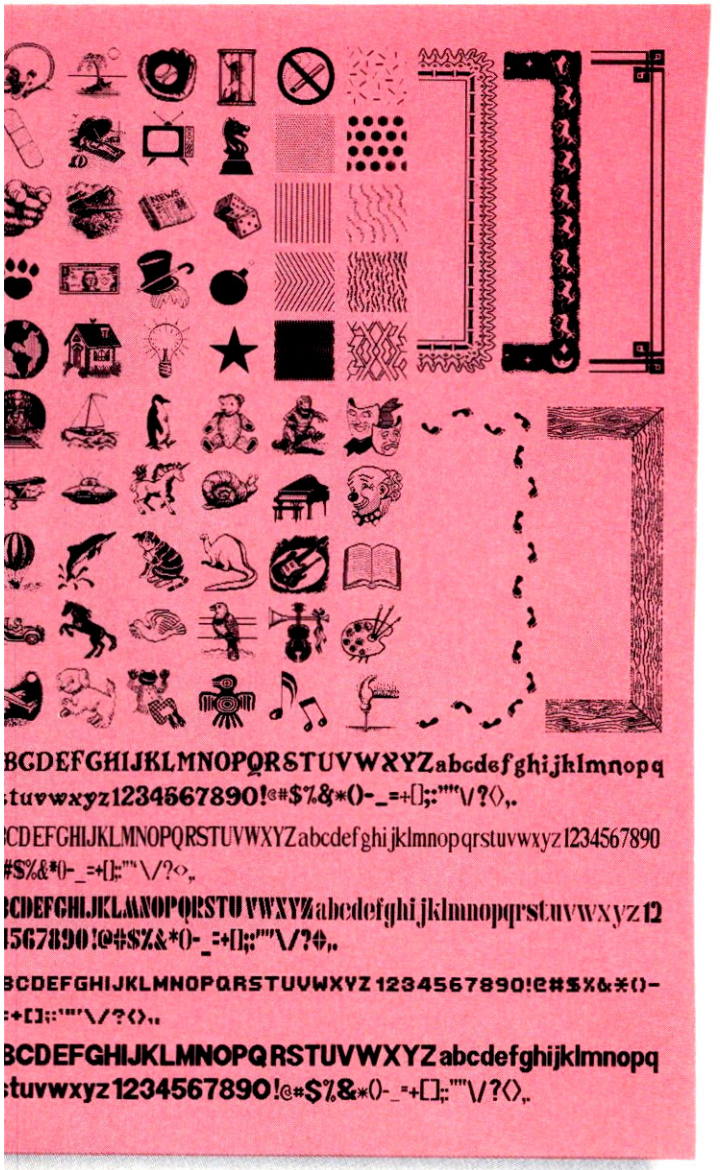

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CIRCLE 113 ON READER SERVICE CARD

One year ago, Apple Computer, Inc., commissioned a creative team to design a sales demonstration program. Not just any demo program, but one that would show off graphics and sound.

Making the IIGS Sales DEMO

Apple wanted the IIGS demo to have music and speech to attract attention in a store, plus animated scenes to portray the benefits of using a IIGS at home and school. Apple also wanted special effects to wow potential buyers with its state-of-the-art technology.

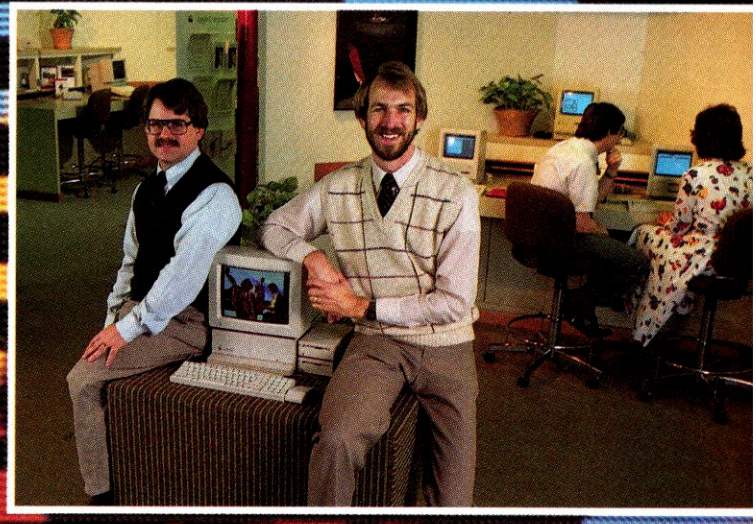
The two programmers involved in the project, Ron Lichty and Tom Crosley, wrote and tested nearly 40,000 bytes of assembly code during the following four months. This is their exclusive report on the techniques they used to create Apple's IIGS demo program.

Precious little in the way of tools and applications has appeared for the IIGS since its introduction. For sophisticated GS owners anxious to put their systems through their paces, here's a glimpse of what's possible with the GS.

"Can it be done?" That was the first question Apple managers hired us to answer. They handed us a preliminary script that was a pretty tall order. It called for a two-to-six-minute IIGS sales demo program to open with a fast-paced "attract mode" accompanied by high-quality music; switch to an animated overview of benefits; branch to various examples of uses in home productivity, education, and small business; and end with a 30-second sales close. Then Apple Computer loaded us down with two IIGS prototypes camouflaged in Apple IIe cases, three linear feet of preliminary documentation, and disk copies of the only two existing IIGS tools—prototypes of the Apple Programmers Workshop (APW) assembler and of Paintworks Plus (from Activision). We would have to write all our other tools from scratch.

Our first test was animation. Earlier Apple II computers use double buffering for animation. The hardware is designed to switch cleanly between two display screens, one at memory location $2000, the other at $4000. Animators set up one frame on the first screen and the next frame on the second screen and switch from the first to the second with a single command. Then their programs quickly set up the third frame on the first screen and switch back, repeating the process for smooth, flicker-free animation.

The IIGS has the graphics modes of the earlier Apple II computers,



PHOTOGRAPHY BY JIM DAVIS

Behind the Scenes

FIGURE 1.

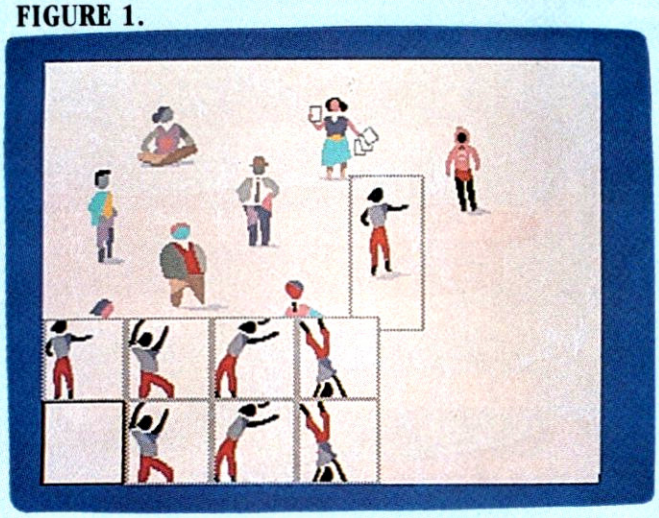


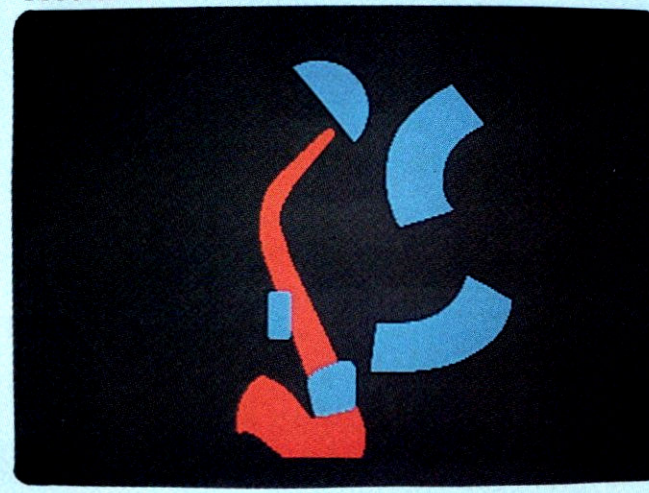
FIGURE 2.

FRAME	1	2	3	4	5	6	7	8	OPTS	SPD
73:	--	A6	B2	--	A7	C5	A1	--		8
74:	--	A6	B3	--	A7	C5	A1	--		8
75:	--	A6	B3	--	A7	C5	A1	--		8
76:	--	A6	B3	TD	A7	C5	A1	C1		8
77:	TE	A6	B3	TD	A7	C5	A1	C1		8
78:	TE	A6	B4	TD	A7	C5	A2	C1		8
79:	A3	A6	B4	TD	A7	C5	--	C1		8
80:	A3	A6	B4	TD	A7	C5	A2	--		8
81:	A3	A6	B5	TD	A7	C5	A2	--		8
82:	A3	A6	B5	TD	A7	C5	A2	--		8
83:	--	A6	B5	TD	A7	C5	A2	--		8
84:	--	A6	B6	TD	A7	C5	A2	--		8
85:	--	A6	B6	TD	A7	C5	A2	--		8
86:	--	A6	B6	--	A7	C5	A2	--		8
87:	--	A6	B6	--	A7	C5	A2	C1		8
88:	--	A6	B7	--	A7	C5	A2	C1		8
89:	--	A6	B7	--	A7	C5	A2	C1		8
90:	--	A6	B7	--	A7	C5	--	C1		8
91:	A4	A6	B8	C6	A7	C5	--	--		8
92:	A4	A6	B8	C6	A7	C5	--	--		8

File: hand X= 39, Y=131

FIGURE 3.

FIGURE 4.



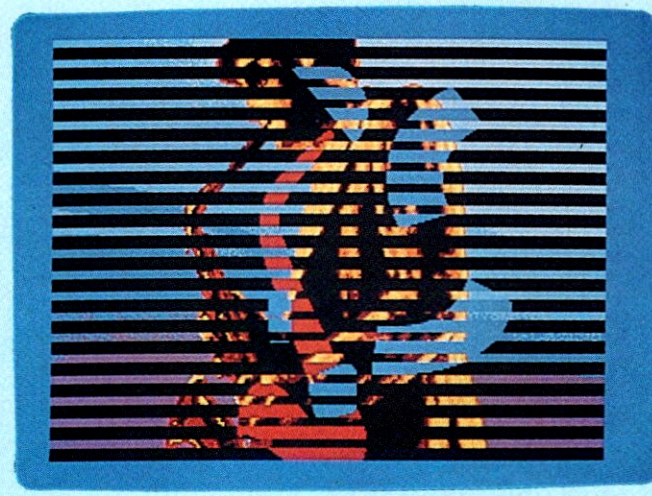


Figure 1 demonstrates the use of the cast cutter tool. Using the mouse to drag the cross hair, the artist could cut up to eight cast members from the full-screen picture to the eight boxes in the lower left corner. The top four of those eight boxes were all that was necessary to make the woman do cartwheels across the stage. The artist cut the first from this picture and copied three of the four top pictures to lower boxes to modify them for additional effects.

Figure 2 shows a segment of the score that drives the solar-system scene. We chose to display scores in the 40-column text mode for improved scrolling speed and legibility. The time runs vertically from top to bottom (note the increasing frame numbers on the left side). Animation tracks (or planes) 1–8 run horizontally from left to right across the top (track 1 is the lowest on the screen, just above the background). Each occupied cell points to a cast member or text file. The cursor is on frame 82, track 7, which is one of the cast members in the file that is called hand.cast, and is located at coordinates X = 39, Y = 131 on the screen. The A2 inside the cell stands for cast member #2 of file slot A (there are 14 cast-file slots, A–N). To the right of the tracks is a column for options such as special effects and conditional branching. The last column indicates the speed between frames; 8 is the fastest.

Figure 3 shows the stage that we used to place the various cast members in their proper positions. This picture is the same as what you see in the actual demo, except that additional information appears in the lower right corner for use by the person who is designing the animation. This picture shows, for the current frame and track, the coordinates of the cast member, if any. The animator can single-step forward and backward through the frames, switch among any of the eight tracks, and move the selected cast members around on the stage without returning to the score.

Figure 4 illustrates a venetian-blinds dissolve from the stylized red saxophone and blue rings on a black background in the opening scene, to a point midway through the dissolve, to the digitized sax player in the next scene.

but it also adds two important new super-hi-res modes: either 320 or 640 pixels (dots) wide and 200 pixels high—significantly better than the other graphics modes, but there's a catch: Both new modes are limited to a single screen that takes 32K of memory. Many of the first IIGS developers were therefore skeptical. How would it be possible to do super-hi-res animation without causing a noticeable flicker on the screen, resulting from the buffer's changing while it was being displayed?

We found the answer in the IIGS's hardware. To make it compatible with earlier Apple II computers, the IIGS hardware designers used a special technique called shadowing. Apple IIGS programs run at full speed (2.6 MHz) out of most 64K banks of memory, but disk, screen, and other I/O actually runs at the "old" speed of 1 MHz out of two banks at the top of memory—far out of reach of a regular Apple II program—in order to maintain hardware compatibility with the earlier Apple II models (see Memory Map, page 50). A set of "soft switches" connects and disconnects the I/O memory from low memory. When this memory is connected, information written to two "fast RAM" banks is automatically duplicated in the two I/O banks. The super-hi-res screen memory is among the shadowed areas. (For further implications of shadowing, see this month's "Speaking of Graphics" column.)

That IIGS feature is what we used to get around the one-screen problem. We discovered we could animate by drawing a frame in the screen's shadow RAM, with shadowing disconnected so the changes didn't show on the screen. Then we could turn shadowing on again and put an identical copy of the frame into the frame's memory location (on top of itself), one "word" (double byte) at a time. The hardware simultaneously copies the frame to the real screen much faster than our program could do it—with less chance of flicker. It's that cycle of drawing-then-displaying that, for example, lets dollar bills float smoothly downward in the demo's section on using the IIGS for home budgeting.

We were also concerned about the speed at which we could animate the huge 32K screen. It turns out that the speed is comparable to that of earlier Apple II computers. Although the 65816 running in the 16-bit (native) mode at 2.6 MHz is about four times faster than an 8-bit 6502 running at 1 Mhz, the 32K super-hi-res buffer is also four times larger than the size of the Apple II's standard hi-res buffer, so things even out. The bottom line is that you can do the same level of animation on the Apple IIGS as you can on other Apple II computers, but in much higher resolution.

Memory Limits

Our second test was to determine whether the program would fit on two 800K disks and run within the extra megabyte of RAM that is the maximum possible with Apple's memory-expansion card. That much memory seemed luxurious until we considered the amount of memory all our super-hi-res graphics and even just a few seconds of high-quality sound would require.

We decided to use synthesized sound to play the music, using the Ensoniq sound chip. The waveforms for the piano, saxophone, bass, and drums would be digitized, and the note sequencer would play the notes in the proper order with the correct timing.

We estimated that music playing throughout the entire demo would require less than 128K. If we had used sampled sound—sound that is captured rather than synthesized—the memory requirements would have been much higher. Sampling yields a more lifelike sound, however, so that's the trade-off.

We restricted the number of 32K super-hi-res pictures to just backgrounds, figuring we'd store animated characters as small parts of a screen. We concluded we could fit the program, pictures, and sound onto two 800K disks if we employed file compression. It could be done—and that's what we told Apple.

Designing the Animator

Once Apple gave us the go-ahead, we started work on the program. For the animation, we used 320 × 200 graphics, which offers up to 16 colors on each line, from a palette of 4096 colors.

We designed the backgrounds as super-hi-res 32K screens. For each moving object against those back-

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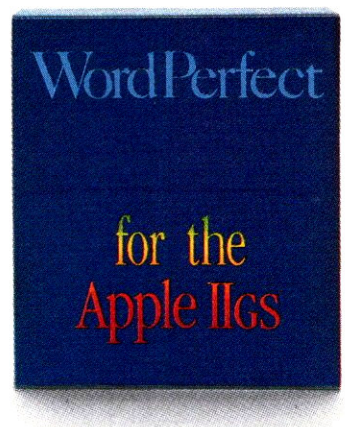

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grounds, such as the fellow with the tie who dribbles a basketball or the woman doing a gymnastics routine (see figure 1), we created a series of "cast members"—bit-mapped picture fragments that, when run successively, would create motion. We stored up to eight cast members together in a "cast file."

To let one object pass in front of another, such as when a television set disappears into a file cabinet or when a man races through a crowd in front of some people and behind others, we drew the cast members in one of eight planes (called tracks) on top of the background. Each cast-member object could contain dots with colors 1 through 15 from the current palette; we reserved color 0 for blank areas that were supposed to be transparent. When we drew one cast member on top of another, the following algorithm let all the nontransparent pixels of the object in front hide the pixels below, so what was "behind" them didn't show through:

```
LDA notmask,Y    get not mask of
                 cast member
AND >buffer,X    and with current
                 picture to make
                 room
ORA object,Y     draw in new cast
                 member
STA >buffer,X    store back to
                 screen buffer
```

"Notmask" is a silhouette of the cast member, with all the transparent pixels reversed to 1 ($F) and all other pixels cleared to 0; "buffer" is the 32K super-hi-res screen buffer; and "object" is the cast member itself. The AND clears the old pixels over which the new pixels will be drawn, and the ORA draws the new image there.

For each frame of animation, the eight tracks are first erased from the background, one track at a time, and then redrawn. Both erasing and drawing take place with shadowing disabled—during the "dead time" between frames, while the microprocessor is counting off 16.67-millisecond "ticks" of the IIGS's heartbeat counter. When it's time to show the next frame, shadowing turns back on, and the program shadows the new picture to the screen buffer by copying every changed double byte to itself. So when a paper airplane flies across the screen and disappears into the corner mailbox, only the throwing arm, upper body, airplane, and mailbox door change from one frame to the next. Because only a small portion of the screen usually changes between any two frames, this animation happens very quickly, without noticeable flicker.

Steps in Creating a Scene

The sales demo consists of 23 scenes. In the education section, for example, a writing-skills scene dissolves to a reading-skills scene, which dissolves to scenes depicting math skills, the solar system, geography, and foreign languages. A scene in this context is one or more screens with the same background picture, palette, and border color, along with up to 14 cast files containing up to 112 cast members—animation often requires a series of almost identical cast members, each only slightly modified—and up to 14 text files. Each scene is described by a "score," which contains the screen locations of all the cast members. In a matrix much like that of a spreadsheet (see figure 2), each frame of animation is

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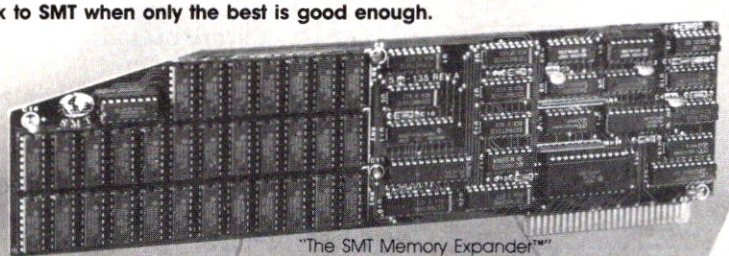

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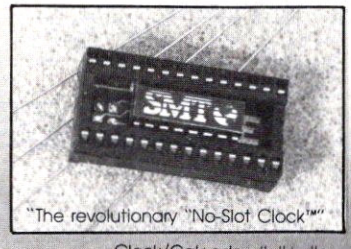

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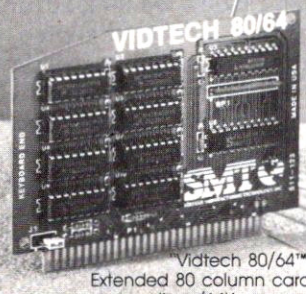

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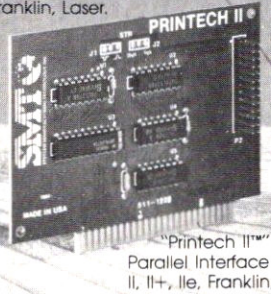

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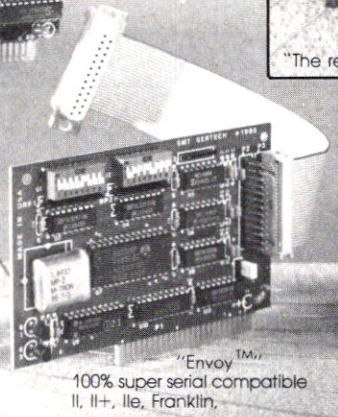

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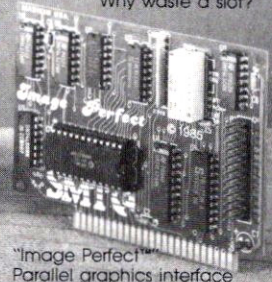

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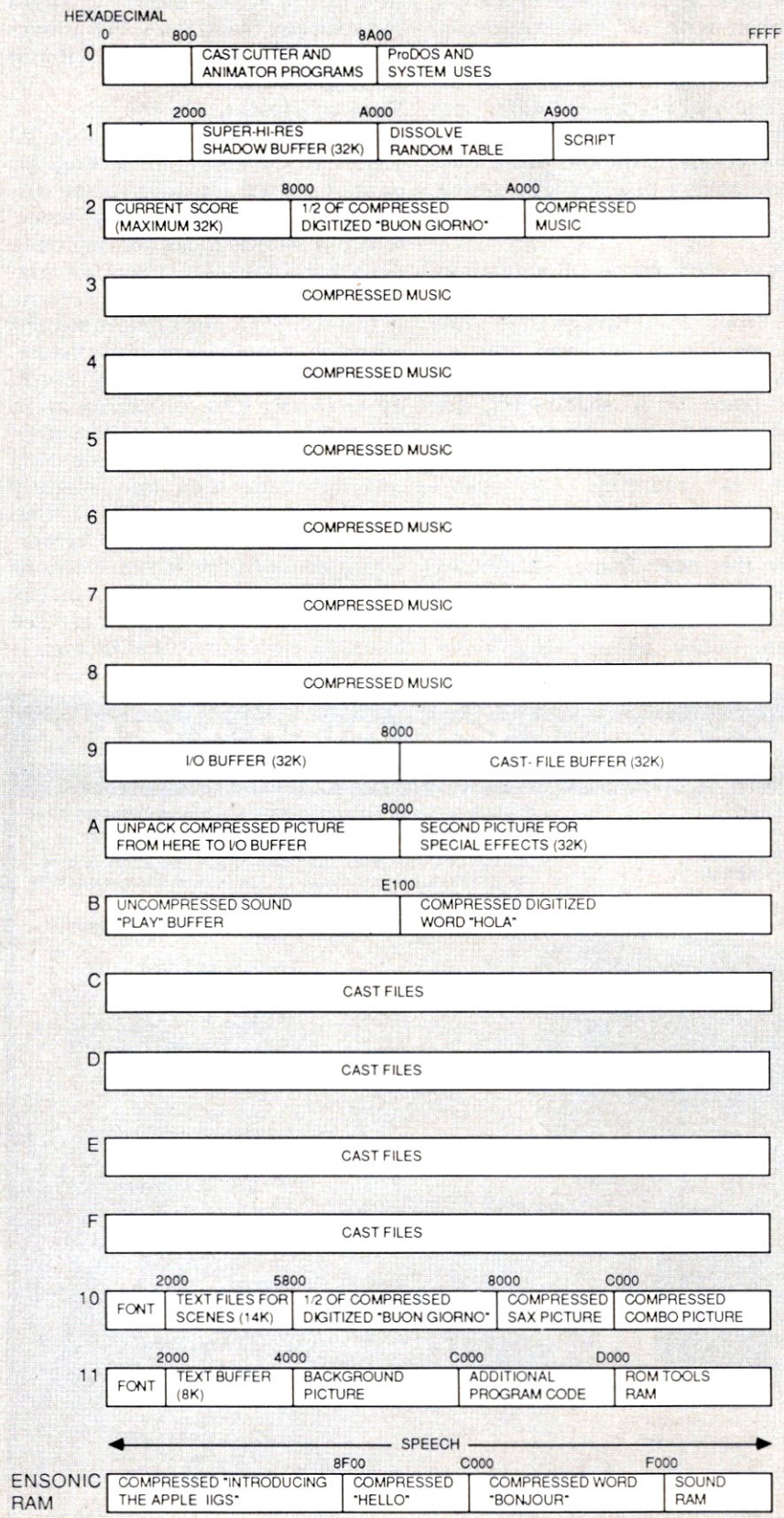
Memory Map

The IIGS sound demo uses every nook and cranny of memory, and even borrows the Ensoniq's own 64K of RAM. Note that the placement of the memory addresses is not to scale.



represented by a row, and each of the eight planes or tracks takes up a column.

Creating a scene took us four steps. First an artist created the art for the scene with a digitizer or paint program (or both), with one picture serving as the background.

Next, an animation specialist extracted cast members from one or more pictures with a "rectangle tool" we wrote ourselves. Cast members that required only minor changes to create animation were extracted several times and then altered with a fatbits utility that we created.

Third, the animator put the background picture and cast members into cells in the spreadsheet-like score and moved each cast member into its position. For instance, when notes cascade across a music staff, the staff is part of the background picture, and the notes are drawn from cast members and positioned by x,y coordinates in the score.

The Cut, Copy, and Paste commands in the score editor are useful for creating repeated animation, and we used them to put together the scene that depicts the rotating solar system (see figure 3). We were able to add various options to the score on a per-frame basis, including IF commands (conditional branches). In the interactive version of the demo, conditional branching lets users press the Return key or click the mouse to alter the animation sequence. It also let us test the animation at various speeds and single-step other score options a frame at a time.

Finally, a writer and the animator added text to the scene. The Text program we wrote let us create multicolored, proportionally spaced text with optional shadows.

Special Effects

To do special effects, such as dissolves and fades, we took advantage of the IIGS's ability to switch each line among 16 different palettes.

The wipe, curtain, and venetian-blind dissolves all change from one picture to another on a line-by-line basis, switching each line's palette to the new colors as soon as the line is copied. The wipe—which, for example, dissolves from budgeting to the file cabinet—copies the destination picture in consecutive lines, top to bottom. The venetian-blind dis-

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Scene Control

The demo is controlled by a text file that lists, in order, directories and score file names necessary for each scene. The colons preceding the second pathname and the succeeding score named mouse1 are conditional indicators. This scene, the one that teaches use of the mouse, appears only when the demo is configured for interaction.

```
/sd2/act1/sc1/
zz
big
rotate
lit

:/sd2/act2/sc1/
:mouse1

/sd2/act3/sc1/
chars1

/sd2/act3/sc2/
mail

/sd2/act3/sc3/
money

/sd2/act3/sc4/
file

/sd2/act3/sc5/
cash

/sd2/act3/sc6/
boys

/sd2/act3/sc7/
write

/sd2/act3/sc8/
chase

/sd2/act3/sc9/
math

/sd2/act3/sc10/
solar

/sd2/act3/sc11/
europe

/sd2/act3/sc12/
music

/sd2/act3/sc13/
flower

/sd2/act3/sc1/
chars9

/sd2/act4/sc1/
per0

/sd2/act5/sc1/
buy
dealer
finalx
```

solve, which alters the scene from an abstract saxophone to a digitized sax player (see figure 4), copies every tenth line and repeats ten times. The horizontal stage-curtain dissolve, which we used in one spot to move from the math-skills scene to the solar system, alternates top with bottom to close at the center.

The overlap dissolve works differently: The first picture seems to become snowy, until you see the second picture appearing through the snow, such as in the dissolve from the sax player to the combo while the music is playing at the demo's beginning. Randomness is critical here. When we discovered that the IIGS's random-number ROM routine was much too slow for use on the fly, we instead had it generate a table of 1024 random screen addresses before the demo began. Then we divided the screen memory into 32 groups of 1024 bytes each and had one pixel in each group switch at a time. The random-number table picks which pixel in each group to alter next, and the 32 palette colors switch to the new picture's colors evenly in the course of the entire dissolve.

Fades occur at the beginning of the demo, when the saxophone fades from black to orange as the rings animate through it, and at the end, as the rotating Apple IIGS fades into the blue background. Creating the effect is simple: Using beginning and ending palettes that we determined, the program divides the difference between the beginning and ending values of each color equally across 16 frames.

Sound

As the animation and special effects came together and our deadline loomed, we realized that the note sequencer we had planned to use would not be ready in time, so we decided not to use digitized sound but the alternate and RAM-costly path: sampled sound.

Another member of the creative team played tapes of the music and speech into a Macintosh, which broke every second of sound into thousands of momentary samples, each represented by a single byte. The main section of the music took 34 seconds. We sampled it at 22 kilohertz—although not hi-fi quality, it sounded pretty good. Each second of music required 22,000 bytes to represent it, however, so the 34 seconds of jazz we digitized required 748K. Instead of the 128K of RAM and disk memory we had budgeted for music and speech, the music alone used up an entire disk and took three times as long to load as to play—more than a minute and a half!

The solution was to compress the sound. Since the bulk of the variations from one sample to the next

FURTHER INFORMATION

Books

Programming the 65816, David Eyes and Ron Lichty (Brady/Prentice Hall Press, New York, NY; 1986), $22.95

65816/65802 Assembly Language Programming, Michael Fischer (Osborne McGraw-Hill, Berkeley, CA; 1986), $21.95

Apple IIGS Toolbox Revealed, Danny Goodman (Bantam Books, Inc., Des Plaines, IL; 1986), $21.95

The Apple IIGS Technical Reference, Michael Fischer (Osborne McGraw-Hill, Berkeley, CA; 1987), $19.95

Exploring the Apple IIGS, Gary B. Little (Addison-Wesley Publishing Company, Inc., Reading, MA; 1987), $22.95

Apple IIGS ProDOS 16 Reference, Apple Computer, Inc. (Addison-Wesley Publishing Company, Inc., Reading, MA ; 1987), $29.95 (includes ProDOS 16 and practice disk)

Technical Introduction to the Apple IIGS, Apple Computer, Inc. (Addison-Wesley Publishing Company, Inc., Reading, MA; 1987), $9.95

Upcoming Addison-Wesley books:
Apple IIGS Hardware Reference, Apple Computer, Inc., $24.95 (available summer 1987)
Apple IIGS Firmware Reference, Apple Computer, Inc., $24.95 (available summer 1987)
Apple IIGS Toolbox Reference, Apple Computer, Inc., Volume 1 and Volume 2, $26.95 each (available fall 1987)

Organizations

The Apple Programmer's and Developer's Association (APDA) is the central source for up-to-date Apple technical information and inexpensive development tools. It publishes a quarterly catalog/newsletter that includes third-party languages, tools, utilities, and Apple-related books. (Note the Apple Computer catalog called *Macintosh and Apple II Development Languages and Tools*.) Membership dues are $20 per year. APDA, 290 SW 43rd Street, Renton, WA 98055; (206) 251-6548.

A.P.P.L.E: The Apple Puget Sound Program Library Exchange is one of the largest users' groups for Apple II-series computers. It publishes *Call-A.P.P.L.E.* and offers a telephone hot-line to members for tough questions or just a little assistance (9 A.M.–3 P.M. Pacific time M–F). Membership dues are $26 per year, with a first-time application fee of $23. A.P.P.L.E., 290 SW 43rd Street, Renton, WA 98055; (206) 251-5222.

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were very small, we compressed most 8-bit samples to 4-bit variations, reducing the music and speech waveforms to about 55% of their original 891K.

After considerable reorganizing, we "found" enough areas of memory to preload all of the compressed sound. In the final demo, because of the compression, all of the animation and special-effects routines active while sound is playing must regularly check the IIGS's 16.67-millisecond heartbeat counter to see whether it's time to uncompress more sound into a 56K on-the-fly decompression buffer. If you look carefully at the dissolves and animation that occur during the music, you can see a rhythmic pause every third of a second or so as another 8K area of the music buffer refills.

Meanwhile, the synthesizer is playing music from the buffer just moments after its decompression, but the program has no way of telling where in the buffer it is. We had to do considerable experimenting to fine-tune the program to keep it ahead of the Ensoniq's interrupts without overwriting music the synthesizer hadn't gotten to yet.

The final memory map for the demo program, which you can see on page 50, was very different from what we'd originally imagined. We no longer had enough RAM to preload a scene while the previous scene played, which would reduce delays between scenes. Instead, every memory nook and cranny overflowed with sound information. For the talking scenes we broke one compressed "hello" into two parts and even filled in the unused portion of the Ensoniq's own 64K of RAM, using it much like a RAMdisk!

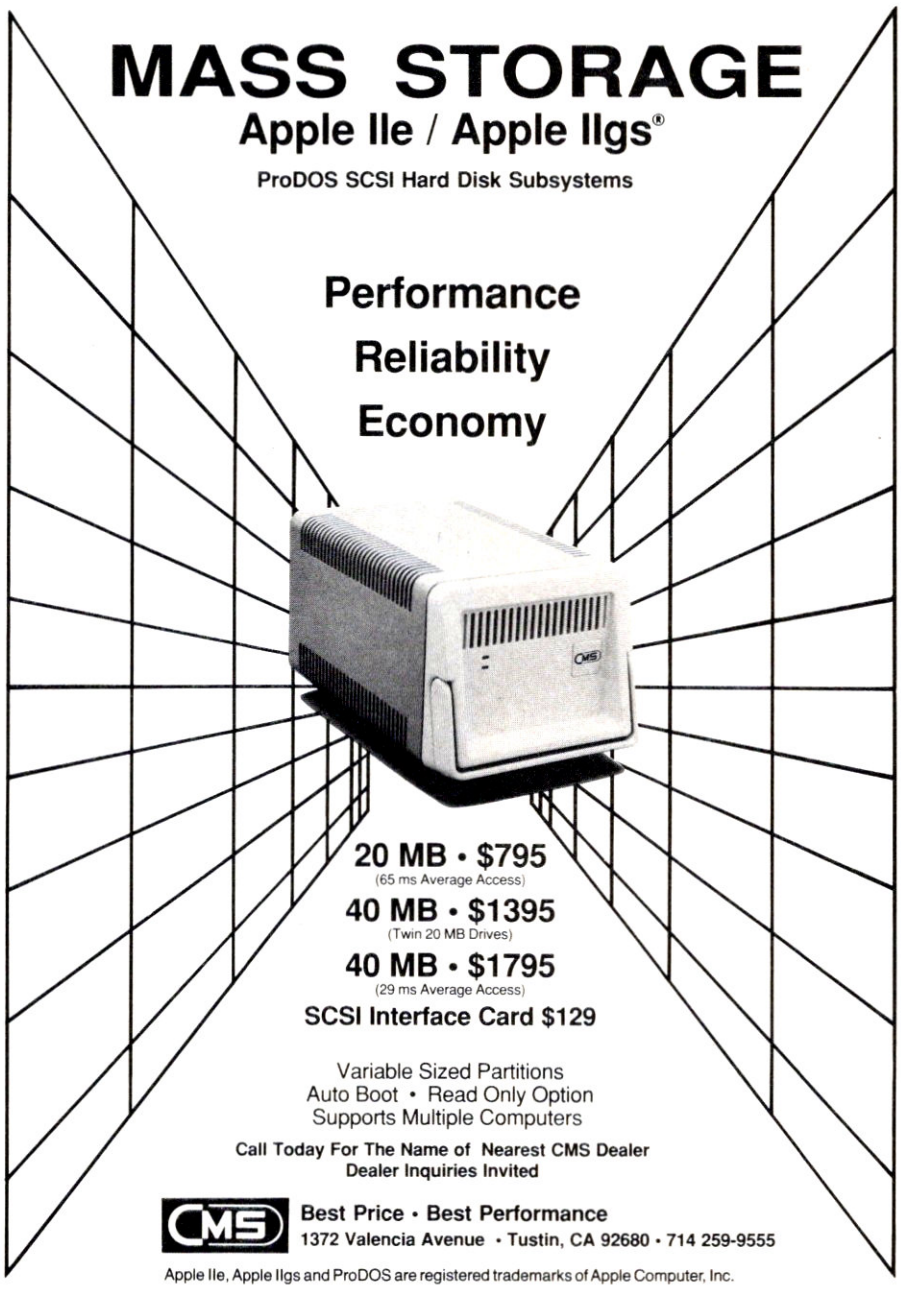
This kind of memory packing isn't good programming practice on a computer such as the IIGS, where every program is supposed to request memory it needs from the memory manager, which determines its location. With the memory manager, multiple IIGS applications and desk accessories can be in memory at the same time, easily switching from one to another (as they are on the Macintosh).

We got away with breaking the rules because we knew dealers would run the demo on a IIGS with a one-megabyte memory card and because we designed the demo to use every bit of that memory itself. ✚

Apple chose Ron Lichty and Tom Crosley, of Softwest, to program the IIGS sales demo because of their knowledge of the IIGS's 65816 microprocessor. Both had participated in software-design critiques of the 65816 in the previous two years, and Lichty had just finished reviewing the galleys for his book Programming the 65816 with his coauthor, David Eyes, for Brady Books.

See It Yourself

If you want to see even more of the techniques we used in our demo, visit your local Apple II dealer to see the full demo program put the IIGS through its paces. You might even be able to persuade your dealer to lend you a copy of the demo. To learn more about our coding techniques, watch for the next issue of *A+*, when we'll publish and explain key elements of the code.



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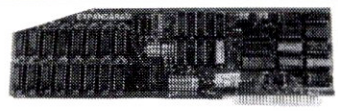

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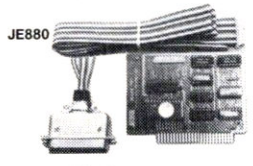

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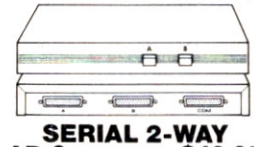

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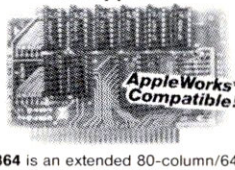

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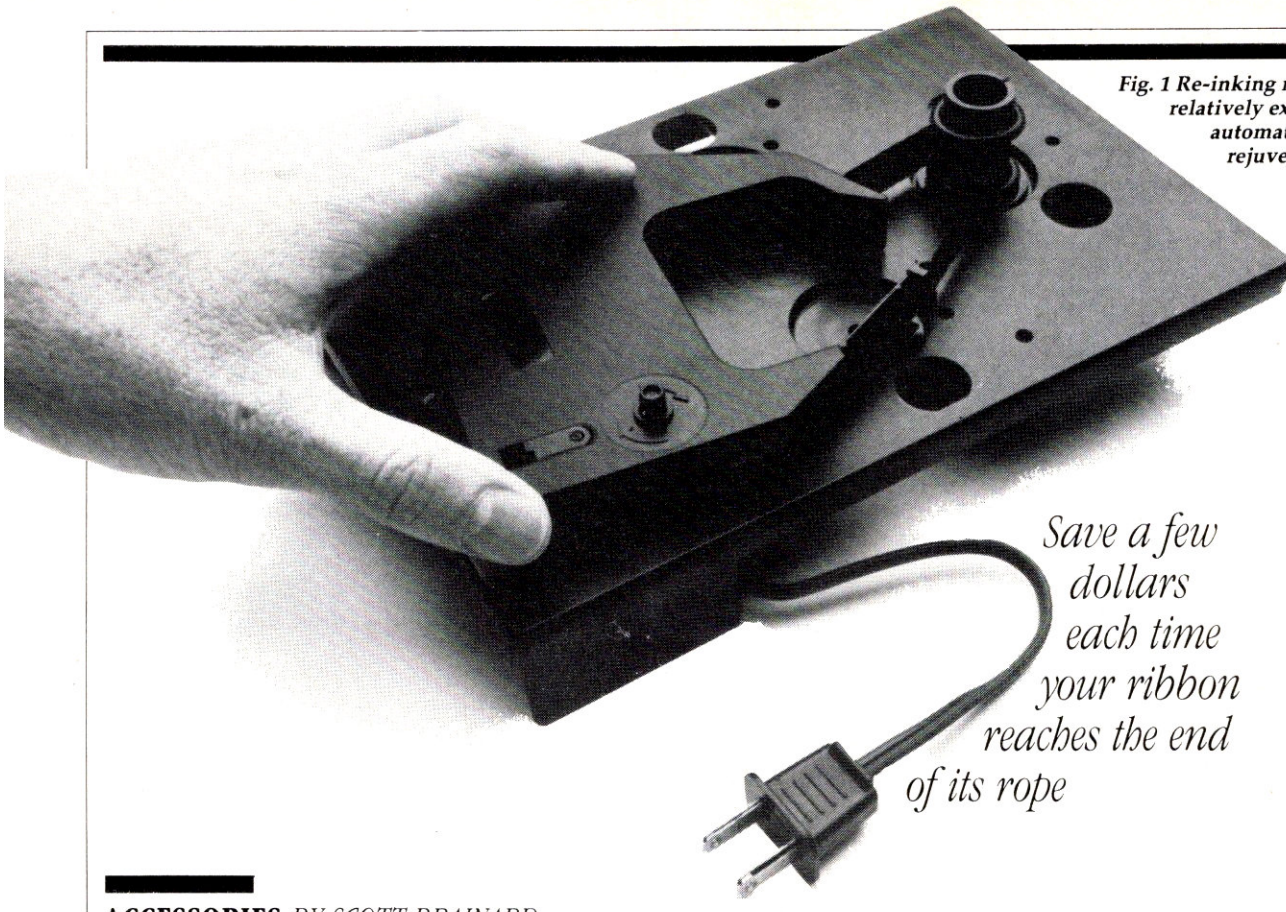

Fig. 1 Re-inking machines are relatively expensive, but automate the task of rejuvenating worn ribbons.

Save a few dollars each time your ribbon reaches the end of its rope

ACCESSORIES *BY SCOTT BRAINARD*

NEW LIFE *for* OLD RIBBONS

Apple did its customers well when it designed the ImageWriter series of printers for the Apple II series. ImageWriters let you produce near-letter-quality (NLQ) printing, which adds a professional look to letters, reports, and graphics.

One ImageWriter ribbon can print roughly 100 single-spaced pages of NLQ text before it becomes noticeably worn. For Apple II users who print extensively, paying between $6 and $10 per ribbon can become quite an expense. Fortunately, there are ways to bring life back into your old ribbons.

Some Apple users' groups or individuals with inking machines may re-ink your ribbons for you, at a nominal fee. Some services, such as American Ink Products, rejuvenate your ribbons for three to four dollars apiece. If you send ribbons through the mail, consider the postage and handling charges as well as the delay while you wait for your ribbon to return. Although you essentially get a new ribbon, your savings may not be worth the extra hassles.

Do It Yourself

If you are a do-it-yourselfer, try rejuvenating worn-out ribbons on your own. You can use a re-inking machine or various solvents—or just replace the ribbon entirely. A word of caution, however: Each of these methods can be messy.

Several suppliers, such as Bede Tech, Computer Friends, and Icon Review, offer simple re-inking machines that add ink onto the ribbon cloth.

You attach the plastic ribbon cartridge onto the machine, and the ribbon extends over an inking wheel. As the wheel spins, the ribbon advances, and ink spreads over the cloth. After a few minutes, your ribbon is like new and ready for use (see figure 1).

In theory, these ma-

Fig. 2 Solvents can redistribute the ink on a used ribbon. Pry open the cartridge with a screwdriver, spray the ribbon with WD-40 or alcohol, and let it stand in a plastic bag for several days to allow the ink to spread evenly.

chines revitalize that same ribbon indefinitely for pennies per inking, but at a cost of $45 to $50 or much more for a re-inker, is it worthwhile? If you truly do a great deal of printing, however, a re-inker may be worth considering.

Another method is to use a solvent such as WD-40 or rubbing alcohol. You can redistribute the ink over the used ribbon, thus gaining another 50 or more pages of NLQ printing. If you paid $6 for a ribbon, got 100 pages of printing, and then re-inked or treated that same ribbon three different times—getting another 150 to 200 pages—you'd essentially get triple use of your original investment.

To treat the ribbon, you open the plastic cartridge by taking a screwdriver and prying between the top and bottom halves. It is held together by plastic pegs, so pry each one up a little at a time to avoid breaking them or causing the ribbon to pop out.

Taking off the top reveals a mass of ribbon coils neatly arranged like an accordion feeding back and forth. The wheel or knob feeds the ribbon into the cartridge by pushing it into the ribbon chamber. The tension the knob creates causes the ribbon to be drawn out from the other side. In between, the ribbon passes in front of the printhead, and the printhead pins make the dots on the paper, before the ribbon feeds back into the cartridge.

Once the cartridge is open, lightly spray WD-40 (or alcohol in a spray bottle) over the mass of ribbon (see figure 2). Alcohol is cheap and may not be as harsh on the cloth as WD-40, but it does not apply as evenly. Don't worry about spraying too little or getting the mass completely covered, because it will soak into the cloth and spread all around. The solvent causes the ink to smear over the worn part of the ribbon. Close the cartridge, place it inside a plastic bag, and let it sit for several days. Turn the knob periodically so the whole ribbon gets treated. Then use it normally.

A word of warning about re-inking old ribbons or using a solvent to redistribute the remaining ink: When reusing the same ribbon several times, remember that the greater the usage, the greater the likelihood that the cloth will fray and jam the printhead pins. You may save $10 or $15 on ribbons, but you may very well spend $150 or more repairing the printhead.

The problem comes either from the chemical reaction of the solvent deteriorating the cloth, the continual impact of the pins striking the reused ribbon, or perhaps a combination of both. Maybe even the weave quality of the cloth itself causes the ribbon to fray after a period of time.

The Replacement Option

Some Apple manuals suggest replacing the old ribbon with a cloth typewriter ribbon. This method has a couple of advantages. If you check

Fig. 3 Using a typewriter ribbon as a replacement reduces the likelihood of fraying, and means a potentially larger selection of colors.

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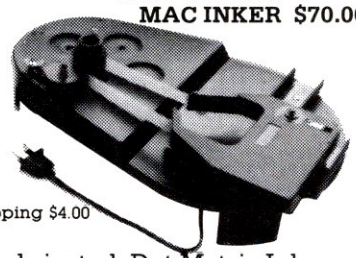

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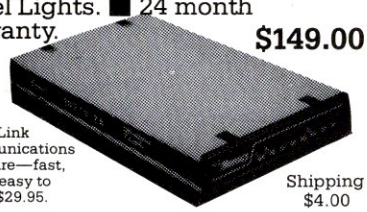

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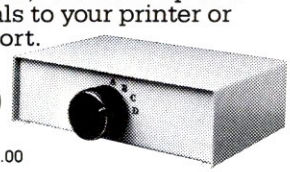

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with your local stationery store, you may find a selection of typewriter ribbons in a variety of colors aside from basic black. The price may range between $2.50 and $4 each, depending on the store. Also, since you are replacing the entire ribbon, you may not have to worry about the ribbon's fraying and jamming the printhead (unless the weave quality is poor).

To replace the ribbon, simply open the plastic cartridge and dump the old ribbon out. Take the typewriter ribbon and cut off any tabs so you have a fresh cloth end. Feed it through the left side of the cartridge and let a few inches dangle off the end while feeding the rest into the ribbon chamber through the small opening. You'll need plenty of patience as you arrange the cloth in a side-to-side coiled pattern until the chamber starts to fill up. Now carefully feed the ribbon between the wheels and out the other side. Close up the cartridge and simply turn the knob to feed the rest of it inside. Making full turns on the knob makes large coils inside, which reduces binding and twisting.

Match up the ends to create a closed loop of ribbon, allowing no more than about an eighth of an inch to overlap, and use a couple of drops of "super" glue to join them together. The smaller the overlap, the easier time the ribbon will have moving around, especially when it passes in front of the printhead. The ribbon is now ready for use. With a little luck, this process will take less than 30 minutes.

An Easier Approach

A simpler method of replacing the ribbon is to pull a few inches out of the cartridge, cut it, and glue the end of the new ribbon to the old one. Turning the knob feeds the new cloth inside the chamber, and you expel the old ribbon by pulling on it. When the ends meet, cut off the old ribbon (as well as the joint) and connect the two new ribbon ends to each other (see figure 3).

You can also replace the black ribbon with a color one—an easy way to collect an assortment of color printer ribbons without paying $10 or more apiece.

Prevention Is Worth . . .

You can also take preventive measures that will lengthen the life of your ribbon and thus reduce replacement costs. Placing ribbons not presently in use in a Ziploc or plastic bag keeps the cloth from drying out. Also, by making sure what you see on the screen is really what you want to print, you save the ribbon as well as paper. Printing in the draft or standard modes when possible saves ink, as does making photocopies of an original, rather than extra printed copies. You can also set the paper-thickness gauge to reduce the impact of the pins striking the ribbon, which also increases the ribbon's longevity.

With a little time investment, you can save money on costly ribbons. By extending their life, you can cut the cost in half (or more) and get the most out of your ImageWriter ribbons. ✚

Scott Brainard is a graduate student at Humboldt State University in California. He previously worked for Blue Chip Software, maker of Millionaire, Tycoon, Baron, and Squire, as an editor in quality control.

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Secret RAMDISK in ProDOS

When you use Apple's ProDOS operating system with an Apple IIe with 128K of RAM or with an Apple IIc, you get a second disk drive that many users never take advantage of. That second drive comes free with the software and does not require any add-on hardware.

This second drive is called /RAM and is located in the 64K area of RAM that BASIC and ProDOS don't use. Using /RAM can require a little creativity, but it can be worthwhile. I find it comes in handy for storing the STARTUP program and READ.TEXT, a utility that lets you look into text files on disks (or on /RAM). With these two programs on the /RAM disk, I don't have to search for my ProDOS disk whenever I need either of them. You will discover other uses for /RAM.

/RAM is automatically created whenever you boot ProDOS. It behaves exactly as do other disk drives and has an automatic prefix of /RAM. To check on /RAM's existence, type CAT /RAM <RETURN> to see that its catalog is empty. You will also notice that no physical drives come on and that the catalog messages appear much more quickly than they would if the computer were getting those messages from a floppy disk.

The speed of /RAM is electronic, because it's entirely in memory; mechanical drives must be much slower because of all the moving parts involved.

/RAM can hold about half the volume of a regular floppy disk. You must use care, however, when you create and store data files on /RAM. Like all data in memory, when you turn the power off, everything stored on /RAM is lost. For that reason, I use /RAM for program files rather than data files.

A Problem and an Answer

Copying files from a floppy to /RAM is problematic, since ProDOS has no internal Copy command. Thus, moving a program file from a floppy disk to /RAM requires a Load and Save sequence. If you want to move more than one file, the process can become quite cumbersome.

You can find help by using ProDOS's EXEC file feature, which executes a series of commands that are stored in an ASCII text file. After you've created the proper EXEC file, you can easily modify STARTUP to move files automatically to /RAM.

Creating the EXEC File

ProDOS's EXEC files must contain ASCII text commands for the computer to execute in the order in which it finds them. Figure 1 is the EXEC file I use to move the files from a floppy disk to /RAM.

You can create such files with text editors, word-processing programs (that save ASCII text), or from within programs designed for that specific purpose. To create the EXEC file in figure 1, I used the BASIC program in figure 2—it names that file MOVE.TO.RAM.

Note that some of the commands in the file in figure 1 contain strings that are enclosed in quotation marks (ASCII character 34). Also note, in the program in figure 2, how those quotation marks are in strings that must be enclosed in other quotation marks.

When you've typed the BASIC program and run it, it creates a text file that is called MOVE.TO.RAM that acts as an EXEC file to give direct commands to the computer. You want ProDOS to execute the commands in MOVE.TO.RAM automatically, so you should run the program with your

```
PRINT "Loading STARTUP into memory..."
LOAD /USERS.DISK/STARTUP,D1
PRINT "Saving STARTUP to /RAM..."
SAVE /RAM/STARTUP
PRINT "Loading READ.TEXT into memory..."
LOAD /USERS.DISK/READ.TEXT,D1
PRINT "Saving READ.TEXT to /RAM..."
SAVE /RAM/READ.TEXT
FOR X=1 TO 1000:NEXT:HOME
PRINT "ProDOS 1.1.1"
PRINT "/RAM contains both files."
NEW
```

Figure 1: EXEC file for moving files from a floppy disk to /RAM

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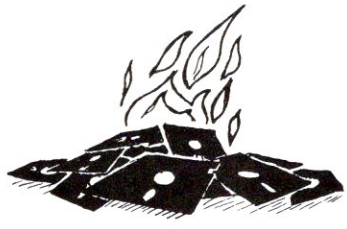

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```
10 REM ----TO CREATE MOVE.TO.RAM TEXT FILE----
20 D$=CHR$(4)
30 PRINT D$;"OPEN MOVE.TO.RAM,D1"
40 PRINT D$;"WRITE MOVE.TO.RAM"
50 PRINT "PRINT "+CHR$(34)+"Loading STARTUP into memory..."
   +CHR$(34)
60 PRINT "LOAD /USERS.DISK/STARTUP,D1"
70 PRINT "PRINT "+CHR$(34)+"Saving STARTUP to /RAM..."+CHR$(34)
80 PRINT "SAVE /RAM/STARTUP"
90 PRINT "PRINT "+CHR$(34)+"Loading READ.TEXT into memory..."
   +CHR$(34)
100 PRINT "LOAD /USERS.DISK/READ.TEXT,D1"
110 PRINT "PRINT "+CHR$(34)+"Saving READ.TEXT to /RAM..."
   +CHR$(34)
120 PRINT "SAVE /RAM/READ.TEXT"
130 PRINT "FOR X=1 TO 1000:NEXT:HOME"
140 PRINT "PRINT "+CHR$(34)+"ProDOS 1.1.1"+CHR$(34)
150 PRINT "PRINT "+CHR$(34)+"/RAM contains both files."+CHR$(34)
160 PRINT "NEW"
170 PRINT D$;"CLOSE MOVE.TO.RAM"
```

Figure 2: The BASIC program that creates the EXEC file in figure 1

```
2691 HOME:PRINT "Moving STARTUP and READ.TEXT to /RAM..."
2692 PRINT D$;"EXEC MOVE.TO.RAM,D1"
```

Figure 3: The two lines you add to STARTUP to give ProDOS the appropriate instructions to make it automatically execute the commands in MOVE.TO.RAM

ProDOS disk in drive 1, with the write-protect tab removed.

To give the appropriate instructions to ProDOS, add the two lines in figure 3 to STARTUP. To do that, load STARTUP and list the program lines 2600–2700. You will see the options for the main menu in STARTUP, with the choices being accepted through line 2690. Line 2691 adds an on-screen prompt, and line 2692 calls and executes MOVE.TO.RAM.

With a RAMdisk, you can speed up the access to some of your most-used files.

Checking the Results

After typing in the two lines in figure 3 (with STARTUP in memory), save STARTUP so that the disk will contain the revised copy. Then reboot your system (with Control/open-apple/Reset) and select BASIC from the ProDOS menu. The computer will prompt you through the process. When the cursor returns to your control, type CAT /RAM <RETURN> to see that /RAM is no longer empty. It should contain the two files named in the EXEC file. (If you have no file named READ.TEXT, use another program that you would like to move to /RAM.)

To use either of the programs on /RAM, simply type a command similar to RUN /RAM/STARTUP <RETURN>, using the /RAM prefix so that the computer will access /RAM. Note how fast the computer now responds to that command.

By combining /RAM and an EXEC file, you can automate and speed up the procedures for accessing some of your most-used files. You may see potential for also using your important program files in this way. ✚

Gary West is the Federal Projects Coordinator for Allendale County, South Carolina, public schools. He also teaches teachers, at the graduate level for the University of South Carolina, how to use computers as instructional tools and as productivity tools for noninstructional tasks.

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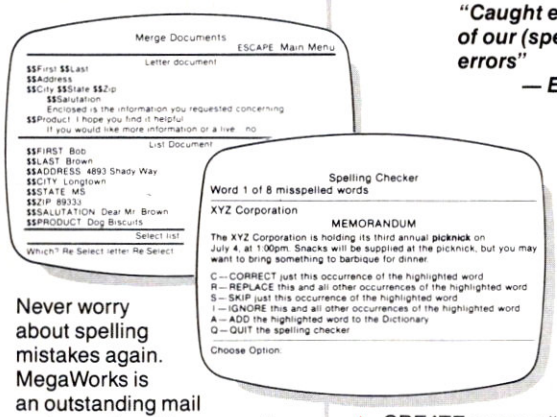

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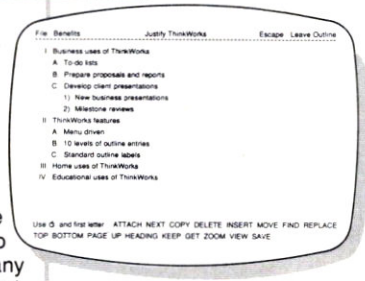

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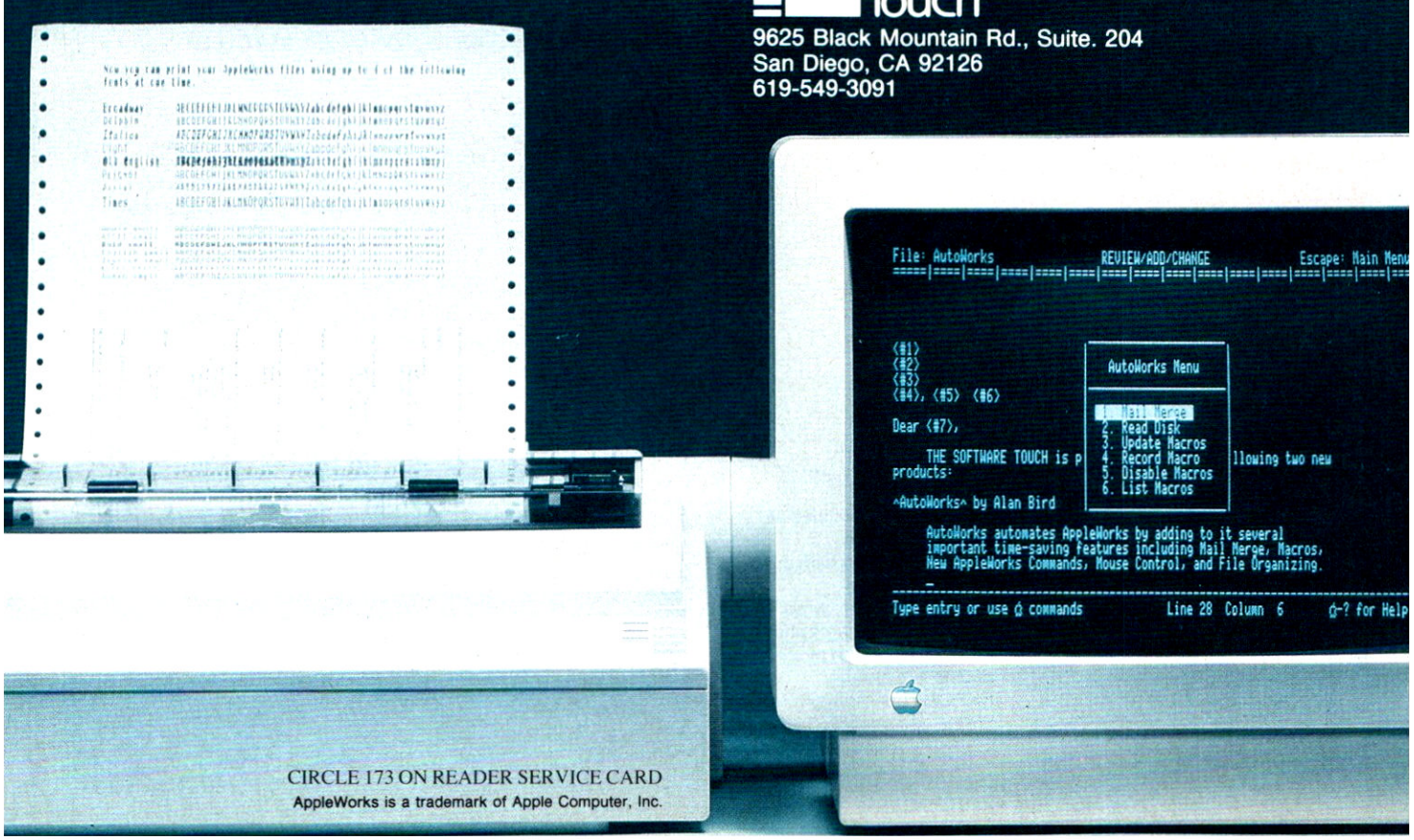

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USER REPORT
USING APPLEWORKS TO FIND A JOB
SHORT REPORTS
FINDING BLANK CELLS
NEW PROGRAMMERS' SERVICE
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A+ APPLEWORKS REPORT

Finding jobs with AppleWorks, locating blank cells, a new bulletin board for developers, and tips for users.

USER REPORT *BY JIM SOYER*

APPLEWORKS, THE JOB FINDER

Are you (a) near graduation, (b) bored with your job, (c) searching for the perfect boss, or (d) simply yearning to make so much money so you'll never need to balance your checkbook again?

If you're nodding "yes" to any of the above, then you need to start looking for a job, but don't fret over the difficulty of finding it. Instead, call on a versatile old friend—AppleWorks—to help you.

First, use the word-processing module to write a job-finding plan. Start by visiting your local library or bookstore. You'll find dozens of excellent books on job hunting, résumé writing, and interviewing for a job.

Take three or four books home. Put their best advice into a word-processor file (JobFind.Notes). Decide which major actions you must take and in what order they must occur. Assign deadlines for each task and transfer the list to a new file (JobFind.Plan). Add subtasks to each major task by asking yourself, "What needs to be done to get that done and by when?"

Now use AppleWorks for each and every step of the plan.

Write an essay describing your perfect job. Write descriptions of the job skills you possess. Pick the two or three job labels that match your skills and fit in with your definition of a great job. (My choices: Press Secretary, Public Relations Account Executive, PR/Marketing Manager.)

Now, pick the town or area where you want to live. (My first choice: a midwestern state capital; second: Minneapolis). Subscribe to the daily newspapers in those towns and order the Yellow Pages for the towns from the phone company.

Data for a Database

Create database files (with names such as KC.Jobs) of possible employers in each town. Include contact person, company name, address, city, state, ZIP code, and phone number. To get the contact person's name, call the company cold and politely ask the receptionist for the name of the person who heads the department you're interested in.

In this same database or in a separate spreadsheet (Jobs.Written.To), list the dates you send your inquiry letter and résumé combination to each company, the "answer received" date, and the company's response. I used the spreadsheet format because it allowed quicker horizontal cursor movement within the file.

Create variations on inquiry letters and résumés quickly by using the Move, Copy, and Delete functions of the word-processing module. For example, one of my standard cover/inquiry letters emphasized my public-relations skills. I used the main body of that letter for every public-relations inquiry and added extra paragraphs and sentences to appeal to each company.

What should be in your letter and résumé? Refer back to JobFind.Notes. Need more information? Read more books and add the best advice to your notes—who knows, in a few years, JobFind.Notes may be your starting point for snaring an even better job.

Write and save different types and styles of résumés under different filenames (such as Job.Rsume.PR). In addition, put the names, addresses, and phone numbers of your professional references into a separate file (Job.References) for sending to job prospects.

When you receive replies from your prospects, update Job.Written.To and respond immediately.

To prepare for the interview, refer again to JobFind.Notes. Because the interview process is the most important step in job finding, create a new word-processor file (Job.Intrvw.Tips) and transfer all interview advice to it. Now read the interview sections of several more books and put the best advice into the new file.

In those books, you will find lists of typical questions that interviewers will ask you and lists of questions you should ask. Create a new file (Job.Intrvw.QsAs) and list those questions in it. Now answer each question in 200 words or less. Add to and make more specific the questions to ask the interviewer.

Print Job.Intrvw.Tips and Job.Intrvw.QsAs. The night before, the morning of, and 15 minutes before your interview, read both files several times (but don't memorize) so that the questions and your answers are fresh in your mind.

After the interview, make additions to both files so you will be better prepared for the next interview. Within 24 hours, send the interviewer and everyone else you met at the company a thank-you letter by creating another "almost form" letter. Always mention something unique to the interview or conversation so that the prospect knows you are interested in that firm.

To determine your salary needs, create a spreadsheet file (JobFind.Budget) and calculate your living expenses/spending desires.

Regularly refer back to JobFind.Plan during your job hunt to keep yourself in line with your deadlines and goals.

Finally, don't delete these files from your disk when you get your dream job. Write a letter to *A+* describing how great AppleWorks is as a Job Finder. Don't expect them to ask you to write an article about it, though. You just read it! ✚

Last January, Jim Soyer started his new job as press secretary for the governor of Wisconsin.

BY CHRISTOPHER VAN BUREN

FINDING BLANK CELLS

Besides calculating data, spreadsheets are also good for storing information, much as a database does. Even though you can sort information in a spreadsheet and find text values, however, the spreadsheet just doesn't have the searching capabilities of the database. One example is finding blank cells.

When entering information, you'll often leave some spots blank. Perhaps the information is not available or does not apply in some cases. In the database module, you can easily find blank fields using the record-selection rules. Perhaps you want to fill in all the information you left blank in earlier entries, but how do you find blank cells in the spreadsheet so that you can fill them in? The open-apple/F (Find) command in the spreadsheet module does not find numeric values, and AppleWorks considers blank cells to be numeric equivalents of zero.

You can get around this problem by using a formula based on the @COUNT function. This AppleWorks function is the only one that recognizes blank cells. In fact, its purpose is to count groups of cells that have values in them—leaving out the blank cells. You can also use this function to find blank cells, though. Begin by entering these values in cells A1 through A6:

A1: 5 A2: 78 A3: A4: -67 A5: A6: 0

Now enter this formula into cell B1:

```
@IF(@COUNT(A1 . . . A1)=0,999,0)
```

Copy this formula to cells B2 through B6, using the open-apple/C command. Choose "relative" references when AppleWorks asks how to replicate the formula. Column B will now display 999 in every cell that's adjacent to a blank cell in column A, and 0 next to every cell con-

```
File: YOUR SPRDSHEET                    REVIEW/ADD/C
========A========B========C========D========
  1|        5        0
  2|       78        0
  3|                999
  4|      -67        0
  5|                999
  6|        0        0
  7|
  8|
  9|
 10|
 11|
 12|
 13|
 14|
 15|
-----------------------------------------------
B1: (Value) @IF(@COUNT(A1...A1)=0,999,0)

Type entry or use A commands _
```

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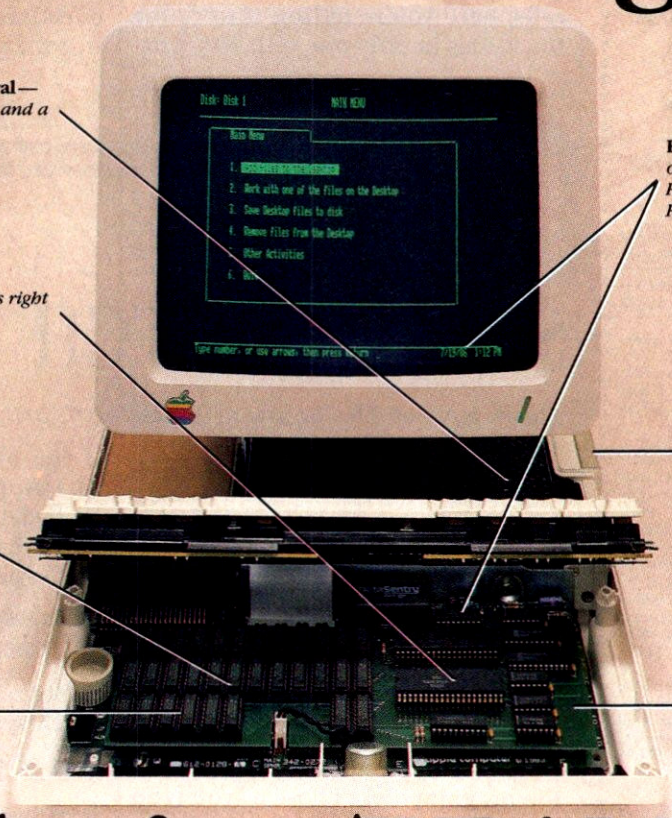

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taining a value (see figure). A quick glance down column B will point out all the blank cells in column A.

Again, the basis of the formula is in the @COUNT function. Whereas @COUNT normally counts many cells, here you're telling it to count the values in only one cell. This procedure always produces a 1 unless the cell is blank, in which case it produces a 0. The @IF statement simply tests for that 0 value and converts it to a 999 to make it easier for you to see at a glance. You have now effectively found all the blank cells in column A. ✚

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TIP FOLDER

BY CHRISTOPHER VAN BUREN

SPECIAL PATCH

Those guys at The Software Touch are impressive! They've sent along a special patch for AppleWorks that tells it you have the Startup and Program files on the same disk (such as a UniDisk 3.5 or a hard disk). It eliminates the need to press the space bar after booting AppleWorks.

When you're using floppies, AppleWorks requires that you start with a special Boot disk and then insert the Program disk. AppleWorks actually stops and asks you to insert the program disk. Those of you who have copied AppleWorks to a hard-disk drive or a UniDisk drive still have had to put up with this pause, even though you have the start-up and the program on the same disk.

No longer! Just install this patch to your AppleWorks system, and it will never again ask you to insert a program disk.

Step 1: Insert the System Utilities disk and turn on the computer. From the main menu, select Exit System Utilities, and you will soon be in BASIC, running under ProDOS. Insert your AppleWorks disk (UniDisk users only).

Step 2: Enter the following exactly as it appears here:

```
BLOAD APLWORKS.SYSTEM,TSYS,A$2000
```

Press Return when you're finished. If you are using a hard-disk drive and have AppleWorks files in a subdirectory, I recommend that you remove them from that directory while applying this patch.

If you are patching Version 2.0 of AppleWorks, jump ahead to the section entitled "Version 2.0." If you are patching Version 1.3 of AppleWorks, enter the following:

```
POKE 13193,44
```

If you have a clock card and would like AppleWorks to accept the default date the clock supplies so you don't have to press Return when you're asked for the date, enter this:

```
POKE 13855,208
POKE 13856,19
```

Step 3: Now you must save the patch system file. Type

```
BSAVE APLWORKS.SYSTEM,TSYS,A$2000
```

If you are patching Version 2.0 of AppleWorks, the information you enter is slightly different. Enter this:

```
POKE 14468,44
```

If you would like AppleWorks to accept the date a clock card supplies, without its asking you to press Return each time, enter this next:

```
POKE 14148,208
POKE 14149,19
```

Now save the patch file by typing

```
BSAVE APLWORKS.SYSTEM,TSYS,A$2000
```

Step 4: Test the results by booting up the computer with the new AppleWorks. If the patch was successful, AppleWorks will boot up to the date without asking you to press the space bar after inserting the program disk. If you have a clock card and entered the patches for automatic date entry, AppleWorks will boot up to the main menu without even asking for the date. If nothing has changed, then the patch was unsuccessful. Try removing all AppleWorks files from subdirectories. Try removing any memory cards while entering the patches, and then replace the cards and test the results. ✚

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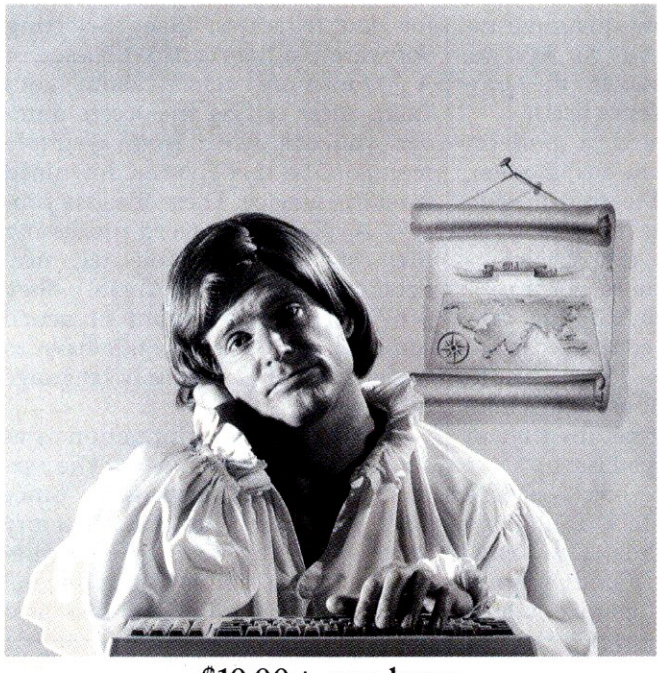

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SHORT REPORT

BY CHRISTOPHER VAN BUREN

NEW PROGRAMMERS' SERVICE

Have you ever wondered how AppleWorks add-on developers get their programs to run right inside AppleWorks? It's not easy. Programs that run inside AppleWorks have to "patch" AppleWorks. (A patch is a program that changes or adds to AppleWorks program code.) Patches can actually add capabilities to AppleWorks that it never had before. Before developers can patch AppleWorks code, however, they must first know where to look inside AppleWorks—and what to look for.

Needing such knowledge is part of being a programmer, but programmers are not without assistance. Certified Apple developers have access to special listings of AppleWorks memory locations and actual source code. This information is what lets them create such add-on products as Pinpoint, MacroWorks, and AutoWorks. Now this same information is available to anyone, courtesy of Bob Lissner, the programmer of AppleWorks itself.

Lissner has created a bulletin board, accessible from any modem, that contains valuable information for AppleWorks developers. The phone number for the service is (702) 831-1722. If you're not a serious programmer, don't bother calling, though; the contents won't make a lick of sense.

"I designed it for the high-school hacker who couldn't get the time of day from Apple," says Lissner.

Lissner's bulletin board uses a system called Let's Talk, from Russ Systems of Santa Cruz, California. Let's Talk turns ProDOS directories into bulletin-board menus, which makes the service especially simple for you to access. (See "Selecting Software" in the April 1987 issue of *A+* for more details about Let's Talk). After calling the access number, you can select from a simple menu of files that you can download from the service. These files are simply AppleWorks word-processing files that explain various technical details about AppleWorks. They provide a small amount of actual source code too, but you'll have to understand 6502 assembly language to make sense of it.

Getting at this information is as simple as that for now, but the system has room for expansion. Since Let's Talk turns ProDOS directory items into menu items on the bulletin board, the menus can go several levels deep if the ProDOS disk uses

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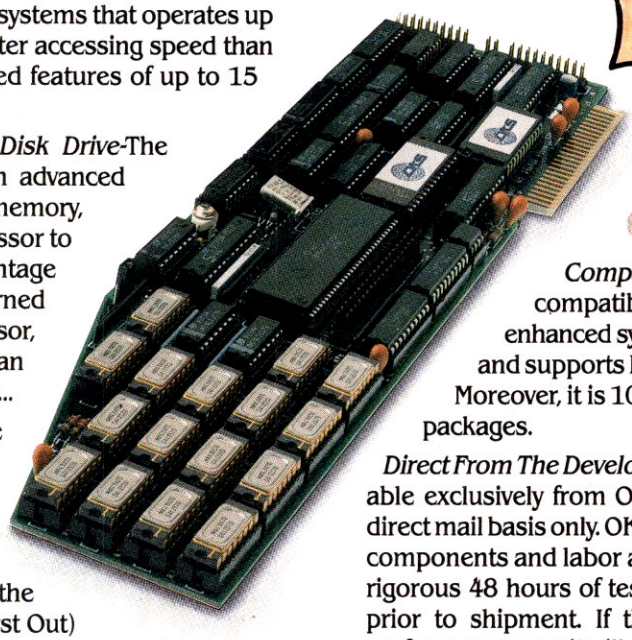

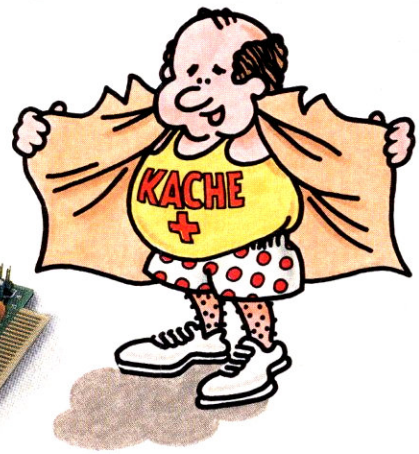

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subdirectories. Also, although no passwords are required to access any portion of this bulletin board, the host system can require them at any time.

Wishful Thinking

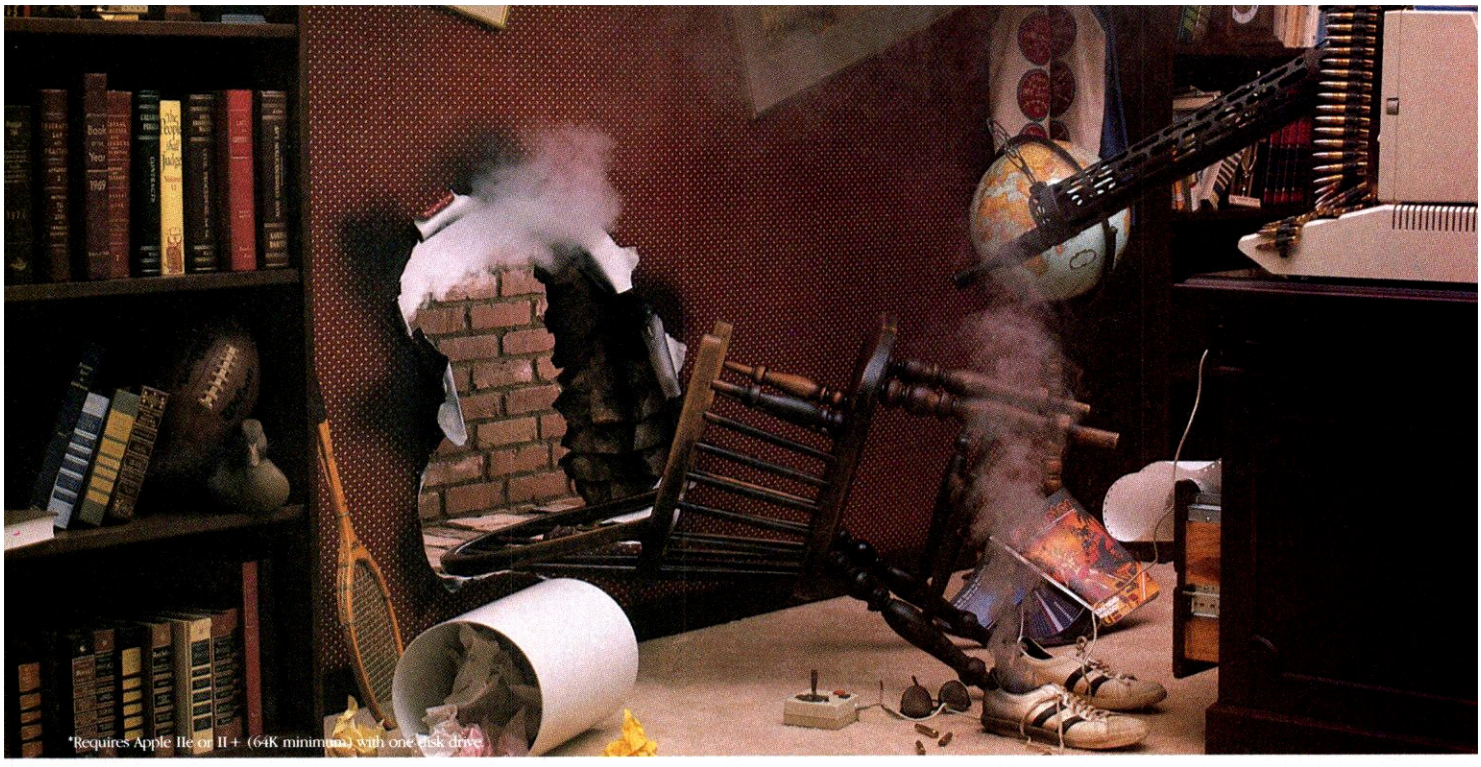
Using this bulletin board to develop patches may not be such a great thing, though. Of course, one of the beauties of AppleWorks is that so much can be added to it, making it a more custom system. AppleWorks add-on developers know another side of the story, however. They know that too many patches in one little program can cause a crowd. Often, certain patches won't let others in, and users can end up with unpredictable results.

The existence of an information bulletin may help developers get together on their patches.

What do patches mean from the users' point of view? Well, Apple comes out with a new version of AppleWorks, of course, and you patiently wait for the third-party manufacturers to upgrade your patch programs so you can use the new version. You get the new versions, update the old ones, and repatch AppleWorks. Some companies require that you use a "prepatch" before using another manufacturer's patch. After installing the prepatch, you can patch with the other product and then with the first one again.

Just when you get everything working, you decide that you've got to have a hard-disk drive—and you start all over again. Maybe the existence of an information bulletin board will help developers get together on their patches. Maybe some "high-school hacker" will figure out a way to counterpatch an unsatisfactory patch or to combine all desired patches into one simple patch. Consider it a challenge! ✚

CIRCLE 202 ON READER SERVICE CARD



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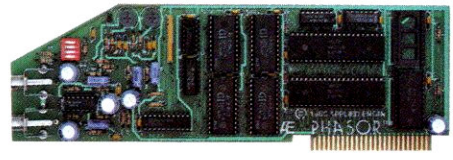

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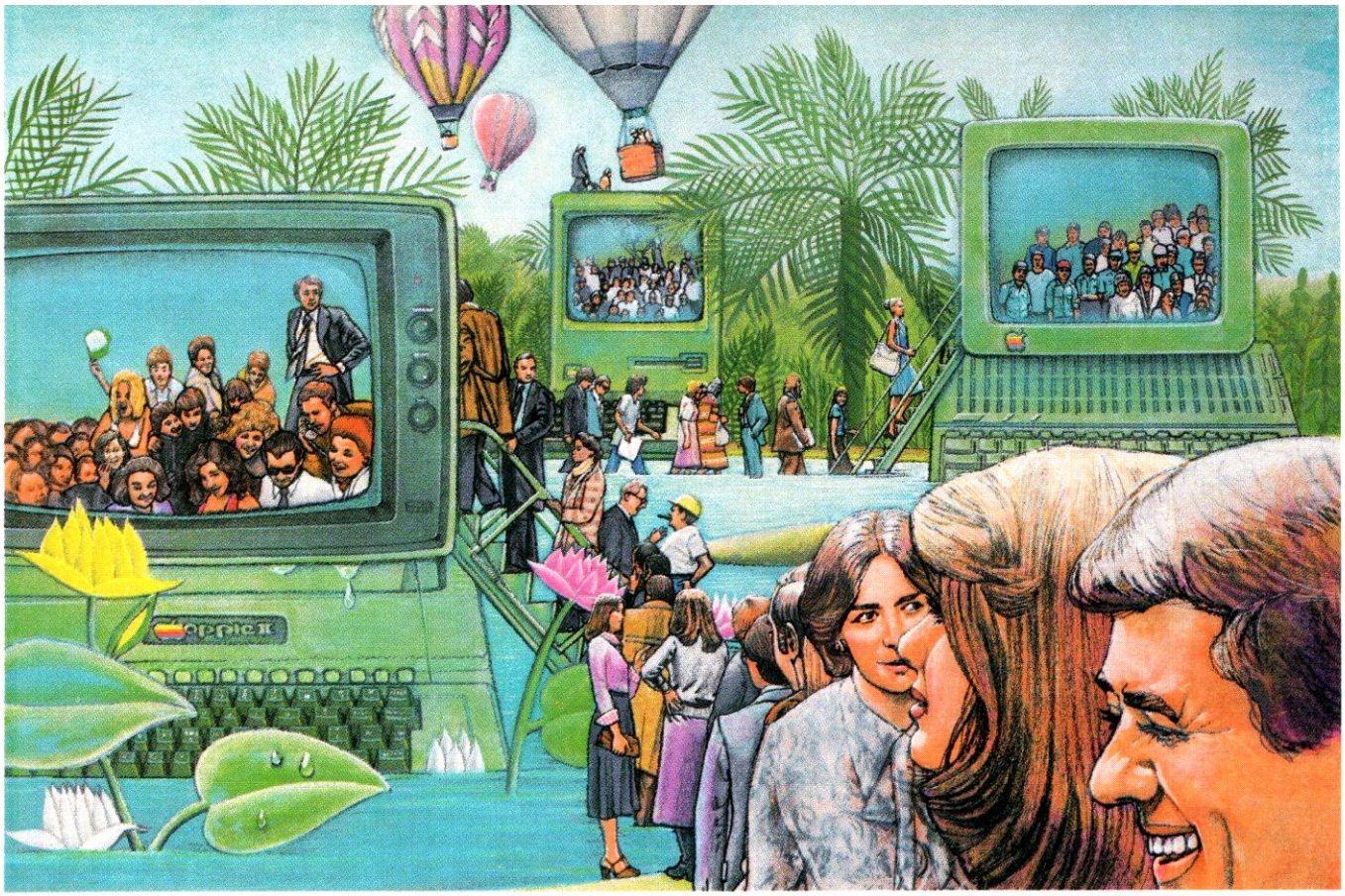

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CIRCLE 271 ON READER SERVICE CARD

BY DAVID D. THORNBURG

COMPUTERS AND CREATIVITY REVISITED

Readers experiment with BASIC program to create graphic images.

Last December I wrote an article that showed how you could generate an attractive family of computer-graphic images with a simple BASIC program ("Learning Curve," *A+*, December 1986). Given the outpouring of letters I received on this article, these patterns captured the imagination of many readers.

This month I want to explore this program some more and share some of the insights that readers have sent to me in the past few months. I will also fix a couple of bugs that crept into the original program.

Getting Down to BASICs

Here's the original program for generating patterns on the high-resolution screen:

```
10 PRINT "ENTER STARTING X VALUE";
20 INPUT A
30 PRINT "ENTER STARTING Y VALUE";
40 INPUT B
50 PRINT "ENTER FIELD SIZE";
60 INPUT S
70 PRINT "INPUT NUMBER OF COLORS";
80 INPUT N
90 HGR
100 FOR I = 1 TO 260
110 FOR J = 1 TO 150
120 X = A + (S * (I - 130) / 100)
130 Y = B + (S * (J - 75) / 100)
140 Z = X * X + Y * Y
150 Z = INT(Z)
160 HCOLOR= (Z - (N * INT(Z / N)))
170 HPLOT I,J
180 NEXT J
190 NEXT I
200 END
```

Figure 2: Contour plot for the formula $Z = X^3 + Y^2 + 3*Y$ with A=0, B=0, S=5, and N=4

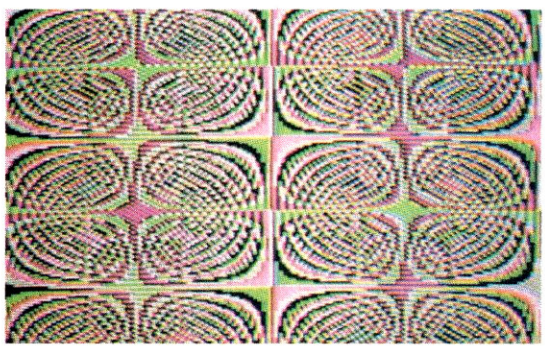

Figure 1: Contour plot for the formula $Z = 4*X*Y + 4*X - 2$ with A=0, B=0, S=9, and N=4

In the December column, I showed the pretty pattern that results when A=0, B=0, S=10, and N=2. This pattern consisted of contours of hundreds of intersecting circles that resembled the patterns you sometimes see when a thin layer of oil floats on water.

The pattern you get depends on the scale factor, S. It works like a magnifying glass to let you see the pattern in higher or lower magnifications. Lower values of S bring you "close" to the pattern, and larger values let you see it from further away.

Figure 3: Contour plot for the same formula as that in figure 2, using the Stong solution to the dot-plotting problem

By changing the formula in line 140, you can produce many different types of patterns. You can see some of the patterns that readers have sent in figures 1–3.

Several readers wanted to know more about how I'd calculated the color for each dot in the picture. This calculation takes place in line

160, and its job is to produce a number between 0 and 1 less than the number of colors (N–1). If you picked N=4, for example, this line would produce numbers in the range from 0 to 3, depending on the value of Z. The mathematical term for this type of calculation is "modulo function." It is nothing more than the remainder that is left over when you divide Z by N.

The reason for performing this calculation is to ensure that you're plotting a color number that the Apple II can handle and to give you some choice in the appearance of your picture. Because of the coarseness of the Apple II high-resolution screen and since adjacent colors "bleed" together, pictures created with different values for N can look quite different from each other.

A Few of My Favorites

Readers found so many interesting formulas for line 140 that I had a hard time picking the best ones to share. Danny Milliorn of Lancaster, Texas, found a pretty pattern by changing line 140 to

```
140 Z = 4*X*Y + 4*X - 2
```

He used the values A=0, B=0, S=9, and N=4 to produce the picture in figure 1.

Since adjacent colors 'bleed' together, pictures created with different values for N can look quite different.

Another pleasing pattern came from Aldo Pires of Canoga Park, California, who used this formula:

```
140 Z = X^3 + Y^2 + 3*Y
```

and the values A=0, B=0, S=5, and N=4 (see figure 2). This pattern shows a lovely interaction among complex curves.

E. C. Smith of Ocala, Florida, contributed lots of formulas to try with this program, including

```
140 Z = X*Y - Y
```

and

```
140 Z = (X - Y)*Y
```

among others. It is fun to play around with line 140 to see how a small change in the formula can produce quite different patterns.

Aliasing and Artifacts

As I mentioned above, the pattern you see on the screen is influenced by several factors, including display resolution and color bleeding. The color-bleeding problem (familiar to all Apple II programmers) results in inaccurate drawing of the contours. Robert Stong of Charlottesville, Virginia, wrote to share a solution that produces accurate contours for N=2. If you add the line

```
160 HCOLOR= 3*(Z - 2*INT(Z/2))
```

to your program, you will get an N=2 plot, no matter what value of N you enter. The color value will be 0 or 3, which guarantees that a dot will appear on the screen everywhere it should. The dots will be magenta, green, or white (because of the color-bleeding problem), but at least the resulting contours will be accurate. Figure 3 shows figure 2 recalculated with Stong's HCOLOR formula.

Speed

As I mentioned last December, this program is a slowpoke unless you have an Apple IIGS. Several readers suggested ways to speed the

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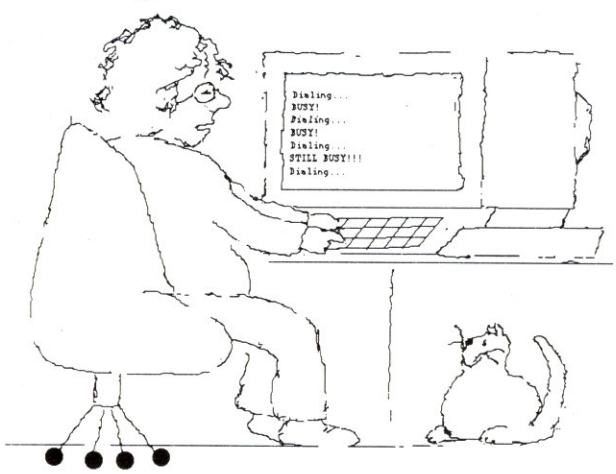

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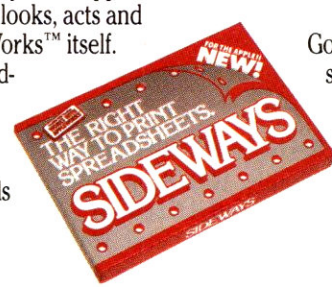

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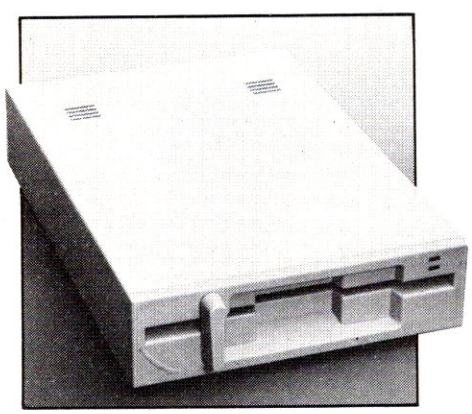

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program up, however. Suggestions ranged from using integer arithmetic to compiling the program. Many readers noticed that the original program produced highly symmetrical pictures and suggested plotting four points at a time to take advantage of this symmetry. Although this approach would work for some formulas, it wouldn't for those we showed this month.

A Disk-overy

The original article included instructions to let your computer create entire families of pictures overnight and save them on disk for viewing the next day. As many of you pointed out, something was missing from the program. I had accidentally left out a magic character that is necessary to send commands to the operating system: Control-D.

To modify your program so you can save your pictures, enter the following lines:

```
5 D$=CHR$(4)
200 PRINT D$;"BSAVE MYPICT,A$2000, L$2000"
210 END
```

You can save the picture under any name by changing MYPICT in line 200 to a name of your choice. If you want to enter a name from the keyboard, you should use these lines instead:

```
200 PRINT "ENTER PICTURE NAME";
210 INPUT NA$
220 PRINT D$;"BSAVE ";NA$; ",A$2000,L$2000"
230 END
```

If you use this modification, be sure that the name you enter meets the requirements of ProDOS or DOS 3.3 (depending on which system you are using).

To see your pictures, all you need to do is enter

```
HGR
BLOAD picturename, A$2000
```

from the keyboard. (You need to replace "picturename" with the name of your picture file, of course.) If you're really ambitious, you can create your own slide-show program that will load your pictures for you and keep them on the screen for a few seconds or until you press a key. I leave that challenge up to you.

Something BASIC

The amount of creativity all of you have displayed is a joy to behold. I am sorry that I don't have room to share more of your work with the rest of the *A +* readers. ✚

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A game simulating the U.S. presidential campaign process, using any historical election since 1960 or a hypothetical campaign. Students may have the computer manage one or more candidates in any scenario while planning political values, campaign expenditures, trips, affiliations, and debates. Game requires several hours of play to complete. Package includes descriptive manual, summary of rules, and worksheets.

List Price: $39.95. Strategic Simulations, Inc., 1046 North Rengstorff Avenue, Mountain View, CA 94043; (800) 443-0100 ext. 335; in CA (415) 964-1353

Requires: Apple II Plus, IIe, or IIc; 48K RAM

THE MEDALISTS – BLACK AMERICANS
Grades 5-10

Drill-and-practice game in which students identify black Americans from clues such as dates, background, and achievements. Students can compete against their own best records or the top three students. Records are kept for 50 students. Program allows teacher to add, change, or delete clues.

List Price: $39.95. Hartley Courseware, Inc., 133 Bridge, Dimondale, MI 48821; (800) 247-1380; in MI (517) 646-6458

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

THE MEDALIST – CONTINENTS
Grades 5-10

Drill-and-practice game in which students read clues and answer questions about world geography. Students can compete against their own best records or the top three students. Records are kept for 50 students. Program allows teacher to modify clues.

List Price: $39.95. Hartley Courseware, Inc., 133 Bridge, Dimondale, MI 48821; (800) 247-1380; in MI (517) 646-6458

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

THE MEDALISTS – STATES
Grades 5-10

Drill-and-practice game in which students guess the states from several clues. Topics include postal abbreviations, bordering states, major industries, capital cities, state birds, and state flowers. Students can compete against themselves or other students, and teachers can change clues.

List Price: $39.95. Hartley Courseware, Inc., 133 Bridge, Dimondale, MI 48821; (800) 247-1380; in MI (517) 646-6458

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

REGIONS OF THE UNITED STATES
Grades 5-12

In Part I of Regions of the United States, "The Fifty States," students review the states and then choose quizzes to identify the states and spell their names correctly. In Part II, "The Regions," students are challenged to name a specific region when the computer gives them clues. Topics include major cities, landforms, products, and climates. The program is meant for use by individuals

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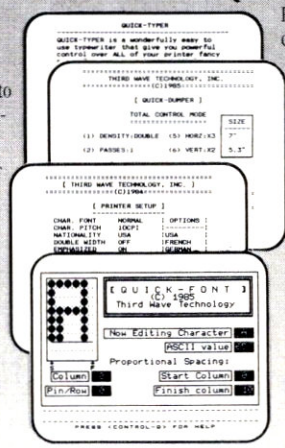

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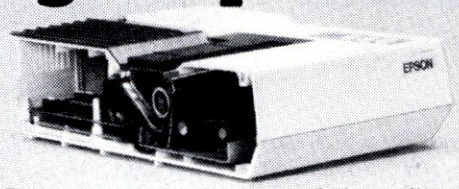

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List Price: $59.95. Educational Activities, Inc., P.O. Box 392, Freeport, NY 11520; (800) 645-3739; in NY, AK, HI (516) 223-4666

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

STATES & TRAITS

Grades 4-14

A program designed to teach U.S. geography using several formats, including games and maps. Topics include state locations, current and historic facts about the states, names of the state capitals, and locations of landforms. For play by one or two students or teams at four skill levels. Allows teachers or students to develop their own games by adding or amending questions. Sound feedback can be turned off.

List Price: $44.95. DesignWare, Inc., 185 Berry Street, San Francisco, CA 94107; (800) 572-2272; in CA (415) 546-1866

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

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List Price: $99 for school version; $39 for home version (called The Time Tunnel: U.S. History Series 3). Focus Media, Inc., 839 Stewart Avenue, P.O. Box 865, Garden City, NY 11530; (800) 645-8989; in NY (516) 794-8900

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

AFRICA

Grades 7-14

A two-disk program designed to teach general information and geography facts about Africa. Part I is a tutorial designed to dispel common misconceptions about Africa. Part II includes a series of quizzes on the countries, major cities, and physical features of Africa.

List Price: $69. Educational Activities, Inc., P.O. Box 392, Freeport, NY 11520; (800) 645-3739; in NY, HI, and AK (516) 223-4666

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

You can reach Education News Service at Box 1789, Carmichael, CA 95609.

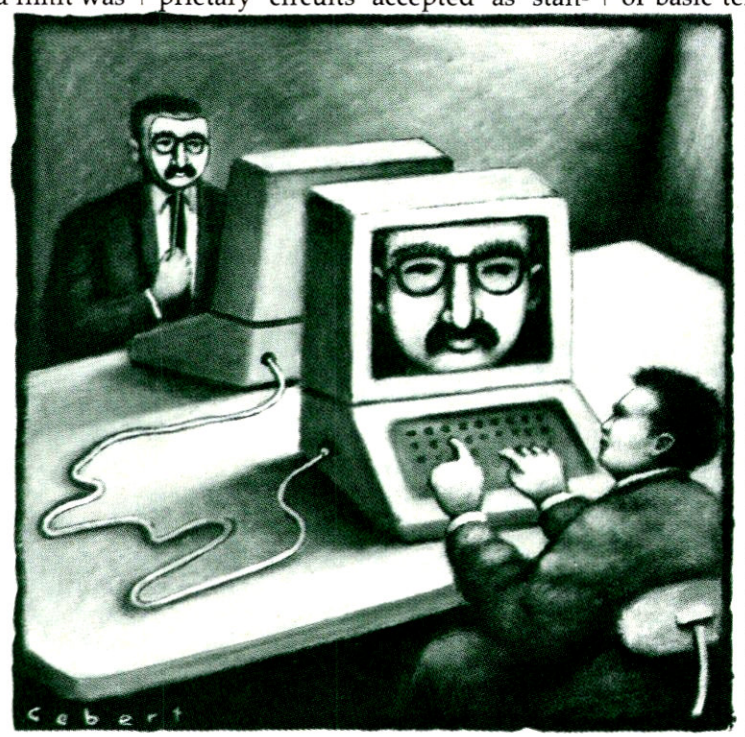
BY RUSS LOCKWOOD

FUTURE SHOCK: A MODEMLESS SOCIETY

The ISDN wave, government GOSIP, and Lockwood's last logoff

A long time ago (measured in computer generations) in a telecommunications galaxy that seems so far away, the choices were simple: You bought an acoustic connect or direct-connect modem, the speed limit was 300 bps, and the rule of thumb was a buck a baud.

Yesteryear's leading edge of telecommunications technology may now seem quaint. Imagine dialing a phone number by hand (rotary, of course); listening to one ringy-dingy, two ringy-dingy; and then frantically stuffing the handset into the modem cups before the carrier tone disappeared. I made a lot of connections that way. Smashed a lot of fingers too.



Today's leading edge of telecommunications is the Integrated Services Digital Network (ISDN), a high-speed digital network that moves voice, data, and video separately or simultaneously. Since it is completely digital, it does not need a modem to translate a computer's digital signals into the analog signals our phone system recognizes. Note that a computer will still require a device of some sort to connect to the ISDN. Mighty modem maker Hayes Microcomputer Products is already readying an "interface board" to connect an IBM PC with the ISDN. You can bet Apple II and Macintosh versions are not far behind.

ISDN is technology-rich and user-poor. Nevertheless, many companies are marching into the field as fast as they can—and with very good reason.

ISDN standards are evolving, and vendors are fighting to get their proprietary circuits accepted as standards. Mitel is one step ahead of the pack, as its U interface was recommended as the North American standard in August 1986 by a subcommittee of the American National Standards Institute. Mitel's design triumphed over those submitted by AT&T, Northern Telecom, ITT, Siemens A.G., and L.M. Ericsson.

The prize is especially lucrative. It seems that no less than the entire westernized world is going to install ISDNs. The European Economic Community (EEC), led by the "Group of Four"—Britain, France, Germany, and Italy—has already approved a timetable for ISDN deployment. The first trials are to be conducted in late 1987 and early 1988, followed by the introduction of basic teletext and high-speed file transfers in late 1988. By 1990, advanced teletext features are to come online, and, by 1993, ISDN will be generally available across the EEC. The estimated cost is $6 to $7 billion to serve a $40 billion market.

On the other side of the world, Japan is beginning to put its own ISDN, the Information Network System, into place. This system should be compatible with the EEC ISDN by March 1988.

Back in the U.S., Mountain Bell (based in Phoenix, Arizona) claims to have the first functioning ISDN, one that offers data and voice services. Mountain Bell chief Don Cline called Arizona Secretary of State Rose Mofford in November 1986 to say "Good Morning. You have my special greetings on this very first phone call in the U.S. over an integrated services digital network." A document (a commemorative certificate with a typo) was sent over the B channel. This step may not seem as dramatic as "Come here Watson, I need you!"

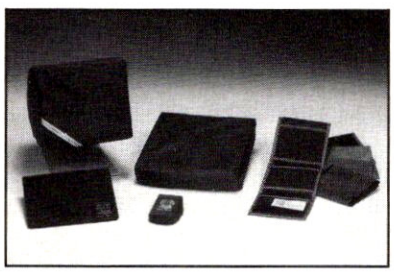
ILLUSTRATION BY WARREN GEBERT

but it is an important advance.

Finally, AT&T has become the first company to announce a commercial ISDN product, an end-to-end nodal service, which just happens to be part of a $7.5 billion network upgrade plan.

To take ISDNs one step closer to science fiction, a Caller ID service is in the wings. If you have a visual display, this service allows you to see who is calling you *before* you pick up the phone. Mountain Bell vice president of marketing Robert Hawk jokes that some people might never ever connect another call. Personally, I think this development could cause a run on Novelty Noses.

Seriously, it could be a big boon to computer security. The system checks a caller's physical identity against images stored in a database. Those that are in the database complete the connection. Those that are not do not. This system lets companies "see" unauthorized entries, record them, and then automatically reject interlopers' efforts.



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CIRCLE 136 ON READER SERVICE CARD

Turning ISDN into GOSIP

Open Systems Implementation (OSI) is a seven-layer protocol covering computer interconnections. It is the cornerstone of the "global village" concept, whereby anyone using this standard should be able to connect with someone else who follows the standard. In the U.S., it has three main subsets: MAP (Manufacturing Automation Protocol), TOP (Technical Office Protocol), and GOSIP (Government OSI Protocol).

GOSIP is receiving a big push from the U.S. National Bureau of Standards, not to mention General Motors, Boeing, Alcoa, and other industrial heavyweights. The U.S. Government, which will spend $4.5 billion for Federal Telecommunications System FTS2000, wants to make sure that it can connect into a proposed international research system based on OSI. The current schedule is to have a standard by the summer of 1987 and a full demonstration in Baltimore, Maryland, in June 1988.

The most important aspect of all this high-tech telecommunication is that the National Bureau of Standards expects to integrate ISDN into GOSIP in 1990. The infrastructure of the "global village" is taking shape.

OSI will work with the Macintosh, but whether OSI filters down to the Apple II remains to be seen. Given the II's penetration into the education market and the theoretical plans for an international research system, however, you can probably bet on some sort of Apple II expansion card somewhere down the road.

Modem Magic-A Disappearing Act

This strategic view of telecommunications portends a dim future for modems as we know them. The entire purpose of a modem is to translate digital signals into analog signals and back again. Without an analog system, you do not need a modem.

Remember, however, that you will still need some sort of device to translate Apple signals into ISDN and OSI signals. Modem manufacturers are aware of this need, so you can expect a slew of new ISDN products over the next few years.

Before you sell off your Hayes at the next flea market, though, remember that the timetables I present are not written in stone. I have a feeling my modem is going to be

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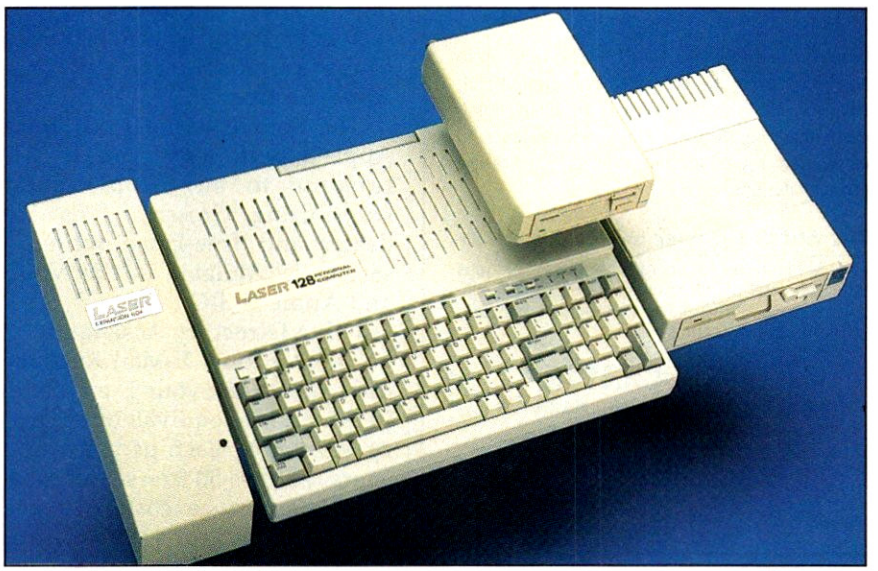

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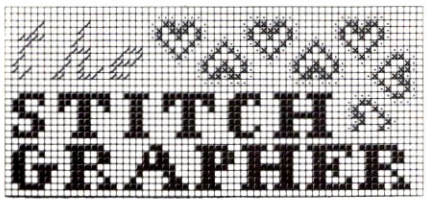

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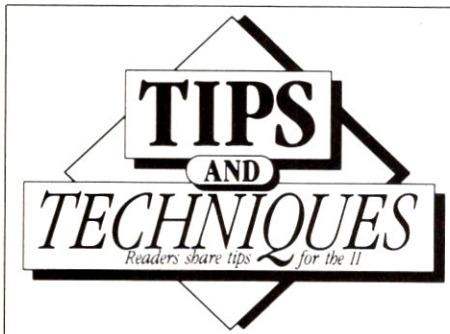
Supports the Imagewriter and Scribe printers directly (depicted grid style is available for these printers only). Other dot matrix printers require graphics capable interface card or separate support software.



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around for quite some time, and the only reason I'd sell it would be to upgrade to a 2400-bps model.

TELETIPS

"Speedism"

According to management consultant Dale Flanagan, an increasing number of bulletin-board operators are discriminating against slower-speed modems. Two Los Angeles boards have banned 300-bps modems, and another limits their use to between 8 and 9 on Saturday mornings. I guess this break allows the system operator to watch the Roadrunner cartoon.

Apple Source

The Source has started "Ask the Apple Expert," a guaranteed 24-hour response to any Apple question from Craig Crossman, an Apple dealer and free-lance writer. The service is available in the MACSIG and Apple II SIG.

On-line Directory Assistance

The National E-Mail Registry allows you to list your E-mail address in the on-line equivalent of Directory Assistance. Each person who registers receives 50 free searches. After that, the service costs $10 per 50 searches or $95 for a year of unlimited searches. Only those who register their addresses can search in the Registry.

Escape with Hayes

Hayes Microcomputer Products has developed a program that employs its patented Improved Escape Sequence with guard time for use with its modems. The guard time prevents escape-sequence characters from appearing in data being transmitted.

BBS with USRobotics

Bona fide BBS operators can obtain USRobotics' new 9600-bps Courier HST modem for $495 instead of the usual $995. The company's new 2400-bps modem, the Courier 2400e, is available to BBS operators for $350 instead of the usual $699. BBS operators must prove their systems exist and must post a notice that they are using USRobotics' modems.

Modem Comparison Chart

Hire Education offers a chart comparing 58 features of 328 modems from 73 vendors. It includes articles, purchasing guidelines, and a glossary. The price for the chart is a reasonable $15.

MY LAST LOG-OFF

For almost four years, from Volume I Issue 1 in November 1983 to be exact, I have covered the telecommunications world for *A+*—and enjoyed every minute of it. I regret to announce, however, that I can no longer write this column.

While I was a technical writer for AT&T, I had no professional conflicts of interest. But when an opportunity at a competing computer magazine came along, I took it—and this career change causes me to stop writing for *A+*.

I will be continuing my monthly space-exploration newsletter, *Space Race* (RD 1 Box 307, Stockton, NJ 08559, $19/year).

I suppose I should steal some snappy closing line such as "old carrier tones never die, they just fade into static" or "I never met a modem I didn't like," but I think I'd like to close with a simple "thank you for your support." ✚

Editor's Note: The A+ "Telecommunications" column will continue under the skillful guidance of Michael Fischer. You can reach Fischer at MFISCHER on GEnie, (74365,40) on CompuServe, and MAFISCHER on BIX.

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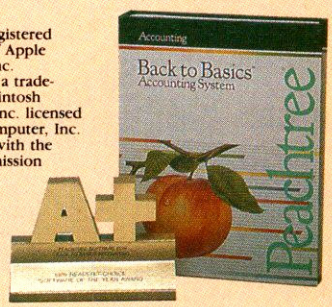

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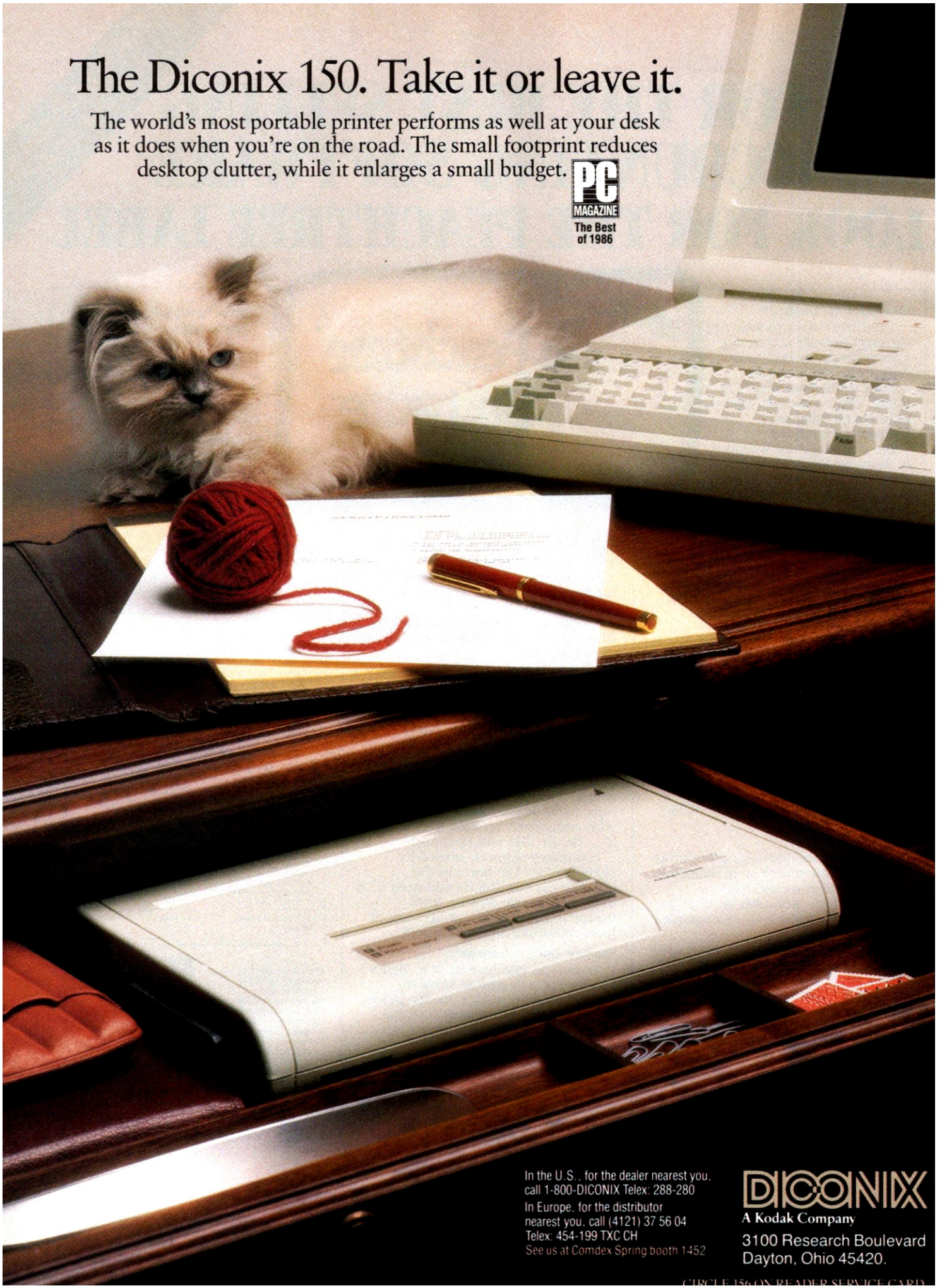
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BY ROBERTA SCHWARTZ AND MICHAEL CALLERY

HOW CAN BASIC EDUCATE YOU ABOUT IIGS GRAPHICS?

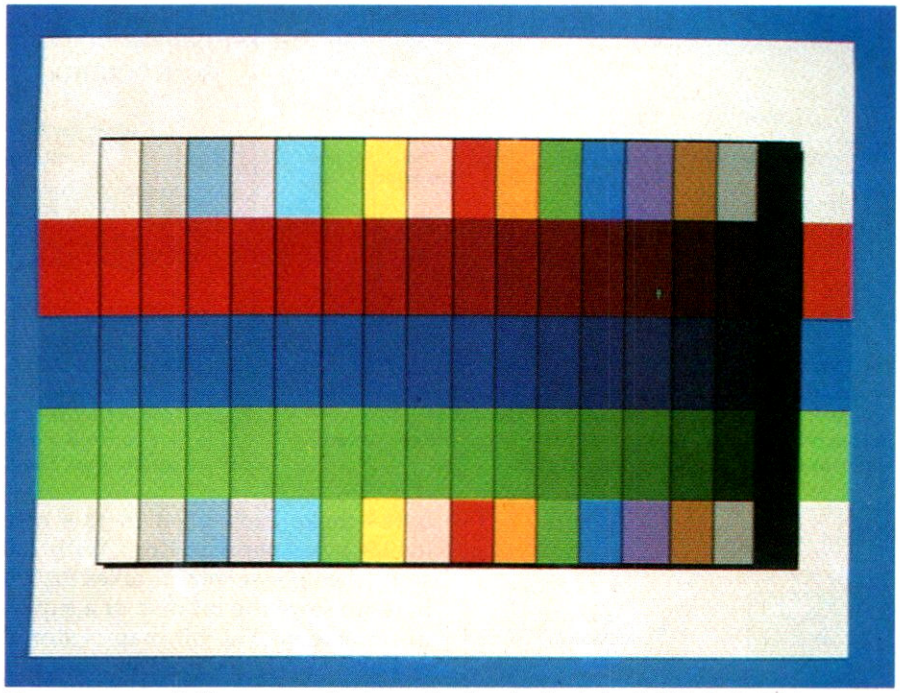
The shadow knows.

This month, we'll talk about some Apple IIGS programs on CompuServe, but first we have a BASIC program that lets you control the display of IIGS pictures and highlights the way the GS displays graphic images. This column will be a bit technical, but we think you'll find it worthwhile.

Before you can load any GS super-hi-res picture file from an information service such as CompuServe or from a diskette into the computer's memory, using BASIC routines, you must know where the computer expects to find the image in RAM. You also need to know other data that gives these pictures their high resolution and the way programmers are storing this data on disk.

The IIGS makes extensive use of "shadowing." That is, a change to one memory location simultaneously causes a change in another memory location. The Apple IIGS can have 16 megabytes of memory, organized in 64K banks. The "user" RAM that comes in the system is located in the lower half of the address space, and you can expand it to 8 megabytes with a memory card. The upper half of this address space is reserved for system RAM and ROM.

The video-control chip in the GS uses the memory bank at address $E0 to create the display. Bank $E0 (decimal 224) is well above the user-RAM area. The GS's 65816 chip in the 6502 emulation mode—the mode it's in when it's running Applesoft BASIC or any DOS 3.3 or ProDOS 8 programs—can work only with bank $00, the first, or lowest, 64K of memory (called main memory in Apple IIe and IIc computers). To create the display, however, the IIGS circuitry also automatically writes everything in bank $00 video memory to bank $E0 (see figure 1, next page). Thus, when you print an *A* on the text screen, it is simultaneously being written to two memory locations: one in normal video RAM, bank $00, and the other in bank $E0. The display you see on your monitor is created from the version in bank $E0.



The screen generated by program 2 when a simple color bar is loaded. Note that this screen shows four different palettes, the standard Paintworks Plus palette and one palette each devoted to shades of pure red, blue, and green.

Eighty-column displays and double-hi-res graphics, stored in the second 64K bank, $01 (called auxiliary [aux] memory in Apple IIe and IIc computers), are shadowed in bank $E1 on IIGS computers.

The super-hi-res screen of the IIGS is generated from bank $E1 and, when shadowing is enabled, a copy is also kept in bank $01. Therefore, to work with super hi res from BASIC, which can work only with bank $00, you need only to find a way to get the data from bank $00 to bank $01, from main to aux memory (see figure 2). You can use a routine in the Apple 80-column-card ROM to transfer data to aux memory. Unfortunately, the routine requires some setup that is impossible directly from BASIC, so the transfer routine will be in assembly language. You use it from BASIC with the CALL command.

Now that we know how to put data into aux memory from BASIC, we need to know what to put there to get a super-hi-res image. The most important component of a super-hi-

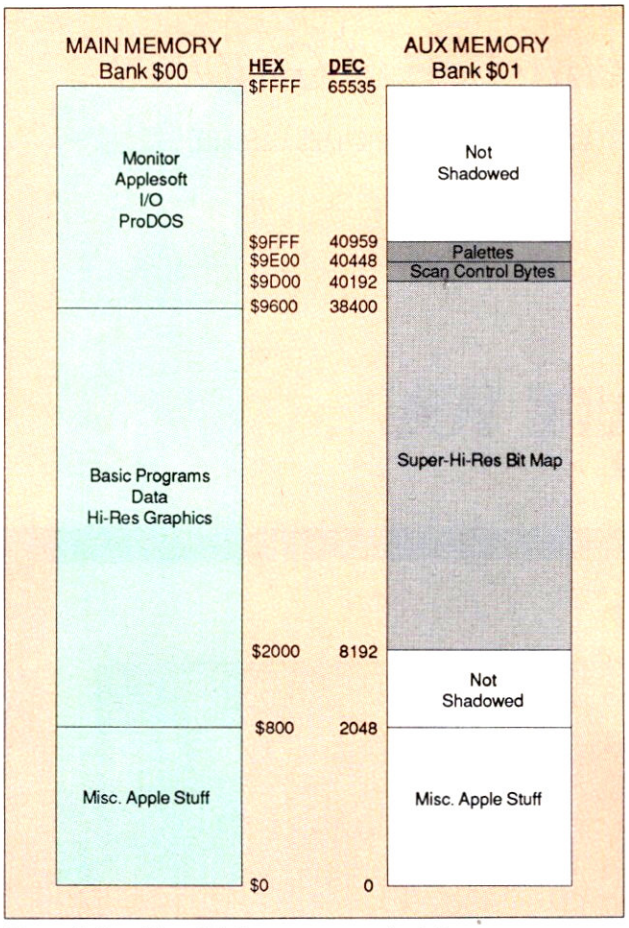


Figure 1: An abbreviated memory map (not drawn proportionately) of the Apple IIGS, showing the shadowed super-hi-res screen and associated data

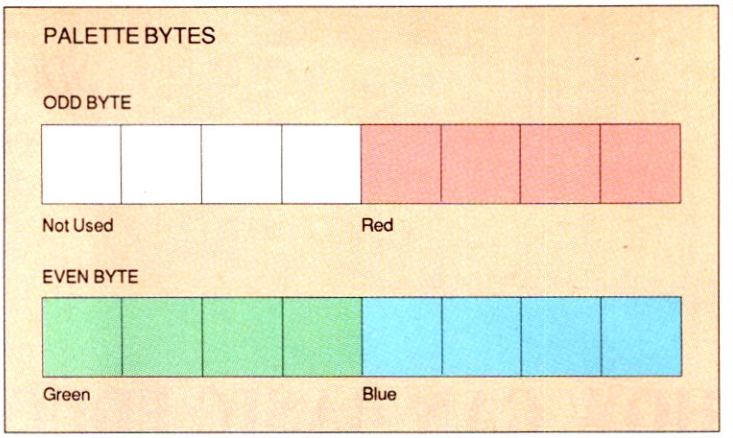


Figure 3: Palette bytes—these bytes define each color in a palette. The unused portion of the odd byte should be set to 0. A half byte (or nibble) per color allows generation of 16 different shades of each color.

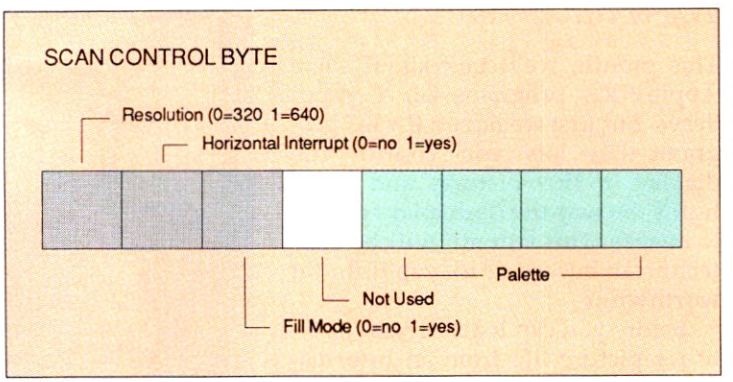


Figure 4: Scan Control Bytes (SCBs)—each scan line has one SCB. Each bit of the byte controls a different screen parameter; four bits control the palette for the line. The Fill mode works only in the 320 mode.

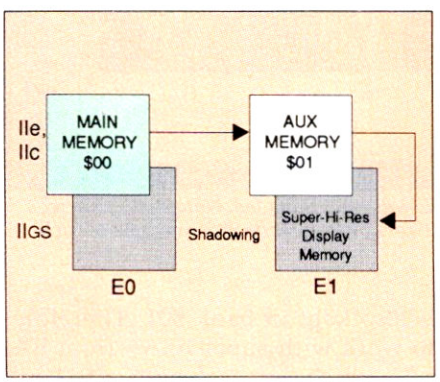


Figure 2: You can move graphic data in Apple IIe/IIc main memory to the IIGS super-hi-res memory location by moving it from main memory to aux memory with shadowing on.

res picture is the bit map, in which each pixel on the screen is represented by a bit (or collection of bits) in memory.

In the 320 mode (320 × 200-pixel resolution), four bits—or half of a byte—make a pixel; therefore, each scan line must contain 160 bytes (320/2). The bit map has the same number of bytes for the 640 mode (640 × 200-pixel resolution), since only two bits—or one quarter of a byte—make each pixel in this case (640/4 bytes per scan line). With 200 scan lines per screen, it takes 32,000 bytes to store the bit map of a super-hi-res screen. The bit map is stored at $2000 (8192/decimal) in bank $E1 and, when shadowed, bank $01.

SCBs and Palettes

The bit map alone is not enough to define a super-hi-res picture. In super hi res, the color palettes are "soft." A bit pattern points only to a palette value, and the palette value determines the actual color of a pixel. In super hi res, you must store a palette, which consists of 32 bytes. Two bytes define each color: One byte controls the red component of the video signal, and the other controls the green and blue components (see figure 3). With up to 16 different palettes for each image, the palette area occupies 512 bytes.

The palettes and bit map are almost enough information to display a picture. The final twist in this complicated plot is the so-called scan-control bytes (SCBs). The super-hi-res screen can be a mixture of modes, part of the screen in the 320 mode and another part in the 640 mode. In the 320 mode, the scan lines can be either in the regular bit-mapped mode or in a special color-fill mode. The SCBs determine the mode (320 or 640), the palette (0–15), and whether to use the fill mode or not (see figure 4). The IIGS has 200 SCBs, one for each line of the screen, but Apple assigned a block of 256 bytes to store them in. The extra bytes are set to 0.

A super-hi-res image, then, occupies 32,768 bytes or 32K of memory: 32,000 bytes for the bit map, 256 bytes for the SCBs, and 512 bytes for the palettes.

Super-Hi-Res Files

In ProDOS, all files have an identifier such as BAS for a BASIC file and BIN for a binary file. Paintworks Plus, for example, produces three distinct types of files: $C0-type files when you save a "paint" file, $C1-type files when you save a "screen" file, and $C2 files when you save an animation. We're interested here in $C1-type files, which consist of the image data, stacked end to end: first the bit map, then

SPEAKING OF GRAPHICS GALLERY

THE LAST CIGARETTE AND OTHER MOODS

Rebecca August and Vivi Kuhnle, students at Parsons School of Design and the New School Computer Center in New York City, created these images with an Apple IIe computer and the Apple Graphics Tablet. Rebecca used Blazing Paddles and Fontrix to make a graphic statement on "How to Stop Smoking." Vivi used a video digitizer and Blazing Paddles to express her many moods.

A+ invites readers to submit artwork created with the Apple II to the "Speaking of Graphics Gallery." We will pay $25 for pictures selected for publication. Submissions must be on a diskette and include a written description of the hardware and software used. When submitting pictures made with Dazzle Draw, please format your disk with a slide-show option so we can boot the disk and look at the pictures. Send your artwork to *A+* magazine, 11 Davis Drive, Belmont, CA 94002, Attn. Graphics Gallery.

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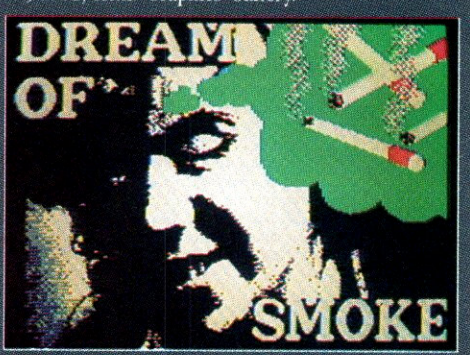

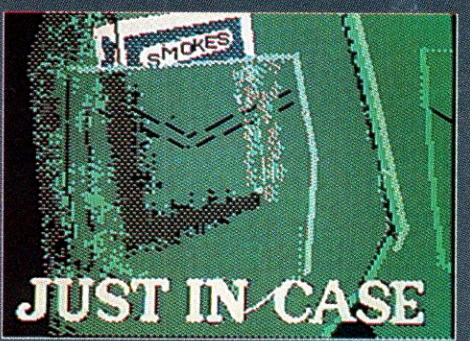

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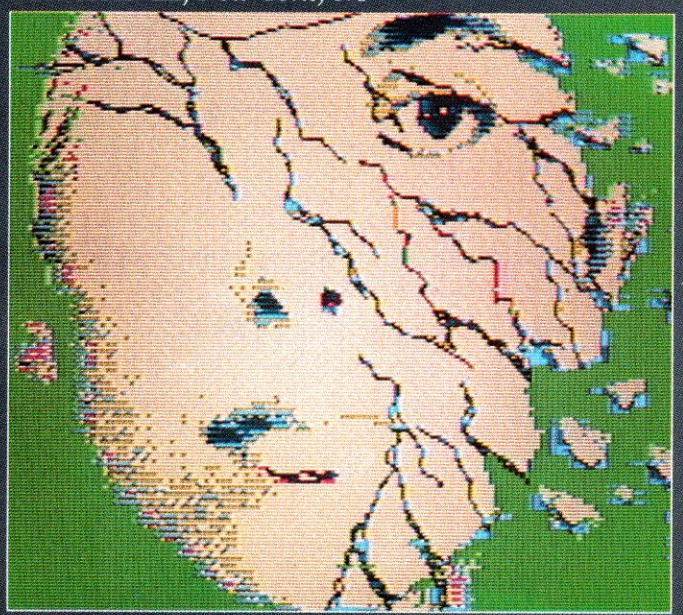

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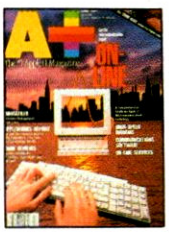

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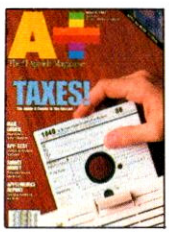

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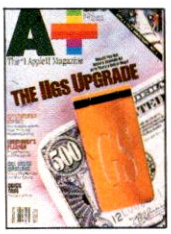

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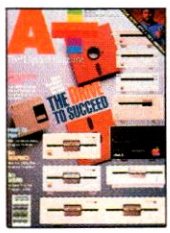

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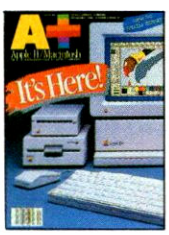

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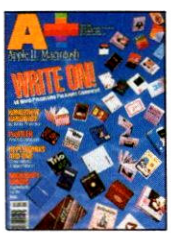

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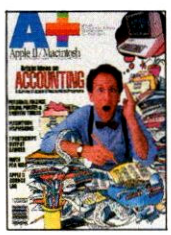

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the SCBs, then the palette values. This structure has become the standard for GS super-hi-res images.

When you're working in BASIC with ProDOS loaded, a 32K picture barely fits into memory. We chose to have the program load any image in three segments: the bit map as two segments and the SCBs and palettes as the third. The assembly-language program, then, has three CALLS, one to transfer each segment. Program 1 creates a binary file called SUPER.B, which contains the routines to transfer a super-hi-res picture from main to aux memory.

After you've typed in the program, proofread it and save it before running. Then, if you've typed something wrong and have to reboot to regain control of the computer (as happens with assembly language), you won't have to start from scratch.

PROGRAM 1

```
100  GOSUB 1000: GOSUB 1100: GOSUB 1200
110  PIC$ = "your picture name goes here":T$ = "$C1"
120  GOSUB 2000: REM Load Picture
130  GOSUB 4000: REM Alter SCBs
140  GOSUB 3000: REM Alter Palettes
160  GET A$: CALL P3: REM Wait for key then move
900  GET A$: GOSUB 1300: END
1000  PRINT  CHR$ (4)"BLOAD SUPER.B"
1010  P1 = 768:P2 = 797:P3 = 826
1020 POKE 49205,0: REM Enable super hi-res shadowing
1030  RETURN
1100  POKE 230,32: CALL  - 3086: REM  Clear hi-res 1 to Black
1110  POKE 230,64: CALL  - 3086: REM  Clear hi-res 2 to Black
1120  CALL P3: CALL P1: CALL P2: REM   Clear SuperRes to Black
1130  RETURN
1200  POKE 49193,163: REM  Display super hi-res
1210  RETURN
1300  POKE 49193,1: REM  Display standard Apple II modes
1310  RETURN
1999  REM Load SCBs and palettes
2000  PRINT  CHR$ (4)"BLOAD"PIC$",A8192,B32000,T"T$
2010  CALL P3
2019  REM Load top segment of picture
2020  PRINT  CHR$ (4)"BLOAD"PIC$",A8192,L16384,T"T$
2030  CALL P1
2039  REM Load bottom segment of picture
2040  PRINT  CHR$ (4)"BLOAD"PIC$",A8192,B16384,L15616,T"T$
2050  CALL P2
2959  REM Reload SCBs and palettes so we can play with them
2060  PRINT  CHR$ (4)"BLOAD"PIC$",A8192,B32000,T"T$
2070  RETURN
2999  REM POKE palette 0
3000  FOR I = 0 TO 31: READ T: POKE 8448 + I,T: NEXT
3009  REM POKE palette 1
3010  FOR I = 0 TO 31: READ T: POKE 8480 + I,T: NEXT
3019  REM POKE palette 2
3020  FOR I = 0 TO 31: READ T: POKE 8512 + I,T: NEXT
3029  REM POKE palette 3
3030  FOR I = 0 TO 31: READ T: POKE 8544 + I,T: NEXT
3040  RETURN
3100  REM   Palette 0 - Standard PaintWorks Plus Palette
3110  DATA   0,0,119,7,65,8,44,7,15,0,128,0,112
3120  DATA   15,0,13,169,15,240,15, 224,0
3130  DATA   223,4,175,13,143,7,204,12, 255,15
3200  REM   Alternate Palette 1 - REDS
3210  DATA  0,0,0,1,0,2,0,3,0,4,0,5,0,6,0,7
3220  DATA  0,8,0,9,0,10,0,11,0,12,0,13,0,14,0,15
3300  REM   Alternate Palette 2 - BLUES
3310  DATA  0,0,1,0,2,0,3,0,4,0,5,0,6,0,7,0
3320  DATA  8,0,9,0,10,0,11,0,12,0,13,0,14,0,15,0
3400  REM   Alternate Palette 3 - GREENS
3410  DATA  0,0,16,0,32,0,48,0,64,0,80,0,96,0,112,0,128,0
3420  DATA  144,0,160,0,176,0,192,0,208,0,224,0,240,0
3999  REM POKE SCBs to use new palettes
4000  FOR I = 60 TO 150
4010  IF I > 120 THEN T = 3: GOTO 4040
4020  IF I > 90 THEN T = 2: GOTO 4040
4030 T = 1
4040  POKE 8192 + I,T: NEXT : RETURN
```

The Whole Picture

Now, you need to know only how to enble the super-hi-res graphics-display mode. Apple provided a "soft switch" in main memory to display super hi res. Unlike the switches you use with standard hi res, such as POKE -16302,0 to display full-screen graphics, this switch can contain several values. The switch is located at $C029 (decimal 49193). Poke 1 into this location to display normal Apple text and graphics; poke 163 to display super hi res. Be careful—other values can cause your system to crash!

Program 2 demonstrates all the steps in the previous paragraph in action. You can save yourself some typing by not entering the REM statements; they're explanations for you, and nothing in the program depends on them.

After the program loads a picture from a diskette, it reloads the SCBs and the palette values, and normal pokes change the palette values to demonstrate different color possibilities. After they're changed, a call to the third segment mover (CALL P3, where P3 is 860) moves the altered palettes into aux memory, changing colors in the picture.

The subroutine at line 3000 creates four palettes. The first is the standard Paintworks palette of 16 different colors, and the others are palettes consisting only of red, blue, and green. The subroutine at line 4000 alters the SCBs so that scan lines 60 to 90 use palette 1, 91 to 120 use palette 2, and 121 to 150 use palette 3. The remainder of the screen uses palette 0, the default palette (see figure on first page).

Take It from Here

You can also load binary files of type BIN with lengths of 32000 bytes, with this program. (These files don't contain SCB and palette information.) To do so, skip the BLOAD and call to P3 by using GOSUB 2020 after defining a filename and type. You should also delete line 2060. The picture's appearance will depend on whatever SCBs and palettes happen to be in memory. You can modify the subroutines at 3000 and 4000 to create the proper palette and SCBs.

CompuServe

You'll find programs like these two sample programs and lots of

PROGRAM 2

```
100 LOC = 768:LE = 87
110  FOR I = LOC TO LOC + LE - 1
120  READ T: POKE I,T
130  NEXT I
140  PRINT "Save binary file?";: GET A$: PRINT
150  IF  LEFT$ (A$,1) = "N" OR  LEFT$ (A$,1) = "n" THEN 170
160  PRINT  CHR$ (4)"BSAVE SUPER.B,A768,L87"
170  PRINT "Done"
1000  DATA  169,0,133,60,169,32,133,61,169,255
1010  DATA  133,62,169,95,133,63,169,0,133,66
1020  DATA  169,32,133,67,56,32,17,195,96,169
1030  DATA  0,133,60,169,32,133,61,169,255,133
1040  DATA  62,169,92,133,63,169,0,133,66,169
1050  DATA  96,133,67,56,32,17,195,96,169,0
1060  DATA  133,60,169,32,133,61,169,0,133,62
1070  DATA  169,35,133,63,169,0,133,66,169,157
1080  DATA  133,67,56,32,17,195,96
```

others in MAUG's IIGS sections on CompuServe. Most files are stored in MAUG (Microcomputer Apple User Group) as Binary II files. You download a Binary II file as a text file and then convert it to its proper file type, using a program called BINARY.DWN, which you must also download. You can lump more than one source file into the Binary II file, allowing you to download complicated programs faster.

You'll find several super-hi-res picture-display programs here, simple BASIC programs with machine-language subroutines that you can easily modify to suit your needs. We're waiting for someone to provide a program to replay the animated sequences from Paintworks.

One of the utilities, by Jason Harper, installs a desk accessory on the Control/open-Apple/Esc menu for fixing the palette if it gets messed up when you're loading a file into Paintworks. We've found it to be generally useful for experimenting with the GS palettes.

Another group of programs is devoted to translating Atari ST pictures to the IIGS. ST pictures are similar to those on the GS—the main problem is the file and disk formats. Using the ST converter programs from MAUG, you can download an ST picture to a GS disk and convert it to a $C1-type file. Check out CompuServe's Atari section for some great images.

A third group includes programs that explore the graphics capabilities of the GS itself. We especially like Stephen Jensen's experiments with color—it's exciting to see 256 colors on the screen at one time. We expect other programmers to hack out some amazing graphics tricks.

Finally, for all Apple II users, there is a nice picture-conversion program by Jim Upchurch to allow you to convert picture files from one format to another. The program works with Beagle Graphics, Dazzle Draw, and MousePaint and includes information and a "program stub" to allow you to add your own converter. It works well and can save you a great deal of hassle.

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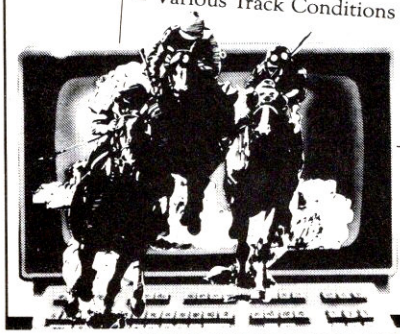

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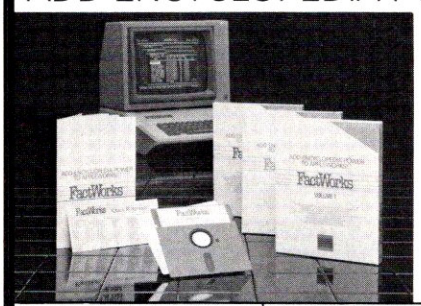

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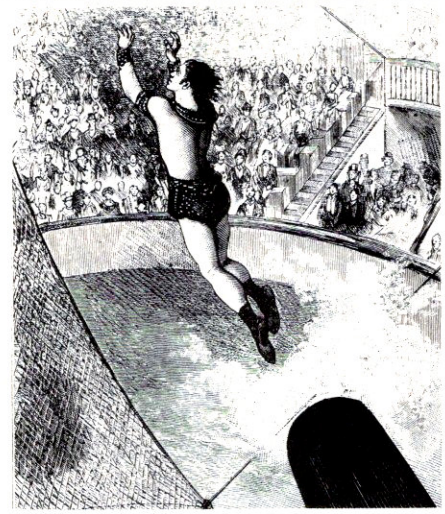

Beagle Compiler author Alan Bird leaves for work.

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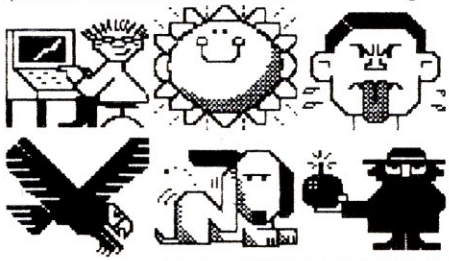

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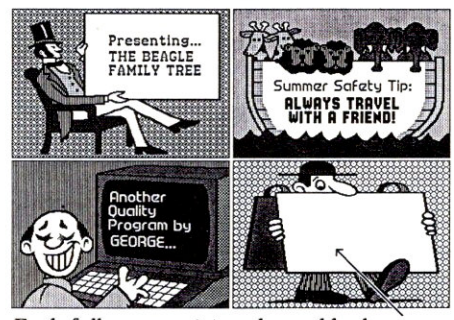

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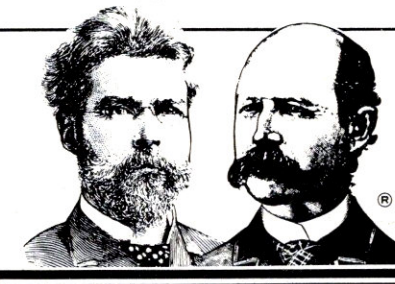

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ENTERTAINMENT

GAMEPORT

BY BOB LINDSTROM

Shanghai and Police Quest, two IIGS games from a pair of programmers who have overcome some extra hurdles, and updated Wizardry scenarios

FANFARE FOR THE COMMON MAN

In the universe of computer games, heroes tend to be brawny supermen with beefsteak pectorals and the fastest ship in the galaxy. Survival means carrying the biggest sword, commanding the largest army, or wielding the most potent spells.

But this month, "GamePort" sounds a fanfare for the common man. The real world has few of the overdeveloped Goliaths of computer fantasy. What we do have is more remarkable: ordinary people who find themselves doing extraordinary things.

SHANGHAI AND ITS CREATOR

Some regard it as the greatest "hard day at the office" cure since the 6 o'clock martini. Shanghai stacks the colorful ivory tiles of Mah-Jongg into a computerized classic. Just lean back in an armchair, turn on the computer, and start removing pairs of exotically patterned tiles from a five-level pyramid.

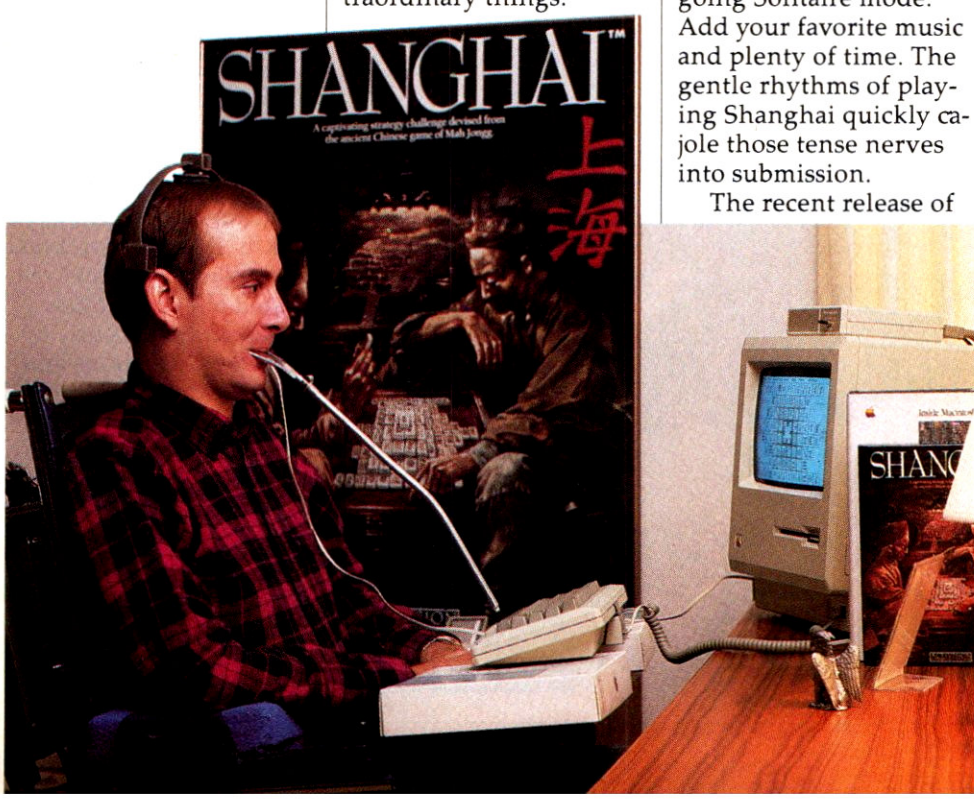
Head-to-head fans can play Shanghai's Challenge mode against a human opponent. The most theraputic way to approach Shanghai, though, is in its easy-going Solitaire mode. Add your favorite music and plenty of time. The gentle rhythms of playing Shanghai quickly cajole those tense nerves into submission.

The recent release of Shanghai for the Apple IIGS is an eye-filling demonstration of that computer's graphics power. The many colors of the GS shape a nearly photographic represention of the pyramid of tiles. The game is also available in a less glamorous version for the Apple IIe/c.

Shanghai is the most elegant of game designs and a true triumph for its designer, Brodie Lockard. The creation of Shanghai is the lesser of Lockard's triumphs, however.

Lockard, 26, was enrolled at Stanford University eight years ago when he suffered an accident as a member of the varsity gymnastics team. The mishap left him paralyzed below the shoulders. Lockard refused to be defeated by the injury and overcame the disability to become a full-time programmer at Stanford.

"There are two things to do in that situation," Lockard explains in a telephone interview. "You can sit or lie around all day, or you can create some goals and do what you planned to do." Lock-



ard chose to pursue his goals.

Lockard had been studying computer programming for about a year at the time. "The computer was a real motivating force after my injury," Lockard says. He proceeded to earn a Bachelor's degree and a Master's degree at Stanford, working in the field of Interactive Educational Technology.

Lockard created the first version of Shanghai on the Control Data Plato educational computing system. When the Apple Macintosh came out, Lockard decided to convert the game for the Mac's high-resolution graphics. It took a full year of evenings and weekends for him to write the program. After seeing an early version of Shanghai, Activision chose to fund final development and publish the program. Lockard types his programs with the aid of a mouthstick and controls the cursor with a View Control System or "flying mouse." Composed of a headband and ultrasonic sensors that surround the monitor, the "mouse" allows Lockard to move the cursor by tilting his head.

"From writing Shanghai, I've learned that if you have a goal you'd like to realize someday, you should go for it," Lockard concludes. "I wasn't a Mac expert when I programmed Shanghai. It was just something I wanted to do for fun, and it turned out pretty well."

THE BLUE KNIGHTS

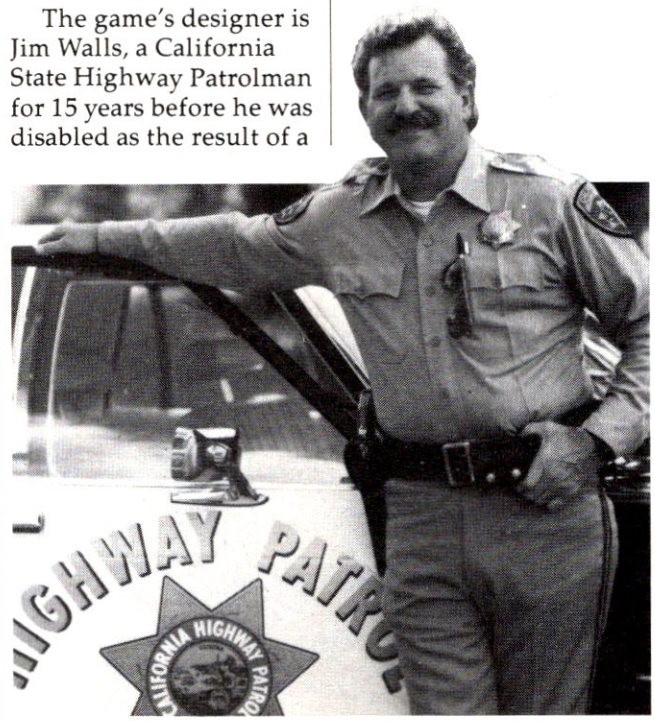
Though often romanticized and misrepresented on entertainment screens large and small, police officers stand proudly in the ranks of "everyday" heroes. Despite the frivolities of prime-time TV, law enforcement is much more than high-speed car chases and William Shatner's latest hairstyle. It's a grueling career of unending responsibility and unexpected jeopardy.

Now Sierra On-Line salutes those blue knights with the release of Police Quest, the latest and most unusual entry in its series of graphic adventure games. This game for the Apple IIGS is an adult look at a police officer's world of crime and punishment, of traffic tickets and narcotics traffic.

The game's designer is Jim Walls, a California State Highway Patrolman for 15 years before he was disabled as the result of a shoot-out. "Everything in the game is based on my experience," Walls tells "GamePort." Police Quest "puts you in the driver's seat as far as experiencing what it is like to be a police officer."

The adventure casts the player as a police officer in a middle-American town. "The town has no big problems with crime," explains Walls. "Suddenly, it is invaded by a big narcotics pusher. You start off as a police officer in a car and then become an undercover narcotics agent. Your responsibility is to get clues to lead you to the man you need to arrest."

Unlike the fantasy settings of Sierra adventures such as King's Quest and Space Quest, Police Quest ventures into a brutally realistic world of bars and jail cells. The game isn't all Dirty Harry action, though. Game play also deals with the routine of police life. The game's officers find themselves handing out speeding tickets, attending briefings, and discovering their best efforts tangled in the red tape of justice.



"Crooks don't have to play by the rules, but cops do" notes John Williams of Sierra On-Line. "There's a frustration to that. The police don't get to shoot first and ask questions later."

A booklet that comes with the program describes police procedures for arrests and other situations. Players must follow those procedures in the game, just as officers must follow them in the field. A careless officer might make an arrest that won't hold up in court or, worse, might let a dangerous suspect get the upper hand. Players also have access to a realistic crime computer that provides them with information on suspects.

The game also offers a dose of humor. The camaraderie of fellow officers in locker rooms and coffee shops adds a light touch. Even so, don't take the mean streets and infested alleys of Police Quest lightly. Its unflinching situations and real-life dramas are aimed at mature game players.

"I hope the game will give players an insight into what it is to be a police officer," Walls says—"the things we come across, how we handle them. And it should give an idea of what we feel and go through."

GAMEPORT

THE WIZARD'S NEW CLOTHES

Returning to the fantasy world of computing gaming, we find ourselves in the mazes of Wizardry—but someone has fixed up the joint. Everything looks different, more elaborate, more detailed. Sir-Tech Software, Inc., has called in a dungeon redecorator, and the results are new, improved versions of all three Wizardry scenarios for Apple II computers with at least 64K of memory.

Many years have passed since role players

first ventured into the Proving Grounds of the Mad Overlord. Many microcomputer graphic advances have occurred since then. The new versions of Wizardry update the art and incorporate some of the features Wizardry fanatics requested, while maintaining the time-tested dungeons of the originals.

A new system of on-screen windows lets you toggle maze and status screens on and off. Every monster group has its own graphic representation. The program automatically identifies spells when you type in the first two letters of the name. If the program still doesn't recognize the spell, it will provide a menu of spell choices.

For those who have trouble with money, the new Wizardries enable players to split gold equally among party members or to pool the gold with one character. And, at long last, you can save a game while in a maze. Hallelujah.

According to Dan Hackett of Sir-Tech, "The new versions will probably look strange to old-time players," even though the game play is virtually identical.

The feeling of disorientation (nothing unusual for Wizardry lovers) should end quickly, though. The new key commands, says Hackett, are similar to those of the old versions. Veteran role players should be slicing and dicing demons with a minimum of retraining.

There is some bad news: All the old bugs have been fixed. Why is that bad? Well, all the "GamePort" readers who have submitted ingenious "cheats" for Wizardry will have to uncover other ways to outsmart the new versions.

The updated Wizardry scenarios, whose packages are marked "New Edition," are the first fruits of a Sir-Tech development system for speeding creation and conversion of Wizardry scenarios. Hmmmm. Dare we hope for "The Return of Werdna"?

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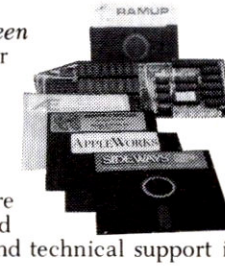

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Ramfactor	218	284	Timemaster	79
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CIRCLE 104 ON READER SERVICE CARD

GAMEPORT

FANFARE FOR THE COMMON CRITIC

If we had any common critics, we'd blow them a blast. Instead, we have our uncommon *A +* team looking at another quartet of silicon amusements.

"Do we get to win this time?," asked John Rambo, his emotions petrified in a typical Sylvester Stallone deadpan. Of course we get to win this time, because we're not leaving the job to stone-faced actors. You get to pilot the helicopter and invade an enemy installation in Mindscape's Infiltrator.

Put on weight, wear a ski mask, and pound the table while yelling like a maniac. Surprise, you're ready for a career in professional wrestling. And you can sweat, grunt, and bluster in the comfort of your own home with Epyx's Championship Wrestling.

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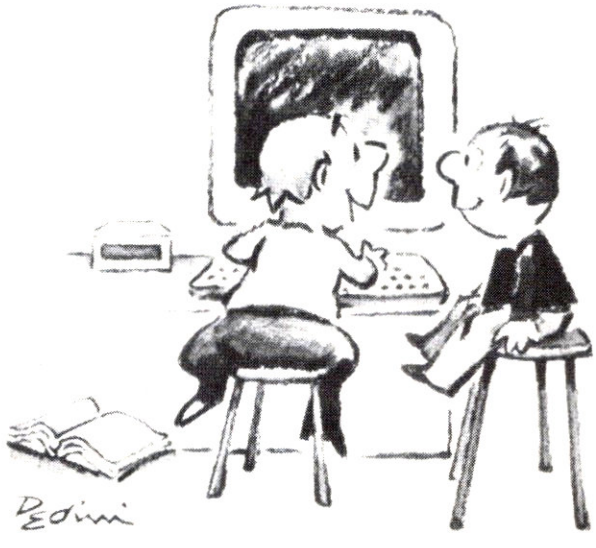
BY DEDINI

LAUGHTRACK



"If we keep at this we could become rich kids. At the very worst, rich old men."

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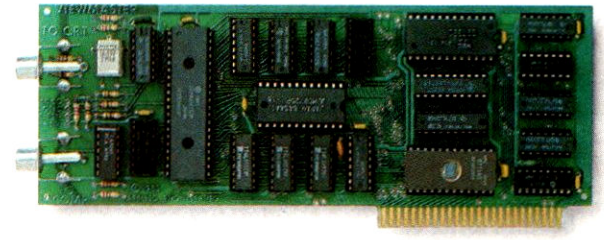
Viewmaster 80

Now run AppleWorks™ on your II+ *and* keep full 80 column compatibility!



	BUILT-IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7 X 9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS	
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SUPRTERM		✓					✓	✓	
WIZARD 80					✓		✓	✓	
VISION 80	✓	✓			✓				
OMNIVISION		✓					✓	✓	
VIEWMAX 80	✓	✓			✓			✓	
SMARTERM	✓	✓				✓	✓		
VIDEOTERM		✓	✓		✓	✓		✓	

One look at the chart will give you some of the reasons there's only one smart choice in 80 column cards for your Apple. But the real secret to Viewmaster 80's success is something even better: Total compatibility.

Each Viewmaster 80 includes our powerful AppleWorks expand software, allowing AppleWorks to run on the II+ with only 64K (or more) memory. (We recommend the RamFactor memory card, but any compatible Apple memory card will work.) The software provides our full range of AppleWorks enhancements, including expanded records, word processor, multi-disk saving, time and date display on screen with any PRO-DOS clock, and more!

The Viewmaster 80 works with all 80 column applications, including DOS 3.3, PRO-DOS, CP/M, Pascal, WordStar, Format II, Applewriter II, dBase II, Visicalc, Multiplan, and *hundreds* of others—including AppleWorks.

Here are just a few of the powerful features the Viewmaster 80 delivers for a great price ($149):
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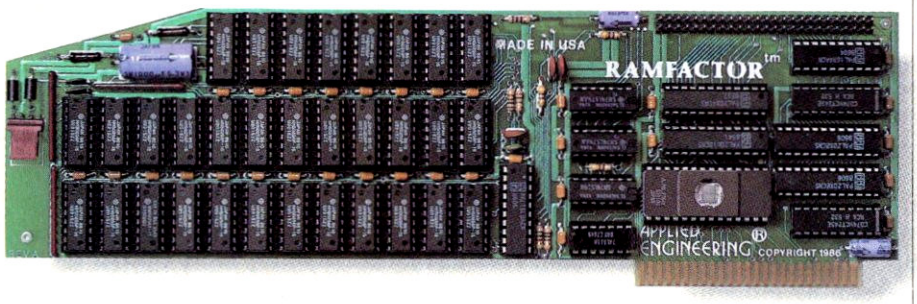
RamFactor™

Boot any II+, IIe, or IIGS and be up and running your favorite software in less than 1 second.

Now anyone with an Apple II+, Franklin, Laser 128, Apple IIe or IIGS preferring to use slots 1 through 7 can now enjoy the speed and performance that they've been waiting for.

With RamFactor, you'll be able to instantly add another 256K, 512K, or a full 1 MEG on the main board and an expansion connector can address an additional 16 MEG of memory for possible future expansion. Since virtually all software is automatically compatible with RamFactor, you'll immediately be able to load programs into RamFactor for instantaneous access to information. You'll also be able to store more data for larger word processing documents, bigger data bases, and expanded spreadsheets. And with the battery back-up option, you can switch on your Apple and your favorite software will be up and running in less than 1 second!



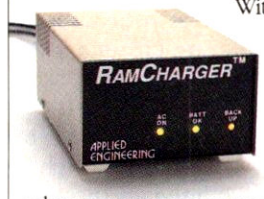
Very Compatible

All the leading software is already compatible with RamFactor. Programs like AppleWorks, Pinpoint, BPI, Managing Your Money, Dollars and Sense, SuperCalc 3A, PFS, MouseWrite, MouseDesk, MouseCalc, Sensible Speller, Applewriter IIe, Business Works, ReportWorks, Catalyst 3.0 and more. And RamFactor is fully ProDos, DOS 3.3, Pascal 1.3 and CP/M compatible. In fact, no other slot 1-7 memory card is more compatible with commercial software.

AppleWorks Power

There are other slot 1-7 cards that give AppleWorks a larger desktop, but that's the end of their story. But RamFactor is the only slot 1-7 card that increases AppleWorks internal memory limits, increasing the maximum number of records in the database and lines permitted in the word processor, and RamFactor is the only standard slot card that will automatically load all of AppleWorks into RAM dramatically increasing speed and eliminating the time required to access the program disk, it will even display the time and date on the AppleWorks screen with any ProDos clock. RamFactor will automatically segment large files so they can be saved on 5¼", 3½", and hard disks. All this performance is available on the Apple II+, IIe, Franklin, or Laser 128 when used with an 80 column display. RamFactor, no other standard slot card comes close to enhancing AppleWorks so much.

The "Instant On" Apple.



With the RamCharger battery backup option, RamFactor will retain programs and data during power failures or even when you turn your computer off. And because RamFactor plugs into slots 1-7, it's the only memory card that can cold boot an Apple without using slow floppy or hard disks. An available "Y" cable allows one RamCharger to power two RamFactors.

Powerful Program Switcher

With RamFactor, you can organize memory into multiple work areas and switch between them. Each work area can contain different programs and even different operating systems. Now you can switch from one program to another or even switch from AppleWorks to DOS 3.3 to CP/M to Pascal to ProDos in under a second. And with our battery back-up option, you can have permanent storage for up to 20 years.

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- Fully Apple II Memory Expansion compatible
- Compatible with Apple IIe, II+, IIGS, Franklin and Laser 128
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- Automatically recognized by ProDos, DOS 3.3, Pascal, and standard CP/M
- Built-in RamDrive™ software (a true RAM disk not disk caching)
- Systems are directly bootable from RamFactor if desired
- Built-in self diagnostic software
- Automatic expansion with AppleWorks 1.3 or 2.0
- Allows Apple II+ and IIe to run your AppleWorks without buying any additional software
- Accelerates AppleWorks
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- Much, much more

RamFactor with 256K	**$239**
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(Allows one RamCharger to power two RamFactors.)

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ENTERTAIN

Choose your battleground: this month's games challenge your Apple to the wrestling ring, the open skies, the English moors, and a bloody Civil War site in Maryland.

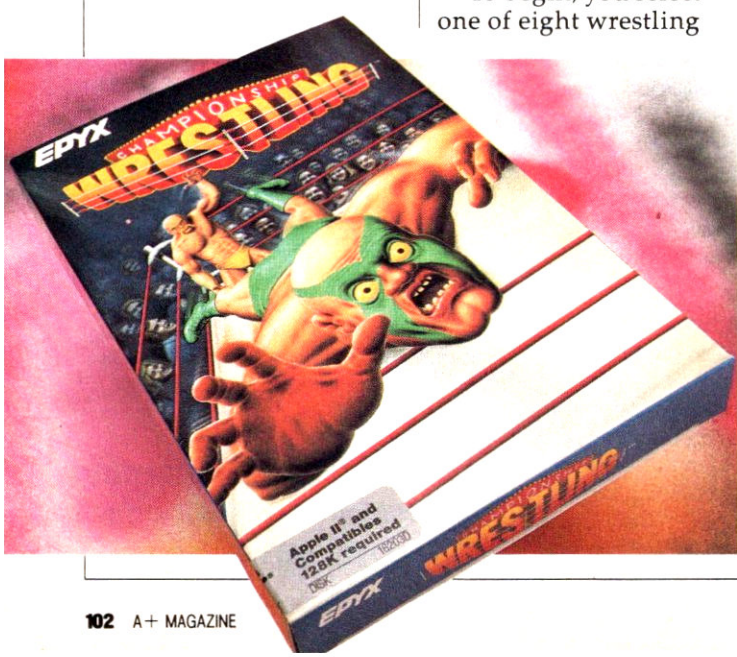
SIMULATED MAYHEM

Epyx did very well with its Olympics titles Summer Games I and II, and now it's back at it again with a game about wrestling.

Championship Wrestling gives you a chance to experience the trendy sport of the decade without the inconvenience of having to actually lift and throw 300-pound, beer-bellied bozos while the masses hurl debris at you. It's okay for Hulk Hogan, but for people like us, a computer simulation will do nicely.

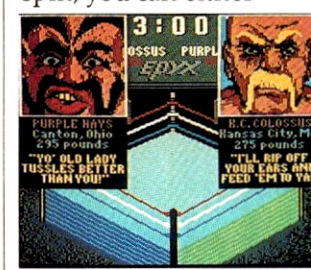
Epyx's simulation lacks the theatricality of the wrestling experience, but what it lacks in flash, it makes up for in challenge. It is a difficult game to learn to play, let alone to win.

To begin, you select one of eight wrestling personalities to control. As in real wrestling, the object is to pin your opponent's shoulders to the mat for a three-count. To do so, your wrestler must first soften up the opponent, draining him of the energy he needs to resist. Learning how to execute the holds and when you can use them takes a little time.



You can choose to control your wrestler by using either a joystick or keyboard commands. Neither method offers you a shortcut to the point at which you'll have all the moves down. Depending on your distance from your opponent, his energy level (which appears constantly at the top of the screen), and the tactic you're currently applying, you have a specific set of holds you can use, from a total of 18 moves plus 1 "custom" option.

For example: Suppose you're close to your opponent but haven't got a hold on him. You can punch or kick him or attempt right or left headlocks. If you succeed with a headlock, you can now choose to apply a lift, a suplex, a body suplex, or an atomic drop. If you successfully lift him, your options are now the pile driver, body slam, or left and right airplane spins. If you opt for the airplane spin, you can either



throw or slam your opponent. Got it?

That's only one path of options you can follow. As you see, it's remembering all the moves, their proper order, and the keys you have to press to execute them that makes the game a challenge to learn.

Once you've got the mechanics under control—usually after plenty

MENT REVIEWS

of humiliating experiences in the Practice mode—you can move on to "real" matches in the hopes of tallying victories and moving up in the standings. Your ultimate goal: the Championship Belt.

Among the most entertaining facets of the game are the individual personalities of the wrestlers you'll battle on the way to the title, some of which are obviously modeled on popular TV pro wrestlers. Each has a special "custom move," a wrestler's special hold that usually brings his opponent down onto the mat. For K.C. Colossus (the game's Hulk Hogan clone), it's the Trash Compacter. For the Cousin Elmer copy, Zeke Weasel, it's the Stomp. For the evil Colonel Rooski, it's the Great Bear.

Championship Wrestling works well in the solitaire mode, with the computer ably controlling your opponent. You may stand more of a chance of winning with human opponents in control, however (up to eight may play—but not simultaneously—in a tournament). The only hazard with human opponents is that if the match is really competitive, it may jump off the screen and take place in your living room. Just stay off the ropes and try not to get hurt.

Brian J. Murphy

CHAMPIONSHIP WRESTLING
Epyx, Inc.
600 Galveston Drive
Redwood City, CA 94063
(415) 366-0600
LIST PRICE: *$39.95*
REQUIRES: *Apple II Plus, IIe, IIc, or IIGs; 128K RAM; one disk drive; joystick optional*
CIRCLE READER SERVICE NO. **420**

MOONLIGHTING MEETS MADMAN

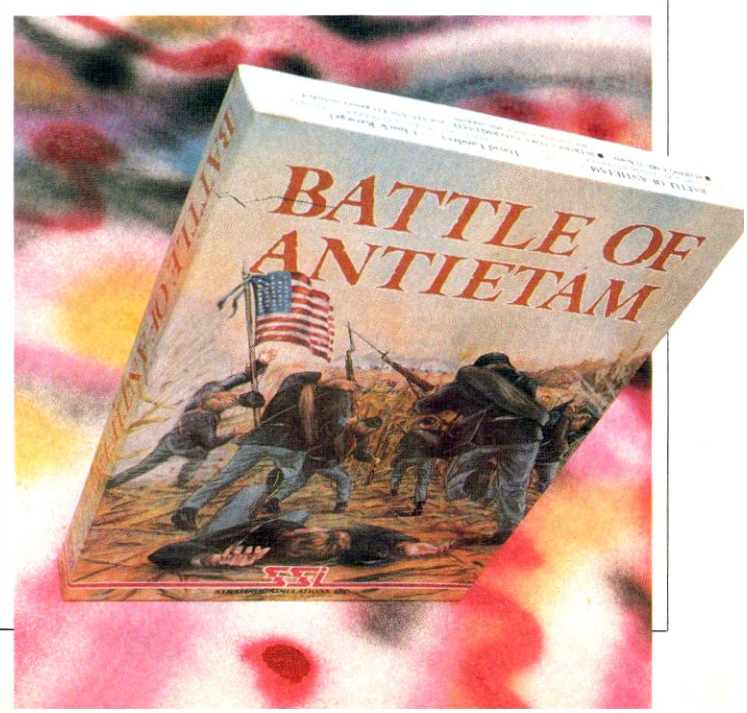
Hey muchachos and muchachettes! The top gringo is back in town, and Arriba, Arriba, Fiesta-time! But hey! Gotta blow in a few tics to do the open-heart surgery, then it's out for the gig at the stadium. I got ten new rock'n'rollin' songs I composed in the chopper. Hey, tune this in—it's about a writer with a new computer game he's got to review, and, well, snatch me the mike and I'll sing a few bars:

I'm just a game reviewer
Just slogging through the disks.
It's not the fame and fortune,
It's in the taking risks.
Subsumed by the computer,
I'm in another life.
I may be strange
Or else deranged,
At least so says my wife.

The game's called Infiltrator,
It's billed as arcade fun.
A 'copter simulator
with spying to be done.
I'm Captain Jimbo-Baby,
Ace pilot, doc, and spy.
Despite my wings
And hi-tech things,
I think I'd rather die.

Infiltrator, Infiltrator,
My hands are not frenetic.
Infiltrator, Infiltrator,
You've made me schizophrenic.

Sorry, that's all you get. I don't want to spoil the gig. Cats in bags, know what I mean? Tell you what, to make it up to you, let me tell you about



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DIGITAL VISION

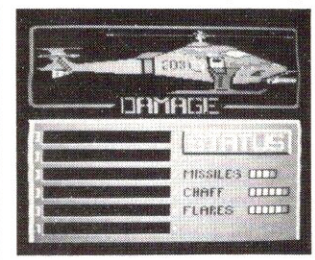
CIRCLE 170 ON READER SERVICE CARD

REVIEWS

my inspiration for the song, an arcade/adventure game called Infiltrator from the folks at Mindscape. There I am, Captain Jimbo-Baby McGibbits, coolest of the cool, a jack-of-all-trades, the absolute epitome of cliché. I talk in slang, I walk in slang, and I do everything except windows. I even have a nifty haircut.

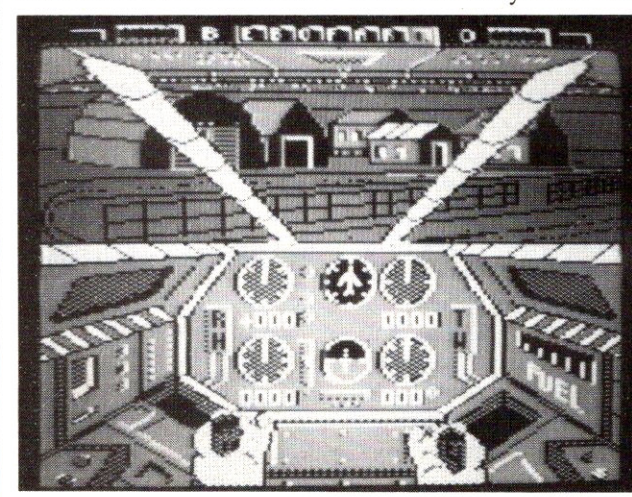
All I have to do is pilot my Whizbang Gizmo DHX-1 Attack Helicopter into the country ruled by The Mad Leader, infiltrate his base three times, and stop his plans to start a war—all under time pressure, of course. No prob—another day, another peso.

Let me tell you, Infiltrator is the dullest flight simulator I've flown, and that includes everything from Piper Cubs to Space Shuttles. With its out-of-cockpit view, I expected some daredevil, seat-of-pants flying under bridges, past trees, and around other obstacles. Somehow, a flat, featureless, static meadow is not my idea of hair-raising fun. If I didn't look at my instruments, I never even knew whether I was flying left, right, or upside down.



Some enemy jets make a few desultory attacks on you, but these are easy to fool or evade. When you compare this game to a MicroProse flight simulator, or even Electronic Arts' Skyfox, you will know the true meaning of disappointment. To be fair, it is called Infiltrator, not Helicopter Fighter, but when you see a helicopter with guns blazing on the cover and an entire side of a disk dedicated to that purpose, you expect to do something other than yawn.

Once you land, you make your way to the base, a series of buildings surrounded by fences and



REVIEWS

patrolled by guards. You have fake papers, a "minesweeper," a camera, and sleeping gas for getting past the guards. The game starts to liven up once you enter the buildings and descend to the subterranean levels. Each level is made up of rooms, some guarded, some not.

Green rooms are elevators, blue rooms are mostly time-wasters, and red rooms are the important areas in this game.

You search room by room, locate what items you need to complete your mission, and go home. If any of the guards give you trouble, gas 'em.

Play action is identical to that of a game called Castle Wolfenstein by Muse Software. Unfortunately, Infiltrator does not have the wonderful speech synthesis of Castle Wolfenstein.

As any good secret agent knows, there are certain tricks to the trade. For example, never gas a guard and wait for him to recover—all it does is set off alarms. Likewise, never gas a guard, leave the room, and come right back into the room. He always seems to wake up just as you pass him, and the touch is fatal. Finally, burn a few Jimbos exploring the base.

The contents of a room never seem to change, so the electronic keys are always in the same room. You get five Jimbos in the game—make the most of them. That is, if you really want Jimbo-baby. He may appeal to slang-slinging eight-year-olds, but to me he's a real wimp.

Infiltrator is a lot like cotton candy—all fluff and not much substance. Given the quality of Mindscape's other products, the disappointment is rather hard to take. I guess it proves everyone makes mistakes. Infiltrator just happens to make two: a dreadfully dull helicopter simulator and an uninspiring subterranean search.

Hey, you blew the game, so you blew the movie rights. It happens. Not to me, but it happens. Luck and time, know what I mean? Mindscape, I love ya, but before you release the next one, have your computer call my computer. We'll do lunch. I'll let you know what will fly. Birds and view, know what I mean? Like the final refrain in my song says:

I wish I'd found excitement,
Too bad it is unfounded.
The spying uninspiring,
The 'copter lay grounded.

So that is Infiltrator,
Once opened up in lust.
Upon my shelf,
Not by itself,
It sits and gathers dust.
R. "Jimbo-Blaster" Lockwood

INFILTRATOR
Mindscape
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
LIST PRICE: *$29.95*
REQUIRES: *Apple II Plus, IIe, or IIc; 64K RAM; joystick optional*
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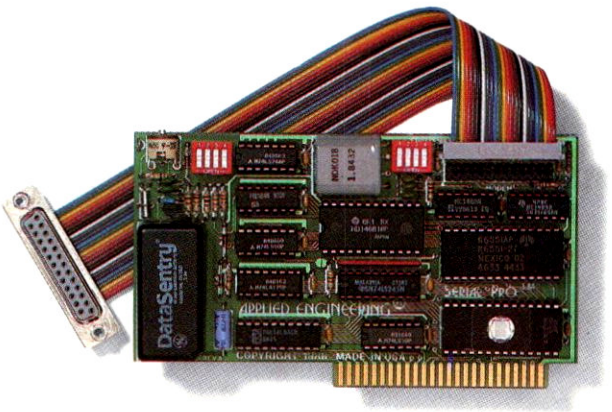

Serial Pro is a powerful multifunction card for the Apple IIe, II+, IIGS and compatible computers. Serial Pro combines a powerful serial port for interfacing to a printer, modem or other serial device, with a full function clock/calendar. Serial Pro's serial port is compatible with virtually all letter quality and dot matrix printers, including Apple's Imagewriter and Imagewriter II, and can communicate with the fastest external modems at baud rates from 50 to 19,200.

Set up is easy, because unlike other cards, there are no switches to program serial parameters or disks to use. Serial Pro has a built-in setup screen that allows all parameters to be set. And on-screen help that makes it super-easy. An on-board battery stores your selections for over 20 years, but you can change them at any time. Serial Pro is the perfect upgrade for Super Serial card owners looking for more performance or a built-in clock.

Serial Port Features • Fully Super Serial Card compatible but more versatile and easier to use • Compatible with printers • Compatible with modems • Prints graphics to printer (without software) in normal mode, 90° rotation, double size, side by side, and black/white inversion • Variable word length, number of stop bits and parity selection • Crystal controlled circuits are used to provide ultra accurate baud rates.

Clock Calendar Features • ProDos, DOS and AppleWorks compatible. Displays time and date on the AppleWorks screen • Automatically time and date stamps AppleWorks files • 20 year auto recharging nickel-cadmium battery • Realtime interrupts • Built-in on screen time and date settings (no software needed) • Does not use phantom slots.

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Serial Pro comes complete with manual, cable and instructions for connecting to all the leading printers and modems.

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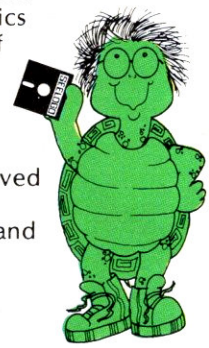

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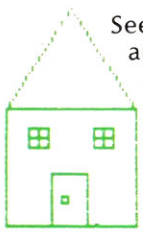

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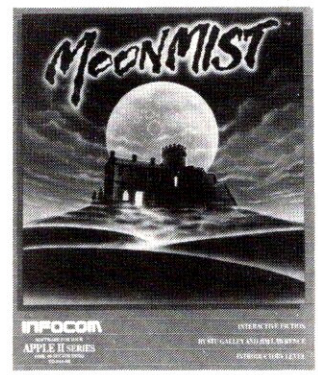
REVIEWS

THE GHOST GOES WEST—OR WAS THAT EAST?

Picture an isolated seaside castle on the fog-shrouded moors in Cornwall, England. Built in 1242, this ancient fortress has withstood the ravages of time and now, after being refurbished over the years, has everything you'd expect to find in such a place: myriad rooms of all shapes and sizes; a library; a wine cellar; a tower; a chapel; and



even its own dungeon, complete with a working iron maiden. And, oh yes, Tresyllian Castle has something else of more than passing interest: a ghost. For the last 600 years, inhabitants of the castle have seen a "White Lady" haunting the tower on moonlit nights. This woeful spirit has always seemed quite harmless, but recently a young American girl, Tamara Lynd, was frightened and had reason to believe that the White Lady was trying to kill her.

No, the preceding is not the plot of the latest Hollywood teen-slasher movie. It is the premise of Moonmist, an all-text interactive-fiction game written by Stu Galley and Jim Lawrence and published by the company that specializes in this genre, Infocom. Moonmist bears a nodding similarity to a Nancy Drew or a Hardy Boys mystery (coauthor Lawrence actually wrote some Nancy Drew mysteries under a pseudonym), but I don't mean to imply that Moonmist is targeted only for young audiences. Rather, Moonmist is a good introduction for gamers of all ages who want to try interactive fiction but aren't yet ready to tackle some of the more advanced games.

Interactive fiction is an immensely popular form of computer entertainment, mainly because when you play this type of game you are not just a passive observer—you assume the lead role in the story. Although you eventually have to follow a predetermined path to the solution, you usually have a satisfying degree of flexibility in shaping the course of events.

Moonmist is a good introduction for gamers of all ages who want to try interactive fiction.

In Moonmist you are a famous American detective who has been summoned to Cornwall by

REVIEWS

your friend Tamara to help solve the mystery of the ghost. When you arrive, you find that the recently deceased lord of the manor, Lionel Tresyllian, has hidden a valuable treasure somewhere on the premises. So your objective in playing Moonmist becomes twofold: to find out who (or what) is haunting the castle and to find the hidden artifact.

Moonmist is a replayable adventure, continuing an idea used in an earlier Infocom game called Cutthroats. You can go through Moonmist four times—each of the four color-coded variations has a different hidden artifact, different clues to help you find it, and a different ghost mystery. In addition, your computer alter ego can be either male or female; the other characters in the castle react to you according to your gender.

When you experience a classic mystery (in book, film, or game form), the solution should come as a surprise, but after you know all the pieces of the puzzle, the outcome should make perfect sense in its context. Based on this criterion, Moonmist is really just the shell of a mystery, because it doesn't develop any of the four variations in enough depth to make the endings completely satisfying. Neither are the variations particularly difficult, which is why this game is especially suitable for novices.

If you are a diehard Infocom fan (as I am), you will want to try Moonmist, but you will also probably be more than a little bothered by the uncharacteristic (for Infocom) waits for disk access after you type your instructions. (The reason for the delay is that before the program can respond to your input, it has to check which variation you are playing and determine what you know up to that point.) On the other hand, if you are new to interactive fiction and are using Moonmist to cut your teeth on, you will not notice the disk access (I promise!), and you will probably find Moonmist a jolly good time. And if you do find yourself searching Tresyllian Castle, don't venture into dark, secret places without a light source. Ghosts can be dangerous if their motivation for haunting is revenge . . .

You are a famous American detective summoned to Cornwall to help solve the mystery.

Donald Oliver

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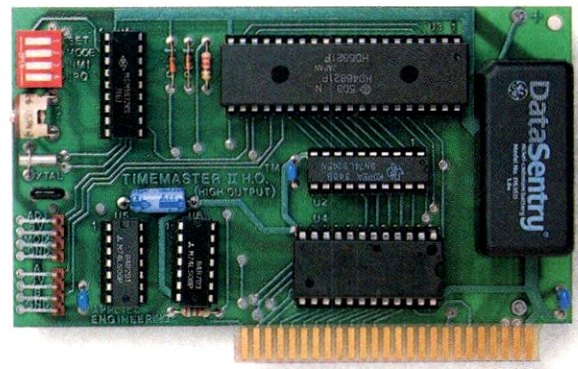

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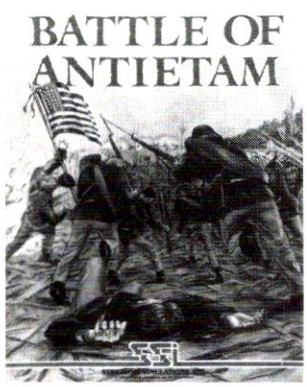
JOHNNY REB VS. BILLY YANK

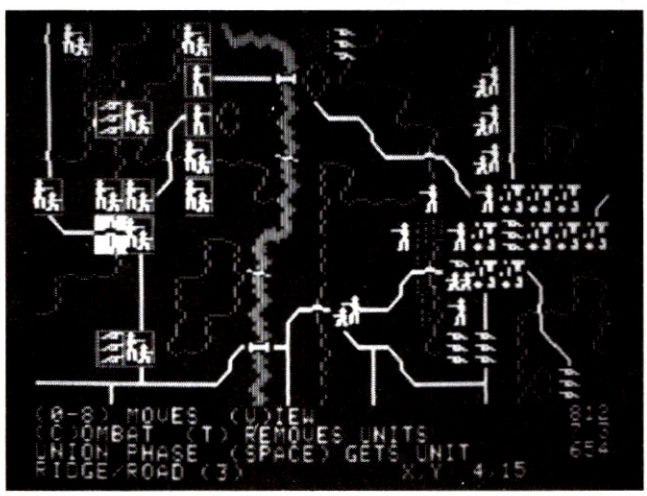
To be honest, I have a love/hate relationship with computer war games. The battles they simulate are interesting, the military concepts they present are sound, and the ability to pit your strategy against an ever-ready opponent is wonderful. They are windows to history and provide an ideal way to project your 20-20 hindsight onto a crucial event in time.

Yet the mechanics of play are often so cumbersome that they detract from the feel of directing troops. Maneuver is no longer what you do on the electronic battlefield but what you do on the keyboard. Efforts to impose a hexagonal grid on the terrain make it even worse. Facile fingers that fly in a word-processing program are reduced to hunt-and-peck in a war game.



Battle of Antietam, a "grand-tactical simulation of the bloodiest day of the Civil War," does not make entering troop movements or firing orders any easier than other war games do, but it is a first-rate war game that, frankly, has me hooked. A large part of the allure has to do with the particular battle.

By a stroke of luck, Confederate General Robert E. Lee's Special Order 191 fell into the hands of Union General George B. McClellan on September 13, 1862. By the 15th, McClellan's 80,000 troops had Lee trapped between Antietam Creek and the Potomac River. Lee, who had sent half his army south to capture Harper's Ferry, opposed McClellan with only 40,000 troops.



Preparations had taken too long for the attack to proceed on the 15th, and heavy ground fog the next day delayed the attack until the 17th. In the meantime, Union Colonel Miles surrendered Harper's Ferry to the Confederates on the 15th.

In short, McClellan's plan to hit Lee's flanks and then punch a hole in the center turned into uncoordinated, piecemeal frontal assaults. Lee used internal lines (and timely reinforcements from the Harper's Ferry contingent) to shift troops to blunt each Union attack. McClellan, fearful of a Confederate attack on his *northern* flank, never committed more than a third of the Union army. The result was a bloody stalemate with more than 22,000 casualties.

Battle of Antietam places you in the boots of either General McClellan or General Lee. You can play against the computer or against another person. The game offers introductory, intermediate, and advanced complexity levels.

Naturally, historical accuracy is important, and each unit, representing roughly half a brigade, uses one of 17 weapon types. Fatigue, morale, and losses all affect the effectiveness of a unit. If the effectiveness drops low enough, a unit is routed and runs away, sometimes never to rally. At the higher complexity levels, the presence or absence of a leader also affects the unit.

Since the Union has 2:1 superiority, letting you use all the troops at once results in a devastating Confederate loss and a rather dull game. Battle of Antietam handles the historical situation of disjointed attacks by "acti-

This Civil War simulation is a first-rate war game with a good historical perspective.

vating" only a certain number of Union units per turn.

The playing area represents a section of Maryland and features 13 different types of terrain, each with its own movement and combat effects. The total area measures 42 × 36 squares, with each square representing 200 yards on a side. Up to one brigade and one artillery battery (three units total) may stack in a square.

Your objective is to inflict casualties on the opponent, suffer minimal casualties yourself, and grab selected squares on the map. You have 11 turns (each turn represents one hour) to achieve your objective.

The game centers on the use of operation points (OPs). Every time a unit performs some action—move, shoot, or become involved in a melee—it expends OPs.

REVIEWS

When a unit runs out of OPs, it may do nothing more. A unit can "save" a couple OPs from one turn to the next and, at the higher complexity levels, add OPs temporarily by increasing fatigue.

I think mastering the use of OPs is the key to victory. The best strategy you can devise will fall apart just like McClellan's plan if you can't figure out how to get the most from your OPs. Diagonal movement costs more (as it should) than vertical or horizontal movement, hence learning how to expend OPs efficiently helps you move further, faster, and with less fatigue than just moving the unit in a straight line. Don't forget to hold back a few OPs so you can fire and engage in melees.

Tactically, you suffer fewer casualties and inflict more casualties with a two-turn, concerted attack than in an all-out charge. In one turn, advance your units until one square lies between your units and the enemy units. Artillery bombards the enemy units, and the one-square gap lets you recover from fatigue faster. The next turn, you will have enough OPs to both fire and enter a melee with the enemy.

Of course, this maxim of combat changes, depending on the situation. Another successful tactic involves placing artillery batteries supported by infantry right next to the enemy. You take heavier casualties, but in the next turn, the artillery (especially "Napoleon" cannons) massacres and routs the enemy troops.

Earlier, I mentioned how play mechanics can interfere with game play. In short, SSI's use of the number keys to move the cursor and units and to select targets is cumbersome. I would rather use a two-button joystick or a mouse to move and fire units, much as in SSI's Panzer Grenadier. I'm not saying the keys should be eliminated, for that is impossible, given the range of options at the higher complexity levels, but how about some provision for alternative input devices?

Personally, I prefer the introductory game. It is fast and furious and conveys the best feel of the battle without loading you down with a lot of excess worries such as keeping divisional commanders within six squares of corps commanders and figuring out unit-facing and travel modes.

All in all, I find Battle of Antietam an outstanding simulation. It offers variable complexity, provides good historical perspective, and involves you in the game. If you are looking for a computer war game, try this one in your disk drive.

Russ Lockwood

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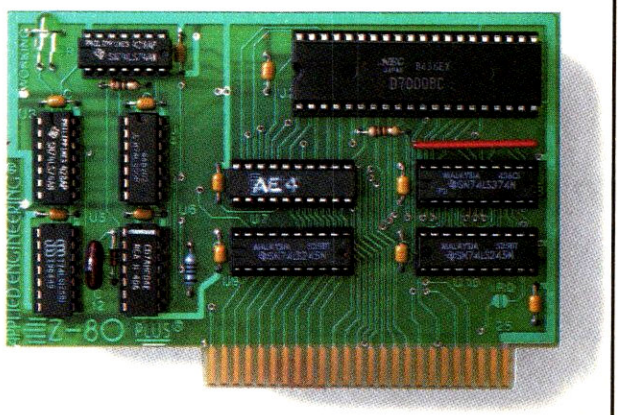

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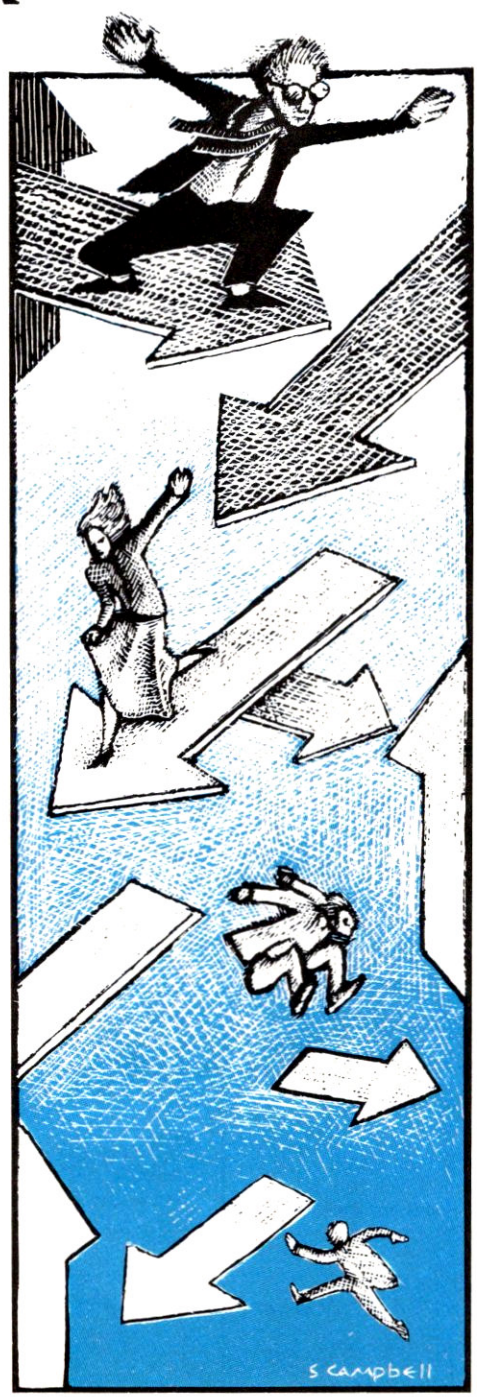
BY MICHAEL WIESENBERG

MULTIDIGITAL MULTIPLICATION MIND-BENDER

Can you devise a program to solve this well-known puzzle?



Mathematical puzzlists like to devise numeric expressions that involve one each of the digits 1 through 9. For example, with each digit represented by a letter, the expression $abc \times de = fg \times hi$ asks what three-digit number multiplied by what two-digit number produces the same product as what two-digit number multiplied by what other two-digit number, with each of the nine digits appearing once only within the expression? Among the several solutions is $158 \times 23 = 79 \times 46$ (both sides of which multiply to 3634). Can you find the others programmatically? The best solution to this one will be the most efficient and the fastest executing (taking into account the language).

Although this puzzle has been published often (notably in Martin Gardner's *Wheels, Life and Other Mathematical Amusements*, W. H. Freeman, 1983), no programmatic solution has appeared in print.

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Answer to March's Puzzle

March's puzzle said that some puzzles seemed like they needed a computer to solve, but didn't, whereas others did, and posed one of each kind. I asked you, first, to find, without a computer, what number, n, had in the digits of its cube (n^3) and fourth power (n^4) all the digits 0 through 9, once each. Second, with a computer, you were to find a six-digit number that, when multiplied by 2, 3, 4, 5, and 6, each time produced a new number composed of the same digits as the original (but in different orders).

Several entrants found a solution to the second problem but gave no answer for the first. The best and fastest solution to the second that also solved the first came from Jeff Blinn, of Ulysses, Kansas.

I seem to have caused some confusion with my first question, because a number of readers insisted no answer was possible. They interpreted the question as requesting two ten-digit numbers, one for the cube and one for the fourth power; they were quite correct in stating that that was not possible. That was not my intent, however; I meant the ten digits to be spread between the two numbers.

You can check all of the following assertions on a pocket calculator. You can quickly observe that the two numbers must have either a

ILLUSTRATION BY STEVE CAMPBELL

five-digit cube and five-digit fourth power, or four-digit cube and six-digit fourth power. The smallest number whose cube has five digits is 22 (10648); its fourth power has six digits (234256). That eliminates five and five, so the solution must be four and six. The smallest number with a six-digit fourth power is 18 (104796). The largest number with a four-digit cube is 21 (9261). The solution, then, must lie between 18 and 21, inclusive. You can eliminate 21 immediately (without calculating), because both its cube and fourth power end in 1; you can also eliminate 20, because both end in 0. That leaves only 18 and 19. Try the smaller number first, and you see that its cube is 5832 and fourth power 104796, which together use one each of the ten digits.

Many who solved the second puzzle used the "brute force" method to find the answer, usually after many minutes, sometimes after several hours. Blinn relied on knowledge of an interesting fact about repeating decimals. (A repeating decimal is one formed from a fraction with some block of digits that keeps repeating, such as 1/3 = 0.3333 . . .). Whatever its periodicity—that is, the number of digits that repeat—any multiple up to that number of digits merely "comes in" at a different point in the cycle.

In general terms, if p is a prime number that is not 2 or 5, there is a least integer r for which $10^r - 1$ is divisible by p. That integer r also divides evenly into $p - 1$, and if it is actually *equal* to $p - 1$, mathematicians say that 10 is a primitive root for the prime p.

When that occurs, you can write:

$$\frac{1}{p} = \frac{a}{10^{p-1}-1} = \frac{a}{99\ldots99}$$

where a is an integer having $p - 1$ digits, and there are $p - 1$ 9s in the denominator. (You may need initial zeros to a to get $p - 1$ digits.)

The decimal expansion of $1/p$ is $0.aaaa\ldots$, with repeating blocks of $p - 1$ digits, and $a, 2a, 3a, \ldots, (p - 1)a$ will *all* have the same digits (if you add initial zeros as needed to get exactly $p - 1$ digits), and these digits will appear in cyclical order.

Knowing this information, by the way, you could have worked out the puzzle without a computer, because you could then have seen that for a to actually have $p - 1$ digits with no initial zeros necessary, p had to be less than 10. You could have seen that only 7 had a repeating block of six or more digits.

Not relying on the preceding method, Blinn searched for six-digit repeating decimals. He assumed that he would find an answer in a fraction with an odd denominator, since even denominators either do not produce a repeating decimal or are half of a fraction with a previously tested odd number. He extracted the digits, using string conversions, and made five new numbers by cycling the digits. If these new numbers were equal to the five multiples, he had a solution.

This program relies on the way Applesoft BASIC represents numbers, namely without a leading space for the sign. In other versions of BASIC you might have to add this statement to get it to work:

```
59 Y$=MID$(Y$,2)
```

Since the program generates a decimal fraction and relies on its being there in the extraction of digits, I added a statement (190) to remove the decimal point.

Following Blinn's program is a run with the answer. ✚

THE MARCH WINNER

```
10 HOME
20 FOR X = 7 TO 31 STEP 2
30 Y = 1 / X
39 REM Keep only 6 digits.
40 Y = INT (Y * 10 ^ 6 + .5) / INT (10 ^ 6 + .5)
50 Y$ = STR$(Y)
51  Y1 = Y * 2
52  Y2 = Y * 3
53  Y3 = Y * 4
54  Y4 = Y * 5
55  Y5=Y*6
60 A$=LEFT$(Y$,1)
61 B$=MID$(Y$,2,1)
62 C$=MID$(Y$,3,1)
63 D$=MID$(Y$,4,1)
70 E$=MID$(Y$,5,1)
71 F$=MID$(Y$,6,1)
72 G$=RIGHT$(Y$,1)
80 H$=A$ + C$ + D$ + E$ + F$ + G$ + B$
81 I$ = A$ + D$ + E$ + F$ + G$ + B$ + C$
90 J$=A$ + E$ + F$ + G$ + B$ + C$ + D$
91 K$ = A$ + F$ + G$ + B$ + C$ + D$ + E$
100 L$ = A$ + G$ + B$ + C$ + D$ + E$ + F$
110 H = VAL(H$)
111  I = VAL(I$)
112  J = VAL(J$)
113  K = VAL(K$)
114  L = VAL(L$)
119 REM Compare digits.
120 IF Y1 = H OR Y1 = I GOTO 150
121 IF Y1 = J OR Y1 =K GOTO 150
122 IF Y1 =L GOTO 150
130 NEXT X
140 PRINT "No number found"
141 END
150 IF Y2 = H OR Y2 = I GOTO 160
151 IF Y2 = J OR Y2 =K GOTO 160
152 IF Y2 <>L GOTO 130
160 IF Y3 = H OR Y3 = I GOTO 170
161 IF Y3 = J OR Y3 =K GOTO 170
162 IF Y3 <>L GOTO 130
170 IF Y4 = H OR Y4 = I GOTO 180
171 IF Y4 = J OR Y4 =K GOTO 180
172 IF Y4 <>L GOTO 130
180 IF Y5 = H OR Y5 = I GOTO 190
181 IF Y5 = J OR Y5 =K GOTO 190
182 IF Y5 <>L GOTO 130
190 Y = Y * 10^6
191 PRINT "The number is:";Y
200 FOR K = 2 TO 6
210 PRINT K;" times the number = ";Y * K
220 NEXT K

 The number is: 142857
    2  times the number =  285714
    3  times the number =  428571
    4  times the number =  571428
    5  times the number =  714285
    6  times the number =  857142
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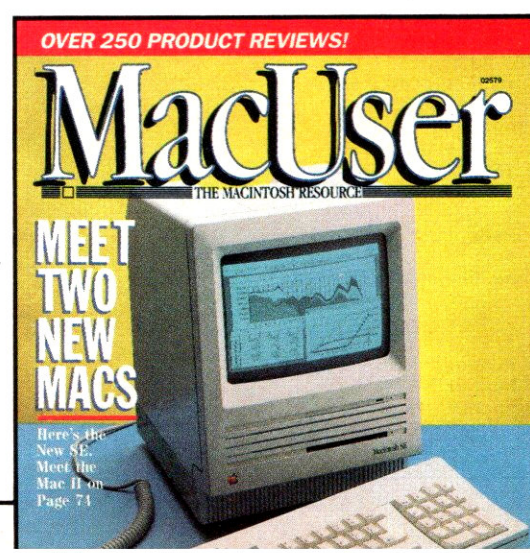

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8Z029

TIPS AND TECHNIQUES

Readers share tips for the II

SCREEN SLIDER

The short machine-language program below lets you slide a line of 40-column text off the screen to the right, accompanied by sound. To use the routine in your own Applesoft BASIC programs, simply include lines 20–50 near the beginning of your program.

Then do a VTAB n (where *n* is in the range from 1 to 24) to select the line you want to slide and CALL A. The address A can be any convenient location with 29 unused contiguous bytes.

The 88 in line 50 controls the speed of the slide. Larger values produce a slower slide, and smaller values produce a faster one. You can experiment to determine the optimum speed.

Lines 60–90 give a simple demonstration of the technique.

Robert C. Moore
Laurel, MD

INPUT TRICKS

As you probably realize if you've done any programming in Applesoft, if you try to enter commas or colons with an INPUT statement, you lose everything after the colon or comma and then get an EXTRA IGNORED message. Several public-domain and commercial programs can get you around this problem, but the easiest way requires no special programming at all.

```
10  A$ = "": PRINT "ENTER CITY,
    STATE, ZIP";
20  CALL  - 657
30  FOR I = 512 TO 767
40  IF  PEEK (I) <  > 141 THEN A$
    = A$ +  CHR$ ( PEEK (I) -
    128): NEXT
50  PRINT A$
```

The actual routine is lines 20 through 40 in the listing above. The additional lines demonstrate how the routine can function in a program. It works on all Apple II-series computers, under both ProDOS and DOS 3.3. You may enter any non-control character, and the left- and right-arrow editing keys work, although you can't use the Delete key.

Vincent D. O'Connor
Minneapolis, MN

CURSOR CHANGER

When I was experimenting with my Apple IIGS (by pressing all the keys and key combinations), I found that when you press Control-6 followed by any character, the cursor becomes the character that you pressed. You can get the normal cursor back by pressing Control-Reset.

Chung H. Shum
Alhambra, CA

KEEPING TRACK OF DISKS

Cut a mailing label into pieces about ½ inch wide and ¾ inch long. Put the name of a disk on it in the middle ¼ inch. Peel off the backing and fold about¼ inch of label back on itself, leaving ¼ inch still sticky. Now place the sticky part on the top edge of the disk. Your disks will have tabs that make them easier to find when they are in your disk drives or in a disk holder.

R. Douglas Briggs
Portland, ME

SCREEN-SLIDER PROGRAM

```
10 PRINT  CHR$ (21): REM   GO TO 40 COLUMN MODE
20 A = 768: REM   MACHINE LANGUAGE ADDRESS = $300
30 FOR I = A TO A + 28: READ D: POKE I,D: NEXT : REM  INSTALL ML
40 DATA 162,40,160,39,136,177,40,200,145,40,136,208,247,169
50 DATA 160,145,40,44,48,192,169,88,32,168,252,202,208,230,96
60 A$ = "ABCDEFGHIJKLMNOPQRSTUVW": REM  FILL SCREEN
70 FOR V = 0 TO 39: PRINT A$;: NEXT : REM    FILL SCREEN
80 FOR V = 1 TO 23: VTAB V: CALL A: NEXT : REM SLIDE LINES
90 GOTO 70: REM  KEEP IT UP!
```

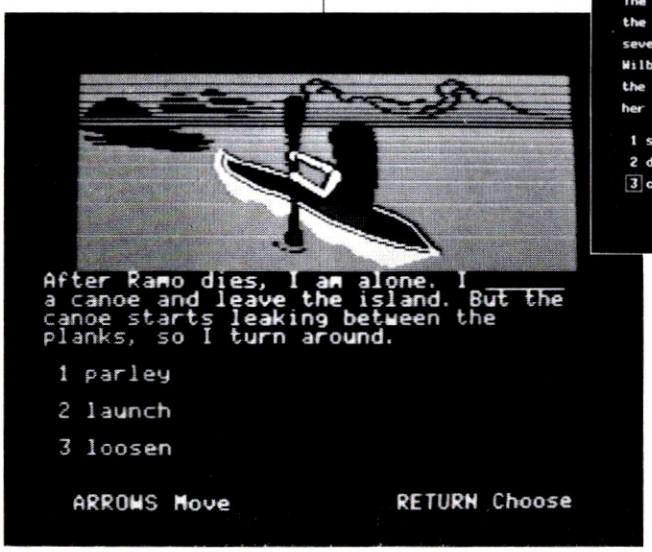
CRAZY SOUND

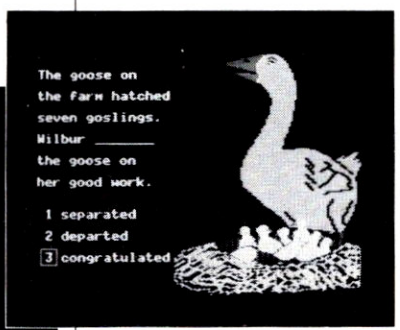
```
1  HOME : FOR D = 1 TO 40: VTAB 2: PRINT ".";: VTAB 22: PRINT ".";: NEXT
: FOR A = 770 TO 788: READ B: POKE A,B: NEXT : VTAB 11: PRINT " PRESS
FIRE BUTTON #0 TO START": WAIT  - 16287,128: CALL 770: DATA
162,,32,30,251,141,48,192,162,1,32,30,251 ,141,48,192,76,,3
```

Jackie Lee
Scarborough, Ontario, Canada

Please send your Apple II tips to A+, 11 Davis Drive, Belmont, CA 94002; ATTN: Tips and Techniques. We will pay $25 for each tip we publish, so be sure to include your name, address, and social security number.

PIPE





Computer versions of Charlotte's Web (above) and Island of the Blue Dolphins (left) from Sunburst Communications

SUNBURST SOFTWARE

Sunburst Communications has released computer versions of three Newbery Award winners—*Charlotte's Web, A Wrinkle in Time,* and *Island of the Blue Dolphins*—for grades 3–6, 4–8, and 5–8, respectively. Each package contains a disk, a backup, a teachers' guide, and a paperback copy of the book. With the programs, students participate in the characters' adventures and at the same time build their vocabulary and comprehension skills.

Each program contains an adventure game with multiple-choice questions. In Charlotte's Web, when players make an incorrect choice, the program displays an explanation of why the answer is wrong. If students chose the wrong word to complete a statement, the program displays the correct word in the statement and gives a definition of the incorrect word. In A Wrinkle in Time and Island of the Blue Dolphins, teachers can change the number of turns allowed to complete adventures. In A Wrinkle in Time, teachers can choose exercises using multiple choice or fill in the blank, with or without hints. Island of the Blue Dolphins also offers a vocabulary exercise based on synonyms and definitions. *(List Price: $59 each)*

Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM

Sunburst Communications, Inc.
39 Washington Avenue
Pleasantville, NY 10570
(800) 431-1934
In NY (800) 221-5912
(914) 769-5030

CIRCLE READER SERVICE NO. **550**

3.5-INCH HEAD-CLEANING DISKETTE KIT

A new head-cleaning diskette kit for use on all 3.5-inch microdiskette drives is available from 3M. Each kit contains two head-cleaning microdiskettes and two half-ounce bottles of disk-drive cleaning solution—enough for 30 cleanings—plus an instruction booklet.

Intended for use with both single- and double-headed drives, the head-cleaning microdiskettes feature a special tab designed for head-access slots in 3.5-inch drives. (3M also manufactures a line of head-cleaning disks for 5¼-inch drives.) *(List Price: $19.95)*

3M
P.O. Box 33600
St. Paul, MN 55133-3600
(612) 733-7297

CIRCLE READER SERVICE NO. **551**

3M's line of head-cleaning diskettes now includes a kit for use on 3.5-inch drives.

L I N E

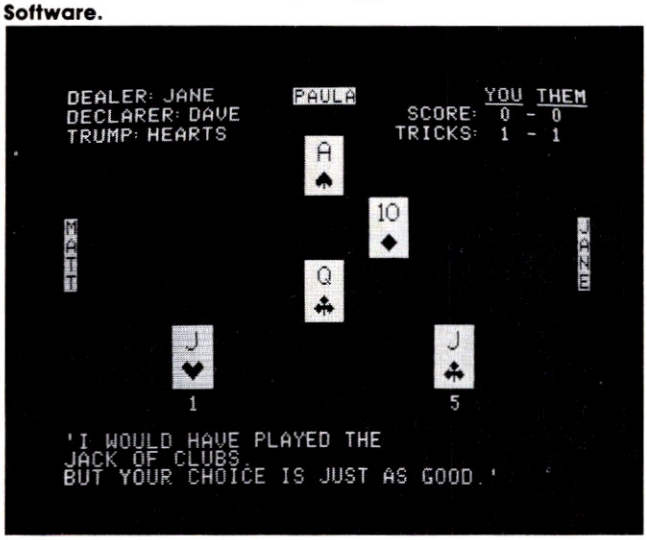
CARD PARTNER EUCHRE

Card Partner Euchre is a computerized version of the centuries-old card game Euchre. Resembling the game Trump, Euchre is played by four people in two partnerships. In this version of the game, the computer plays three of the four hands. The program displays cards in hi-res graphics, along with each team's scores, and provides help in the form of advice from an unbiased (computer) onlooker, replay of each hand, or observation of the computer playing all four hands. *(List Price: $19.95)*

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM
Seven Hills Software
2310 Oxford Road
Tallahassee, FL 32304
(904) 576-9415

CIRCLE READER SERVICE NO. **552**

A computerized version of the centuries-old card game Euchre is now available for your Apple from Seven Hills Software.



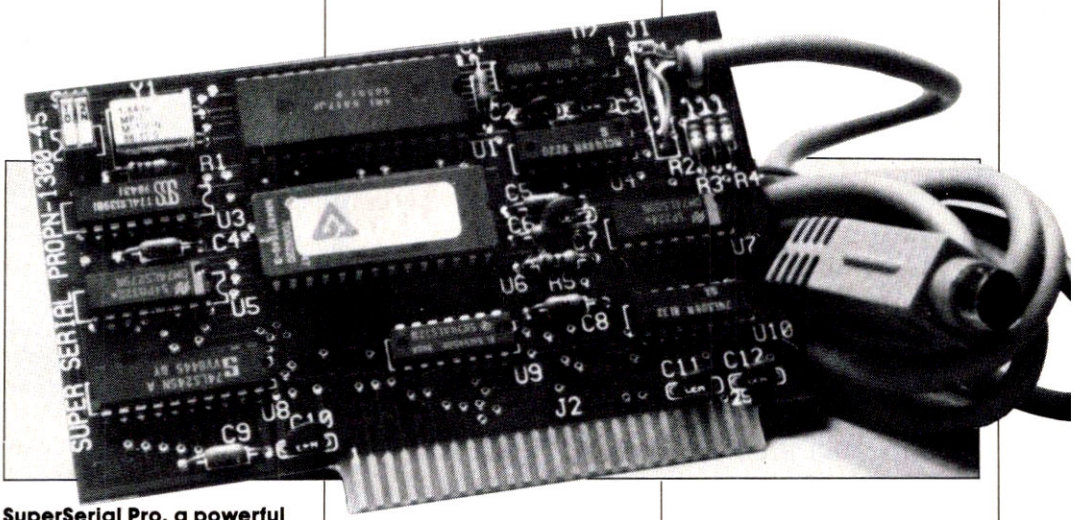
SUPER SERIAL PRO CARD

Super Serial Pro, a powerful and easy-to-use serial-interface card for Apple II computers, is now available from Apricorn. The card is compatible with Apple's Super Serial Card and comes ready to plug into the specialized mini DIN-8 connector on the ImageWriter II and Personal Modem. Users can set all serial parameters with one switch, which is marked PRINTER and MODEM. *(List Price: $79.95)*

Requires: Apple II Plus, IIe, or IIGS
Apricorn
10670 Treena Street
Suite 10
San Diego, CA 92131
(619) 271-4880

CIRCLE READER SERVICE NO. **553**

SuperSerial Pro, a powerful serial-interface card, is now available for the Apple II from Apricorn.



LASER-PRINTER CARTRIDGES

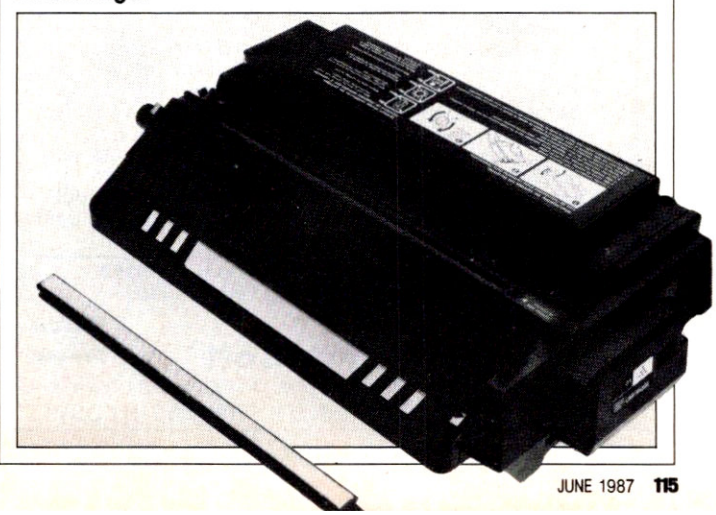
Lasers Edge has introduced a service that provides reconditioned and refilled laser-printer cartridges and purchases spent cartridges for $5 each.

The reconditioned cartridges are filled with Canon toner, tested, and sealed; they also include a refurbished cleaning pad. Cartridges are available for the Apple LaserWriter, Hewlett-Packard 2686, Canon, Wang, QMS Smartwriter, and Cordata laser printers. *(List Price: $55 each)*

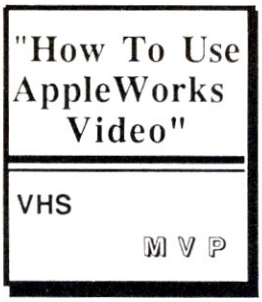
Lasers Edge
392 Salem Street
Wilmington, MA 01887
(617) 658-0178

CIRCLE READER SERVICE NO. **554**

Reconditioned laser-printer cartridges are available from Lasers Edge.



"How To Use AppleWorks Video"



A Training Video tape for VHS or Beta Video Recorders.

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P I P E

HARDWARE

POWER-PAK

Systems Manufacturing Technology (SMT) has announced Power-Pac, a 16-megabyte RAM board for the Apple IIGS. The board provides full battery backup for the computer's RAM, removing the need for users to reload programs into RAM. The Power-Pak features SMT's plug-in SIM Module RAM packs, which means that users can easily upgrade the basic board and need not add daughterboards to upgrade the product. *(List Price: $199; each, one-megabyte upgrade, $99)*

Requires: Apple IIGS

Systems Manufacturing Technology, Inc.
1145 Linda Vista Drive
San Marcos, CA 92069-3820
(619) 744-3590

CIRCLE READER SERVICE NO. **555**

SOFTWARE

SCAT SOFTWARE

SCAT (an acronym for "screen articulator") is a program designed for use with RC Systems' Slot-Buster multifunction card. The program enables visually impaired Apple users to gain access to many unprotected programs through automatic keyboard and oral feedback and built-in screen-review features. The program is easy to use, is compatible with 40- and 80-column screens, works with most popular DOS systems, and includes on-disk documentation. It is compatible with a variety of application programs, and its Echo/Textalker emulation mode works with most programs written for the Echo speech synthesizer. *(List Price: $19.95)*

Requires: Apple II Plus, IIe, or IIGS; Slot-Buster

RC Systems, Inc.
121 W. Winesap Road
Bothell, WA 98012
(206) 672-6909

CIRCLE READER SERVICE NO. **556**

REVISED BATTLE OF WORDS

Gessler Educational Software (GES) has introduced revised editions of its Battle of Words software series for learning French, German, and Spanish vocabulary. Bataille de Mots (French), Wortgefecht (German), and Batalla de Palabras (Spanish) each contain a series of exercises that stimulate users to work at their own pace to improve their language skills. Each of the two-disk programs also includes an arcade-style game in which the player tosses a beret, Hut, or sombrero into a field of four words scrolling at the top of the screen, matching the scrolling word with its correct translation at the bottom of the screen.

The new editions offer a system utility that allows teachers to create and print out material and generate tests. They also offer color graphics and optional sound effects. *(List Price: $49.95 each)*

Requires: Apple IIe or IIc, 64K RAM

Gessler Educational Software
900 Broadway
New York, NY 10003
(212) 673-3113

CIRCLE READER SERVICE NO. **557**

L I N E

CHARTS UNLIMITED

Charts Unlimited integrates graphics and text processing to allow quick and easy creation, editing, and printing of full-page flowcharts and organizational charts. The program provides a set of commonly used flowchart objects, boxes, and geometric shapes and a set of smaller symbols, such as arrows pointing in eight different directions. Users can also create their own objects and maintain libraries of objects on disk. The program's graphic worksheet contains 123 columns and 90 rows. Although only part of the worksheet is visible at one time, the program's View feature lets users shrink the worksheet and display it on the right side of the screen. The software's text-editing features let users enter, insert, and delete characters anywhere on the worksheet. *(List Price: $49.95)*

Requires: Apple II Plus, IIe, or IIc; 64K RAM; DOS 3.2

Graphware, Inc.
P.O. Box 373
Middletown, OH 45042
(513) 424-6733

CIRCLE READER SERVICE NO. **567**

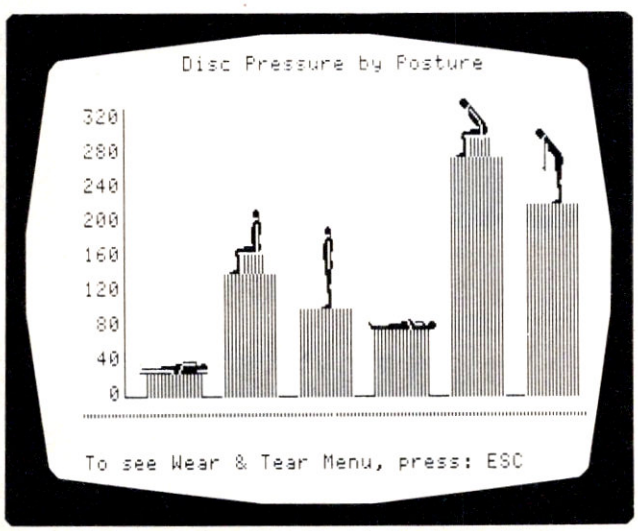
BACKAID SOFTWARE

Designed to promote self-help through education, self-awareness, exercise, and relaxation, Backaid Software helps to identify the probable causes of specific back pain and provides helpful solutions to many back problems. Interactive and easy to use, the program is the first release in Brain-Bank's Be Better Series. The program is not intended to diagnose or to supplement professional medical treatment but rather to illustrate and explain the common types of back pain. *(List Price: $99)*

Requires: Apple II Plus, IIe, IIc, or IIGS; 48K RAM

BrainBank
220 Fifth Avenue
Suite 1201
New York, NY 10001
(212) 686-6565

CIRCLE READER SERVICE NO. **558**



Backaid Software from BrainBank helps to identify the probable causes of specific back pain.

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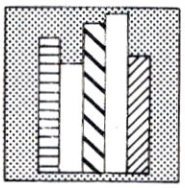

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Visualizer IIGS

Req. Apple IIGS w/ 512K & 3½" drive. AppleWorks optional.

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PIPELINE

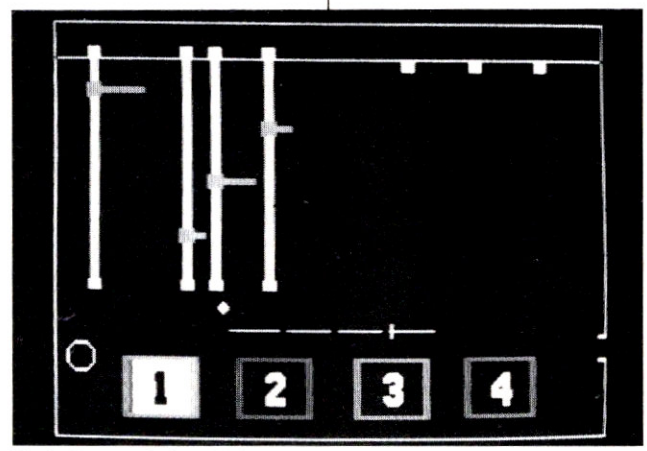
MUSICSHAPES

MusicShapes lets children create their own compositions by moving colorful graphics on-screen and hear their music played on a Casio CZ synthesizer as they do so. Users shape melodic, rhythmic, and sound patterns and then manipulate these "music blocks" to build complex structures. The program lets them see the effect that changing one musical quality, such as sound or rhythm, has on another. *(List Price: $175)*

Requires: Apple II Plus, IIe, or IIGS; 64K RAM; Casio CZ synthesizer, Passport-compatible MIDI card; joystick; color monitor recommended

Music Systems for Learning, Inc.
311 E. 38th Street
Suite 20C
New York, NY 10016
(212) 661-6096

CIRCLE READER SERVICE NO. **560**



MusicShapes lets children create their own compositions.

MENUS & WINDOWS

Of interest to program developers as well as Pascal teachers and students, Menus & Windows lets users quickly add pull-down menus and pop-up windows to their Apple II programs. Written in Apple Pascal and 6502 assembly language, the toolkit uses the concept of precompiled library units to add new commands to Pascal. Programmers simply specify one of several units in their programs to add menus and windows. The package includes two double-sided diskettes; many examples; all source code for every program module; and an illustrated 100-page manual with instructions, examples, and details of all routines. *(List Price: $39.95)*

Requires: Apple IIe, IIc, or IIGS; 128K RAM; Apple Pascal 1.2 or 1.3

Swan Software
P.O. Box 206
Lititz, PA 17543
(717) 627-1911

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AWARDWARE

AwardWare lets users quickly and easily design and print customized certificates, awards, announcements, stationery, and memos, as well as upbeat checks, coupons, and tickets. The program provides a large selection of graphics, fonts, and borders with which users can personalize each printout. With the program's special Create an Award Disk option, users can design an award and copy it to another disk to send to a friend. The program comes on two disks and works with a variety of dot-matrix printers. *(List Price: $14.95)*

Requires: Apple II Plus, IIe, IIc, or IIGS

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Simply tell us about innovative, creative, and successful methods you have used to teach with computers. Entries must be 500 words or less, typewritten and double-spaced. Please include the category, **Classroom Users** *(one person teaching a group of people)* or **Home/Personal Users** *(one person teaching one other person)*. Make sure your entry has your name, address and telephone number.

SEE ADDITIONAL RULES AND REQUIREMENTS ON PAGE 120.

Send your entries to:

Classroom Users:
A+ CLASSROOM TECHNIQUES
"HOW I USE A II TO TEACH"
11 DAVIS DRIVE
BELMONT, CA 94002

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Enter The A+ First Annual

"HOW I USE THE II TO TEACH" CONTEST

CONTEST RULES

See page 119 for further details No Purchase Necessary

1. All entries must be 500 words or less, typed and double-spaced. Multiple entries, mailed in separate envelopes, will be accepted. Include your name, address and daytime/evening telephone number on each entry. Entries become the sole property of *A+* Magazine. Mail completed entries to the category you are entering:

Classroom Users:
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"HOW I USE A II TO TEACH"
11 DAVIS DRIVE
BELMONT, CA 94002

Home/Personal Users:
A+ HOME TECHNIQUES
"HOW I USE A II TO TEACH"
11 DAVIS DRIVE
BELMONT, CA 94002

Entries that do not fulfill the above requirements will be disqualified.

2. Contest begins May 15, 1987, and is promoted and advertised in *A+* Magazine and related publications. All entries must be postmarked by August 15, 1987, and received no later than August 21, 1987. All decisions will be made by September 15, 1987, and winners will be announced beginning with the November 1987 issue of *A+* Magazine.

3. There will be a total of 52 prizes awarded as follows:

A. One Grand Prize for the Classroom User category and one Grand Prize for the Home/Personal User category. Grand Prize is an Apple IIGS system complete with AST-VisionPlus Digitizer, Applied Engineering 512K GS Memory Board, MDIdeas SuperSonic Stereo Card and a KroyKolor printer/photocopier enhancer. Approximate retail value is $4389.95 per system.

B. Twenty-five First Prizes for Classroom User category and 25 First Prizes for Home/Personal User category. First Prize is a choice of educational software selected by the editors of *A+* Magazine. Approximate retail value of $39 to $100 each. No substitutions for prizes. Prizes are not transferable. Taxes are the responsibility of the winners. All manufacturer's claims or warranties will apply. *A+* Magazine makes no claims or warranties for any prizes. Winners may be required to execute an affidavit of eligibility and release. *A+* Magazine has the right to reproduce the name, address and likeness of winners in future promotions. *A+* Magazine shall have all publication rights in all entries.

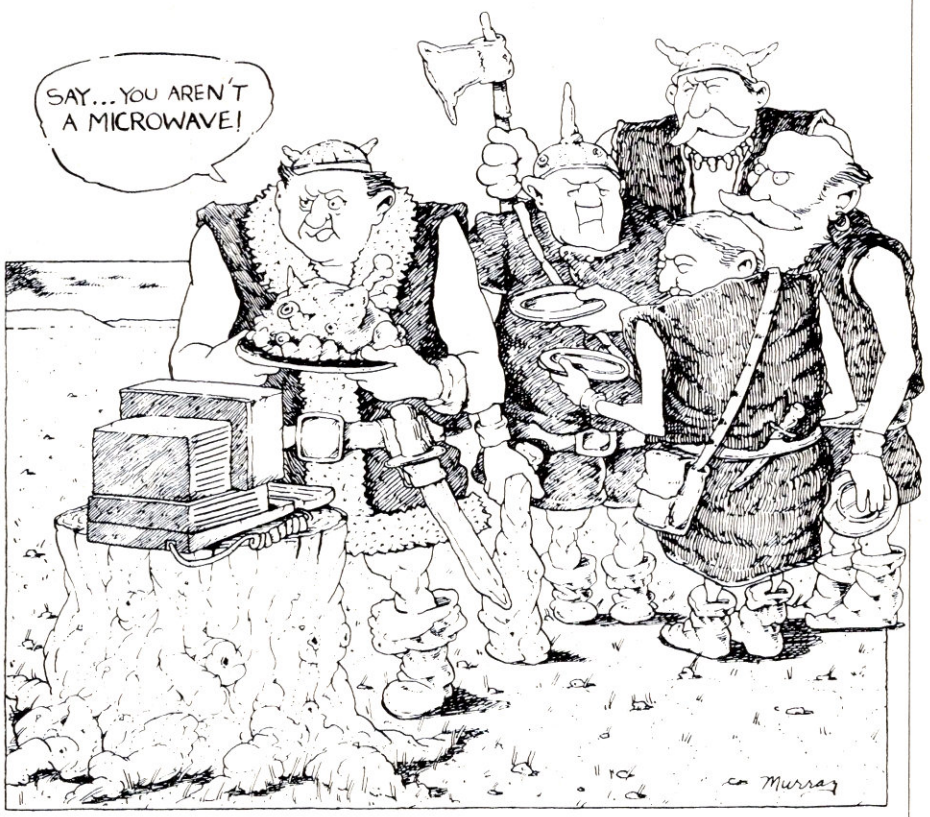
4. Winners will be selected by a panel of judges, selected by the publishers, from all submissions that meet entry requirements. Decisions will be based equally upon content, originality, practicality, and results of educational applications described. Decisions of the judges will be final.

5. The *A+* "How I Use The II To Teach" Contest is open to all individuals of at least 18 years of age who are residents of the U.S., its territories and possessions, with the exception of employees (and their families) of Ziff-Davis Publishing Company and its properties, and their advertising and promotion agencies. Void wherever restricted or prohibited by law.

6. For winners list, send a stamped, self-addressed envelope to: *A+* Magazine, "How I Use The II To Teach" Contest, 11 Davis Drive, Belmont, CA 94002. Refer to the November and December 1987, and the January 1988, issues of *A+* Magazine for winners' names and reprints of winning entries.

Rescue Squad

BY GARY B. LITTLE



65816 CARDS AND SOFTWARE FOR THE IIGS

Q. *For months we've been reading advertisements for 65816 cards for the Apple IIe and IIc made by Checkmate Technology and Applied Engineering. Will we be able to run new IIGS software if we buy one of these cards?*

A.L. Marsh, Lee G. Cohen
Plymouth, CA; Englewood, CO

A. The answer is an unqualified "No!" Although these cards use the same processor as the IIGS, the IIGS has a unique hardware/ROM configuration that you can never add to the IIe or IIc. The new GS-specific applications are intimately tied to this configuration and thus cannot work on any other 65816 system. In other words, you won't get features such as super-hi-res graphics and Ensoniq sound just by adding a 65816 to the IIe.

As far as I'm concerned, only programmers interested in learning how to program in 65816 assembly language should buy 65816 cards. In fact, it was primarily programmers who were buying them prior to the release of the IIGS; they anticipated that the new Apple II would use the 65816 and wanted to become familiar with the new language quickly. Now that the IIGS is readily available, serious Apple programmers will buy it instead of a 65816 option for the IIe.

ASSEMBLY-LANGUAGE RANDOM-NUMBER GENERATION

Q. *I need an assembly-language random-number-generation program. Can you help me?*

Lionel H. Layton
Brigham City, UT

A. With the aid of the Fastfind magazine-index program (Fastfind Company, 28503 Coveridge Drive, Rancho Palos Verdes, CA 92074), I easily located an article containing such a program. It appeared in the January 1983 issue of *Call-A.P.P.L.E.* and is entitled "RND Is Fatally Flawed." As you might guess, the article also describes a bug in the Applesoft random-number generator. Contact A.P.P.L.E. at 290 S.W. 43rd Street, Renton, WA 98055 for back issues of *Call-A.P.P.L.E.*

PRINTING SPECIAL GRAPHIC CHARACTERS

Q. *I use an Epson LX-80 printer with a Grappler+ interface on my IIe. The printer has special graphic characters with codes from 128 to 159, but I can't print them with an Applesoft PRINT CHR$(xx) command. What am I doing wrong?*

Yvan Caya
Montreal, Quebec, Canada

A. The Grappler+, like almost every other printer interface card, turns off the eighth bit of any character code you send to it before it relays the code to the printer. That's because it assumes you want to send ASCII codes to the printer, and ASCII codes don't use the eighth bit. Since the eighth bit has a decimal value of 128, the printer-interface card converts the codes from 128 to 150 to codes from 0 to 31, which are ASCII control characters and not graphic characters.

The soluton to your problem is to send a command to the Grappler+ to tell it to stop messing with the eighth bit; then send the graphics characters. The command to use is Control-I H. You can return to the default mode with the Control-I X command. For example, to print the symbol for code 129 on the printer, use the following sequence of commands inside an Applesoft program:

```
200 PRINT CHR$(9): "H"
300 PRINT CHR$(129) : REM Graphics
400 PRINT CHR$(9): "X"
```

In order for this technique to work, switch 1 on the Grappler+ must be off, which is its factory setting.

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002. Because of limited space we aren't able to publish responses to all inquiries we receive.

ILLUSTRATION BY TOM MURRAY

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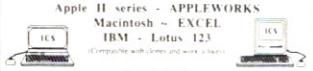

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Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 6 months.

	(1.) Own	(2.) Plan to Buy
Apple II GS	A	H
Apple IIc	B	I
Apple IIe	C	J
Apple II+	D	K
Apple II	E	L
Other (specify)	F	M
None	G	N

Please indicate which of the following peripherals you plan to buy in the next 6 months.

	(3.) Plan to Buy 1-3 Months	(4.) Plan to Buy 4-6 Months
Printer	T	Z
Modem	U	1
Disk Drive—Hard	V	2
Disk Drive—Floppy	W	3
Monitor—Black & White	X	4
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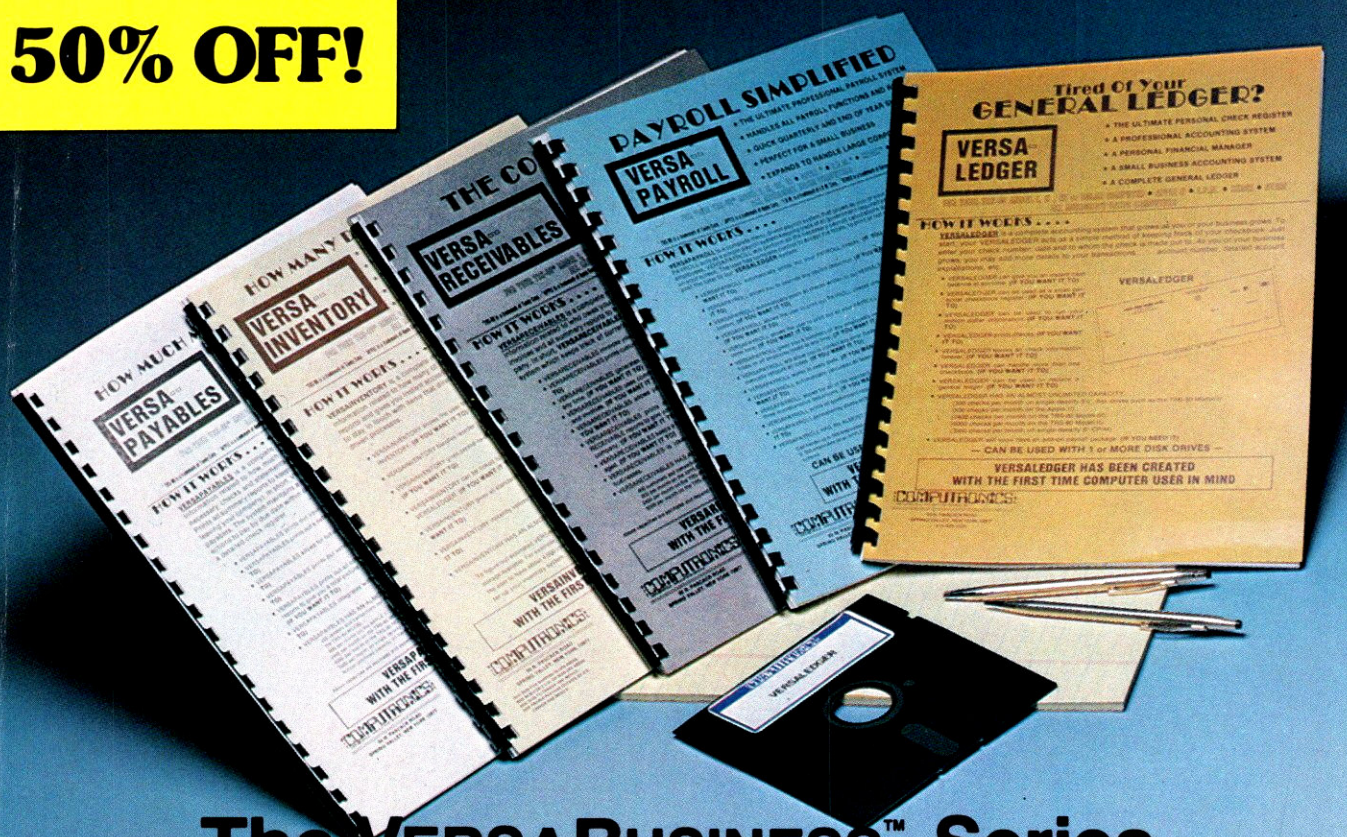

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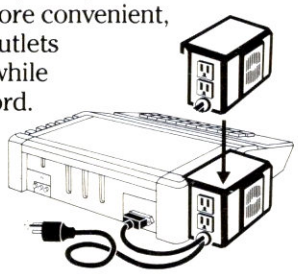

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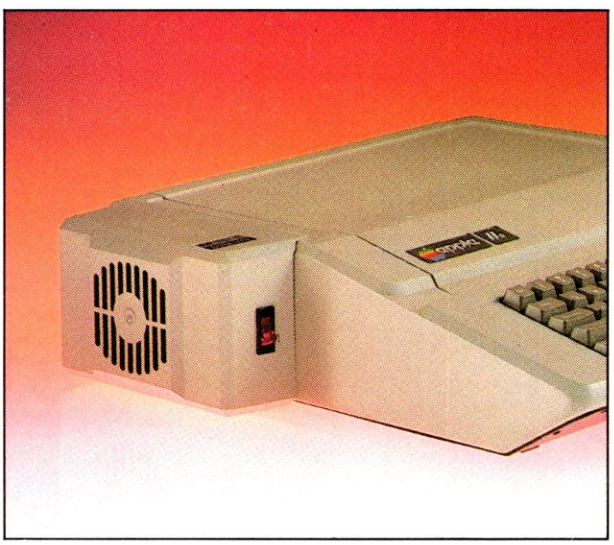

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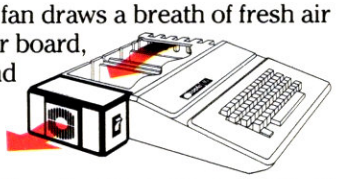

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