THE APPLE II MAGAZINE

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pg. 62

inCider

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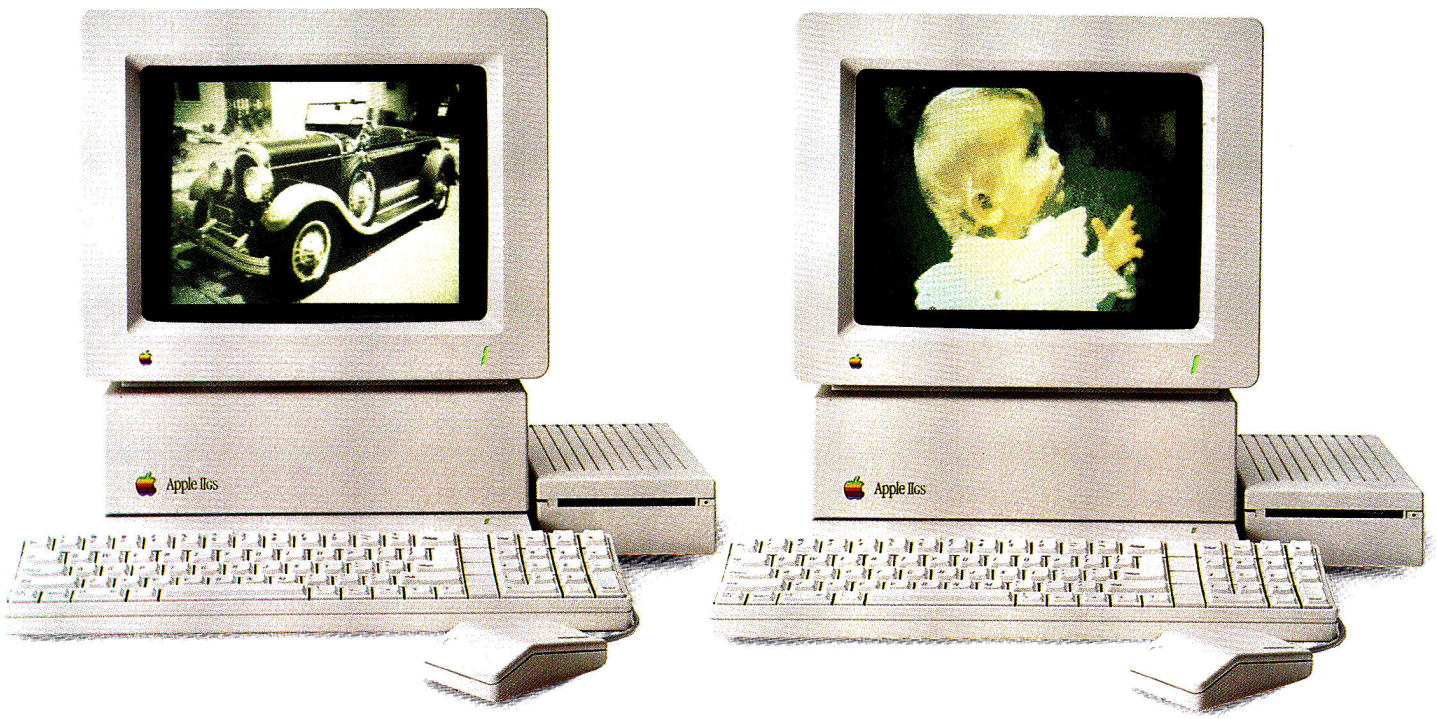

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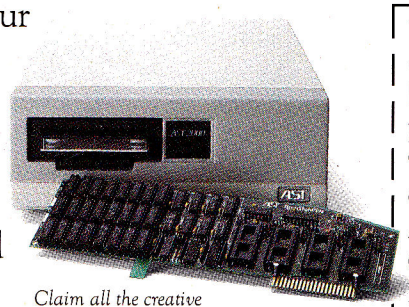

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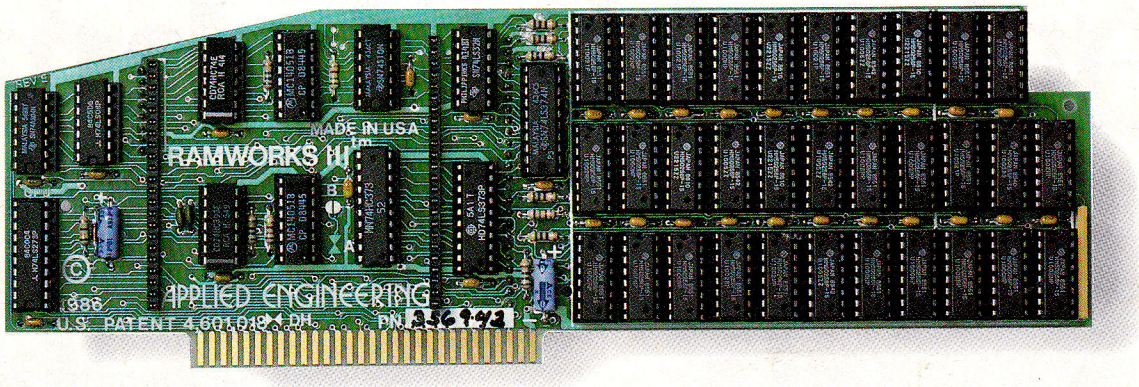

With battery backed RAM port, RGB port, increased memory capacity, full software compatibility and more compact design, RamWorks III is a generation ahead.

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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.

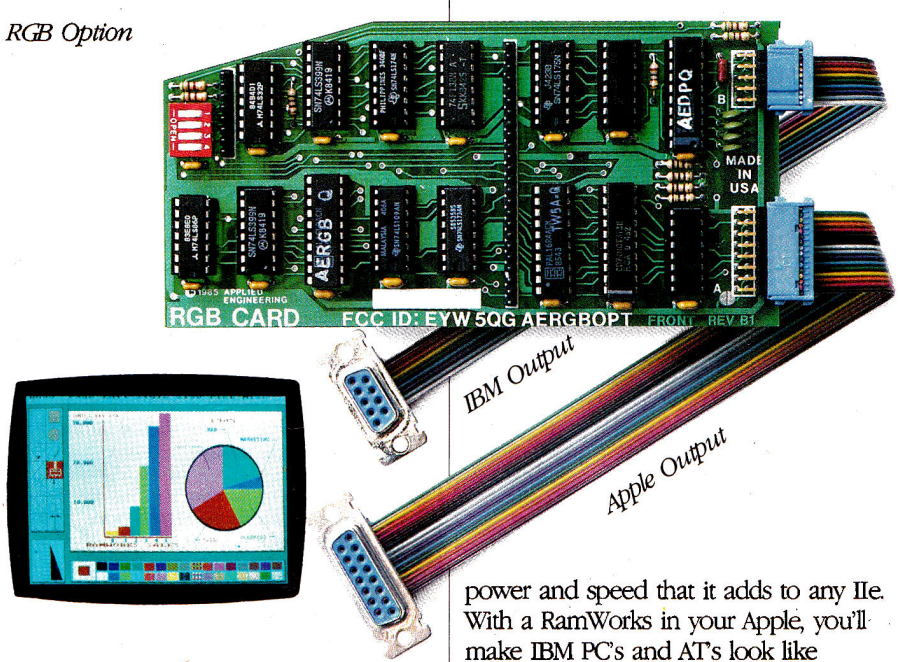
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

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



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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.

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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.

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- Takes only one slot (auxiliary) even when fully expanded
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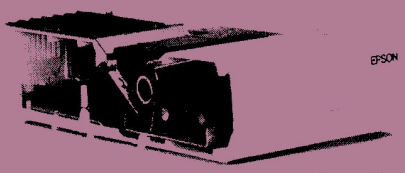

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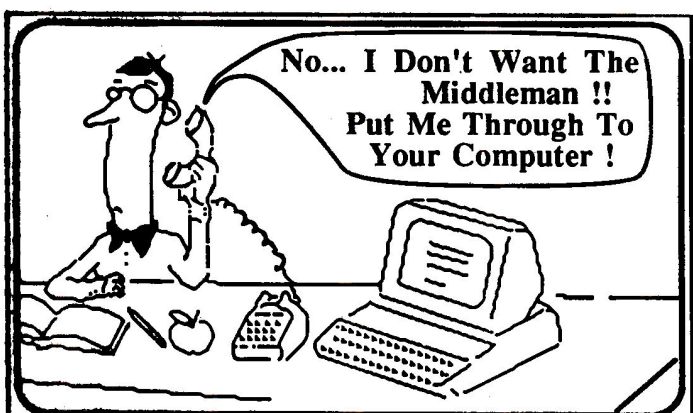

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Problems Spell Opportunity

by Deborah de Peyster, Editor in Chief



"Some of the best Apple II products today exist because they solved big problems."

We have a slogan around our offices that's most often offered in jest, but in which more than a grain of truth lies: In every problem lies the seed of an opportunity.

When Technical Editor Paul Statt blew up our GS after installing an early prototype of a stereo card, more than one voice was heard to yell, "Don't worry, Paul, there's got to be an opportunity in there somewhere."

After the smoke cleared, literally, from both the GS and Paul, opportunities did appear. We talked to Apple and learned that compared to a IIe, boards go into the GS backward—we're warning you now, be careful. We also talked to the manufacturer of the prototype. He's reviewing the design and documentation to make sure the same thing doesn't happen to you. And, finally, we made a good technical contact at Apple.

The Apple II market is full of great examples. Some of the best products today exist because they solved big problems. Look at the way Software Arts solved the problem of recalculating figures quickly so that financial types could ask "what if" easily. It developed the electronic spreadsheet called VisiCalc, which not only addressed those financial problems, but gave the microcomputer a reason for being and launched the industry.

Then there was the difficulty of producing newsletters, fliers, and bulletins quickly and economically. Schools, clubs, and businesses were spending tons of money and time in typesetting, offset presses, and mimeograph equipment, and still didn't come up with what they wanted. It was a big problem. But Springboard saw it as an opportunity and introduced The Newsroom to help design fliers and newsletters fast and efficiently. Broderbund solved the problem of making banners with The Print Shop. And when Aldus introduced PageMaker, a sophisticated publishing system for the Macintosh, not only did it save that machine, but it also initiated the concept of desktop publishing.

In fact, clever developers seek out problems to fix. Robert Lissner, author of AppleWorks, attended the recent MECC conference in Minneapolis specifically to hear about problems people have with AppleWorks and to listen to their suggestions. People said they needed a larger clipboard, sideways printing functions, macros, more fonts, and graphics, among other things. Lissner paid close attention. And out of those problems we'll see the opportunities he and Apple will choose to pursue.

Of course, as with every slogan, you can take it too far. We certainly wouldn't have expected General Custer at Little Big Horn to declare, "My goodness, what an opportunity!" But as problems pop up in your day-to-day routine, it pays sometimes to stop and think about them a little differently. Look for the opportunity, and perhaps you'll discover the potential for success.■

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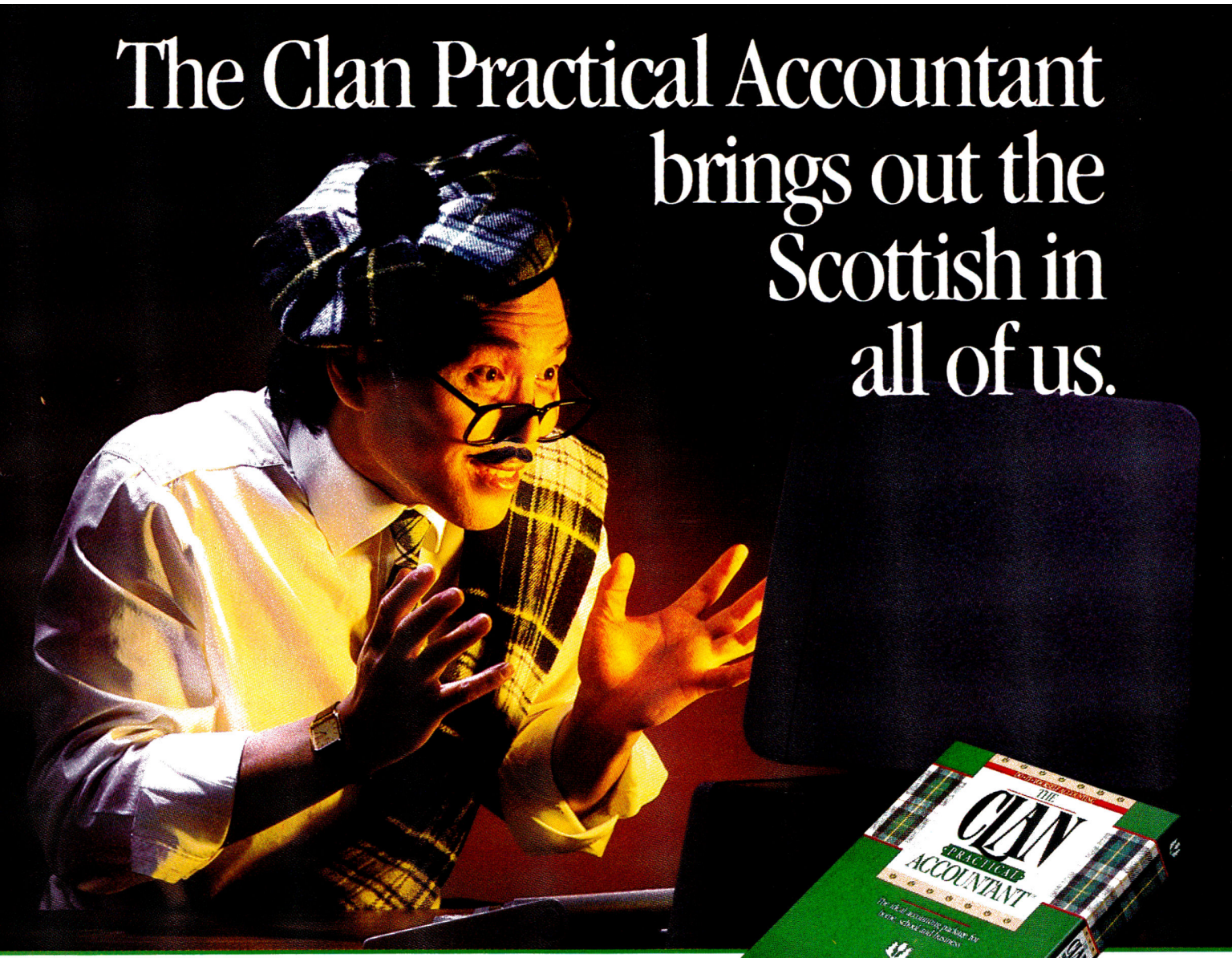

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LETTERS

Data Strips

For several months now, you've been advertising the Cauzin Softstrip System, and, as far as I can tell, you haven't published any Softstrips in *inCider* since your June 1986 issue. At times I've spent days typing programs from your magazine into my computer, then days debugging them to see what they can do and if I can really use them. Quite often, I end up filing the program at the back of my disk library, never to be used again.

Now to my point—I teach Math and Computers at a nearby school during the day, adult-education computer classes four nights a week, and in between I work in 30 hours toward a Master of Education in computer science. Last spring, I purchased a Cauzin reader and all the associated "bells and whistles" to save time.

Is there any chance you'll be putting Softstrips into your magazine to go along with program listings? I'm sure my situation isn't unique, and many other *inCider* subscribers would welcome those strips.

Raymond W. Day
3473 Sodom Road
Hamersville, OH 45130

Check out our Hints/Techniques section in the February 1986 inCider, *along with "The Automatic Dialer" in the same issue (p. 121).*

At press time, we planned to continue offering data strips with Hints/Techniques and any free listings published in inCider. *Readers who don't have data-strip hardware shouldn't worry, though—we'll still print our program listings as always.* —*eds.*

Dogs of War

In your article "Experts' Choice" in the December 1986 issue (p. 51), Paul Statt condemns the war simulations Nam and Conflict in Vietnam as "dogs of '86" on the grounds that "I just don't care for war games. Nobody's death is a game."

Such admirable sentiments don't justify classifying these programs as "dogs." Military simulations have a 150-year-old history. There are hundreds available as board games and computer games, and hobbyists number in the thousands. Military history is one of my interests, and I've found many of these simulations to be invaluable tools in improving my comprehension of the topic.

If Mr. Statt objects to all war games, he shouldn't review them. His blanket condemnation of an entire product category provided no useful information and was therefore of no value to potential buyers. The article in question was supposed to provide an overview of the best programs of 1986. On the subject of military simulations, it didn't do so.

Kenneth J. Cohen
278 Hidden Trail
Willowdale, Ontario
Canada M2R 3R8

Breaking Almost Even

I found an error in formula 1 of the break-even-analysis spreadsheet featured in the December 1986 AppleWorks in Action (p. 94). Formulas 1, 2, and 7 depend on each other for data, thus producing the error. Formula 1 depends on the calculation of formula 7 to produce "sales needed." Formula 7 requires data from formula 2 to produce the proper percentage. Formula 2 needs the answer from formula 1 to calculate "variable costs."

If formula 1 isn't solved first, the remaining formulas won't calculate. All you receive is an error message. To fix this problem, change formula 1 from (B19/(1 – C8)) + (B3/(1 – C8)) to (B19/(1 – (B4/100))) + (B3/(1 – (B4/100))), to let AppleWorks properly calculate the values for the remaining formulas.

Richard G. Bush
3811 Syracuse
Dearborn, MI 48124

MousePaint Graphing

I've found a way to use Flexigraph (March 1986, p. 52) to produce clean graphs with MousePaint.

First put Flexigraph into memory with ProDOS also in RAM. The changes listed below make Flexigraph produce black on white (instead of white on black) and a continuous line (instead of dots), and also give you the option of saving the graph to a ProDOS disk for use with MousePaint.

When Flexigraph graphs your function, you'll find extra lines on screen that aren't part of the graph. You can erase them with MousePaint: Simply add scale markers with MousePaint, clean up the graph (removing the bumps in the curves), and print.

I hope you will find the following modifications useful:

```
150 HGR : POKE 49234,0 : HCOLOR =
    3: HPLOT 1,1: CALL 62454
160 HCOLOR = 0
240 IF Y => 0 AND Y =< 191 THEN
    HPLOT TO X,Y
10000 TEXT : HOME : PRINT "DO YOU
      WISH TO SAVE HI-RES SCREEN
      FOR MOUSEPAINT ENHANCE-
      MENT?": GET QQ8$: IF QQ8$ =
      "N" OR QQ8$ = "n" OR QQ8$
      = "NO" OR QQ8$ = "no" THEN
      RETURN
10010 INPUT "WHAT IS THE FILE-
      NAME?";PQ$ 10020 PRINT CHR$
      (4);"BSAVE";PQ$;",A$2000,L$1FF8"
```

Note: QQ8$ is just a variable name—you can change it to whatever you like.

Howard Link
6 Box Place
Hauppauge, NY 11788

Printer Praise

I strongly disagree with your reviewer's criticism of the Panasonic KX-1080AP printer (December 1986, p. 39). I've had substantial experience with an ImageWriter I, and now I use the 1080AP exclusively.

The tear-bar comments were amusing. The "correct" method for loading fanfold paper is to set the perforations immediately behind the printhead, and, naturally, the tear bar would tear

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LETTERS

the paper at the wrong location. With word-processing software, an "incorrect" setting can be accommodated, but not with graphics software (such as The Print Shop). I've simply convinced myself to willingly waste one sheet of paper each time I turn off the printer. Of course, the ImageWriter was no different.

I did observe an apparent problem with some software. In tracking it down, I learned that the Panasonic printer manual isn't entirely accurate when your printer is connected to an Apple IIc. Switch 5 (the printer DIP switch in the front) should be permanently set to seven bits. All other switches (front and rear) should be in position when shipped.

Except for that one time, I've never had to touch the DIP switches (not even the NLQ). I do everything by setting the appropriate printer control codes in my software.

Granted, I don't have font-downloading capability, but I can do without it (especially at the price saving). Besides, the Panasonic's print quality appears to be better than the ImageWriter's.

George M. Dick
7 Cambridge Court
Mount Holly, NJ 08060

The Right Touch

I must disagree with your evaluation of AutoWorks' documentation and support in the November 1986 issue (p. 40). If all software companies supported their products the way The Software Touch does, there would be fewer complaints and fewer software companies in financial trouble. I've bought several programs from this company, and its response to inquiries is fantastic. You write a letter on Monday, and by Friday you have your answer—and a corrected disk if that's the problem. The Software Touch deserves the highest rating for support.

I also think AutoWorks' documentation is better than "above average." It's clear and easy to follow, it lists examples, and it covers all you need to know.

Don Prohaska
7711 Bay Avenue
California City, CA 93505

Through some fluke, I bought both AutoWorks and MacroWorks a few months ago, and I've had time to thoroughly test both. AutoWorks is the clear winner for macros, mousing, and mail merge. The file librarian is diabolically clever and faster than blazes. The whole package is more deserving than your somewhat dowdy, uncommitted review (November 1986, p. 40) indicates.

I'm writing because I notice that your columns reflexively favor MacroWorks, the Beagle Bros product. AutoWorks should at least get equal time. Those cute and rascally Beagle Bros write great software, bu AutoWorks is the more elegantly cor ceived macro enhancement.

Dan Sadowsky
101 Midland Park A-10
Aspen, CO 81611

Applied Satisfaction

I purchased my Apple II computer almost four years ago. Through the years, I've acquired software, printers, and most of the internal boards available for the Apple II. I ordered most of these items through the mail.

I'd like to comment on one of these companies. I recently ordered a RamFactor board from Applied Engineering. Applied Engineering knows what it takes to build a loyal customer base—excellent products, superb technical assistance, prompt shipping, and friendly personnel who can answer absurd questions from users like myself. Four days after placing my order, my new board was installed and working perfectly. Applied Engineering is a model for others to follow.

Emery Moren
2019 Walker Avenue
Greensboro, NC 27403

Questionable Costs

Recently, I called five 800 numbers listed in *inCider* ads to inquire about software, and not one dealer would sell at the advertised price. One dealer, whose ad promised to beat any advertised price in *inCider* by $1, wouldn't sell at his own advertised price. Another dealer's ad promised absolutely no additional charges for freight or credit-card sales. Unfortunately, his software sells for about $6 more than advertised. When questioned about differences in price, dealers use the excuse that prices and availability are subject to change.

Promised delivery times and customer inquiries are another matter. In-

stead of apologizing for questionable mail-order practices, *inCider* should take the initiative and bring shoddy operators into line. *inCider*'s editors don't have to become consumer crusaders to do this. You're obviously aware of the problem, as indicated in your editorial ("Risky Business," November 1986, p. 6). Some monitoring of reader complaints should provide you with all the necessary information. Just refuse to accept ads from abusive mail-order firms for one month and watch their practices change. When their phones stop ringing, they'll improve their attitude toward customers.

As you pointed out in your editorial, there's a place for mail-order buying for many computer users. *inCider* should urge its readers not to take abuse from mail-order firms, teach them how to fight back, and urge them to become familiar with their mail-order rights under the law. Credit-card companies and the Better Business Bureau can also be very helpful in this matter.

Michael A. Paxinos
705 Isabella Road
Connellsville, PA 15425

inCider welcomes readers' comments regarding articles, letters, or other topics of interest. We reserve the right to edit letters for clarity, style, and space. Please address your correspondence to Letters, inCider, *Elm Street, Peterborough, NH 03458.*

CORRECTIONS

In our December 1986 News Line ("The Christmas Apple," p. 17), we inadvertently omitted the price of Paper Models. The package retails for $29.95, from Activision, 2350 Bayshore Parkway, Mountain View, CA 94043, (415) 960-0410.

Also in December's News Line ("Pep Rally," p. 16), we erroneously reported that the Macintosh version of KidsTime II isn't a popular package. We've since learned that Great Wave's music software is actually a best-selling Mac program.

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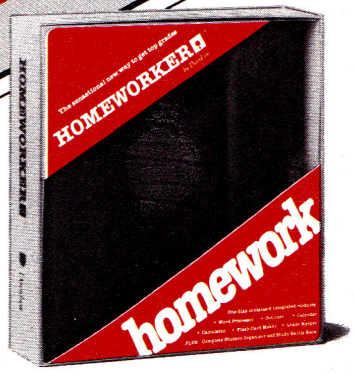

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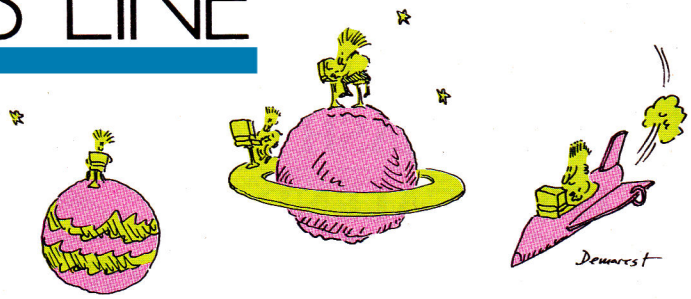

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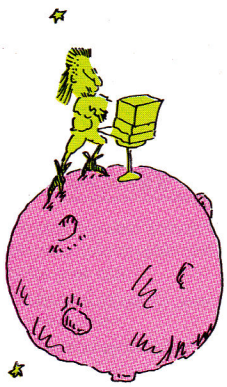


APPLE CYBERPUNKS

The latest word in science fiction is computers—not talking Apple IIs, Pinpoint BrainChecker, or Stickybear Space Shuttle, but a weirdly wired future when people are programmed and information does the work of currency.

The word is *Cyberpunk*. It's a loose association of young writers—you may have seen their work in *Omni* or read about them in *The Wall Street Journal* or *Rolling Stone*—who share the vision that computer scientists, genetic engineers, and pharmacists will affect people's lives in ways of which astronauts and nuclear physicists only dreamed.

Unless you're a fan of William Gibson's *Neuromancer*—a novel Mindscape is turning into a computer game and Timothy Leary is making into a movie—you may prefer to wait patiently for the future to happen. But you might be interested to learn that a lot of Cyberpunks write on Apple IIs, if not about them.

Bruce Sterling, unofficial leader of the Cyberpunks, author of *Schismatrix*, editor of *Mirrorshades: The Cyberpunk Anthology*, and *inCider* subscriber, "wouldn't write without an Apple IIc." His computer also makes possible *Cheap Truth*, the Cyberpunk BBS he operates at (512) 836-7363. He claims he's "not much of a power user"; he uses Apple Writer II and never touches WPL.

Whatever redeeming social value or philosophical depth Cyberpunks' writing may enjoy, it's certainly high-tech:

> Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts.... (*Neuromancer*)

Cyberpunk doesn't work in small gulps—you need to overdose. There's plenty of action in every Cyberpunk story, but most of it takes place in cyberspace. **—P.S.**

APPLE PLAY

Playing with a computer is more than a game for special-needs students and their parents—it's a way to learn. Now Compuplay Centers, designed to help parents and their special-needs children take advantage of that play-learning on Apple IIs, will be opening across the country, thanks to the work of a nonprofit group called the National Lekotek Center of Evanston, Illinois.

"The importance of play in the lives of young children with special needs cannot be overstressed," says Mary Trieschmann, Lekotek's Compuplay program director. "Play is a child's work. Through play they learn about themselves and the environment they live in."

The Compuplay program consists of six sessions that cover setting up a system to meet the child's special needs, training parents to use the system, and teaching parents how to use the computer to play with the child, Trieschmann says. A drop-in center and software lending library are available for families after they've taken the classes.

Lekotek trains not only parents, but professionals, as well, in the Compuplay method, Trieschmann says. Easter Seals is sending its staff members to the program so that they can set up Compuplay centers as part of that organization's offices nationwide. While those offices won't be available immediately, the plan projects about 20 Compuplay centers by the end of 1987.

For more information about Compuplay centers, write to Mary Trieschmann, Compuplay Program Directory, 2100 Ridge Avenue, Evanston, IL 60204.

—D. de P.

BINARY LINES

Gary Little, creator of the communications program Point-to-Point (Pinpoint Publishing), has proposed a new file format that can ease communication between Apples and host systems such as CompuServe's.



Photo courtesy of Frank Cordelle

Unlike Apple-to-Apple programs, large systems don't receive a file's attributes—necessary information such as its file-type code, kept separately in the disk directory—along with its data. They store Apple programs as text files, three times the size of their binary originals, which must be downloaded, then returned to binary format with Applesoft's EXEC command.

Little's proposed format, Binary II, has several advantages over the old text-and-EXEC method. For one thing, a Binary II file is never more than 255 bytes bigger than its original (a 128-byte attribute header, plus up to 127 null bytes to pad the overall length to a multiple of 128). The header contains more than file, operating-system, and date information, too. A "disk space needed" flag lets the downloading system abort transfer immediately if a file's too big to accept, while "number of files to follow" lets a single Binary II file link related disk files.

With the standard's technical details now in the public domain, the next hurdle is market acceptance. As of early December, Little told *inCider*, Binary II was in place on CompuServe, Delphi, and Genie and under consideration by The Source. Among communications programs, Little promised Binary II support in Point-to-Point for early 1987; as for his competitors, he said, "I'm pretty sure PBI will [add it to] CommWorks," though he described United Software Industries as cool to his overtures toward ASCII Express Pro and MouseTalk.

While Binary II is "kind of geared to ProDOS 8," Little expects ProDOS 16 will provide its main boost: "I think it's going to take some more public-domain GS stuff on [information] systems before people start needing it. The GS picture files are 32K; if you have to transfer that in text form, it's 100K. Besides, with all that extra memory in the GS, programmers are going to get sloppy and write big files." **—E.G.**

VIDEO PHONES

Remember video phones?

Not many people do—video phones went the way of videotex years ago. But Ma Bell thinks sending pictures over the wires may still have a future, and that your Apple II may help.

It starts with an ImageWorks board from Redshift Limited, a video grabber that "makes the old familiar II do everything the IIGS can do, and more," according to its developer, Charlie Springer.

Ron Sanecki, who confesses that he's an "old Apple fan," agrees. Ron's investigating new technologies for the Bell system at Bell Communications Research in Morristown, New Jersey: "We're looking at the feasibility of sending single-frame video over the telephone. We see it initially as a pure business need, but it may filter down into the home as it becomes cheaper."

Why not? A Mitsubishi Lumaphone—maybe you spotted one in a cameo role on *Dallas* or *Miami Vice*—costs $1500. You could pick up an Apple II and an ImageWorks board for that much and pay a month's phone bill with the change.

Sanecki is psyched: "We're not having any difficulties. And we've already brought new service concepts like call waiting and call forwarding into the home. The revolution was the Integrated Services Digital Network—that's bringing all sorts of neat stuff into the home."

Remote teaching, medical data, x-rays, real-estate photos and maps, technical field-service docs for your washing machine or computer—all these types of information could stream into your Apple over the phone lines.

Why the Apple? "We use Apple and Redshift equipment because we can write our own software and build our terminals," Sanecki explains. "It's an open system."

Sanecki thinks home video grabbers will be "on top of every TV" and in every Apple in a year or two—the technology is already in place. **—P.S.**

We're always looking for news of the Apple world. If you're making news, send your press releases and photographs to News Line, inCider, Elm Street, Peterborough, NH 03458.

SPOTLIGHT ON....



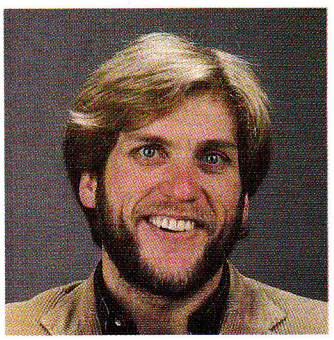
APPLES AID BIBLICAL RESEARCH

Photos courtesy of Apple Computer Inc.

In a medieval abbey in Belgium, an order of monks is using Apple II computers to study the Gospels. The monks have typed the text of the four books into their Apples and have developed a program that provides an index and a concordance (an index of principal words). The software lets users trace the occurrence of particular words throughout the Gospels. The abbey sells the program to Roman Catholic schools and monasteries in French-speaking countries around the world.

Inside the Black Box

by Paul Statt, Technical Editor



"The existence of something doesn't imply that you can count it or measure it."

Programmers don't think the way you and I do. If a programmer makes assumptions when writing software, I want to know what they are. Some, for instance, believe anything that exists can be expressed as an algorithm. Many mathematicians and physicists disagree, but that's the difference between scientists and Chris Crawford, the creator of Balance of Power.

Balance of Power is a game: You play the leader of the U.S. or the U.S.S.R. and try to make your nation look good at the expense of the other without stumbling into nuclear war. It's fun, and you learn something about the geopolitical high-wire act that keeps Reagan and Gorbachev dancing.

Balance of Power: International Politics as the Ultimate Global Game, by the same author, is available to anyone with $10.95. It's a handsome book, well worth the money, and, with one glaring exception, Crawford's prose has been handled with loving care by an editor who knows that a book is more than a sloppy database report.

Crawford's editor erred once. The offending lines defend Crawford's scheme for assigning a value between zero and 128 to a nation's *integrity*:

> There is something both presumptuous and outrageous about attempting to reduce so noble a concept as integrity to a few ciphers in a computer program. It borders on sacrilege.
>
> My reply to these reservations is to claim that the attempt to quantify a concept in no way demeans it. If something exists—that is, if it is real—then its very existence implies a set of numbers that characterize its properties. That set may be very large, or very difficult to determine, but they do exist, and making a stab at getting a few of them is not sacrilege.

Crawford writes well. He stabs cleanly here. There's no mistaking his point: Number is all.

That makes Crawford's confusion about number in his prose especially revealing. Is it *numbers* that characterize an object or concept, or a particular *set*—actually, some comprehensible subset—of numbers?

The question isn't as absurd as it sounds. God's database, which counts the number of stars in the heavens or the billions of synapses in someone's brain, may indeed hold the numbers that characterize me completely. But I refuse to believe that the subset (6 feet 3 inches, 200 pounds)—or even any *collection* of determinable finite subsets—comes anywhere near the whole truth about me.

We humans invented numbers to mean only what we want them to mean, like the Red Queen's words in Wonderland. The existence of something doesn't automatically imply that you can count it or measure it in any finite, comprehensible way. And it's not only "noble concepts" like integrity that can't be numbered—it's also everyday objects such as the number of trees in Vermont, in a widely known paradox. How many trees grow in Vermont? You can't find out without counting, counting takes time, and time grows more trees.

I read Crawford's book with pleasure. I recommend it to people who think Balance of Power sounds like fun, but are reluctant to shell out $50 for a game they've never played, and to people who play the game and wonder how it works.

I wish there were books to explain the software at the credit bureau that sends me forth into the world without an American Express card.

It's getting harder to see the assumptions behind the software we use. The new GS interface further hides the programmer's thoughts from the user. Claus Allmendinger, the AST *Wunderkind* who developed the GS video frame grabber VisionPlus, observes, "It's the end for the hacker. It's the professionalization of programming."

It's coming. It started when the first software developer "locked" his code, making it impossible to copy, but also impossible to "list"—or touch, play with, and make your own. The Macintosh was next—the machine that would never be naked, for which its owner would never see or write a line of code. Then came the Amiga, the Atari ST, and now the Apple IIGS.

Number is all. Crawford believes it, Descartes believed it, Pythagoras believed it. I don't believe it—but at least I know that assumption underlies Balance of Power. I want to understand the software I use; I want to adapt it. I wish more Apple II developers would take the hint and open up the "black box" that fear of "software piracy" closed. ■

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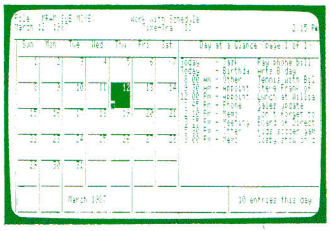

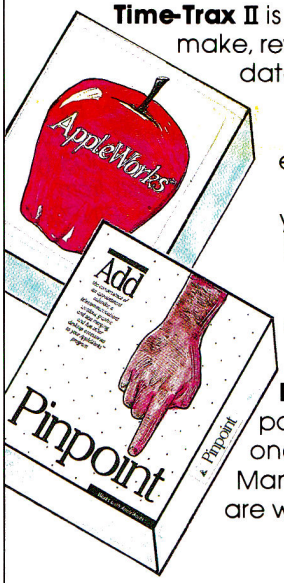

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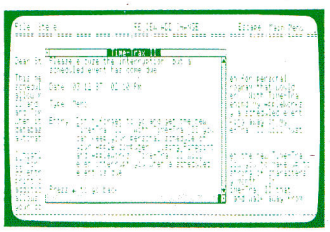

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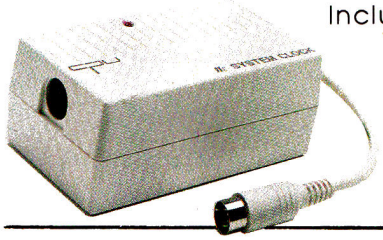
The //c System Clock™ is a perfect addition to any Apple //c or Laser 128. Simply plug it into either your printer or modem serial port and then plug your printer or modem into the //c System Clocks pass through port. Your ProDOS software will then be able to read the time and date. Included with software to display the time and date on the AppleWorks menu too!



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APPLE CLINIC

by Paul Statt, Technical Editor

Apple Clinic is a forum for discussing Apple II hardware, software, and related subjects. If you have questions or answers, or want to make a statement, write to Apple Clinic, inCider, *Elm Street, Peterborough, NH 03458.*

Sleeping Printer

I'd like to know if there's a PEEK that can detect whether or not a printer is active. My ImageWriter has a bad habit of "going to sleep" after being on more than a half hour, so my programs that involve printouts just hang up when they come to the print routine. I've seen commercial programs that check your equipment and give a TURN PRINTER ON message. I'd like to do this from within Applesoft.

David Vidmar
Britt, MN

You can do almost anything from within Applesoft. The key to checking your printer is knowing which slot your printer uses and that memory location $07F8, decimal 2040, holds the number of the active slot. PEEK (2040) – 192 returns the number of the active slot, 1 through 7. You need to write a program that constantly checks the active slot and, if your printer is in any but the active slot, stops the printer and displays the error message.

IBM Disks

I use an Apple IIe. Have you heard of software that will configure an Apple disk drive to write in IBM PC format? I take programming courses in which we use an IBM PC. At home I use an Apple program called ZBASIC, which is also available for the IBM PC, Tandy, and other computers. That lets me program at home for the other computers, but the problem is data transfer to these machines.

The ZBASIC manual suggests four methods: modem, RS-232, retyping the code, and software that configures the disk drive to write in the format of the destination machine.

I know this software exists for other formats—Tandy to IBM, IBM to Tandy, even Commodore to IBM—but what about the Apple II?

Joe Whyte
Pinconning, MI

ZBASIC is a "transportable" language. You might think that would mean you could write programs for one machine that would run on another. It doesn't: Transportable means that the commands and structure of the language are the same from one computer to another. It doesn't mean the disk-operating systems are identical—and that's why you can't pop an Apple disk into an IBM.

You can get around the difficulty by sending files with a modem. If you don't want to tie up your phone, you can use the computers' RS-232 ports—that's like using the upstairs extension as an intercom to call downstairs.

No current software will make your Apple II write IBM files. There are hardware solutions, though: At press time, Applied Engineering, Orange Micro, and a German outfit called Industrielle Computer Technik were all preparing MS-DOS disk drives for the Apple II. (Check "MS-DOS Is Coming," News Line, February 1987, p. 16.)

No ProDOS

I recently experienced some problems booting certain ProDOS programs on my enhanced Apple IIe (with Microsoft SoftCard in the auxiliary slot). When I attempt to boot Sensible Grammar or Pinpoint, I get the ProDOS sign-on, followed by *CONFIGURATION RELOCATION ERROR*. A warm boot dumps me into the Monitor. I requested and received replacement copies from the manufacturers, and the new copies did the same thing. On my Apple IIc they work as advertised.

I can boot other ProDOS programs, such as AppleWorks and Sensible Speller. I think the version of ProDOS may have something to do with the problem, but I'm not sure. Can you help?

Paul Pratt
Iwakuni, Japan

I'm not sure of the exact cause of your problem, but it's certainly the version of ProDOS that's causing trouble. The ProDOS on your "bad" disks is trying to configure the memory in your enhanced Apple IIe in a way that doesn't agree with your CP/M card, the enhancement, or both.

If you're curious, you could pull out the SoftCard, replace the enhancement chips, and poke around. If all you want are disks that boot by themselves, try this. Use your ProDOS System Utilities to copy ProDOS (you may need to unlock it first) from /APLWORKS/PRODOS to /PINPOINT /PRODOS. When the program asks you if it's all right to erase the existing file on the Pinpoint disk, answer yes. (ProDOS is the least sensitive file on any disk—it's on lots of others, including the system disk.) Lock /PINPOINT/PRODOS, and you should now own a self-booting disk.

More 80N

I read with interest Wayne Stonemark's method of eliminating the 80N printed at the top of the first page of AppleWorks 1.1 documents: allowing enough spaces at the top to make the 80N print at the bottom of the preceding page. (See "80N," Apple Clinic, July 1986, p. 22.)

My solution is somewhat easier. On the first page I use the option "pause each page," and below that, "new page." I then reset the options for the second page as if I were writing a new letter. When I print the letter, I simply use a piece of scrap paper as a "dummy" first page—I can re-use it as often as necessary. When the printer stops printing the first page, the one that has nothing but "80N" on it, I then insert a piece of letterhead stationery and print the real letter. This is simpler than spacing the return key and cheaper than buying AppleWorks 1.2.

Werner Simon
Chicago, IL

It's still a bit of a "kludge," but it does get the job done.

I wish someone would write and tell me how to solve *the 80N bug in*

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AppleWorks 1.1. Kelly Stirn promised to solve it in The Main Menu *(CW Communications), but began by telling us to buy AppleWorks 1.3. Is there a real solution?*

Making Port

I have an Apple IIc with a Cricket Speech Synthesizer (Street Electronics) that functions as a system clock. I need to configure serial port 2 to these characteristics from BASIC: 9600 baud, 8 data bits, 2 stop bits, and no parity. So far, I've been able to configure the ports only from the System Utilities Disk.

Matt Smith
Plantation, FL

Port 2 on the Apple IIc thinks it's a communication port for modems. When you turn on your IIc, it configures itself to 300 baud, 8 data bits, 1 stop bit, and no parity, but you can change that configuration in firmware from BASIC.

You need two bits of code: first a CONTROL-D followed by IN#2 to set up port 2, then CONTROL-A followed by 15B 4D. The 15B sets the baud rate to 9600 (6B returns it to 300 baud), and 4D sets 8 data bits and 2 stop bits (0D returns it to standard).

I recommend you take a look at Apple's IIc Technical Reference Manual. *All the codes you need are there, in section 8.1, "Using Serial Port 2."*

More Power to You

Regarding Captain Kurt Miles' letter ("Reader Suggestions," Apple Clinic, December 1986, p. 20) about converting an Apple II Europlus to U.S. voltages, I'd like to add that although the solution of a step-up transformer is obvious and inexpensive, I know a better solution that's equally inexpensive.

Apple II power supplies are notoriously inefficient in output power and eventually "burn out" when operating a fully loaded Apple II. An outstanding heavy-duty Apple power supply is sold by Applied Engineering (P.O. Box 798, Carrollton, TX 75006, 214-241-6060), however, for $69.

Substituting it for the original power supply is child's play. It's low-cost, but the AE power supply offers an on/off switch, weighs less than the step-up, is quieter, and consumes far less power (five watts versus 250 watts). It provides six amps of power, however, while the original Apple II power supply offers only 2.5 amps. And, if you ever have to travel to a country that uses 220-volt power, a simple switch will do the job.

Frederic C. deSibert
Woodside, CA

Thanks for the tip, Frederic. Applied's Heavy Duty Apple Power Supply looks like something I could use in my overworked and undercooled IIe.

ProDOS Failings

I limit all my application programs to ProDOS now, but have some complaints about the operating system:

1) When LISTing BASIC programs, can you put page breaks into the printed copy? Most word-processing programs do this. Is this lack a problem with my printer, or with ProDOS itself?

2) Can you issue ProDOS commands—such as those for formatting a disk—from the keyboard? I can't

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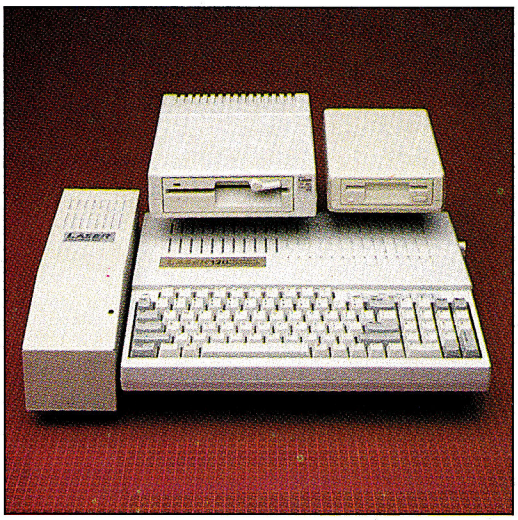

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count the number of times I've had to suspend a program I was running and load the System Utilities to format a new disk.

3) I wish there were a good version of BASIC for the Apple II and ProDOS: one that would support named subroutines, procedures, parameter passing, automatic line numbering, real-number formatting, PRINT USING, and an easy way around typing PRINT CONTROL-D every time I want to issue a disk command from BASIC. Am I in a very small minority?

Jim Augeri
Middletown, CT

People can't want what they don't know exists. That's where the press comes to the rescue.

The Software Touch (9842 Hilbert Street, Suite 192, San Diego, CA 92131, 619-549-3091) concealed ProBASIC on the flip side of its Program Writer disk. ProBASIC is an amplification of ProDOS BASIC that offers the modular programming you want. It also adds PRINT USING and lots of other goodies. It comes free with Program Writer (a package I recommend quite often), which costs $49.95.

I don't recommend KIX often enough. KIX is a front end, or operating-system shell, for ProDOS that lets you type commands directly. Not all commands, not all the time—but I suspect it will get the job done for you; it formats and renames files. You might find that expanded memory will help.

Your first question is a good one, and tough. The trouble is that whatever your printer is configured to do, the PR#n command that prints BASIC listings calls "all bets off." The printout comes in a stream; everything that would have appeared on the screen appears on paper. A more productive route might be to turn your program files into text files, make word-processor files of them, then print them. Or you can insert a form feed at the end of every 66 lines, using PRINT CHR$(12).

Does anyone know a good way to print BASIC code in pages?

Noise Pollution Update

My thanks to everyone who enlightened me about the source of the terrible racket Apple II drives make. It seems that any operation that involves going to the very beginning of a disk—booting or initializing, for instance—makes sure that the drive head (that's to your disk drive what the needle is to your record player) gets all the way to the beginning by moving it 40 tracks, no matter where it started.

If the farthest chair in your living room is 40 steps from the refrigerator, you can make sure you make it to the icebox during every commercial by always walking 40 steps—even if your chair is only 35 steps away. When you get to the refrigerator, you'll have to walk five extra steps with your nose against it. When your Apple II does that, it grinds.

Special thanks to Tom Weishaar at Open-Apple *on this one.* ■

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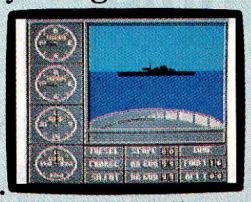

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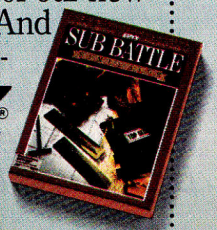

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Lost in the Shuffle

by Eric Grevstad, Review Editor



"The real culprit is market inertia, or what its beneficiaries call brand loyalty."

Despite all the flops and turkeys I've seen," says the theater critic, "I'm not jaded. There's still magic every time the curtain rises." The same goes for those of us who test hardware and software: We've seen neat, innovative products before, and we're always hoping to see another. The trouble with the reviewer's life, the part that leads to cynicism and bad attitude and a tendency to come in late in the mornings, is the run of the mill. I see a lot of shiny new products. Some of them will sink without a trace when they reach the market.

I'm not talking about products that deserve to fail or don't perform as advertised. One reward of my job is telling abusive manufacturers, "Gee, you sound pretty upset, but your program trashed our reviewer's data files, and your tech-support line said that sometimes happens; I felt we should put that in the magazine."

Nor am I swayed by startups who misjudge the market or don't do their homework. As Paul Statt wrote a couple of months ago, one man called hoping we'd review his disk-utility menu; it looked fine for folks with disks full of DOS 3.3 BASIC programs, but when Paul asked about a ProDOS version, the fellow asked, "ProDOS? What's that?"

But I feel for products that although not flawless, deserve more than a cameo appearance on the market stage—the ones that tempt you to say, "This is an intriguing, well-crafted program. It will probably bounce off AppleWorks like a snowball off Superman."

The odds against these items aren't all their fault, though it's natural for proud programmers and vendors to have marketing tunnel vision like the DOS 3.3 menu maker's. (I spent days defending my December 1986 review against the maker of the impressive, imperfect integrated package Foundation—arguing that although it might make a smoother theoretical structure for software neophytes, AppleWorks or 1-2-3 users might miss things like spreadsheet cell pointing with the arrow keys.)

The real culprit is market inertia, or what its beneficiaries call brand loyalty. The printer market, for example, is a bustling, competitive part of the MS-DOS arena. In the Apple world, it's ImageWriter all the way, thanks to Apple's defying the parallel-interface standard (though it does change the serial connectors every so often to keep things interesting). You can bet most Apple dealers won't tell Mr. and Mrs. Customer and the kids about the many good parallel adapters or scattered ImageWriter compatibles.

Barring the rare flash of innovation, progress in such a market consists of waiting for the leader to make a mistake. WordStar goes five years between upgrades, forcing buyers to look for less senile software. Profit-crazed Lotus ignores users' cries for site licensing and against copy protection, allowing SuperCalc3 and 4 to make modest gains against 1-2-3. Software Publishing Corporation, turning to IBM, virtually abdicates the Apple market; I'm still waiting for someone to claim the territory once held by its popular PFS series.

Does this mean there are no more opportunities, that independents should throw in the towel? No—there are opportunities for vendors smart enough to seize an opening. Apple releases a mouse with almost no software to support it? Check out MouseWrite, MultiScribe, MouseFiler, or Catalyst. AppleWorks lacks extras? AppleWorks 1.3 with AutoWorks has better mail merge than Apple's own 2.0. The Hard Disk 20SC costs more than the IIGS with which it works? Gangway for low-cost SCSI drives galore.

I'll keep an eye on Franklin's and Laser's challenge to Apple; I'll keep watching for an all-around rival to AppleWorks. (Foundation is great as a database and windowing system, but slips elsewhere—and, as Emerson said, when you strike at a king you must kill him.) Meanwhile, I'm happy to make smaller discoveries—a new idea, a neat enhancement, a bargain price—and share them with *inCider* readers. It makes up for the occasional monotony of AppleWorks templates and Print Shop picture disks. ■

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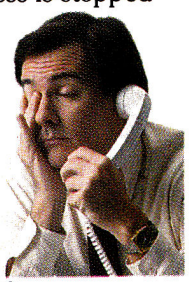

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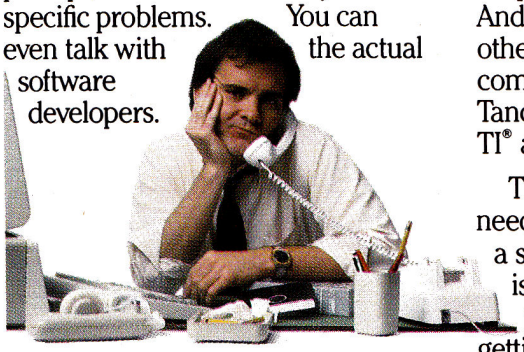

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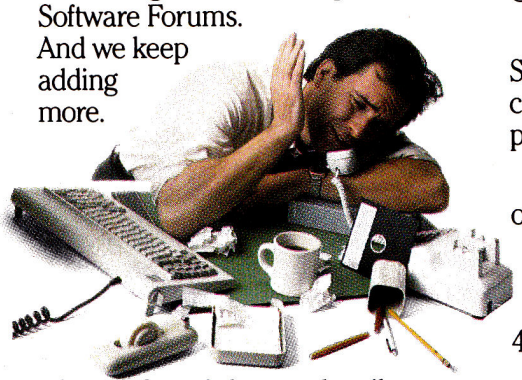

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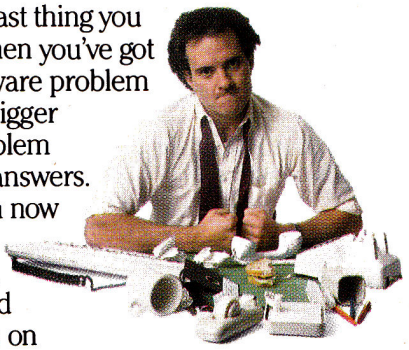

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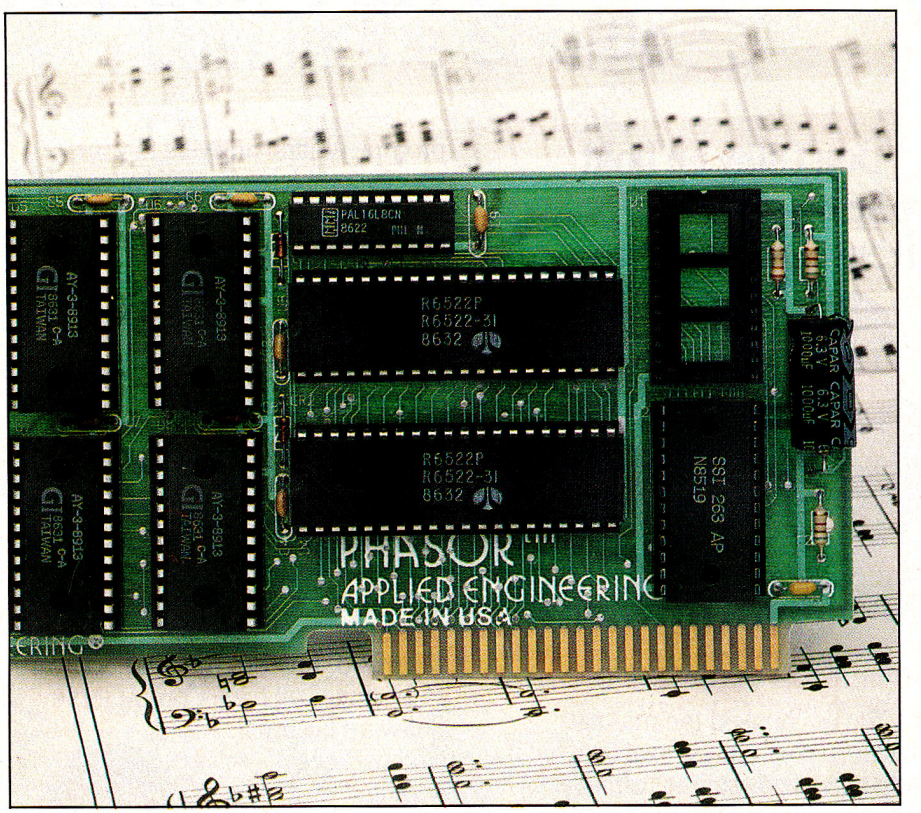

As befits Applied Engineering's outrageous advertisements, showing a machine gun bursting from the screen of an innocent IIe, the Phasor represents heavy artillery in the world of Apple music, speech, and sound effects.

The Phasor card fits into any slot (except slot 3) of a 64K Apple IIe or II Plus, adding two channel outputs, two volume controls, and a four-watt stereo amplifier. You can connect the card directly into your home speakers (you'll have to supply a couple of RCA connectors), headphones, or your stereo amplifier's auxiliary inputs. It all adds up to the ability to produce 12 voices of sound simultaneously. Each of the Phasor's four integrated sound chips can synthesize three voices, one of which can be percussive.

The board's capabilities are impressive—the four-watt amplifier, for instance, overpowers Sweet Micro Systems' Mockingboard's two half-watt amplifier chips. Some of its accompanying ProDOS software is more potent than the rest, and it won't boost many existing programs—most games I tried, for example, beeped and buzzed through the Apple's tinny speaker as usual. But the Phasor is a powerful accessory for sound experimenters.

HARDWARE AND MUSIC

On-board rocker switches let you configure the Phasor to emulate various existing sound cards—necessary because, at this point, all of the software that works with the Phasor (except for the control program and demonstration songs that come with it) was originally written for other boards.

Applied Engineering claims that the Phasor is compatible with the Mockingboard, Street Electronics' Echo Plus, the ALF Apple Music Synthesizer, and Applied's own Super Music Synthesizer. I successfully tested the Phasor with Mockingboard demo disks and Electronic Arts' Mockingboard-compatible Music Construction Set; I couldn't get the Echo Plus demonstration software to boot up.

Applied's programmers did a great job creating demo programs to introduce Phasor users to their newfound music and sound capabilities. When I attached my two stereo speakers, I discovered the best songs I've heard coming from an 8-bit computer. With the ability to create up to 12 simultaneous musical lines, an experienced Phasor programmer can create masterful arrangements.

As a veteran keyboard-synthesizer musician, I find it frustrating to be unable to harness the power of the Phasor. I'm still trying to plink out tunes as though I were just learning to play an instrument. I guess there's an irony here somewhere: The Phasor, like many other music boards and programs, is designed for the nonmusician who wants to enter sheet music, note by note, but not actually perform.

The Phasor music-editing program gives the dedicated programming or nonperforming musician a great deal of control over the hardware, but it's difficult to use. The editor's screen display holds a staff onto which you place up to 3357 notes, rests, and other commands. You can select the position of a note or command and its pitch, key, and time signatures; entries can be individual notes, tied notes, rests, triplets, or accidentals such as flats, sharps, and naturals.

inCider's Ratings

Excellent—remarkable, a must buy	■■■■■
Very good—impressive and recommended	■■■■
Good—average, solid performance	■■■
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Poor—unacceptable or unusable	■

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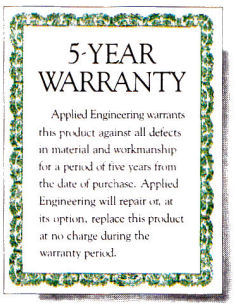

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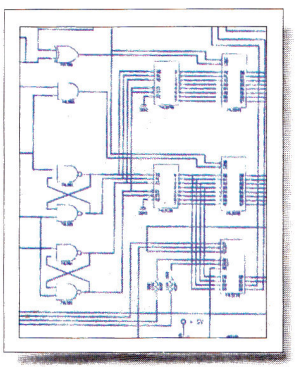

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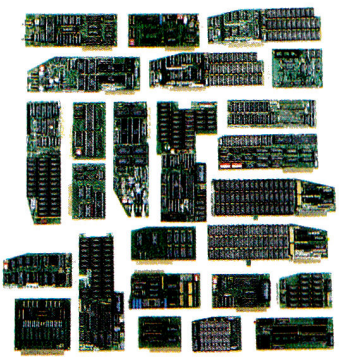

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You can control each note's attack, decay, sustain, and release value, as well as just about anything else you can think of. Be warned, however, that this music editor isn't for the beginner. You'll need patience and practice before you'll match the smooth sounds of the demo disks.

SOUNDS AND SPEECH

It may not quite match a machine gun, but the Phasor's sound effects can knock you off your seat. You can control each chip's tone, noise width, and envelope lengths, and the board gives you a huge volume. The soundbuilder program lets the conscientious user build a good repertoire of customized sound effects you can save and reuse in your own BASIC programs, though, as the manual says, the feature is "for experienced programmers only."

While the music and sound-effects programs provide impressive potential, yet are difficult to control, the text-to-speech feature is the opposite. The supplied speech demo is cute, but it sounds like a Bulgarian immigrant who just learned English. Some inflections can be heard, but for the most part, the strings of syllables are read in a monotone with a nasal twang. (This, by the way, is similar in sound to the Mockingboard speech demos. Echo Plus speech is far superior.)

The Phasor talks through just one of its channels, but the board has been designed for future expansion to utilize the second channel. With the current software, you can emulate a male voice, but not a female. The program is phoneme-based, letting you create an unlimited vocabulary—whatever you type in, the program will attempt to speak. You can also control speech parameters such as volume, rate, and inflection.

While it sounds rather flat compared to the music and sound-effects routines, the speech program is easy to use and does the job. After booting ProDOS and BASIC and executing the program, you have five extra Applesoft commands for adding voice to your programs. You can have the Apple speak a string of text or spell out words.

SOME SHORTCOMINGS

The Phasor synthesizer is definitely a well-designed item, adding colossal sound capabilities to the II Plus and IIe. While my impression of the hardware is good, Applied Engineering needs to put greater effort into creating comprehensive, helpful documentation for its software. While the software is partly menu-driven, the music and sound-effects editors aren't. It's here that strong, well-written documentation should be provided. Instead, the new user will feel the burden of having to figure things out in the shadows.

To its credit, Applied Engineering has a helpful and courteous technical-support staff available for long-distance guidance. The phone number is printed in the manual.

I've already described the Phasor advertising photos as colorful, loud, and explosive—just what would attract a game-crazed adolescent computer user. The implication is that most of your game software will take advantage of the Phasor board. Don't be naive—only with software expressly written for a Mockingboard or other sound card will you get those explosive effects. While I've heard that there's a ton of such software out there, none of it was in my collection; I had to borrow a copy of Music Construction Set.

The devoted programmer will appreciate the Phasor, as will the person who is dissatisfied with a previously purchased sound board for which he or she has a library of games and music programs. The Phasor isn't for the casual application user, the musical performer, or the user who requires clear speech. ■

Margaret Morabito
Rindge, NH



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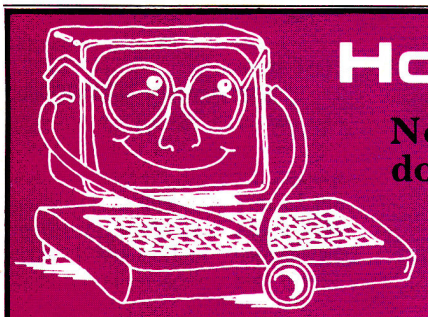

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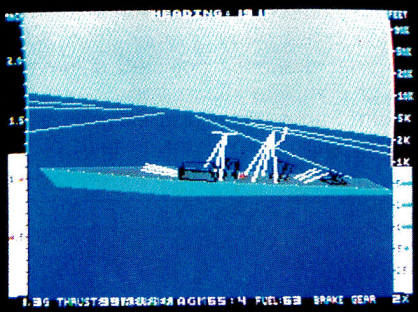

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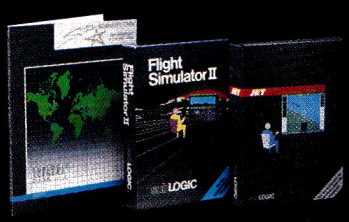

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What graduation gift can take you great distances—without gas, tires, or high insurance premiums? (Hint: It's not a hang glider.) It's "student-productivity software," a new genre of programs for your Apple II. At least two of these applications, Term Paper Writer, from Activision, and Homeworker, from Davidson & Associates, can do for high-school and college students what "calcs" did for number crunchers: save time and relieve frustration.

TERM PAPER WRITER: NOTES AND OUTLINE

Name one onerous task that strikes fear into the hearts of freshmen and seniors alike. Ah, the term paper—academic tradition at its best.

Remember the arduous process of collecting notes and trying to keep your sources straight? And trying to figure out what format you were supposed to use—do the page numbers go in the middle or to the right? (Is it too late to drop this course?)

Help has arrived—in the form of a single double-sided disk and a 95-page manual. Term Paper Writer works with you from start to finish, with four modules called Notetaker, Outliner, Writer, and Bibliographer/Footnote Compiler.

Notetaker helps you keep track of the information you collect and your sources. Even its one awkward feature—you have to transcribe your notes into the computer—has educational benefit: Composing your notes twice (once at the library and once at the Apple) helps you digest this new knowledge.

With enough memory to accommodate the contents of up to 50 "notecards," the program holds sources, bibiliographic information, your jottings, and keywords you can use later to search for related information (although searching is quite slow). You can print shortened notecard summaries or complete information.

Term Paper Writer also includes a flexible outline processor. Instead of sitting down to prepare a formal outline right away, you can brainstorm and type in your ideas as they come to you. When you're ready, Outliner helps you construct a formal outline with up to four levels (Roman numerals, uppercase letters, Arabic numerals, then lowercase letters). You can move, delete, and regroup ideas whenever you like. Changing a hierarchical level is as easy as pressing Tab (to move an item to a lower level) or the left-arrow key (to move an item to a higher level).

Okay—your notes are in order, and your outline is in good shape. You're ready to write.

PROGRAM INTEGRATION

Select the Writer module from the program's main menu and start typing. What if you haven't memorized that important quote on notecard #6? No problem—Notetaker and Writer are integrated. Just pull down the Features menu (with the open-apple key) and select the View Notes option.

Wouldn't it be handy if you could have your outline right there on screen? As easily as you can view your notes, you can ask Term Paper Writer to split the screen and display part or all of your outline at the top. Term Paper Writer's integration is "transparent"—it handles copying and transferring files for you. All these distracting maneuvers are invisible. The program also tallies your paper's word count.

As efficient as it is, the program doesn't write the term paper for you, of course—you have to paraphrase ideas and come up with some of your own. To indicate a footnote, press Control-F; the program prompts you for the number of the notecard corresponding to that footnote. Press Control-F again and you're back in paragraph-writing mode.

Like other word processors, Writer includes the basic editing features you need—move, search, replace, and reformat. It doesn't include a spelling checker, grammar checker, or thesaurus.

When you're finished writing and editing, it's time to call up Term Paper Writer's Bibliographer/Footnote Compiler to generate your references. You can select from three formats: Turabian (a guru of research writing), MLA (Modern Language Association), or APA (American Psychological Association).

Continued on p. 95.

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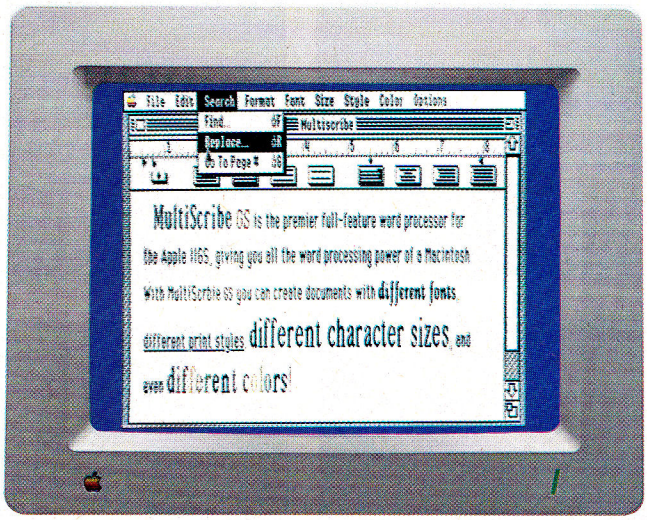

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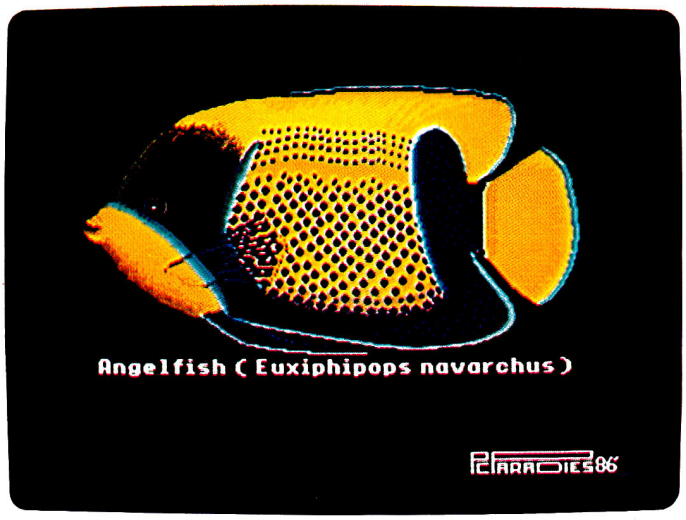

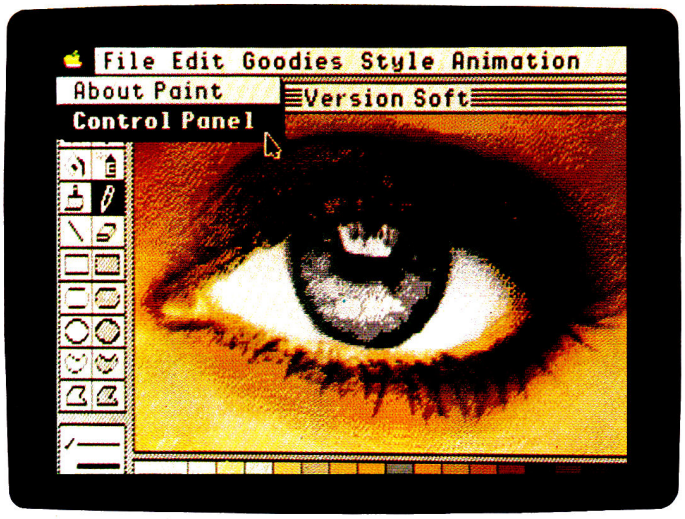

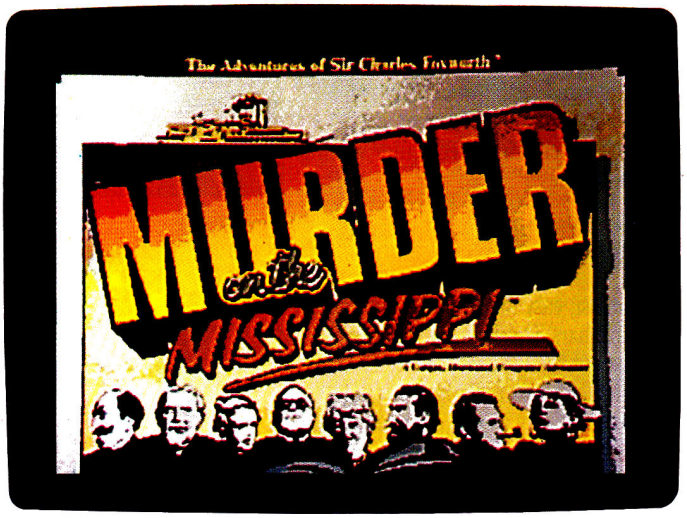



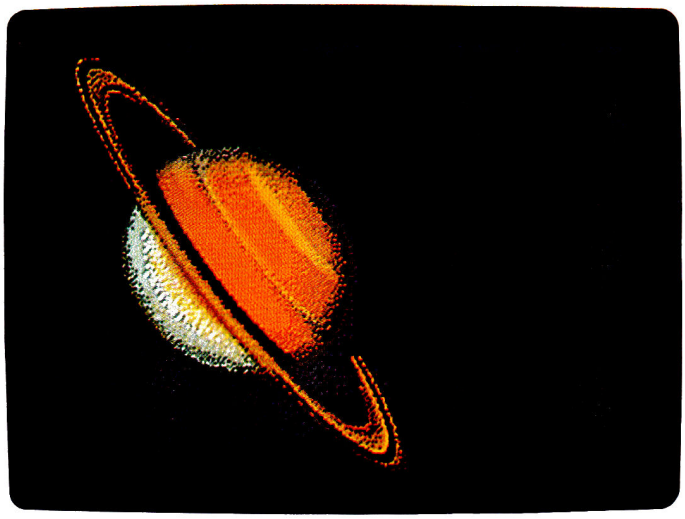

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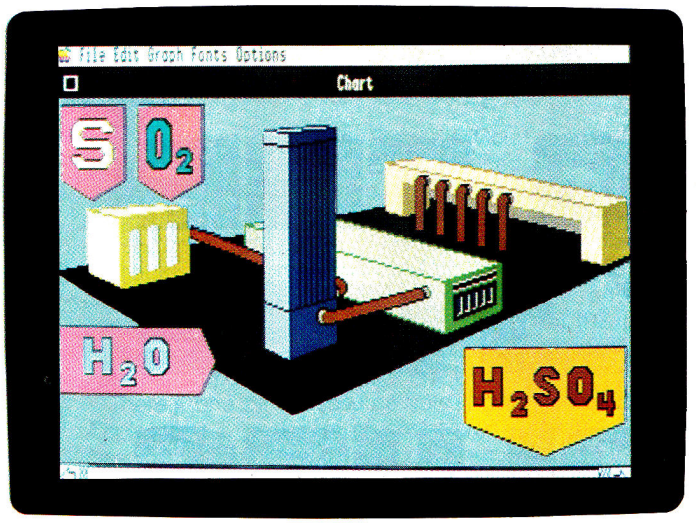



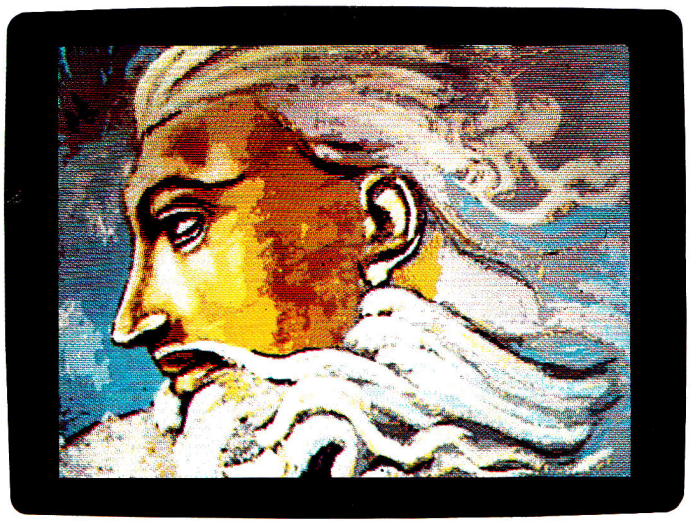

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BEATING THE TAX TIME BLUES

Need help figuring your income tax? Your Apple can lend a hand—take a look at the seven tax-preparation packages evaluated here and pick one that suits your style and budget.

by Cynthia E. Field



Turn-of-the-century Supreme Court Justice Oliver Wendell Holmes, Jr., maintained that "taxes are what we pay for civilized society." Legal historians refer to Holmes as "the great dissenter." Many taxpayers unofficially think of him as a great comedian.

Thanks to tax simplification, your tax life may be more complicated than ever. However involved it is, one thing is certain: You need help. Some people rely on IRS publications, a pencil, and a calculator; others seek assistance from tax-preparation firms like H&R Block.

There's one other resource you shouldn't overlook—your Apple—with a choice of at least seven software packages (see the accompanying Product Information box for manufacturer addresses and pricing) devoted to helping you make that contribution to civilized society. There's a tax-preparation program to suit any hardware setup and nearly any personal style and budget.

HERE TODAY, GONE TOMORROW

Because the Internal Revenue Service implements those interminable revisions of the tax code, tax-preparation software for a given year is obsolete the next. Certain calculations and printing features change because they must conform to IRS regulations.

This short life span isn't characteristic of the nature of a program, though, or of its user interface. The majority of 1986 versions I used to prepare this article (at press time, the 1987 versions, for filing 1986 tax returns, weren't yet available) are substantially unaltered from year to year, according to company spokespersons. One notable exception is Sylvia Porter's Swiftax: Swiftax 1987 has undergone a total face lift.

Once you find a package with a style you like, you can count on saving money in future years by purchasing updates of that program; each publisher offers discounts on these yearly editions. Seventy dollars may seem like a steep price to pay for a program you're likely to use for only a few hours in March, but next year's update may cost you as little as $30. And, depending on your tax status, Uncle Sam might help you pay for your Apple and software—within limits, they're deductible. (See the accompanying sidebar, "Deducting Your Apple," for details.)



To further soften the blow, most tax-software licenses let you prepare unlimited numbers of returns—as long as you or someone under your supervision does them on one computer system. For the price of a single program, you can prepare returns for every member of your family—even the in-laws. Entrepreneurial types might consider setting up limited tax practices to support their computer habits.

LEVELS OF AUTOMATION

Before you take the plunge into computerizing your tax return, you should consider some inherent deficiencies and inconveniences.

Few tax programs are fully automated; some require you to manually transfer information from one form to the next. For example, you may have to type in the amount of your income from self-employment (calculated via the computer equivalent of Schedule C) into the screen version of Form 1040. Certain tax programs transfer such data automatically.

Some tax-preparation programs don't let you type in text. Instead, you type in numeric entries (income and expenses), get a printout, then use a typewriter (or pen) to complete the form.

Once you've entered all your data into a tax-return-preparation program, printing the forms for submission may entail some hassle. According to Nicholas Sky of Sky Computer Resources, the law doesn't permit you to print any color-coded IRS forms or forms requiring a signature. For those, you must use the official forms the IRS provides. With prior approval from the IRS, tax-preparation programs can print all of the nonsignatory, noncolor-coded forms, though.

Even programs that don't print the complete page in IRS-acceptable format can "fill in the blanks" on official IRS forms. Professional preparers purchase continuous IRS forms and schedules from stationers, but individuals are better off friction-feeding into their printers the forms they receive in their IRS packets. Another alternative is to print the computer version and manually transcribe the information onto the official IRS forms.

At the moment, the IRS doesn't permit individuals to file their personal returns on disk or by modem. According to Patricia Rusk, an associate with the IRS Public Affairs Office, however, certain professional preparers participating in seven pilot programs nationwide are filing client returns electronically. (See the accompanying sidebar, "Filing on Disk," for more information.)

NO SUBSTITUTE FOR A SHOEBOX

Most tax programs can't automatically collect and organize the information you need to prepare your return, but there are some notable exceptions. J.K. Lasser's Your Income Tax can use information you've entered during the year into J.K. Lasser's Your Money Manager ($89.95). Tax Preparer (from HowardSoft) has a built-in itemizer that lets you keep a running list of deductible expenses and other pertinent data.

Users of Intuit's check-writing/organizing program Quicken

should investigate 1040Works, a series of AppleWorks templates that claims to import data directly from Quicken. Less directly, 1040Works can work with data from Monogram's home-finance program, Dollars and $ense.

NO EXPERT SYSTEM, EITHER

For the most part, personal income-tax-preparation programs are screen-based equivalents of paper, pencil, and calculator. You may find your own clever way to use them for tax planning, but most aren't designed to perform that function.

Some, though, do have built-in tax-planning capabilities, such as five-year projection and "what if" features. Foremost among these, perhaps, is Tax Preparer. Another program, Tax Command Professional (Practical Programs), can work with a companion package, Tax Command Planner ($50) to perform similar tax-strategy functions. Monogram's Forecast is a dedicated tax-planning program; you can interface it with Dollars and $ense or use it independently.

Tax counseling isn't ordinarily built into the software itself, but you may find advice in accompanying manuals. Two examples are Sylvia Porter's Swiftax and J.K. Lasser's Your Income Tax. Each software package includes the respective (and respected) adviser's tax-planning/preparation guide.

WHY BOTHER?

If no tax program does everything in the tax-planning/organizing/preparing/printing sequence, why should you consider computerizing your taxes at all?

There's one overriding reason: greater control over your personal financial affairs. *You* determine the degree of tax advice you need, the amount of forecasting you want to do, the extent to which you need to simplify the filing process.

Consider the advantages. You store your tax information on disk and it's available at any time during the year. Want to estimate the tax consequences of investing $1000 in your IRA? Paying off the mortgage on your vacation home? Selling those laggard shares of ROMs R Us? Having a baby?

Even if forecasting holds no attraction, preparing and printing returns may be easier with your Apple. Most programs make the process of typing in information foolproof, if not tidier. Editing is simple, too: Delete one value, type in a new one, and the whole 1040 recalculates. Say good-bye to erasers and smudges.

Whether planning or preparing your taxes, you'll enjoy the convenience of working at your Apple. Unlike a professional tax-preparation service, your computer requires no appointment—unless your youngsters are playing Where in the USA Is Carmen Sandiego?.

DECISIONS, DECISIONS

Your first task in selecting tax software is to think about the forms and schedules you need to file. (See the accompanying chart for a comparison listing of the seven programs reviewed.)

Next, determine whether your hardware is compatible with the programs you've tentatively selected. Some programs require only 64K; others 128K. At least one operates most smoothly with 256K of RAM. All work with one disk drive, but two drives eliminate disk swapping. A printer is technically an option (you could transcribe numbers by pencil from the screen to paper), but practically a necessity.

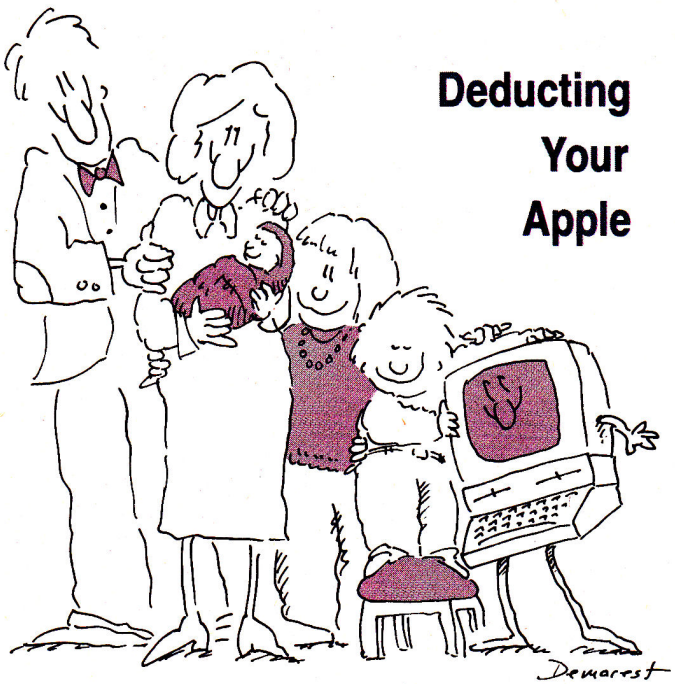
These considerations should narrow your choices somewhat. The following descriptions will help you decide on the tax program that's right for you.

TAX COMMAND PROFESSIONAL: NO FRILLS

The least expensive of the stand-alone programs reviewed here, Tax Command Professional may be more suited to those who already have tax-preparation and personal-computing experience.

Though adequate, the manual is spare, and there's little hand holding. The on-screen forms don't look like their IRS counterparts. New users may need on-screen instructions and on-line help, which this program lacks.

Tax Command Professional doesn't sacrifice mathematical adroitness, though. The program prepares the most commonly used forms and schedules, although it lacks Form 4562 (contained in the Tax Command Planner program).

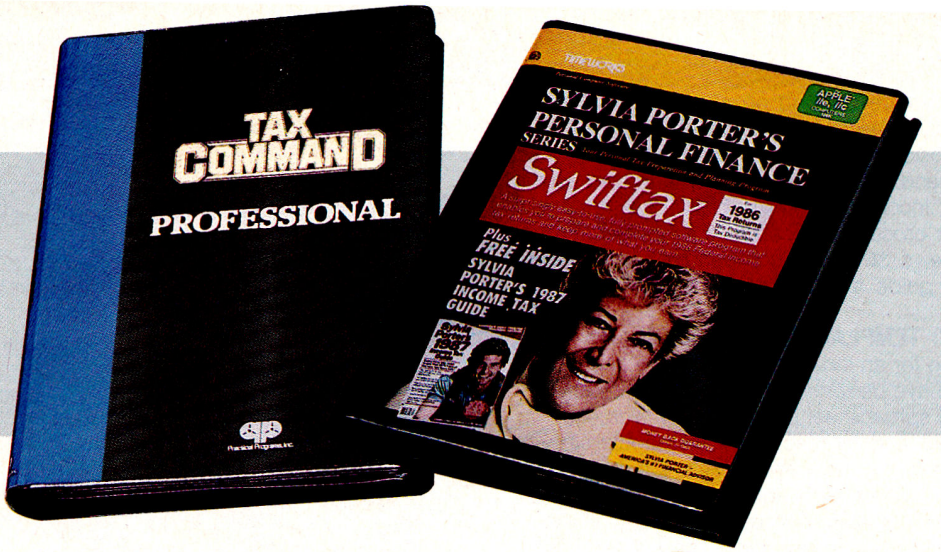


If you use your Apple for business or investment, you may be able to write off a portion of its cost (called *basis* in taxspeak), along with that of your printer and monitor, against your taxable income. The IRS has established three categories of use to determine the amount you can claim.

The first consists of employees who use their own computers for their employer's business. To get the maximum tax benefit in this situation, you must prove that your employer requires you to have the computer for his or her convenience, and that you use the computer more than 50 percent of the time for business. A letter from your boss isn't enough to satisfy the first requirement. The IRS is taking a very tough stance on this issue, so seek good tax advice if you're in doubt.

As for the second requirement, keep a detailed time log of each minute you use your computer and for what purpose (business, games, and so on). If you use your Apple only 50 percent or less for business, you can still benefit to some extent, as explained below.

The second category includes self-employed users, who must also satisfy the 50-plus-percent minimum-use requirement to receive the maximum tax benefit. Again, you can still benefit if you use your computer 50 percent or less for business, unless you use your com-



Tax Command Professional requires 64K, but doesn't fully automate the tax-preparation process. You must enter text (such as names of sources of interest income) with a typewriter or pen after printing.

Program designer Bruce Thompson indicates that most of his customers are individuals with personal income-tax returns to complete, but about 20 percent are professional preparers. At $50, this DOS 3.3, copyable program is flexible and quick. If your tax return is fairly uncomplicated and you don't mind manually entering some information on your return, Tax Command Professional may be the most expedient stand-alone program on the market.

SYLVIA PORTER'S SWIFTAX: EASY ALTERNATIVES

This completely restyled version of Timeworks' Swiftax program promises to be an appealing entry into the tax-preparation genre. According to program developer Nick Alexander, Sylvia Porter's Swiftax is extraordinary in its ease of use. The program is window-based: All menus and data—even a movable graphics calculator—appear in windows. There's a pop-up "memo pad" and a series of always-available help screens. Enhancing its ease of use is Timeworks' toll-free technical support.

According to Alexander, the program offers two alternative approaches to filling out forms and schedules. You can either prepare forms one by one or use Form 1040 as a road map, branching off automatically when you arrive at a line requiring a subsidiary form or schedule.

One of the few ProDOS-based tax-preparation programs, Sylvia Porter's Swiftax isn't yet available in 3½-inch format. It's copy-protected and doesn't interface with programs in the Sylvia Porter's Personal Finance series, so you'll need a printout from your home-finance program—or that shoebox of receipts and cancelled checks.

J.K. LASSER'S YOUR INCOME TAX: THE INTERACTIVE INTERVIEW

If you're in the market for the ease of use provided by Sylvia Porter's Swiftax combined with the ability to prepare almost any federal form or schedule, look seriously at J.K. Lasser's Your Income Tax from Simon & Schuster.

Among its many "user-friendly" features, this copyable program contains an interactive interview. Your responses let the software automatically determine the forms and schedules you're likely to need. If you already know, you can override this part of the interview.

Entering information on the form and schedule facsimiles is easy. A status line at the top of the screen lets you

---

puter exclusively in a business establishment. (The IRS treats a qualifying home office as a business establishment for the purposes of this rule.)

Investors make up the third category. If you use your Apple to manage your holdings, you can claim the same deduction as those whose business use of their computers is 50 percent or less.

The next step is to determine the date you placed the computer into service (not necessarily when you bought it). If you began using your Apple for business after June 18, 1984, and you're in the first or second category, you may claim ACRS (accelerated) depreciation and/or first-year expensing, along with the ITC (investment tax credit). This means you can depreciate your computer's basis over a five-year period, or claim up to $5000 of the basis as an expense the first year and depreciate the balance.

You can't take the ITC (ten percent of the basis) on any amount you claim as a first-year expense. The Tax Reform Act of 1986 has repealed the ITC for computers (as well as most other business equipment) placed into service after December 31, 1985.

If you placed your computer into service before June 19, 1984, you may claim ACRS and ITC for any business or investment use, but the IRS allows a first-year expense claim only for business use.

If you think you might be entitled to any of these benefits on past returns, you can file an amended return within the statutory limitations.

If you're in the third category of business users, or you come under the 50-percent-or-less rule in the first or second categories, you can still depreciate your computer's cost over a 12-year period on a straight-line basis (that is, one-twelfth the basis each year), taking business- or investment-use percentage into account. You may include bundled software (the cost of which isn't stated separately in the price of the computer) in the depreciation basis.

The new Tax Reform Act of 1986 has changed the depreciation rule for computers used 50 percent or less for business that were placed into service after December 31, 1986—but don't worry about that until you do your 1987 taxes.

Consult your CPA or tax lawyer if you need help taking these deductions. In general though, if you're in the first category of business users, you'll need Form 2206; self-employed users would use Schedule C; and Schedule A is for investors.□ **—Martin Blumenthal**

know which part you're working on at any given time. The program enters automatically into Form 1040 the amounts calculated on subsidiary forms and schedules.

Like Tax Command Professional and Sylvia Porter's Swiftax, J.K. Lasser's Your Income Tax prints directly on IRS forms.

The software is cross-referenced to J.K. Lasser's *Your Income Tax* guide, a 300-page compendium of tax laws and advice. This guide alone is worth nearly $10.

EZTAX-PREP '87: TEMPLATES FOR MULTIPLAN

Instead of opting for an independent program, the developers at EZWare have designed a series of templates for MultiPlan, the $95 spreadsheet program from Microsoft.

Priced at $99.95 and far-reaching in its capabilities, EZTax-Prep '87 may be most appropriate for professional tax preparers. According to the company, its customer base is split 50-50 between individuals and pros.

The program's batch printing should be especially appealing to professional tax preparers. In addition, EZTax-Prep '87 offers "client-organizer" and "client-letter" files. An audit-alert feature, using a method similar to the IRS', compares a taxpayer's deductions to average deductions taken by individuals with similar adjusted gross incomes.

Unlike other tax-preparation programs reviewed here, EZTax-Prep '87 also offers supplements for preparing California and New York State income-tax returns.

For personal use or a small tax practice, take a closer look at EZTax-Prep '87 if you already own MultiPlan.

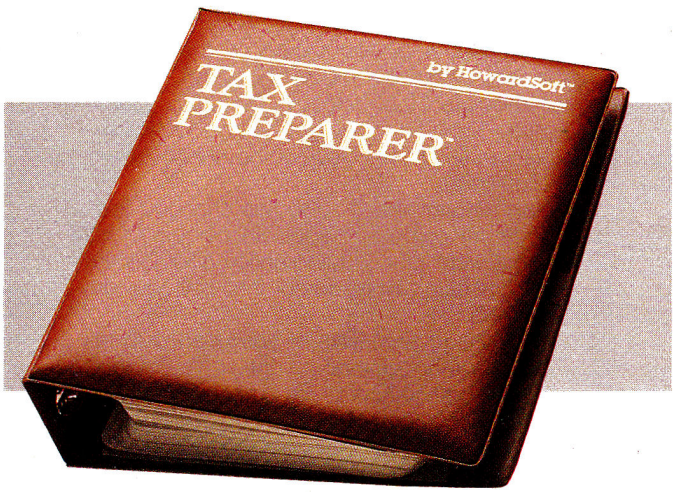
TAX PREPARER: SMOOTH AUTOMATION

The manufacturer shortchanged Tax Preparer when it named the program. As described earlier, not only does this HowardSoft program prepare and print your return, it also keeps track of data during the year and helps you plan financial moves that will affect your taxes. But calling the program Tax Perfection would be too boastful, and a little premature.

Bretta Brictson, a spokeswoman for HowardSoft, advised me that a faster ProDOS version has supplanted the aggravatingly snail-paced DOS 3.3 edition I tested. Although Tax Preparer is quite capable and professional, I'd advise potential purchasers to request a dealer demonstration before plunking down $250.

On the plus side, the program is about as automated as tax-preparation software can be. Data transfer among forms is automatic; it automatically creates certain forms (Schedules SE and R, for instance) when required.

Tax Preparer supports the latest hardware, including the Apple IIGS, the Apple Memory Expansion card, First Class Peripherals' Sider hard-disk drives, and the UniDisk 3.5 (as a program disk drive or a data disk drive).



Product Information

EZTax-Prep '87
EZWare Corporation
29 Bala Avenue
Suite 206
Bala Cynwyd, PA 19004
(215) 667-4064
(800) 543-1040
$129.95
Update: 40% discount
Requires 128K, MultiPlan
Reader Service Number 300

Federal Tax Forms
Sky Computer Resources
P.O. Box 204
Department I
Portland, OR 97207
(503) 234-7291
$39.95, plus $2.50 shipping
Additional forms, $5 each
Update: $29.95
Requires 128K, AppleWorks, 17-cpi printer
Reader Service Number 301

J.K. Lasser's Your Income Tax
Simon & Schuster Software
One Gulf & Western Plaza
New York, NY 10020
(201) 592-2900
$69.95
Update: $29.95
Requires 64K, 80-column card
Reader Service Number 302

Sylvia Porter's Swiftax
Timeworks Inc.
444 Lake Cook Road
Deerfield, IL 60015
(312) 948-9200
$69.95
Update: $34.98
Requires 128K, 80-column card
Reader Service Number 303

Tax Command Professional
Practical Programs Inc.
P.O. Box 93104
Milwaukee, WI 53203
(414) 272-7227
$50
Update: $25
Requires 64K
Reader Service Number 304

Tax Preparer
HowardSoft
1224 Prospect Street
Suite 150
La Jolla, CA 92037
(619) 454-0121
$250
Update: $75
Requires 64K
Reader Service Number 305

1040Works
Personal Financial Services
P.O. Box 1401
Melville, NY 11747
(516) 261-8652
$21.95, plus $2.50 shipping, 128K
$24.95, plus $2.50 shipping, 256K
Updates: discount undetermined
Requires 128K, AppleWorks
Reader Service Number 306

1040WORKS: APPLEWORKS TEMPLATES

At first glance, you may dismiss 1040Works' $21.95 price tag as a typo. It isn't. Rather than devote thousands of man-hours to writing code for a stand-alone tax-preparation program, Phineas Fiske has simply developed templates for the AppleWorks spreadsheet. Time saved is money saved—for Fiske and for you.

Besides economy, spreadsheet templates offer an amazing advantage over programs. Most significantly, you don't have to learn any new commands. Fiske's templates are simply AppleWorks files you load in the usual way. You fill in information when AppleWorks prompts you to do so. Formulas are protected; mess-ups are unlikely.

With AppleWorks as the master program, 1040Works files peacefully coexist with AppleWorks enhancements, such as Pinpoint. The 1040Works disk also includes two files containing predefined macros for AutoWorks and MacroWorks, to speed up your tax-preparation chores.

The software is available in two versions. The first, 1040Works, requires 128K and splits Form 1040 into two parts (sides 1 and 2). On each giant (42K–52K) spreadsheet are all the subsidiary forms and schedules to which each side of Form 1040 refers. This setup makes 1040Works a little confusing, since it seems at first that everything is crammed in together.

Here's more you can do with the new Apple IIGS.

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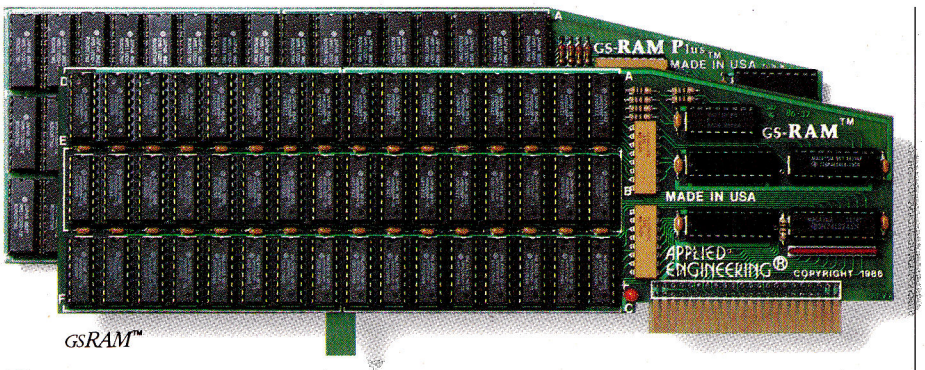
Expand the IIGS RAM and ROM with the GSRAM or GSRAM Plus with ROM Pak. Available now with 256K to 8 MEG!

GSRAM Plus™



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.

GSRAM and GSRAM Plus are available now, allowing up to 8 MEG of memory expansion. That's 8 times the memory capacity of Apple's card and just look at the benefits that only GSRAM and GSRAM Plus have over Apple's card:

- Lower cost
- Has 6 RAM banks (Apple's card has 4)
- Has memory expansion port
- Has ROM expansion port
- No configuration blocks to set
- No soldered in RAM chips
- Expandable to 8 MEG
- Expands AppleWorks internal limits
- Built-in Hi-Res self-diagnostic software
- 5 year hassle free warranty (Apple has a 90 day warranty)
- Made in USA

GSRAM for More AppleWorks Power

Only GSRAM and GSRAM Plus eliminates AppleWorks internal memory limits, increasing the maximum number of records available from 6,000 to over 25,000 and only GSRAM and GSRAM Plus increases the number of lines permitted in the word processing mode from 6,000 to over 15,000. And only GSRAM and GSRAM Plus offers a built-in printer buffer so you can continue using AppleWorks while your printer is printing. GSRAM and GSRAM Plus even expand the number of lines in the clipboard from 255 to 2047 and will auto segment 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. GSRAM and GSRAM Plus will even display the time and date right on the AppleWorks screen. Nothing comes close to enhancing AppleWorks so much.

Turn Your IIGS into a Giant

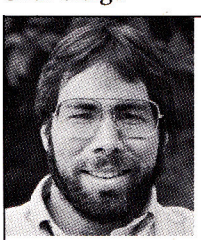
Simply plug GSRAM into the IIGS memory expansion slot and you've got up to *8 megabytes* of RAM at your fingertips—all of it instantly and automatically recognized by the IIGS. GSRAM is compatible with all IIGS software, including AppleWorks, as well as BASIC®, ProDos, DOS 3.3, PASCAL®, "C" and CP/M®.

Grow by Bytes or Megabytes

We offer GSRAM in two configurations so you can increase your memory 256K at a time (GSRAM) or a megabyte at a time (GSRAM Plus). Both offer full compatibility, lower cost than other boards, and easy expandability. And both are extremely low in power consumption. A fully expanded GSRAM operates at only 375 ma, and GSRAM Plus at only 270 ma (even with 6 megabytes on board!)

GSRAM—for Normal Memory Requirements

GSRAM is available with 256K, 512K, 1 MEG or 1.5 MEG of memory already on board. If you don't need the full 1.5 MEG now, you can choose a GSRAM with less memory and expand it up to 1.5 MEG in the future—or upgrade to GSRAM Plus for a small charge.



"I recommend Applied Engineering products wholeheartedly."

Steve Wozniak, the creator of Apple Computer

With an optional piggyback card, you can expand GSRAM even higher than 1.5 MEG! (Other cards are only expandable to 1 MEG.)

GSRAM Plus—for Growing by Leaps and Bounds

GSRAM Plus is the first Apple memory card to use 1 MEG RAM chips on the main board. It's available with 1 to 6 MEG on board. If you don't need the whole 6 MEG now, you can buy a GSRAM Plus with less memory and easily expand it in the future.

GSRAM Plus can be expanded up to 8 MEG with an optional piggyback card.

Easy Expansion

Both GSRAM and GSRAM Plus use standard RAM chips that are readily available and just plug right in. So unlike other cards, you'll find expanding your GSRAM or GSRAM Plus easy, convenient and very economical. And with our optional ROM expansion module you can even increase the IIGS's ROM space and all in just one slot.

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Applied Engineering is the largest supplier of Apple peripherals in the world. We *invented* the first large RAM cards for the Apple. With a 5-year "no-hassle" warranty and outstanding technical support, you can be sure GSRAM and GSRAM Plus will deliver the performance you're looking for—or return them within 15 days for a full refund.

GSRAM with 256K	$169
GSRAM with 512K	$219
GSRAM with 1 MEG	$299
GSRAM with 1.5 MEG	$379
GSRAM with 2-8 MEG	CALL
GSRAM Plus with 1-8 MEG	CALL

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Comparison chart: Bullets (●) indicate forms and schedules included in package. Asterisks indicate availability at $5 each.

	FORMS																		SCHEDULES									
	1040	1040A	1040EZ	1040ES	2106	2119	2210	2441	3468	3903	4137	4562	4684	4797	4835	5329	5695	6251	6252	A	B	C	D	E	F	G	R	SE	W
EZ Tax-Prep '87	●			●	●	●	●	●	●	●		●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●
Federal Tax Forms	●	●	*	*	●	*	*	*	*	*	*	●	*	*	*	*	*	*	*	●	●	●	●	●	●	*	*	●	●
J.K. Lasser	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Swiftax	●	●	●		●			●				●						●		●	●	●	●	●	●	●	●	●	●
Tax Command Professional	●			●	●	●		●		●										●	●	●	●	●	●	●	●	●	●
Tax Preparer	●				●	●	●	●	●	●		●		●			●	●	●	●	●	●	●	●	●	●	●	●	●
1040Works	●				●	●		●		●		●						●		●	●	●	●	●	●	●	●	●	●

KEY

Forms

1040	"Long" form
1040A	"Short" form
1040EZ	"Easy" short form
1040ES	Estimated Tax for Individuals
2106	Employee Business Expenses
2119	Sale or Exchange of Principal Residence
2210	Underpayment of Estimated Tax by Individuals
2441	Credit for Child and Dependent Care Expenses
3468	Computation of Investment Credit
3903	Moving Expense Adjustment
4137	Computation of Social Security Tax on Tips
4562	Depreciation and Amortization
4684	Casualties and Thefts
4797	Gains and Losses from Sales or Exchanges of Assets Used in a Trade or Business and Involuntary Conversions
4835	Farm Rental Income & Expenses
5329	Return for IRA Taxes
5695	Residential Energy Credit
6251	Alternate Minimum Tax Computation
6252	Computation of Installment Sales Income

Schedules

A	Itemized Deductions
B	Interest & Dividend Income
C	Profit or Loss from Business or Profession
D	Capital Gains & Losses
E	Supplemental Income Schedule
F	Farm Income and Expenses
G	Income Averaging
R	Credit for the Elderly and the Permanently and Totally Disabled
SE	Computation of Social Security Self-Employment Tax
W	Deduction for a Married Couple When Both Work

The advantage, of course, is that data transfer from subsidiary forms is automatic when you recalculate the spreadsheet. A "data port" built into the software uses the AppleWorks clipboard to transfer data from the first Form 1040 file to the next.

If you use the other version, 1040Works-X, which requires 256K, you can load both sides of the 1040 into memory at one time, to speed up and simplify the tax-preparation process.

FEDERAL TAX FORMS: PERFECT FACSIMILES

Last but certainly not least, among the easiest and tidiest tax software I've seen is the Federal Tax Forms series from Sky Computer Resources: easy because they're AppleWorks templates, tidy because each tax form is a separate template that precisely mirrors its namesake's appearance. According to Nicholas Sky, even the IRS liked these facsimiles. (A printer capable of generating 17 characters per inch is required.)

You'll find tax preparation less confusing with each form or schedule as a separate file (as opposed to 1040Works files, which are all-encompassing templates). Because Federal Tax Forms files are smaller, three or four templates will fit on the AppleWorks desktop at one time.

Of course, you pay a price for compartmentalization—you have to type in values you want to transfer from one form or schedule to another. In this respect, Federal Tax Forms isn't as automated as 1040Works.

In another way, though, Federal Tax Forms is more automated. You must fill in certain text information by hand after printing your 1040Works form.

A quick look at the accompanying table shows that the basic package from Sky Computer Resources contains only the most frequently used forms; you can order virtually any other federal form from the company for an additional $5, though. Among state forms, only the Oregon income-tax template is available.

Like 1040Works, Federal Tax Forms is compatible with AppleWorks macro programs, Quicken, and Pinpoint.

TAXING DECISIONS

If you use AppleWorks, investigate the two AppleWorks templates packages described. Their prices are reasonable—you might want to try both this year to see whether you prefer the integrated or component approach.

If you're looking for a stand-alone program to simplify the preparation of your income-tax return, you have three choices: Tax Command Professional, a no-frills, speedy calculator for intermediate computerists; Sylvia Porter's Swiftax for those with relatively uncomplicated returns who seek ease of use and sage advice; and J.K. Lasser's Your Income Tax for people whose tax lives are on the compli-

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RamWorks III 256K **$169**
RamWorks III 512K **$209**
RamWorks III 1 MEG **$279**
RamWorks III 1.5 MEG **$389**

65C816 16 Bit Card Requires RamWorks II or III and Apple IIe. Enhances VIP Professional. **$149**

RamWorks RGB Option Even if you bought a RamWorks just to use the RGB option, it would be worth it. The Applied Engineering RGB option has 4 text colors, runs both Apple and IBM RGB monitors, and is compatible with Apple's standard for RGB, includes cables. **$99**
(See our new RGB monitor at right.)

TransWarp™ We tested all the accelerators and TransWarp was 20-300% faster than the others. Runs cool too! **$219**

Z-80 Plus™ Runs all CP/M® software, works with Sider hard disk. There are over 5000 CP/M® programs out there and this card runs them all. Includes operating system and manual, a great value. **$109**

Timemaster H.O.™ Timemaster H.O. has the most features and is the easiest to use. It comes with more software than any other clock card. It even adds 15 new commands to BASIC! **$99**

Viewmaster 80™ Super resolution, total software compatibility and everything you need to run AppleWorks on a II+ or Franklin. **$109**

RamFactor™ If you have a II+ or would rather use slots 1-7 in your IIe or IIGS, RamFactor is for you. It is fully compatible with Apple's memory card, runs AppleWorks on a IIe, II+ or IIGS and has a battery back-up option.

RamFactor 256K **$189**
RamFactor 512K **$224**
RamFactor 1 MEG **$299**
Battery Back-up **$149**

Extended 80 Column Card with 64K Comes with full documentation. **$69**

GSRAM & GSRAM Plus These cards offer much greater performance and expansion capabilities than Apple's memory card and unlike most others, GSRAM and GSRAM Plus use standard RAM's so further expansion is easy and economical. Only GSRAM and GSRAM Plus can expand AppleWorks 2.0 internal limits and include a built-in printer buffer.

GSRAM 256K **$139**
GSRAM 512K **$179**
GSRAM 1 MEG **$249**
GSRAM 1.5 MEG **$319**
GSRAM 2-8 MEG .... **Call 214-484-5464**
GSRAM Plus 1 MEG **$529**
GSRAM Plus 2-8 MEG **Call 214-484-5464**

IIc System Clock™ **$69**

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Ultra 1: Memory Only	256K	**$169**
	512K	**$209**
Ultra 2: Memory & Clock	256K	**$209**
	512K	**$249**
	1 MEG	**$319**
Ultra 3: Memory, Clock & CP/M	256K	**$259**
	512K	**$299**
	1 MEG	**$369**

Phasor Simply the best sound and speech synthesizer for the II+, IIe, or IIGS. **$139**

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5-1/4" Disk Controller Runs up to 2 drives. **$49**

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Heavy Duty Apple Power Supply With over twice the output current of Apple's original power supply. This unit can run even fully loaded Apples. **$59**

DataShield Uninterruptable Power Supply Keeps your Apple running through power transients, voltage drops, brownouts and blackouts. Provides constant flow of power in a blackout for 15-20 minutes, allowing an orderly shutdown. **$299**

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Internal 1200 Baud Modem Cermetek 1200, for Apple IIe, II+ and IIGS runs at 1200 and 300 baud. Auto-dial, auto-answer with built-in speaker. Hayes compatible, with built-in communications software. Comes complete with cable and manual. (List $299) **$149**

Pinpoint's AppleWorks Accessories The best available and they are written to fully utilize Applied Engineering's RAM cards. (Includes RAM enhancement software). Together a $118 value. Only **$69**

256K RAMS 150ns. 5 year warranty. Set of 8 **$39**

VIP Professional Lotus 1-2-3 Workalike. For IIe & IIc (List $249) **$169**
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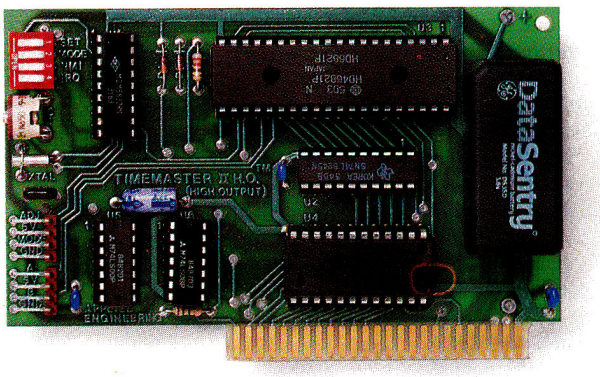
Here's more you can do with the new Apple II.

The first clock card to add time and date to AppleWorks'™ screens and files.



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Filing on Disk

Two years ago, the Internal Revenue Service initiated an experimental program, the Electronic Processing Pilot Project, for filing tax returns on disk. The IRS received approximately 100 responses from various individuals and companies during August and September, 1985, when the agency accepted public comment on the proposed plan. While few respondents addressed the program's merits, almost all asked how to participate in it.

The IRS considered this a positive reaction, and introduced the project in Cincinnati, Ohio; Phoenix, Arizona; and Raleigh, Durham, and Fayetteville, North Carolina, for the 1986 tax season. Only participating tax-preparation firms received IRS approval to file electronically. For the first year, the project coordinators limited filing to Forms 1040A, 1040EZ, and 1040, with no extra schedules or forms except Schedule A, for itemizing deductions. Partnership returns (1065), fiduciary returns (1041), and corporate returns (1120 and 1120S) were excluded from the pilot program.

More than 25,000 taxpayers filed electronically and signed an acknowledgment to satisfy the legal requirement that all returns bear the taxpayer's signature. The Planning and Statistical Division of the IRS in Washington, D.C., evaluated the program's usefulness, efficiency, and practicality, and came to some favorable conclusions.

The IRS is expanding the program for the 1987 tax season to include Milwaukee, Wisconsin; Albany, Schenectady, and Troy, New York; Sacramento and Stockton, California; and Norfolk, Virginia Beach, and Newport News, Virginia. In addition, individuals who participated in the 1986 pilot program can ask the IRS to deposit their 1987 tax refunds directly into their checking or savings accounts.

Direct deposit won't be available in the new areas this year, but participants can use more forms and schedules, including Schedule C (business income and loss for sole proprietors and self-employed), Schedule D (capital gains and losses), Form 4782 (employee moving expenses), and Form 2119 (sale of personal residence), among others. As a result, virtually all individual taxpayers in the 14 cities listed above who are due a refund will qualify for electronic filing.

Professional tax preparers interested in obtaining more information for next year, including technical specifications and applications, can write to the Assistant Commissioner; Planning, Finance, and Research; Internal Revenue Service, 1111 Constitution Avenue N.W., Washington, DC 20224; Attention: Electronic Filing Project.□

—Martin Blumenthal



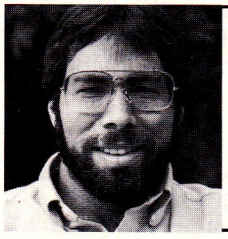
To boldly go at speeds no man has gone before.

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?

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PRESENTING BUSINESS GRAPHICS

Enhance your business presentations with paper, film, and video images. From computer painting to digitized photos, you'll dazzle your audience with an array of Apple graphics.



by Kathryn Alesandrini

Get down to business with Apple graphics. Business presentations pack more punch when graphics screens bring numbers and other abstractions to life. For a fraction of the cost of traditional business graphics, Apple software can help you cut through to the heart of a message and make an impact words and data just can't match.

THE HARD PART

High-quality hardcopy—paper, film, or video—is the number-one priority in business graphics. If your graphics look good, you look good.

Begin by selecting a graphics-output device that will give you crisp, vibrant images. Then choose compatible graphics software.

Output devices range from dot-matrix printers, to laser printers, to color plotters. The device you buy should depend on your business needs. If you need graphs in a hurry and want to promote a conservative, professional image, don't settle for a low-cost, black-and-white dot-matrix machine. For informal but attractive reports, a color dot-matrix printer such as the ImageWriter II is ideal, although its 160-dot-per-inch resolution may be inadequate for formal business presentations of charts and graphs. You can get the most out of your dot-matrix printer with a program such as Beagle Bros' **Power Print**, which lets you design your own characters, such as custom typefaces.

For a crisper image, laser printers produce black-and-white pictures on paper or transparencies in a matter of minutes. They're more expensive than dot-matrix printers, though. Dozens of new graphics-software packages for the GS are compatible with the Apple LaserWriter Plus.

Depending on the graphics program you're using, the LaserWriter Plus can produce images with a resolution of 300 dots per inch. If you can't afford a laser printer, some companies (for example, computer dealers) rent access to laser printers at an hourly or per-page rate: You create the graphics on your own Apple, but take your disk to a dealer for printing.

Pen plotters offer the sharpest image (more than 600 dots per inch) at a more affordable price. They can produce both color and black-and-white images. (Some devices carry a number of pens; others hold only one, but pause to let you change color.) The catch is slow speed: Simple graphics images usually take 5–10 minutes each; more complicated pictures often need 15–20 minutes or more.

FILM PRESENTATIONS

You can record computer graphics on film and reproduce them as prints, 35mm slides, and overhead transparencies. Expensive computer slide-making systems use *digital film recorders*. For inexpensive 35mm output, you can photograph the image directly from the screen. This procedure may result in a wrap-around look at the edges, though, unless the camera is specially designed to compensate for screen curvature. Another way to create slides is to use a simple (analog) film-recording device, such as Polaroid's **FreezeFrame**. It attaches to your Apple so that the computer can control filming automatically. The resolution of slides will look the same as that of the screen—not very sharp when projected.

Several Apple graphics packages offer good image quality at an affordable price for printed materials and overhead transparencies. For 35mm slides, though, new


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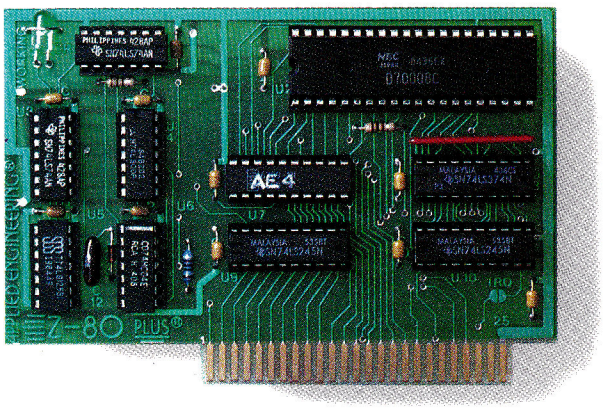

Now, get two computers in one, and all the advantages of both.

Enter the CP/M world with the new Z-80 Plus card from Applied Engineering, and introduce your Apple IIe, IIgs or II+ to thousands of CP/M programs. Only the Z-80 Plus comes standard with the new 5.1 software, the most advanced system ever for running CP/M programs.

The new 5.1 boasts advanced features like built-in disk emulation for popular memory expansion boards, boosting both system speed and storage capacity. And menu-driven utilities that let you get to work faster. The Z-80 Plus also lets you run older CP/M programs—all the way down to Version 1.6 (2.2 is the most popular).

The Z-80 Plus is the only card on the market capable of accessing more than 64K. If you have an extended 80-column card, all 128K is usable. And if you have RamWorks, RamFactor, GSRam, GSRam Plus, or an Apple memory card in your IIe, IIgs or II+, up to 1088K is available.

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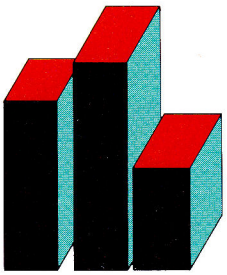

"For visualizing abstract data, nothing beats a sharp graph."

hardware and software capabilities are needed before your Apple can compete with more expensive systems.

SOFTWARE CHOICES

Business-graphics software is specially geared toward producing visuals for reports and presentations. In addition to standard bar, line, and pie graphs, many current Apple packages offer automatic formats for text charts. Some allow free-hand drawing and painting, while others include prepared "clip art" you can add to your reports for a professional appearance.

DATA GRAPHS

For visualizing abstract numerical data such as sales figures, nothing beats a sharp, colorful graph. Plotting sales figures by hand takes hours, but your Apple can generate neat, accurate graphs instantly from stored data.

"Stand-alone" packages accept data for graphing directly from other manufacturers' spreadsheets. One easy-to-use program is **Graph-On**, which works within the AppleWorks spreadsheet. You simply create your spreadsheet and type in your data; Graph-On uses your spreadsheet formulas to make bar, line, and pie charts that appear within the spreadsheet. When you edit data in one cell of the spreadsheet, the corresponding section of the graph also changes automatically.

Graph-On even lets you transfer its charts into the AppleWorks word processor for final editing and inclusion in your memo or report. Graph-On's charts are more useful than pretty, though—they're composed of keyboard characters such as pound signs (#) and 99s.

Several packages import AppleWorks spreadsheet files into a graphics processor, to act as a fourth AppleWorks application. PBI Software's **GraphWorks**, for example, generates standard types of graphs from imported spreadsheet files. An upgrade called **Visualizer**, with versions for the IIe/c and GS, prints graphs in color with the ImageWriter II. The GS edition sports a Macintosh-style interface and creates super-high-resolution output on the LaserWriter Plus and ImageWriter II.

Another package that offers the GS-AppleWorks connection is **Graphic Edge** from Pinpoint Publishing. Both programs can import images from other graphics software to dress up your charts with drawings or clip art.

"Integrated" graphics packages—spreadsheet and graphics in one package—are handy, but tend to sacrifice visual appeal for utility. They're better suited to "decision-support," or preliminary, graphics than presentation graphics.

If you have a great deal of information to plot and your spreadsheet is going to be huge (8191 rows by 256 columns), check out the integrated program **VIP Professional** (see Editors' Choice, November 1986, p. 176, and Reviews, January 1987, p. 38). This package is modeled after

Lotus 1-2-3, with a Mac-style interface. Its limited graphics options make it unsuitable as a presentation-graphics package, but it's useful for visualizing large data sets.

For top-of-the-line presentation graphics, you need a charting package that's compatible with a pen plotter. Two popular packages, **PFS:Graph** and **KeyChart**, send output to Hewlett-Packard desktop plotters, the Apple Color Plotter, and other standard models.

PFS:Graph offers basic chart types, including line, bar (stacked or clustered), pie, and area, but its real beauty lies in its simple yet elegant menus. Even a novice can begin creating business gra..ics within minutes. The program's data-handling capacity is somewhat limited, but it's easy to enter information directly or import it from PFS:File spreadsheets.

If you have a large amount of complex information, you may need KeyChart, which handles 975 data points and up to 99 variables per chart. It also offers a wider range of types of charts, including text.

Another program in this category is **Prime Plotter**, which lets you add three-dimensional and free-hand drawings to your charts. The package requires a software driver for the particular plotter you're using. PrimeSoft sells interface software for the Apple Plotter, most Hewlett-Packard plotters, and other popular machines.

TEXT AND ORGANIZATIONAL CHARTS

Text charts typically include a title with several lines presenting facts or ideas organized around a theme. Although images are more persuasive in some cases, word charts are particularly adept at summarizing abstract information. Software packages for creating text charts let you "typeset" words in various fonts, sizes, and colors. You simply type in your text along with design information; the software then lays out the chart.

For crisp, colorful text charts, consider packages that send output to plotters, including **DGI Type Shop** (Hewlett-Packard plotters), **DGI Sign Maker** (Apple, Hewlett-Packard, Epson, and Houston Instruments plotters), and the text-charting section of KeyChart (all major plotters).

If speed of production is more important to you than sharp image quality, try the text modules of Graphics Department, Beagle Bros' **Beagle Graphics**, or Penguin's **Complete Graphics System**. You can run off text charts quickly with a dot-matrix printer.

Special capabilities are also available for creating flowcharts, structural diagrams, Gantt (time-line) charts, and the like. **DGI Organization** automatically creates organizational charts from typed input. You simply enter number of elements at each level, number of levels, and all labels; the software lays out and prints a neat chart.

If you want to combine charts and graphs with text, check out the desktop-publishing package **GraphicWriter** (see Editors' Choice in this issue, p. 128). At press time, DataPak was shipping the GS edition, which will support the Apple LaserWriter Plus as soon as Apple delivers the print driver.

PAINTING PACKAGES

Painting and drawing packages let you sketch on screen and manipulate your pictures much as word processing lets you enter and edit text. With a graphics-input device such as a KoalaPad or mouse, or your Apple's arrow keys, you draw an image free-hand or choose basic shapes such as circles and lines, then press function keys to automatically scale an image up or down, rotate or invert it, combine it with geometric shapes, color it, texturize

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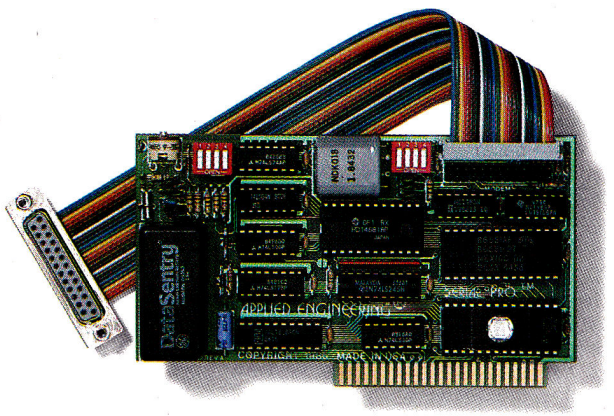
The intelligent multifunction card from Applied Engineering.



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.

Serial Pro is perfect for Apple IIe, II+, IIGS or compatible owners in need of a serial port or clock/calendar or both. But unlike other multifunction cards on the market, Serial Pro does not use phantom slots, so all the slots in your computer are useable.

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

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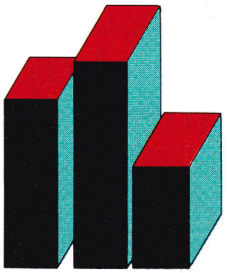


"Your Apple can generate neat, accurate graphs instantly."

it, or zoom in for a close-up. You can even create mirror-image, "rubber-stamp" copies of your picture elsewhere on screen, or animate it, all in a matter of minutes. And, of course, there's an electronic eraser that lets you wipe out mistakes without a trace.

Most Apple sketching packages currently on the market are painting programs. Painting software differs from drawing, or "object-oriented," software in the way it stores images. A "painted" image looks more realistic because it's composed of a grid of dots, much like a newspaper photograph, rather than a compilation of shapes. The human eye, of course, perceives the whole, not the dots.

One advantage of painting software over drawing packages is that painting programs are compatible with digitized photographs produced by scanners and frame grabbers (see below). The drawbacks are less flexibility in editing images and a print resolution limited to your screen resolution.

Two popular painting packages are Broderbund's Dazzle Draw and Baudville's **Blazing Paddles**, which display images in double-hi-res (560 by 192 pixels). You can print your pictures in color with the ImageWriter II, or display them one after another on screen with a "slide show" feature (see below).

A MacPaint look-alike, Activision's **Paintworks Plus** offers 640-by-200-pixel resolution and frame-by-frame animation for the GS. In addition to making color prints with the ImageWriter II, PaintWorks Plus supports the LaserWriter Plus for sharp black-and-white hardcopy. Two additional MacPaint-style packages are Baudville's **8/16 Paint** and Electronic Arts' **Deluxe Paint**.

DRAWING PACKAGES

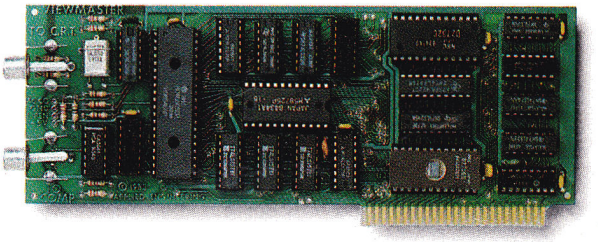
Drawing software produces the sharp, crisp images needed for good-looking business communications. Before the introduction of the GS, no distinction was made between drawing and painting software for the Apple II. True drawing software is "object-oriented": Images are composed of basic shapes such as lines, curves, polygons, and so on. You create images in layers; the software preserves the layers, and you can modify them at a later time.

The major advantage of drawing software is that it can produce hardcopy output that's sharper than the screen image. Unlike painting software, which prints essentially by dumping the screen's dot patterns, drawing programs mathematically adapt to the output device you're using.

For example, a two-inch line on your screen may contain only 80 dots, but a laser printer could display the same line with 600 dots, resulting in a sharper line. Painting software, however, can't tell your Apple that a particular group of dots in the image actually represents a straight line, so the computer can't direct your printer to place the maximum number of dots on that line. Instead, painting programs enlarge images by doubling or quadrupling every dot, resulting in jagged edges. Drawing programs, on the other hand, give your Apple only the

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	
VIEWMASTER 80	✓	✓	✓	✓	✓	✓	✓	✓	
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):
• 80 Characters by 24 lines • Fully compatible with all Apple languages and software • Highest compatibility with existing 80 column software • Very low power consumption • High speed (18 MHZ) scroll rate • Upper and lower case characters and true descenders, both inverse and normal; all on-screen editing functions are supported • User-definable cursor shape • Compatible with Apple II, II+ and IIe • Five-year warranty

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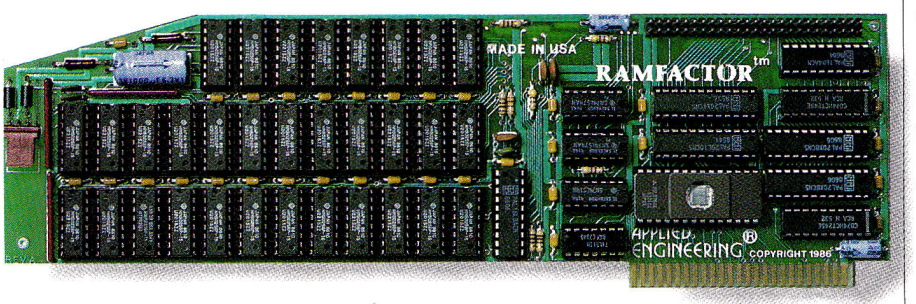

Very Compatible

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.

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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 to anyone with an Apple IIe, IIGS *or* II+ with an 80 column card. RamFactor, no other standard slot card comes close to enhancing AppleWorks so much.

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ending coordinates (not the rest of the points in between) and tell it to draw a straight line.

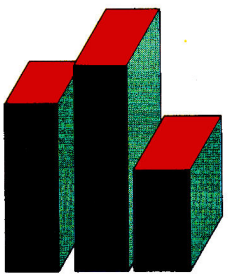
The amount of drawing software currently on the market is sparse. The three-dimensional-drawing module of The Complete Graphics System is an object-oriented program that yields sharp, colorful images with most plotters. Prime Plotter also has a built-in drawing capability that can drive this type of output. Several GS drawing packages are in the works; StyleWare's **Top Draw** is already on the market, and Broderbund's **Drawing Table** will soon be released.

ELECTRONIC CLIP ART

For Apple-graphics fans with too little time or desire to draw, there's electronic clip art. You "cut out" professionally drawn sketches and "paste" them into your own images for a customized look. The advantage is that you can easily dress up even your most abstract graphs of numerical data. It adds a refreshing, creative touch to any presentation. You can represent most topics at least indirectly. For example, you can portray an abstraction by showing something concrete associated with it, such as an airplane to represent the idea of travel.

The Print Shop contains dozens of pictures and symbols, border designs, and other stored patterns you car cut and paste. Several extension libraries from Broder' provide additional images of people and business, anc ternational symbols. The latest version lets you print in color with the ImageWriter II, Epson JX-80, and other

Product Information



Animate, $69.95
Dazzle Draw, $59.95
Drawing Table
Fantavision, $49.95
The Print Shop, $49.95
Broderbund Software
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(415) 479-1700

Beagle Graphics, $59.95
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Frame-Up, $29.50
Power Print, $39.95
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GraphWorks, $79.95
Visualizer for IIe, $89.95
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Reader Service Number 335

models. Other vendors also offer wide-ranging collections of images that are compatible with The Print Shop.

ON-SCREEN SLIDES

After you create your electronic graphics, you'll need a way to show them to others if your goal is to give a presentation. An alternative to expensive hardcopy or film output is to show your "slides" right from your Apple's screen with a program such as Beagle Bros' **Frame-Up**. (See "Video Magic," p. 51 in this issue, for more information on using your videocassette recorder to tape Apple graphics for presentation.) Slide-show software also offers greater flexibility than traditional slides: For added impact, you can punctuate images with such special effects as animation. And with a specialized program like Beagle Bros' **Beagle Screens**, you can add title and comment frames to enhance your presentation.

A number of Apple slide packages let you produce self-running demonstrations. Sensible Software's **Graphics Department** sports a "slide projector" feature that holds up to 16 frames per disk. With tools such as ellipses, lines, and rectangles, the program lets you add pictures to your graphs, as well. **Dazzle Draw**, from Broderbund Software, can display seven slides per disk. For a longer demonstration (up to ten minutes), Accent's **Graphic Solution** offers both frame-by-frame and cell (shape-table) animation.

PHOTO SCANNING AND FRAME GRABBING

The latest trend in graphics systems is combining business charts and graphs with digitized photographs. Data are charted as an overlay against a relevant background photo. Or you can position photos next to the graph to explain or demonstrate the message.

The simplest hardware/software scanning sytems cost less than $200 and work with a dot-matrix printer to scan any photo you can roll through the printer. One such product is **Scannit** (see Editors' Choice, February 1987, p. 128), for the Apple II and ImageWriter. You replace the printer-ribbon cartridge with a small scanning camera, which converts photographs to arrays of dots.

Other types of systems "grab" video frames and convert them to digital Apple graphics files. Products that capture video images this way include **ComputerEyes** (see Reviews, August 1985, p. 72) for the IIe and IIc and **VisionPlus** for the GS. They read images directly from videotape and let you preview them before digitizing. Special video cameras that photograph anything a camera lens can capture are available for frame-grabbing systems.

Once you've digitized the photo, you can manipulate it in a number of ways. You can change the aspect ratio to elongate or squeeze the image, you can vary color and contrast and convert negatives to positives (or vice versa). You can radically alter a photograph, yet leave no trace of the tampering. And you can pull digitized photographs into your images with any type of graphics software that lets you import files.

THE ART OF COMMUNICATION

Bring your business presentations to life with Apple graphics hardware and software. The key to success is achieving the right tone. With sophisticated hardware and dazzling software for your II, you'll have a head start toward mastering the art of communicating your ideas. ■

Kathryn Alesandrini is a cognitive psychologist and associate professor of media and technology at California State University. Write to her at P.O. Box 2805, Malibu, CA 90265.

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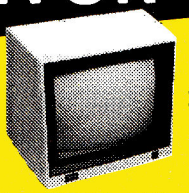
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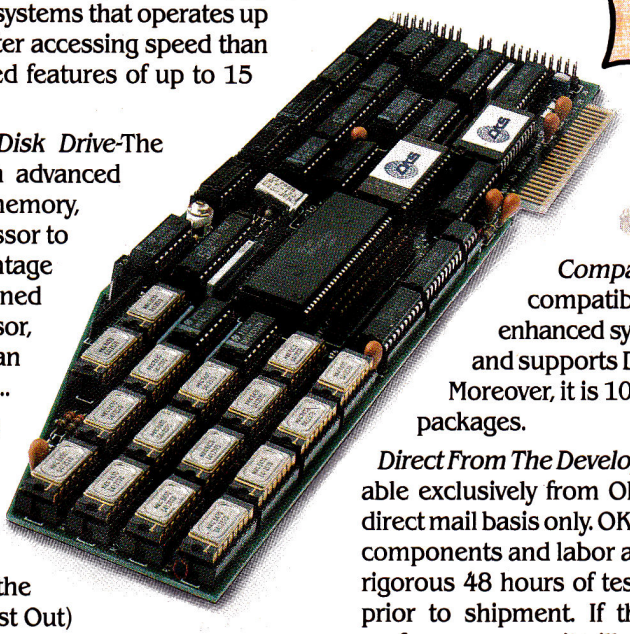

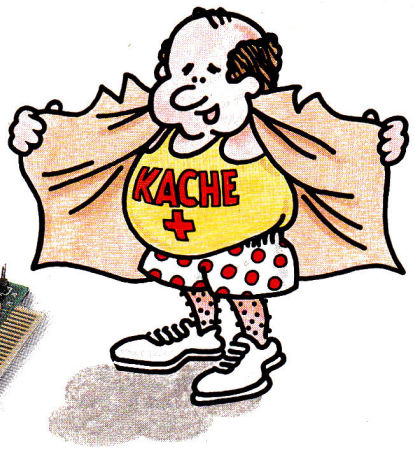

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AUTOMATICALLY saves data in RAM disk mode for future transfer to floppy disk

AUTOMATICALLY time and date stamps files written to disk

Multi-Function Features-The Kache Plus Card also doubles as a multi-function board with a choice of up to 15 expanded features for your Apple *II* system. And, by utilizing the benefits of the Kache Plus Card's cache memory and 64180 microprocessor, each feature offers a performance advantage over comparable expansion boards on the market.

The standard Kache Plus Card comes complete with several of the most popular expansion features to date. And, with the optional features offered it can be easily upgraded to grow with the sophistication of the computer market. In addition, future innovations from OKS will be carefully engineered for easy assimilation into the standard Kache Plus Card design.

Standard Features: 256K Cache Memory/RAM Disk, On Board Clock/Calendar with Battery Back-up; Utilities for Clock/Calendar; Back-up Utilities Diskette; Concurrent Operation of 2 Floppy Drives; User Friendly/Mouse Compatible Menus; On Board Firmware Utilities for Future Upgrade.

Optional Features: 512K Cache Memory/RAM Disk Upgrade; Expandor Module which includes: Concurrent Operation of 6 Floppy Drives, Parallel Printer Interface, 256K/512K Parallel Print Buffer, Super Serial Interface, 3 Line Serial Interface, EEPROM; External Power Supply; Cable Options which include: Duo-Disk Cable, Serial Interface Cable, Parallel Interface Cable; Replacement Battery for Clock/Calendar.

Compatibility - The Kache Plus Card is compatible with Apple *II*, *II+*, *IIe* and *IIe* enhanced systems with 1-6 floppy disk drives, and supports DOS, PASCAL, ProDOS and CP/M. Moreover, it is 100% compatible with all software packages.

Direct From The Developer-The Kache Plus Card is available exclusively from Ohio Kache Systems (OKS) on a direct mail basis only. OKS offers a full year warranty on all components and labor as well as a 30 day trial period. A rigorous 48 hours of testing is completed on each unit prior to shipment. If the Kache Plus Card does not perform as we say it will, simply return it to OKS and your money will be fully refunded.

Don't Buy A Hard Disk Drive Or Another Add-On Board... Buy the Kache Plus Card instead. Priced at:

$395.00 (Price indicated is for the standard Kache Plus Card. Optional features are available at an additional charge.)

The standard Kache Plus Card costs less than any hard disk drive. It's even priced below the cost of buying separate boards for each of the standard features.

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Circle 37 on Reader Service Card.



Photos courtesy of George Walsh Real Estate

VIDEO MAGIC

For professional presentations, your Apple and your VCR make a great team—with a little practice, you'll soon be an expert producer.

by Harold E. Ruppel

If you're looking for new techniques to enhance your business or classroom presentations, here's a way to do just that. Your Apple II, videocassette recorder, Fingerprint + card, and Print Shop program can be your key to bright, professional presentations that convey your message effectively.

A VCR with wired four-function remote control is the heart of the setup, but the secret of success is a graphics-dump interface—I prefer ThirdWare's FingerPrint + printer-control module—and Broderbund's Print Shop. The FingerPrint card isn't essential, but, as we'll see below, videotaping your screen is a time-consuming job without it.

To set up your system, just hook up your Apple output to your TV's monitor. All you need is an RCA-type Y fitting and a five- to six-foot cable with RCA-type connectors on both ends (about $4 total at your local Radio Shack). Insert the Y fitting into your TV's video-in jack; connect a line from your Apple to one arm, and the cable from your VCR to the other arm, of the Y. Data flow from your Apple to your TV for display, from your TV to the VCR for recording, and from your VCR to the TV for playback.

TAKE 1...

Now you're ready to begin experimenting with your material. Switch your VCR to record. Run the Print Shop demo disk, and, as it's booting, press Control-A. You'll see a menu of questions; move the cursor bar to Review of Coming Attractions and press Return.

The Print Shop brings up a menu listing eight patterns. Choose Bubbles to start, press Return, and you'll see a red-and-blue screen of moving bubbles.

Put your VCR on pause; when you're ready, go to full record. Tape the bubbles for about a minute. Pause the VCR again, return to the menu, and try the other patterns.

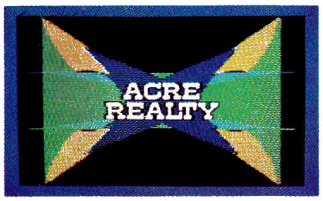
When you've taped several of them, rewind the tape and play it back; the beautiful color will startle you. You've now successfully taped your first computer video—it's time to move on to more sophisticated applications.

HOLD THAT SCREEN

Where does the FingerPrint + printer-control card (or other graphics-dump interface) fit into this scheme? It can hold any part of a program on screen indefinitely. You can control the Print Shop functions and use any color graphics you see on screen.

Let's see how this works. Put your VCR on record, boot up The Print Shop, and select Screen Magic. When you press Return, you'll see a prompt; answer yes and press Return to access the program's Kaleidoscope patterns. A series of colorful graphics appear on screen. When you see one you want to tape, press Escape to freeze the picture and bring up another menu.

Select Write on Screen and press Return. Your graphic reappears with a box at the bottom of the screen telling you to press Return to continue. When you do, you'll see a menu of typestyles. Choose one; The





"Watch your letters unfold on screen. You'll know which colors and sizes look best."

Print Shop then gives you a box for your caption.

Type in your text, then hit the return key. Watch as the menu box goes off screen, and switch your VCR quickly from pause to record. Watch your letters unfold on screen; they're superimposed on the color-graphic background. As soon as the last one appears, pause the recorder before the flashing box comes on at the bottom of the screen.

Next, hit the red button attached to your FingerPrint+ card when the cursor disappears. You'll then see the FingerPrint+ menu. Hit the left-arrow key once and press Return. You'll see your full-color screen without the cursor, and the slide will remain as long as you need it.

Now go to full record and run the slide eight to 15 seconds, then pause the VCR again. Try several more screens, then try writing on them. The Print Shop gives you a choice of "filled" or "solid" letters, so try them all. With practice, you'll be able to quickly make your color presentations look just the way you want.

TAPING TEXT

When you're experienced at making slides, you'll want to plan the text you'll add to your color screens for complete presentations. You'll also know which colors show up and which type sizes look best with various kaleidoscopes.

If you're showing a tape of the computer screen to your audience, the VCR records 40-column type clearly, but 80-column is another story. A video camera with zoom lens is a better recorder of 80-column screens than your VCR's taping mechanism, but that's an expensive alternative.

You can also make video "slides" from Fantavision screens, then with Fontrix, insert printing into the color graphic, recopy it, load it into memory, and record it on videotape. The FingerPrint+ card also lets you save on-screen color graphics to disk.

VIDEO TIPS

A few suggestions for getting the best picture quality from your VCR can make recording easier. When you tape color graphics, run your VCR on its slow speed to get the best bandwidth and prevent "blooming." When you get around to audio dubbing, make sure you don't change speeds—or voices will sound like Donald Duck during the playback. If you do change speeds, copy the videotape at one speed, then do all your audio dubbing on the duplicate.

Record 40-column text displays at the fast setting for best readability. Don't forget—you can show computer programs this way and stop, hold, and talk about them with your audience. You can't stop a color graphic without some distortion, though, so when you're making color slides, let the VCR run on record long enough to accommodate comment and discussion.

Remember that if you want a paper copy of any slide during your presentation, your printer can run one off at the touch of your FingerPrint+ button.

ALTERNATIVES

If you don't have a FingerPrint+ card, you can still make slides—put your color graphic with superimposed print into memory and save it to disk. When you're ready to introduce it into your videotape, you can use a graphics-dump program to bring it back on screen.

With a Legend RAM card or a RamWorks II board with built-in software, you can set up a slide show by loading all your graphics slides into RAM, then calling them up one at a time while videotaping.

As your expertise grows, your colleagues will ask you for duplicate tapes of your presentations. There's a knack to producing professional-looking videos—your Apple and your VCR can show you how.■

Write to Harold Ruppel at 8310 Waterswolde Lane, Fort Wayne, IN 46825.

Product Information

Fantavision
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In its special report on the best small business accounting software, *PC World* said, "Back to Basics takes the *smallest bite out of your capital,* yet it's also the easiest to use of the three contenders. For a bargain price, Back to Basics provides a lot of punch, especially for businesses with heavy cash handling requirements."

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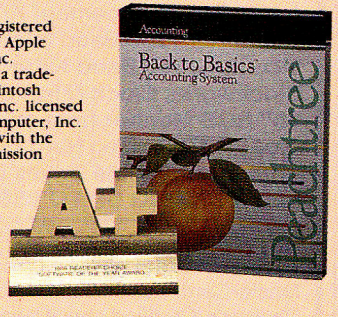

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ARE YOU READY FOR SCSI?

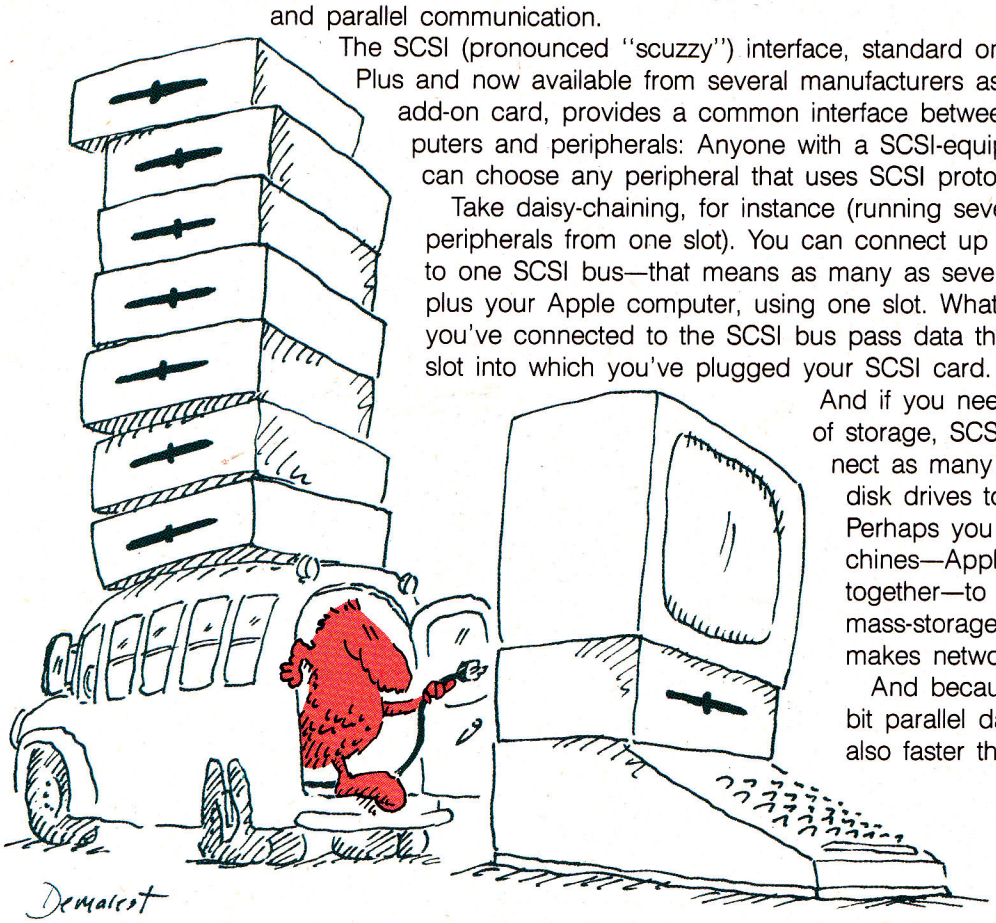
What does the new Small Computer Systems Interface offer you? The promise of daisy-chained hardware, faster data transfer, and a standard interface protocol means that SCSI is transforming the Apple II peripherals market.

by Lafe Low, Assistant Editor

Every Apple user—from consumers to dealers to hardware developers—can take advantage of the Small Computer Systems Interface, or SCSI, standard. Whether you want to daisy-chain your peripherals, save money or slot space, transfer your data faster, or just choose from a wider range of equipment, SCSI offers you an alternative to traditional serial and parallel communication.

The SCSI (pronounced "scuzzy") interface, standard on the Macintosh Plus and now available from several manufacturers as an Apple II add-on card, provides a common interface between all host computers and peripherals: Anyone with a SCSI-equipped computer can choose any peripheral that uses SCSI protocol.

Take daisy-chaining, for instance (running several connected peripherals from one slot). You can connect up to eight devices to one SCSI bus—that means as many as seven peripherals, plus your Apple computer, using one slot. Whatever peripherals you've connected to the SCSI bus pass data through the one slot into which you've plugged your SCSI card.



And if you need vast amounts of storage, SCSI lets you connect as many as seven hard-disk drives to your Apple II. Perhaps you want your machines—Apple IIs and Macs together—to share a central mass-storage unit; SCSI makes networking easier.

And because it uses an 8-bit parallel data bus, SCSI is also faster than serial trans-

mission. In parallel communication, bits travel eight abreast, instead of single file as in serial transfer: An entire byte is transmitted in one clock cycle, as opposed to only one bit per cycle. At 1.5 megabytes per second, "SCSI [data transfer] is about as fast as a microcomputer needs," says John Ison, senior software engineer for General Computer.

EFFECT ON DEVELOPERS

Not only will SCSI let you use more than one peripheral, but the prices of those peripherals are expected to fall as more and more manufacturers develop equipment with built-in SCSI protocol. Manufacturers can address a larger market by making peripherals that aren't specific to individual brands of machines—with a common interface, an entire line of SCSI-standard products can be targeted toward any SCSI machine. Instead of Mac hard drives, Apple II hard drives, or even IBM hard drives, for instance, each unit using the SCSI standard will be compatible with any SCSI-equipped computer.

"There's no reason SCSI should be expensive," says David Dart, technical director of Stellation Two, a hardware-development company. "It opens doors to any hardware. Manufacturers can talk to a much larger market."

Dealers can buy one product and format it for any market to which they want to sell it by altering directory structures. Software developers can make use of drives partitioned for a Mac and an Apple II. "From everybody's point of view, the SCSI bus makes things simpler," comments Ash Jain, vice president of the Apple Enhancement Products Group at AST Research.

BACKGROUND

The precursor of today's SCSI bus was developed by Shugart Associates in the late 1970s. Its first edition, SASI (for Shugart Associates Standard Interface), let a number of peripherals exchange data with one or more host computers, much like the current version.

After improving SASI protocol and its command set to allow arbitration (letting peripherals communicate directly with one another) and multimaster capability, a committee of the American National Standards Institute renamed it Small Computer Systems Interface, or SCSI. The SCSI bus has now been adopted as the ANSI standard, says David Dart of Stellation Two.

TECHNICALLY SPEAKING

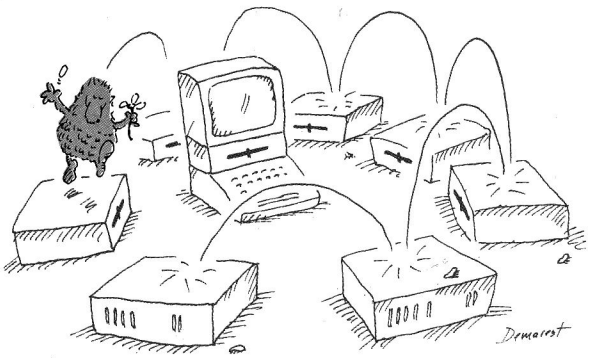
The heart of the 8-bit parallel SCSI bus, according to Charles McConathy, Apple Marketing Manager of CMS Inc., is a card (whether embedded, as in the Mac, or plugged into an Apple II as you would any other expansion board) containing a 5380 microprocessor with built-in SCSI protocol, RAM chips for partitioning, ROM chips for drivers, several jumpers, and a 50-pin connector (25 signal and 25 ground). You can plug a SCSI card into any slot in your Apple, except slot 3 (still reserved for 80-column cards in Apple II architecture).

Each device daisy-chained to the SCSI bus, whether a peripheral or a host computer, is assigned an identification code, accessed through SCSI protocol as you determine the peripheral with which you'll be working. According to Bob Otis, senior software engineer for ProAPP, you select peripheral IDs with DIP switches or jumper pins.

Partitioning hard drives connected to the SCSI bus lets them access data without interfering with each other. Many hard-disk owners are already familiar with reserving different portions of a drive for ProDOS and DOS 3.3.

Product Information

A Sampling of Current SCSI Devices



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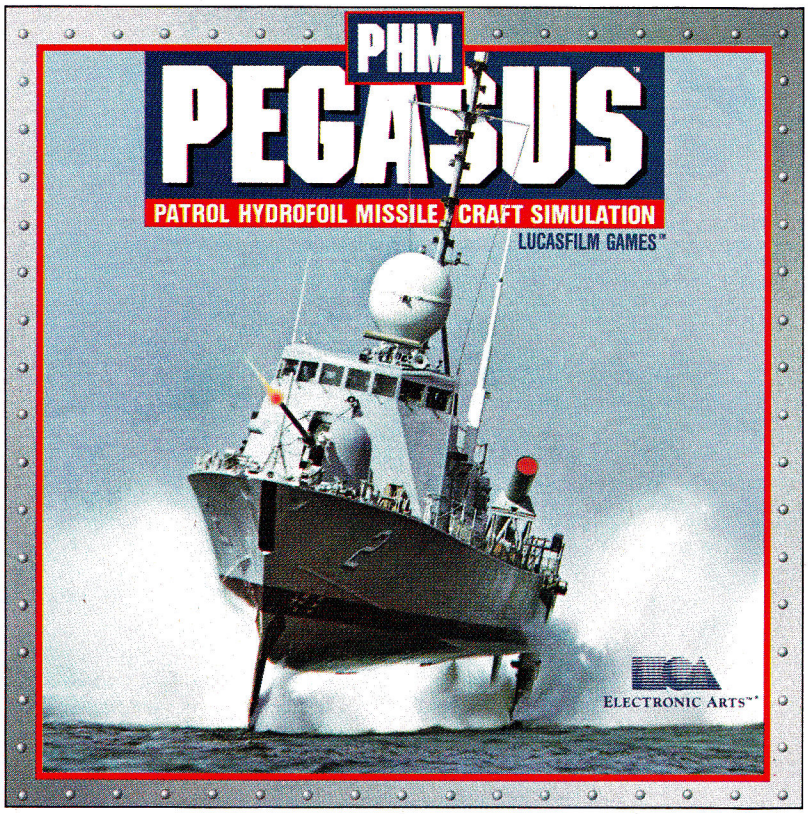

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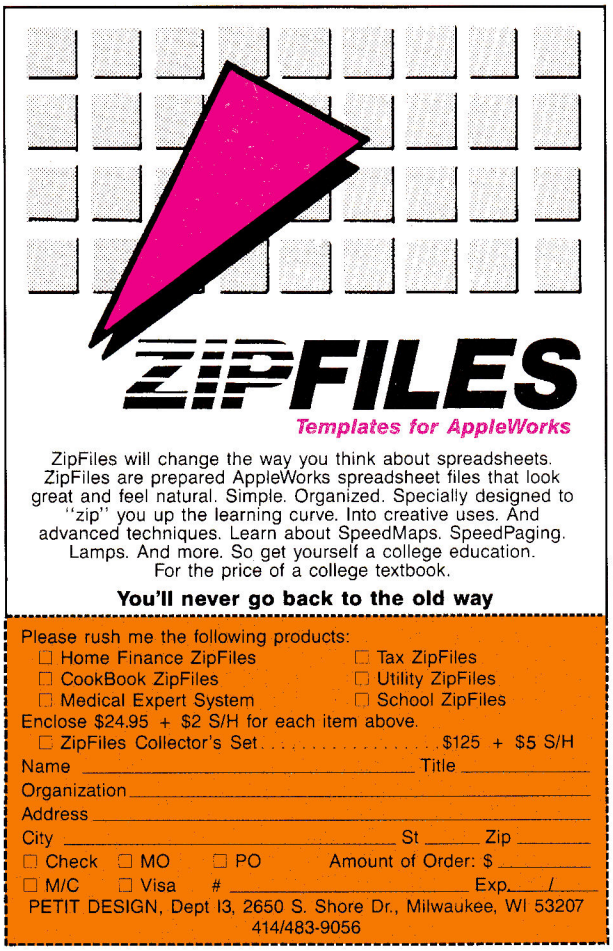

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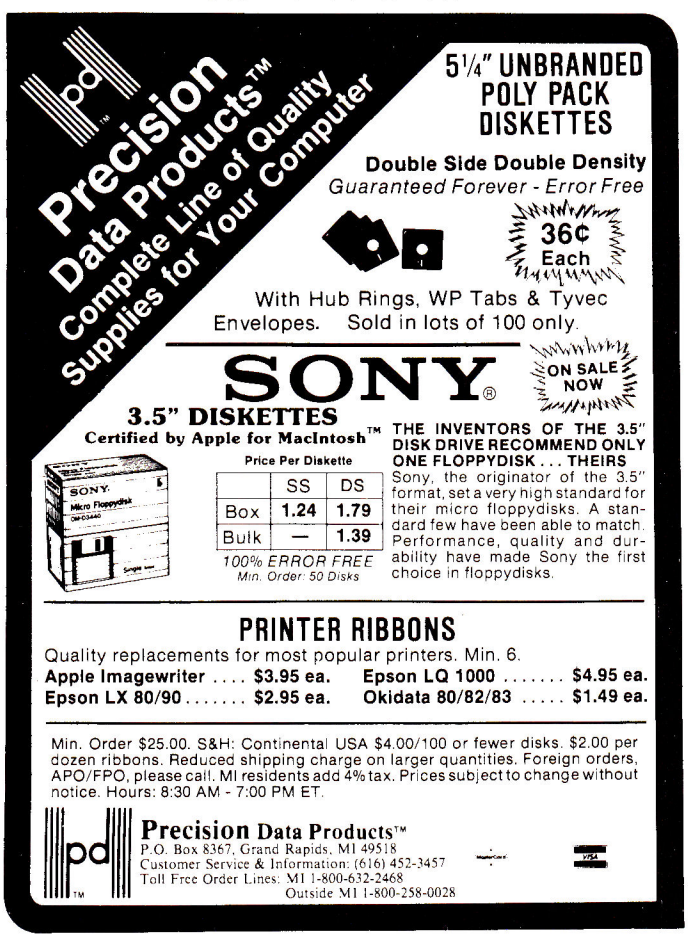

Circle 29 on Reader Service Card.

Under SCSI protocol, individual drives can work in different capacities (such as read-only or read/write), and different machines (such as a Mac and an Apple II) can operate simultaneously without data colliding along the bus, according to CMS' McConathy.

The card's microprocessor converts data to SCSI format, commands the SCSI bus "understands," and can transmit to or receive from a peripheral.

THE INTERFACE ADVANTAGE

The SCSI bus and SCSI peripherals open up a whole range of new options to Apple II owners. The ease of connecting and daisy-chaining peripherals to the SCSI bus gives you the freedom to set up just about any hardware configuration you need, using a variety of host computers and hard drives. SCSI peripherals currently available or under development, according to AST's Ash Jain, include external and internal hard-disk drives, tape backups, and optical disks. Future possibilities, he notes, include printer controllers, intelligent mass-storage controllers, multihost capability, local-area-network interfaces, and specialized processors (see the accompanying Product Information box for details).

SCSI eases communication between peripherals and your Apple. In the case of hard drives, says Stellation's Dart, you won't have to know how to alter timing or handle bad sectors—the SCSI interface will make such adjustments.

Separate controller cards for SCSI hard drives aren't necessary. The controller function takes place inside the hard drive itself and is accessed through SCSI commands, explains ProAPP's Bob Otis.

Most current SCSI peripherals are mass-storage devices, but any peripheral can be "embedded" with SCSI protocol. Hard-disk drives are likely candidates because of the high data-transfer speed and common interface SCSI provides. As General Computer's Ison notes, "Hard drives have to communicate rapidly with the CPU."

The apparent shortage of slot space in the Apple II is no longer a problem. Because the SCSI bus lets you connect up to eight devices simultaneously, the SCSI interface handles all your storage requirements, leaving your other slots free for printer cards, modem connections, and so on. And as more and more peripherals adopt SCSI protocol, you'll also be able to attach these peripherals to your SCSI bus.

THE SCSI FUTURE

SCSI has received "overwhelming support" from hard-drive manufacturers, notes Dart. In that market, it has already established itself as a standard, and Dart says he believes other peripherals will follow.

"That's the whole idea of the interface," says Otis, "to have all peripherals using it." SCSI will become the standard interface, he predicts: "Everyone seems to be going that way."

"It's an accepted standard," Jain states. "It's just a question of when people will have products for it."

Next year, more and more equipment will carry SCSI protocol, McConathy says. With high-capacity drives and conversion software, he adds, SCSI will provide a bridge to the world of the IBM PC.

"There's room to grow," says Dart. "Some advantages of the SCSI are not being fully utilized. It's going to be here for a while."

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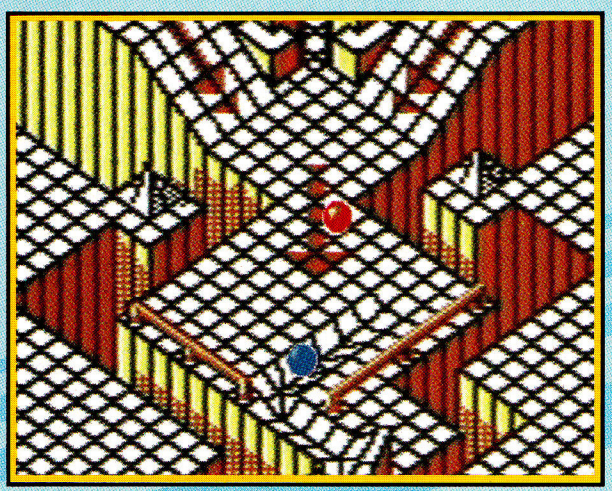

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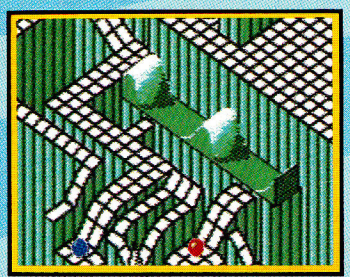

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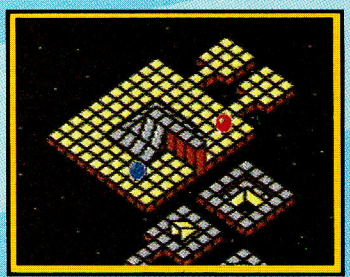

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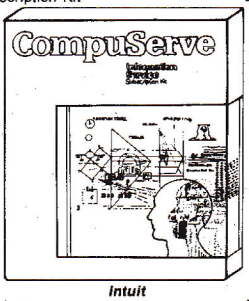

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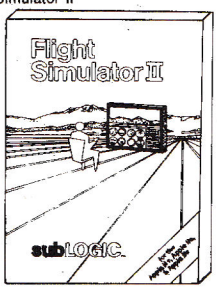

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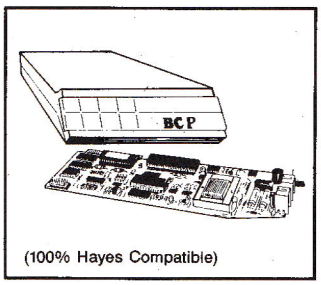

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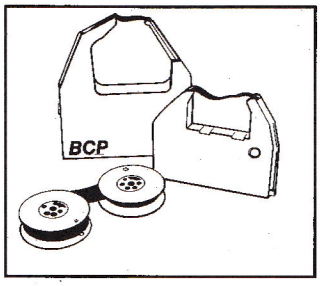

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A Car-Loan Comparison Spreadsheet

Your AppleWorks spreadsheet can help you figure the difference between car deals.



by Ruth K. Witkin

Spring, in my neck of the woods, is a time when the great outdoors beckons and thoughts turn to getting out on the road. If you're yearning for free-wheeling pleasures but don't have the wheels, you're probably thinking about buying a car.

A case in point: David Clark, college student, psychology major, and soon-to-be-graduate. Ever since David received a letter from Detroit offering him preferential college-graduate treatment when he buys a car, he's haunted the showrooms, compared prices, and has finally come up with two deals that are within reach, providing Mom and Dad come up with a down payment.

Figure 1 shows David's car-loan spreadsheet. All he has to do is enter the price of each car (including options), other charges and fees, deposit, down payment, interest rate, and term of the loan. The formulas then produce sales tax, total cost, amount of the loan, term in months, annual loan payment, total loan payment, total interest charge, dollar difference between packages, and, most importantly, the monthly loan payment.

When you see such key combinations as OA-L, hold down the open apple key and type L. If you make a typo, press the delete key to back up the cursor and erase. If you save to disk with a one-drive system, follow the screen prompts that tell you when to swap the Program disk for the data disk.

A SPREADSHEET FROM SCRATCH

Use the AppleWorks Startup and Program disks to bring up a new spreadsheet screen. Name this file CARLOAN. You should now see the Review/Add/Change screen. Use the following summary (in this sequence) to set up the spreadsheet so that it looks like the one in **Figure 2**.

Long Lines: Use an equal sign to enter a line across row 2: Place your cursor on A2 and type " to tell AppleWorks the equal sign is text. Now hold down the equal sign key until the cells from A2 through D2 are filled with equal signs. Move the cursor to row 25 and repeat the procedure. Using a minus sign, enter the lines in rows 4 and 20 the same way.

Column Width: Each column is now nine characters wide. Use the Layout command (OA-L) to increase the width of column A by 16 characters (to 25 characters) and the widths of columns B, C, and D by seven characters each (to 16 characters each).

Short Line: With your cursor on B10, type quotation marks, then press the spacebar five times. Hit the minus sign key ten times, and press the return key. Later, you'll copy this line into C10 and D10.

Labels: Type the spreadsheet title in B1, the labels in row 3, then the labels in column A, indenting the ones in rows 6 to 9, 12, and 13 with a space. Before typing each of those labels, type quotation marks and press the spacebar once.

Formats: Use the Value command (OA-V) to set a standard value of commas with two decimal places. Use the Layout command (OA-L) to right-justify the labels in row 3. Now, after all your work, store the spreadsheet safely on disk: Leave your cursor where it is, press OA-S, and relax while AppleWorks carefully saves your file.

ENTERING THE FORMULAS

Now it's time to enter the formulas that perform your calculations. **Figure 3** shows their locations. First, read how the formula works. Then place the cursor on the cell receiving the formula. Move your cursor to the cell locations shown in the formula description and type everything else. When the formula is complete, compare your screen with the formula description. If everything checks out, press the return key. If you have a problem, press the escape key and start again.

FORMULA 1: SALES TAX

Formula 1 calculates a sales tax of 8 percent on the price of the car (B5) plus rustproofing (B6), and enters the result in B7. You can later edit the formula to work with the sales-tax rate used in your area.

Cell location: B7
Description: +B5+B6*.08

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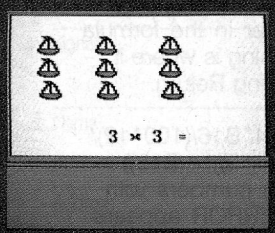

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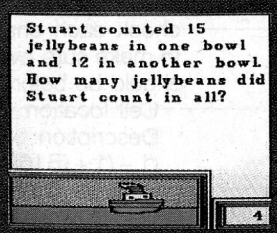

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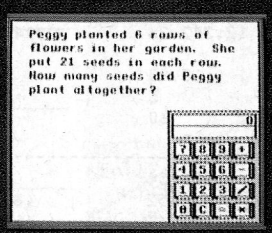

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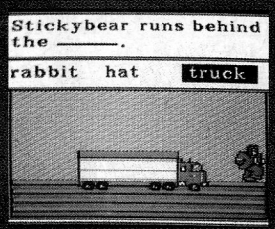

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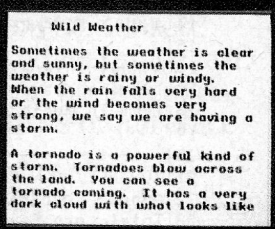

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A/MS88-1

Figure 1. An AppleWorks spreadsheet comparing the costs of two car loans.

	A	B	C	D
1		CAR LOAN CALCULATOR		
2				
3		Sonesta (1)	Madrigal (2)	Diff (2-1)
4				
5	Price of Car	9,844.00	12,553.00	2,709.00
6	Rustproofing	250.00	269.00	19.00
7	Sales Tax (8%)	807.52	1,025.76	218.24
8	Registration/Misc Fees	35.00	36.50	1.50
9	NYS Inspection	8.00	8.00	0.00
10		----------	----------	----------
11	TOTAL COST	10,944.52	13,892.26	2,947.74
12	Deposit	50.00	50.00	0.00
13	Down Payment	1,500.00	1,500.00	0.00
14	AMOUNT FINANCED	9,394.52	12,342.26	2,947.74
15				
16	Annual Interest Rate (%)	7.90	13.90	6.00
17	Term in Years	3	5	2
18	Term in Months	36	60	24
19				
20				
21	MONTHLY LOAN PAYMENT	293.96	286.54	(7.41)
22	Annual Loan Payment	3,527.48	3,438.52	(88.96)
23	Total Loan Payment	10,582.45	17,192.60	6,610.15
24	Total Interest Charge	1,187.93	4,850.34	3,662.41
25				

Figure 2. Labels and lines in the AppleWorks car-loan spreadsheet.

	A	B	C	D
1		CAR LOAN CALCULATOR		
2				
3		Sonesta (1)	Madrigal (2)	Diff (2-1)
4				
5	Price of Car			
6	Rustproofing			
7	Sales Tax (8%)			
8	Registration/Misc Fees			
9	NYS Inspection			
10		----------		
11	TOTAL COST			
12	Deposit			
13	Down Payment			
14	AMOUNT FINANCED			
15				
16	Annual Interest Rate (%)			
17	Term in Years			
18	Term in Months			
19				
20				
21	MONTHLY LOAN PAYMENT			
22	Annual Loan Payment			
23	Total Loan Payment			
24	Total Interest Charge			
25				

FORMULA 2: TOTAL COST

Formula 2 sums the entries in B5 through B9, and enters the total cost of the car in B11. The formula includes the dashed lines in B4 and B10, so that if you later decide to insert rows (for example, to itemize each option under consideration, or to include other fees), you can insert them anywhere between B4 and B10, and AppleWorks will adjust Formula 2 to sum the new entries along with the old. AppleWorks automatically converts the one period you type to three periods.

Cell location: B11
Description: @SUM(B4.B10)

FORMULA 3: AMOUNT FINANCED

Formula 3 subtracts the deposit (B12) and the down payment (B13) from the total cost of the car (B11) to produce the amount financed in B14.

Cell location: B14
Description: +B11 – B12 – B13

FORMULA 4: TERM IN MONTHS

Formula 4 multiplies the term in years (B17) by 12 to produce the term in months in B18.

Cell location: B18
Description: +B17*12

FORMULA 5: MONTHLY PAYMENT

Formula 5 calculates the monthly loan payment in B21. The formula uses the equation Payment = Loan* Rate^Term, which produces a monthly installment (including principal and interest) sufficient to retire the debt at maturity. The formula multiplies the annual interest rate in B16 by 12 to get the monthly rate, which appears as B16/(100*12). This one's long, so check each character in the formula to make sure everything is where it should be before hitting Return.

Cell location: B21
Description: +B14*B16/(100*12)/(1 – (1 + (B16/(100*12))^ – B18))

Formula 5 has no numbers with which to work, so ERROR appears and remains in this cell and in the next three formula cells until you enter the practice numbers.

FORMULA 6: ANNUAL PAYMENT

Formula 6 multiplies the monthly loan payment (B21) by 12 to produce the annual loan payment in B22.

Cell location: B22
Description: +B21*12

FORMULA 7: TOTAL LOAN PAYMENT

Formula 7 multiplies the annual loan payment (B22) by the term in years (B17), and enters the total loan payment in B23.

Cell location: B23
Description: +B22*B17

FORMULA 8: TOTAL INTEREST CHARGE

Formula 8 subtracts the amount financed (B14) from the total loan payment (B23), and enters the total interest charge in B24.

Cell location: B24
Description: +B23 – B14

PROTECTING THE FORMULAS

It's a good idea to protect the formulas from inadvertent changes. When you copy the formulas into the cells in column C, they'll carry the protection with them. Let's start with the sales tax: Place your cursor on B7 and press OA-L to start the Layout command. Press Return to confirm *Entry*. Type **PN** (for *Protection Nothing*).

Next, do the same for the total-cost formula: Place the cursor on B11 and press OA-L. Press the return key and type **PN**. Now for the other formulas: Place the cursor on B14, press OA-L, press the return key, and type **PN**.

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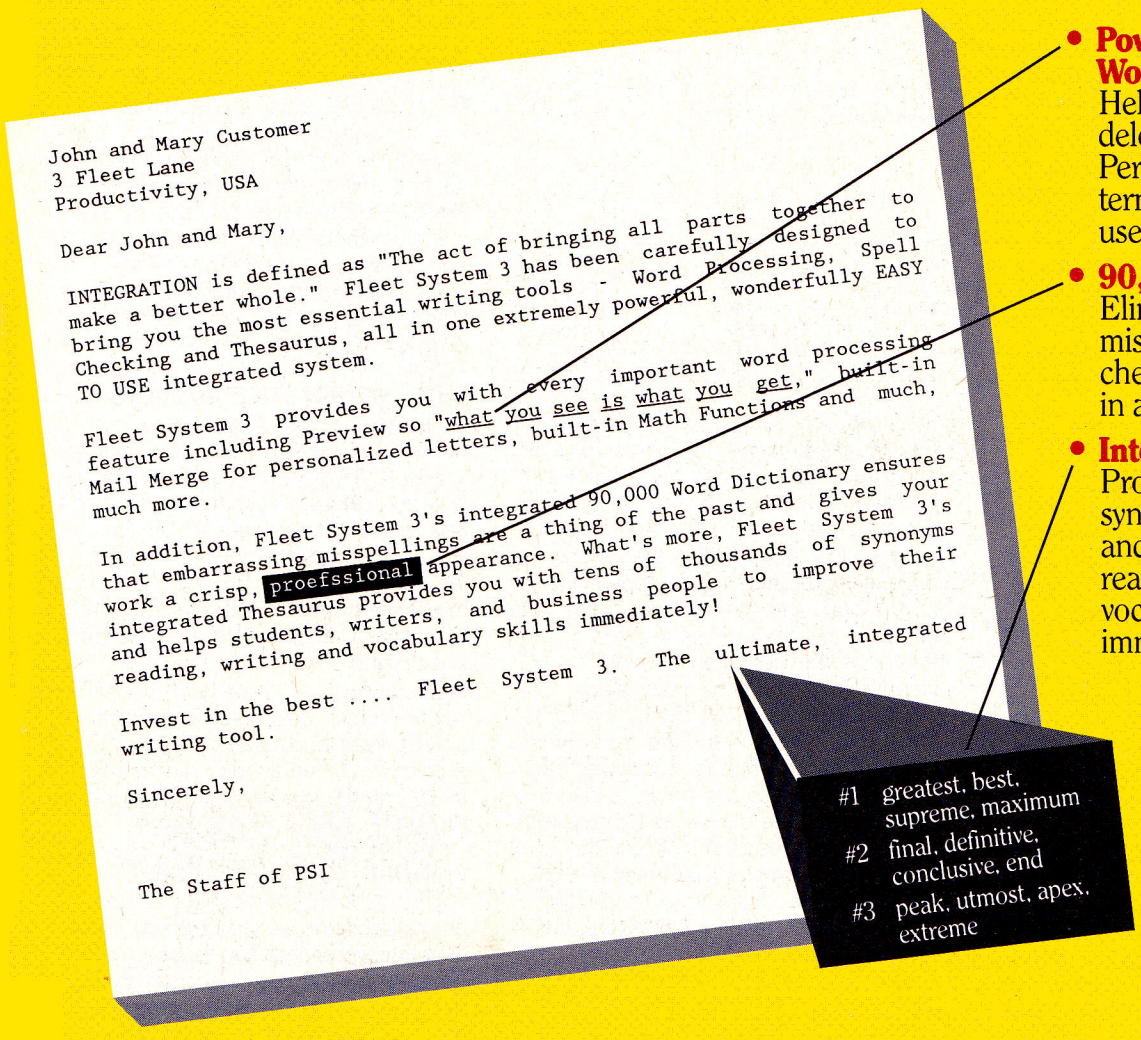

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Figure 3. Formula locations in the car-loan spreadsheet.

	A	B	C	D
1		CAR LOAN CALCULATOR		
2				
3		Sonesta (1)	Madrigal (2)	Diff (2-1)
4				
5	Price of Car			0.00 ⑨
6	Rustproofing			0.00
7	Sales Tax (8%)	0.00 ①	0.00	0.00
8	Registration/Misc Fees			0.00
9	NYS Inspection			0.00
10		----------	----------	----------
11	TOTAL COST	0.00 ②	0.00	0.00
12	Deposit			0.00
13	Down Payment			0.00
14	AMOUNT FINANCED	0.00 ③	0.00	0.00
15				
16	Annual Interest Rate (%)			0.00
17	Term in Years			0
18	Term in Months	0 ④	0	0
19				
20				
21	MONTHLY LOAN PAYMENT	ERROR ⑤	ERROR	ERROR
22	Annual Loan Payment	ERROR ⑥	ERROR	ERROR
23	Total Loan Payment	ERROR ⑦	ERROR	ERROR
24	Total Interest Charge	ERROR ⑧	ERROR	ERROR
25				

Place the cursor on B18, press OA-L, press the return key, and type **PN**.

And finally, protect Formulas 5 through 8: Place the cursor on B21 and press OA-L. Type **B** (for *Block*) and press the down arrow key three times to highlight B21 to B24. Press the return key and type **PN**.

COPYING THE FORMULAS AS A GROUP

Getting the calculations for the (fictional) Chevrolet Madrigal is a simple matter of copying all the formulas you entered for the (fictional) Olds Sonesta: Place the cursor on B7 and press OA-C to start the Copy command. Press the return key to confirm *Within worksheet*. Press OA-9 to jump the cursor to B25, and press the return key. Press the right arrow key to move the cursor to C7, and press Return.

AppleWorks now highlights B5 on the entry line and asks if it's a *No change* or *Relative* reference. Every reference in every formula is relative, so type **R** 17 times.

FORMULA 9: DIFFERENCES BETWEEN DEALS

Formula 9 subtracts the price of the Sonesta (C5) from the price of the Madrigal (B5), and enters the difference in D5.

Cell location: D5
Description: +C5 – B5

Before you copy, protect Formula 9 from change: Leave the cursor on D5 and press OA-L. Press the return key and type **PN**.

Now copy Formula 9 down its column so that it calculates the difference between items. It's more efficient to just copy the formula into every cell from D6 through D24 (even though some cells don't need it) instead of repeating the copy steps three times: Leave the cursor on D5 and press OA-C. Press the return key twice to confirm *Within worksheet* and the *Source*. Press the down arrow key to move the cursor to D6, type a period, and press OA-9. Press the up arrow key to move the cursor to D24, and press the return key. To identify C5 and B5 as relative cell references, type **R** twice.

Now let's take care of a few finishing touches. First, copy the line from C10 to D10: Place the cursor on C10 and press OA-C. Press the return key twice, press the right arrow key, and press the return key again. AppleWorks alerts you that you're about to clear protected cells. No problem—just type **Y**.

Next, blank out the unneeded formula in D15: Place the cursor on D15, press OA-B, and press the return key. Type **Y** to tell AppleWorks to clear the protected cell. Blank out D19, too: Place the cursor on D19, press OA-B, press the return key, and type **Y**.

Now copy the line in C20 into D20: Place the cursor on C20 and press OA-C. Press the return key twice, press the right arrow key, and press the return key again. Type **Y** to clear the protected cell.

And finally, format the cells containing the term in years and months to display their contents with commas and no decimal places. Clearly, these numbers will never need commas. All this format does is match their alignment with all the others: Place the cursor on B17 and press OA-L. Type **B** (for *Block*), press the down arrow key, then the OA-right arrow key combination to highlight the cells in rows 17 and 18, columns B through D. Press the return key twice to confirm the block and *Value format*. Type **C** and press the return key again.

All formats and formulas are now in place, so press OA-S to store everything on disk.

ENTERING PRACTICE NUMBERS

Figure 4 shows the practice numbers. Press OA-2 to jump the cursor to row 4. Place your cursor on B5 and type **9844**. Press the down arrow key to move the cursor to B6. Instantly, calculations pop up around the spreadsheet. In B6, type **250** and move the cursor to B8. Continue in this way to enter the other numbers in columns B and C. AppleWorks takes care of the formatting for you.

Now move the cursor around the spreadsheet and take a moment to admire your handiwork. Your spreadsheet should now look like the one in **Figure 1**.

PRINTING YOUR SPREADSHEET

The car-loan spreadsheet is 73 characters wide, and is printed at ten characters per inch. To position it properly on the page, change the margins: Leave the cursor where it is and press OA-O to bring up the Printer Options screen. Type **LM** and press the return key. Type **.4** and press the return key again. Next, type **RM** and press the return key. Type **.3** and press the return key again. And finally, type **TM** and press the return key. Type **.5** and press the return key again. Press OA-S to save the print settings and return the spreadsheet to the screen.

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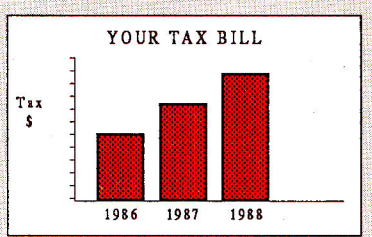

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Figure 4. Practice numbers in the car-loan spreadsheet.

	A	B	C	D
1		CAR LOAN CALCULATOR		
2				
3		Sonesta (1)	Madrigal (2)	Diff (2-1)
4				
5	Price of Car	9844	12553	
6	Rustproofing	250	269	
7	Sales Tax (8%)			
8	Registration/Misc Fees	35	36.5	
9	NYS Inspection	8	8	
10				
11	TOTAL COST			
12	Deposit	50	50	
13	Down Payment	1500	1500	
14	AMOUNT FINANCED			
15				
16	Annual Interest Rate (%)	7.9	13.9	
17	Term in Years	3	5	
18	Term in Months			
19				
20				
21	MONTHLY LOAN PAYMENT			
22	Annual Loan Payment			
23	Total Loan Payment			
24	Total Interest Charge			
25				

Now turn on your printer. Leave the cursor where it is and press OA-P to start the Print command. Press the return key to confirm *All*. Press the return key to select your printer or type a printer number, then press Return. Type today's date and press the return key twice (the second time confirms one copy). The printer whirs, and here's your spreadsheet.

ITEMIZE YOUR OPTIONS

Instead of lumping everything into the price of the car, you might want to itemize each piece of optional equipment, which makes it easier to determine what you can afford. All you have to do is insert rows. Try it now: Place the cursor on row 6 and press OA-I to start the Insert command. Press the return key to confirm *Rows*. Type **4** and press the return key again.

This gives you room to type in the items under consideration—power windows, sun roof, or anything else your heart desires. Place the cursor on B15, and you can see that AppleWorks dutifully adjusted the Total Cost formula to add every entry in rows 4 through 14. Now place the cursor on B11. The sales-tax formula still adds only the cost of the car and rustproofing, so you'll have to create a SUM formula to include the other taxable amounts—in this case, @SUM(B4...B10)—and append whatever your sales tax happens to be.

If you want to save this version of the spreadsheet, use the Name command (OA-N) to give it another name first. Next month, when David cuts and pastes the spreadsheet into a letter to Mom and Dad, you'll need the original version without the row insertions. Incidentally, several people have written to ask how to create a page header. The instructions in next month's letter will explain it step by step.■

Ruth K. Witkin is a consultant in computer applications for business. She is the author of the hotCider Success with AppleWorks *(*inCider, *CW Communications),* Managing with AppleWorks *(Howard W. Sams & Co.), and* Personal Money Management with AppleWorks *(Hayden Books). Write to her at 5 Patricia Street, Plainview, NY 11803. Enclose a stamped, self-addressed envelope if you'd like a personal reply.*

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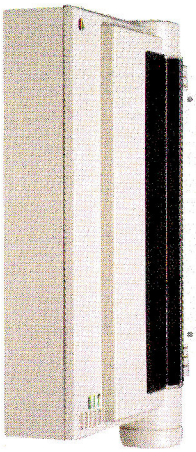

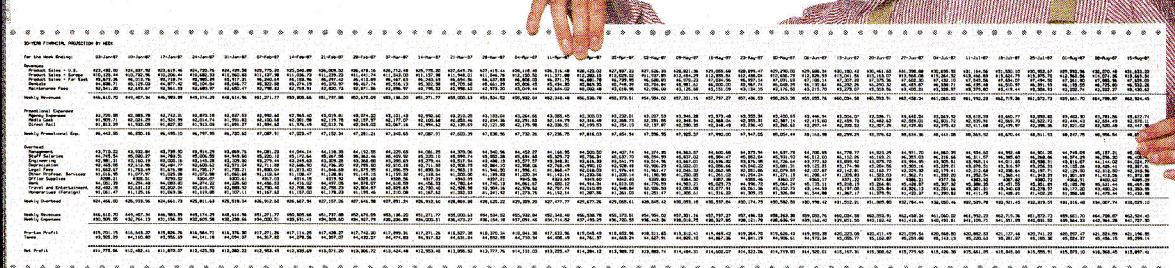

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Most things you can do in Pascal or Fortran, you can do in Applesoft BASIC.



by Dan Bishop

Have you ever wished that Applesoft BASIC had the same exotic loop-control commands found in other versions of BASIC or in Pascal? Have you tried to translate a program only to run into structures Applesoft doesn't support? This month, I'll show you how to incorporate the same commands into your Applesoft programs. Knowing how to use these commands in Applesoft will make it easier to translate code from other programs, and open up a wide range of possibilities for your own programs.

THE COUNTING LOOP

The only built-in looping structure Applesoft BASIC recognizes is FOR/NEXT. Most higher-level languages have a FOR/NEXT or similar command. Use it when you want to execute a command or block of commands a specific number of times. The example below executes the PRINT command between FOR and NEXT 25 times:

```
100 FOR K = 1 TO 25
110       PRINT K;". HELLO THERE!"
120 NEXT K
130 PRINT "GOOD-BYE."
```

The loop counter, K, is given a starting value of one. The program increases the value for K by one after each cycle through the loop, and compares its new value to the loop limit specified after the word TO. Your Apple continues executing the loop commands until K reaches a value that's greater than the loop limit (25 in this case), and the program resumes execution at the line following the NEXT (line 130), thus ending the loop.

In some cases, values for starting and ending the loop might be variable, and come from the program itself. Store these values in variables such as X and Y. Your FOR statement would then look like this:

```
100 FOR K = X TO Y
```

Varying conditions might cause your program to assign different values to X and Y each time you run it. But it's important to note that your computer will indicate a specific number of loop cycles when it executes this statement.

BASIC lets you specify an increment other than one for those situations that require it. Just add a STEP function to the FOR statement. For example, the statement

```
100 FOR K = 100 TO 1 STEP -1
```

assigns K an initial value of 100, then decreases K by one after each loop cycle. Again, the computer executes the loop until K reaches a value less than one. If you omit the STEP variable, the computer automatically assumes that the incrementing factor should be +1.

BASIC lets you change the value of K within the loop, but you must be careful not to create an infinite loop. For example, let's suppose you want to execute a subroutine up to 100 times, the actual number depending on the value of variable J, which the subroutine controls. But you'll have to stop the looping process if J drops below zero before the 100th cycle.

The following code provides a way to stop the loop:

```
90 IX = 0
100 FOR K = 1 TO 100
110       GOSUB 1000
120       J < 0 THEN IX = K:
          K = 100: GOTO 150
130 other statements
140 other statements
150 NEXT K
```

A test within the loop for the value of J determines whether to run another cycle or end the loop prematurely.

Notice two important features: Ending the loop prematurely involves giving the loop counter the maximum value for K and jumping directly to the NEXT statement. If you must use the actual number of cycles through the loop later in your program, you can assign the current loop-counter value to a second variable (IX in this example) before you change it.

Using this approach, you can force the FOR/NEXT loop to end, but in a carefully controlled manner. The computer "thinks" that K has reached the maximum value, and goes on to line 160. You can test later on to see if the loop cycled the full 100 times or ended prematurely. If IX is still zero after your program progresses beyond the loop, then you know that the loop went through 100 cycles, and that J was never less than zero.

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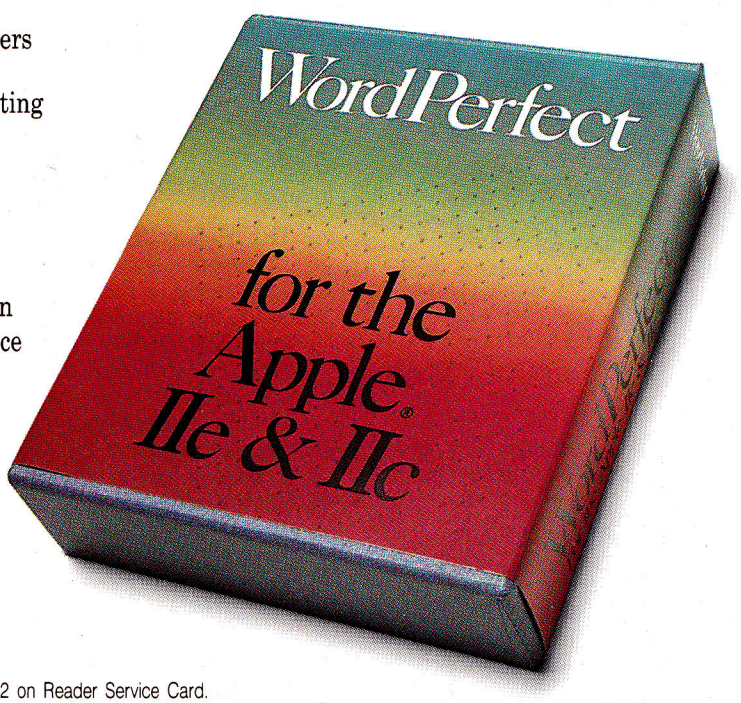

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One common mistake novice programmers make is to jump completely out of the loop with a GOTO command. For example,

```
IF J < 0 THEN GOTO 160
```

ends the loop, but leaves the computer's memory cluttered with garbage. The computer reserves memory space to keep track of K and the loop maximum. Since the computer reserves only a limited amount of space (called a *stack*) for this kind of information, you can easily fill the stack and find your program crashing with an "out of memory" error.

To illustrate this, run this short program:

```
100 A = 0
110 A = A + 1 : PRINT "LOOP CALL
    NUMBER ";A
120 FOR K = 1 TO 100
130       IF K = 50 THEN GOTO 150
140 NEXT K
150 GOTO 110
```

How many times did you go back through the loop before your stack filled up?

THE REPEAT/UNTIL LOOP

Some versions of BASIC, and virtually all structured programming languages, use the REPEAT/UNTIL loop. Unlike the FOR/NEXT loop, REPEAT/UNTIL has no set number of cycles to execute. Instead, it keeps cycling through the loop until a specified situation changes, forcing the loop to end. This condition is expressed as a true/false (or Boolean) test, which comes at the end of the block of commands that make up the loop.

Since the test occurs at the bottom of the loop, the program executes the instructions within the loop at least once. This is the key characteristic of the REPEAT/UNTIL structure. A REPEAT/UNTIL loop in Pascal might look like this:

```
REPEAT
      WRITELN('ENTER AN X TO END
      THIS LOOP.');
      READLN(A);
      IF A <> 'X' THEN
      WRITELN('INVALID ENTRY.');
UNTIL A = 'X'
```

This example is a "mini-menu," which prompts you to press the X key. An error message appears if your entry isn't valid, and the loop repeats until the condition is met.

Obviously, you want this loop to execute at least once. The only logical place for a test to determine whether to cycle through the loop again is at the end, after the keyboard response. Finally, you have no idea how many times the loop cycle must repeat.

Notice one additional feature of the REPEAT/UNTIL structure: The conditional test in the last line lets you exit the loop when the test evaluates to true. The loop recycles as long as the condition remains false.

Applesoft BASIC doesn't recognize either REPEAT or UNTIL. But that doesn't mean you can't use them in your program—just be sneaky. Use them after a REM—your Apple will ignore them, and you can use Applesoft's IF/THEN and GOTO commands just as if REPEAT and UNTIL really exist.

The above Pascal code looks like this in Applesoft BASIC:

```
100 REM REPEAT
110       PRINT "ENTER AN X TO END
          THIS LOOP."
120       INPUT A$
130       IF A$ <> "X" THEN PRINT
          "INVALID ENTRY."
140       IF NOT(A$ = "X") THEN
          GOTO 100
150 REM UNTIL A$ = "X"
```

Since we've translated this from Pascal, PRINT and INPUT replace the WRITELN and READLN statements, and we've altered the format to correspond to BASIC. We've also changed the string-variable name from A to A$, as BASIC requires. The one major change is in the last IF statement (line 140)—notice that the "polarity" of the conditional test is different:

```
140 IF NOT(A$ = "X") THEN GOTO 100
```

This statement gives the condition for *not* exiting the loop, unlike the standard REPEAT/UNTIL control structure. Using BASIC's NOT operator makes this conversion quite simple.

THE WHILE/DO LOOP

Another common looping mechanism found in Pascal and some BASICs is the WHILE/DO loop. Like the REPEAT/UNTIL loop, use this structure when you don't know how many times to execute the loop. The WHILE/DO loop, though, puts the conditional test at the top of the loop instead of the bottom. Should this test fail, the program may never execute the instructions inside the loop. (Remember that REPEAT/UNTIL always executes the loop at least once.)

An example of a Pascal WHILE/DO loop might be:

```
A := 5; B := 3; RP := 100;
WHILE RP > 0 DO
      BEGIN
      WRITELN('RP IS NOW ',RP);
      A := A + B * B;
      RP := RP - A;
END;
```

Pascal marks off a block of statements using BEGIN and END, clearly setting apart the commands within the loop. Some versions of BASIC (none of which uses BEGIN) indicate the end of the looping instruction set with an ENDWHILE command. The above code tells the computer to execute the loop if RP is greater than zero, and to skip the loop otherwise. Once in the loop, the program needs a way to alter the value of RP to ensure that the loop will eventually end. In this case, the program subtracts the value of A from RP. The loop will end when RP is less than zero.

The following code represents this loop structure in Applesoft BASIC:

```
90 A = 5: B = 3: RP = 100
100 REM WHILE RP > 0 DO
110       IF NOT(RP > 0) THEN
          GOTO 160
120       PRINT "RP IS NOW ";RP
130          A = A + B * B
140          RP = RP - A
150       GOTO 100
160 REM ENDWHILE
```

Here again you must reverse the "polarity" of the conditional test with a NOT (line 110) to specify the conditions necessary to exit the loop. If the NOT condition is met, the program exits the loop at line 160, whether or not any loop instructions have been executed. The instruction at the bottom of the loop (line 150) forces a return to the top, where the condition is tested again.

WHILE/NEXT AND UNTIL/NEXT LOOPS

Some versions of BASIC include WHILE/NEXT and UNTIL/NEXT loops, which have the same basic structure as the WHILE/DO loop. For these, the keyword NEXT designates the end of the loop instead of ENDWHILE. Be careful how you interpret the conditional test when you translate these commands to Applesoft BASIC—you won't have to reverse polarity on the conditional test with the UNTIL/NEXT category of loops.

YOUR MAIN PROGRAM

The BASIC REPEAT/UNTIL example above illustrates how to set up a program menu using this type of loop. You can easily handle the main program (which should consist primarily of subroutine calls) in a WHILE/DO loop.

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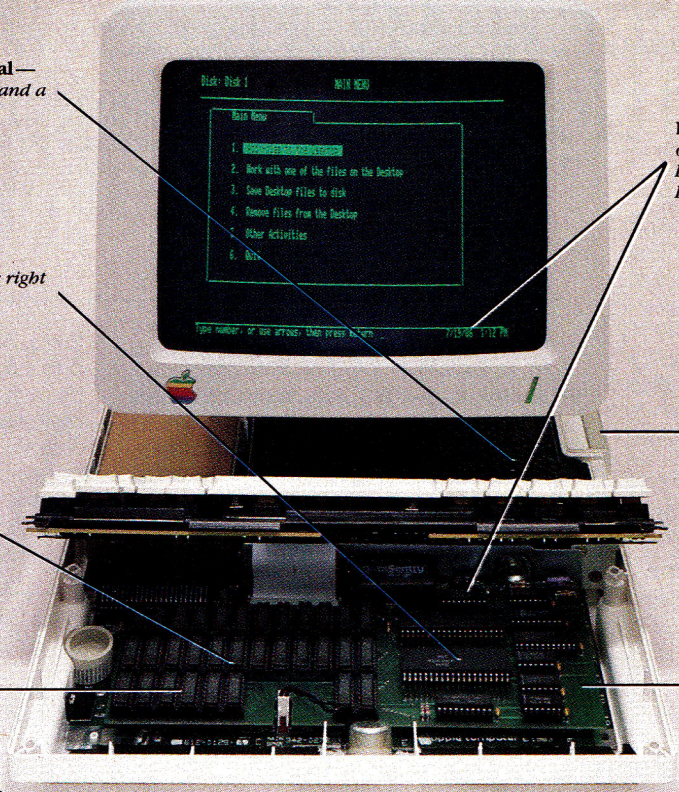

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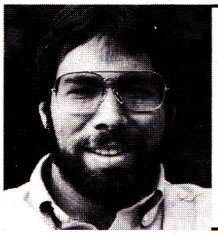

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For example, suppose your program first calls a menu subroutine that displays the following options:

```
ENTER THE LETTER THAT CORRESPONDS
TO YOUR CHOICE:
  A. ADD NEW CLIENT
  E. EDIT/DELETE OLD CLIENT
  P. PRINT CLIENT DATA
  X. END THE PROGRAM
```

Selecting X at the start skips the rest of the program and ends it. Any other selection takes you into the loop that contains the rest of the program, with another call to the menu at the end of the WHILE/DO loop.

This part of the program might look like the code in the accompanying **Program listing** (assuming the menu choice is MC$ in the menu subroutine).

Program listing. Example of a WHILE/DO loop in BASIC.

```
10 GOSUB 200 : REM CALL TO MENU SUBROUTINE TO GET MC$
20 REM WHILE  MC$ <> "X" DO6
30     IF NOT(MC$ <> "X") THEN GOTO 120: REM (IE, IF MC$="X")
40        GOSUB 500: REM LOAD CLIENT DATA
50        IF MC$ = "A" THEN GOSUB 1000: REM ADD CLIENT
60        IF MC$ = "E" THEN GOSUB 2000: REM EDIT CLIENT
70        IF MC$ = "P" THEN GOSUB 3000: REM PRINT DATA
80        GOSUB 800: REM PRINT ACTIVITY REPORT
90        GOSUB 200: REM CALL TO MENU SUBROUTINE FOR MC$
100    GOTO 20
110 REM ENDWHILE
120 END
```

CONCLUSION

As you can see, Applesoft BASIC lets you "program around" many of the features found in other versions of BASIC as well as Pascal. If you use enough REM statements this way, your BASIC programs might well begin to look like some of the more advanced languages, too. You might be surprised at how easily you'll understand the logic within your program six months or a year later when you want to modify it.

The bottom line is that every programming language is either interpreted (such as BASIC) or compiled (Pascal or Fortran, for example) into the same fundamental set of machine-language instructions before your Apple can use them. Most things you can do with one programming language you can do with the others (though the result may be rather awkward in some cases). So don't be intimidated by the appearance of more sophisticated programming languages. If you know Applesoft BASIC, you can usually figure out a way to get the job done.■

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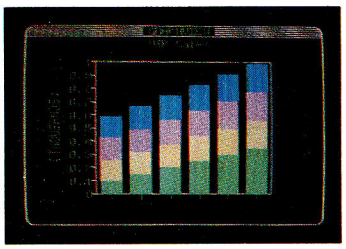

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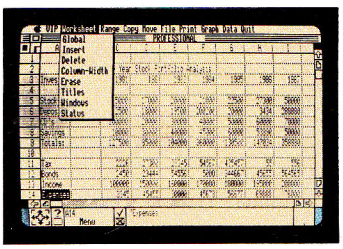

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GS Gems

Some GS fundamentals—windows and pull-down menus—and an accompanying program that illustrates some of the features you'll be exploring in the upcoming months.



by Tom Swan

With my new GS and an advance copy of TML Pascal, graciously provided by Tom Leonard of TML Systems Inc., I'm able to share with you an example of a real, live GS application—complete with window and pull-down menus. I'll also show you several GS toolbox fundamentals—a central theme of this and future articles.

FRIENDS, HACKERS, AND PROGRAMMERS

In the coming months, I'll investigate many GS toolbox features using various languages such as 65816 Assembly, C, and Pascal. I'll cover QuickDraw graphics, disk files, Ensoniq sound synthesis, windows, dialogs, menus, fonts—all supported by various tools just waiting for you to put them to work. I'll share tips, tricks, and tidbits that come my way and give sneak previews of new and interesting products. And I hope also to publish full programs and utilities—including as much source code as space allows.

But to accomplish all of that, I need your help. Friends, hackers, and programmers, don't just lend me your ears, lend me your voices, too. Although I write the words, this column belongs to you. I want this to be your place to share your experiences. Tell me what you want to read. Because I hear that most GS owners have some computer experience, I'll assume that you know the difference between RAM and ROM, and that you don't need instructions about typing control characters. But I don't want to leave out beginners while trying not to insult the experienced. Let me know if the balance is right.

WHAT DOES A COMPILER DO?

Compilers are programs that read text files and convert instructions they find there to machine language that runs on the computer. To program in a compiled language, you type instructions the same way you write letters and reports with a word processor. The compiler reads your program as text and converts it to code that runs the computer.

Actually, the process is often more complicated than that. For example, the early version of TML Pascal that I'm using produces 65816 assembly language—another text file—that you then assemble and link before it's ready to run. To make things worse, the version I have runs on a Macintosh computer, an example of a "cross compiler," one that generates code for a different computer from the one on which the compiler runs. Writing a GS program requires typing it on the Macintosh, compiling, transferring to a GS disk, assembling, and linking. Of course, by the time you read this, native GS TML Pascal will be available. But I mention it because the company might release its cross compiler as a product. If you have a Mac and a GS, you might want to ask about it.

GS toolbox routines offer programmers three important advantages. They save time. They standardize the way programs operate. And they help less experienced people write sophisticated software using pull-down menus, windows, mouse movements, and other items that are difficult to program from scratch.

The toolbox gives the GS its personality. In it are routines that draw windows and pull-down menus, display text and graphics, and make sounds. Some tools are in ROM. Others are in RAM. When Apple finds a bug in a tool, they might replace it with a temporary RAM version until engineers include the fixed programming in new ROM chips. Consequently, some tools might be in both RAM and ROM.

Because you never can be sure whether a tool is in RAM or in ROM, the first rule of GS programming is never to write programs that directly access ROM routines. Instead, in assembly language, you first load a tool and routine number into the X register and call location $E10000. For example, to call the DeskStartUp tool, which every program must do as one of its initial operations, you'd write the 65816 assembly-language instructions:

```
ldx     #$0205
jsl     $E10000
```

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5. Can I recover a specific payable without printing a full report?	YES	NO	YES	NO
6. How many account numbers can I have for each payable?	10	1	10	12
7. Does the point of sales update the inventory in case of a credit memo?	YES	N/A*	NO	NO
8. Does the point of sales automatically check customer credit?	YES	N/A*	YES	NO
9. Are the State and Federal tax values in Payroll when I buy it?	YES	N/A*	YES	NO
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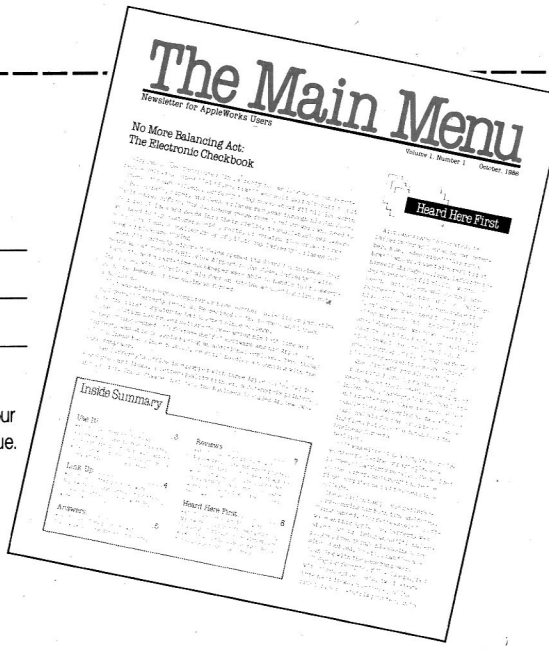

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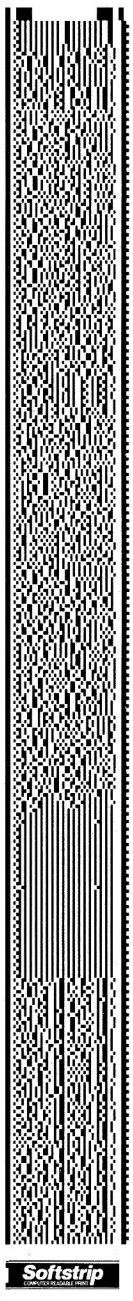

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Listing 1. GSDEMO.PAS.

```
{$a+}

PROGRAM GSDemo;


(*
 * PURPOSE : Demonstrate Menus, Windows, Controls, and other GS tools
 * SYSTEM  : Apple IIGS - ProDos16 - TML Pascal
 * AUTHOR  : Tom Swan (from an original program by Tom Leonard)
 *
 *)


USES

   QDIntf,            { QuickDraw }
   GSIntf,            { Various GS Tools }
   UserIntf;          { Our own initializations }


BEGIN
   InitGSEnviro;         { Do startup initializations }

   SetUpMenus;           { Create and display the menu bar }
   SetUpWindows;         { Create and display program window }
   ShowCursor;           { Display the mouse pointer cursor }

   MainEventLoop;        { Handle all program operations }

   ShutDownGSEnviro;     { Prepare to end program }
END.
```

Listing 2. USERINTF.PAS.

```
{$a+}

UNIT UserIntf;


(*
 * PURPOSE : Define things that programs can use
 * SYSTEM  : Apple IIGS - ProDos16 - TML Pascal
 * AUTHOR  : Tom Swan (from an original program by Tom Leonard)
 *
 *)


USES

        QDIntf,                 { QuickDraw }
        GSIntf;                 { Various GS Tools }


CONST

        ScreenMode = $80;       { 640 graphics display }
        MaxX       = 640;       { Maximum X (horizontal) dimension }


VAR

     MyMemoryID : integer;      { Application ID assigned by Memory Mgr }


{ NOTE: Actual programming for the following procedures is in
          the file UserIntfB.Pas, the "body" to this interface. }

PROCEDURE InitGSEnviro;
PROCEDURE MainEventLoop;
PROCEDURE ProcessMenu(codeWord : Longint);
PROCEDURE SetUpMenus;
PROCEDURE SetUpWindows;
PROCEDURE ShutDownGSEnviro;


END.
```

Continued from p. 78.

That calls tool number 5, routine number 2. But how do you do the same thing in higher-level languages like C and Pascal, which don't have commands to load processor registers or to call memory locations as subroutines? To answer that question, compiler writers invented a new kind of procedure declaration. For example, in TML Pascal, you first declare the DeskStartUp tool like this:

```
PROCEDURE DeskStartUp;
  Tool 5, 2;
```

Later in the program, you write DeskStartUp and the compiler generates the appropriate assembly-language instructions to call this tool. In other words, you let the compiler handle the dirty work of loading registers and calling subroutines while you concentrate on more important parts of your program.

Many tools are simple procedures like DeskStartUp. Others require parameters—values that select one or another feature specific to this tool. The ClearScreen tool, for one example, takes an integer parameter representing the color you want to use. In Pascal, you'd declare the tool this way:

```
PROCEDURE ClearScreen(Color:Integer);
  Tool 4, 21;
```

Later you'd write ClearScreen(3) or ClearScreen(10). The value in parentheses controls the levels of Red, Green, and Blue of each point or pixel on the screen. Eventually, I'll explain such details more fully when I cover QuickDraw graphics. For now, it's important for you to understand only that to call toolbox routines in Pascal, you merely declare the tool procedure and then use it as you do any other Pascal procedure or function.

Because there are hundreds of such tools in the GS toolbox, most come predefined for you in "units"—collections of procedures, variables, and other modules you compile in advance to include later in programs. They define toolbox routines. By using these units, you can quickly add every toolbox procedure to any program, effectively extending the language with hundreds of new commands and data types. You can declare individual tools if you want to, but, most of the time, you'll simply use one of these handy units that declare groups of toolbox routines for you.

PRACTICE MAKES PERFECT

Listings 1 through **4** make up GSDEMO, a simple example of a GS

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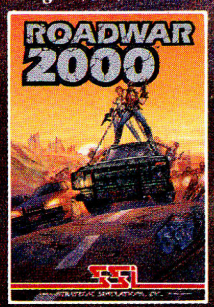

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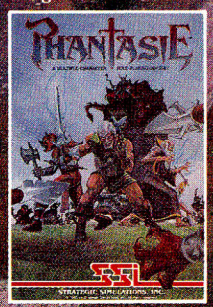

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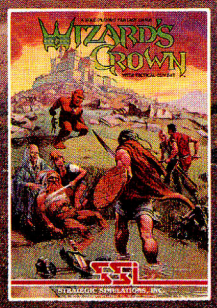

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application that uses several toolbox routines. You might use GSDEMO to practice dragging a window around the screen, change its size, and select commands from pull-down menus. When showing someone how to use the GS—especially someone new to computers—let him or her play with the demo. Many people will appreciate the opportunity to practice on this GS simulator before they take off in the real thing.

GSDEMO.PAS in **Listing 1** shows the general form of a GS Pascal program. The example uses three precompiled units, QDIntf, GSIntf, and UserIntf. (Intf is short for interface.) QDIntf contains the data types, procedures, and functions to call QuickDraw graphics routines. GSIntf has the definitions of what Tom Leonard calls "core tools," those that most programs use. UserIntf in **Listings 2** and **3** contains several routines that might serve as starting places for your own designs. QDIntf and GSIntf, containing nearly 2000 lines, are too long to reprint here. But you receive these, plus interfaces to all other GS tools, on disk along with the Pascal compiler.

GSDEMO's main body—between the BEGIN and END—performs six operations. It begins by calling InitGSEnviro (initialize environment), which initializes the toolbox routines the program uses. Next, it calls SetUpMenus and SetUpWindows to prepare the pull-down menu bar and open the demo window. It also calls the toolbox routine, ShowCursor, which displays the desktop pointer. MainEventLoop performs all program operations. Finally, a call to ShutDownGSEnviro disengages the program from memory and tells various tools we're finished using them.

UNITS WITH BODY

Listings 2, **3**, and **4** demonstrate two kinds of units in TML Pascal. **Listing 2** is called an interface because it declares the identifiers you want programs to use. Everything in the interface is visible to the program that uses the unit—just as though you directly declared those same items in the program.

Listing 3 is the body to the UserIntf unit. It contains the actual programming that goes with the interface. Everything in the unit body is invisible to a program. For example, a program might call InitGSEnviro, a procedure the interface declares. But

Listing 3. USERINTFB.PAS.

```
{$a+}

UNIT BODY UserIntf;


(*
 * PURPOSE : Actual programming for the UserIntf unit
 * SYSTEM  : Apple IIGS - ProDos16 - TML Pascal
 * AUTHOR  : Tom Swan (from an original program by Tom Leonard)
 *
 *)


USES

   Res;          { "Resource" unit that goes with this program }


VAR

   ToolsZeroPage : Handle;       { Handle to zero page memory for Tools }
   Done          : Integer;      { TRUE after selecting Quit command }


PROCEDURE InitGSEnviro;

{ Initializes required IIGS Tools.  Called once at program start. }

   VAR

      ToolRec :  LoadToolRec;              { Tells which tools to load }


   BEGIN

      TLStartUp;                           { Initialize Tool Locator }
      MyMemoryID := MMStartUp;             { Initialize Memory Manager }
      DeskStartUp;                         { Initialize Desk Manager }


    { Allocate 7 pages of memory in bank 0 for use by GS Tools.
      3 pages for QuickDraw, 1 page for Event Manager,
      1 page for Menu Manager, 1 page for Control Manager,
      and 1 page for Line Edit }

      ToolsZeroPage :=
       NewHandle(
          7 * 256,                         { 7 pages of 256 bytes }
             MyMemoryID,                   { Program ID for memory blocks }
             fixedBank + fixedblk + locked, { Attributes }
             ptr( 0 ) );                   { Start in bank 0 }

      QDStartUp
          ( LoWord( ToolsZeroPage^ ),      { Low address of first 3 zero pages }
             ScreenMode,                   { Display mode }
             160,                          { Maximum size of scan line }
             MyMemoryID );                 { Program ID for memory blocks }

      EMStartUp
         ( LoWord( ToolsZeroPage^ ) + $300,{ Low address of 4th zero page }
          20,                              { Event queue size }
          0,                               { Minimum X (horizontal) dimension }
          MaxX,                            { Maximum X }
          0,                               { Minimum Y (vertical) dimension }
          200,                             { Maximum Y }
          MyMemoryID );                    { Program ID for memory blocks }


      { Display a message while program loads RAM-based tools }

      MoveTo(40,40);
      SetBackColor(0);
      SetForeColor(15);
      DrawString('Loading RAM based tools...');


      { Load RAM-based tools plus RAM patches to those in ROM }

      ToolRec.NumTools := 8;
      ToolRec.Tools[1].TSNum := 4;                  { QuickDraw // }
      ToolRec.Tools[1].MinVersion := 1;
      ToolRec.Tools[2].TSNum := 5;                  { Desk Manager }
      ToolRec.Tools[2].MinVersion := 1;
      ToolRec.Tools[3].TSNum := 6;                  { Event Manager }
      ToolRec.Tools[3].MinVersion := 1;
      ToolRec.Tools[4].TSNum := 14;                 { Window Manager }
      ToolRec.Tools[4].MinVersion := 0;
      ToolRec.Tools[5].TSNum := 15;                 { Menu Manager }
      ToolRec.Tools[5].MinVersion := 1;
      ToolRec.Tools[6].TSNum := 16;                 { Control Manager }
      ToolRec.Tools[6].MinVersion := 1;
      ToolRec.Tools[7].TSNum := 20;                 { Line Edit }
      ToolRec.Tools[7].MinVersion := 0;
      ToolRec.Tools[8].TSNum := 21;                 { Dialog Manager }
      ToolRec.Tools[8].MinVersion := 0;
      LoadTools(ToolRec);
```

Listing continued.

Listing continued.

```
WindStartUp( MyMemoryID );                    { Initialize Window Manager }

CtlStartUp                                    { Initialize Control Manager }
   ( MyMemoryID,                              { Program ID for memory blocks }
        LoWord( ToolsZeroPage^ ) + $400 );{ Address of 5th zero page }

LEStartUp                                     { Initialize Line Edit }
        ( LoWord( ToolsZeroPage^ ) + $500,      { Address of 6th zero page }
          MyMemoryID );                         { Program ID for memory blocks }

      DialogStartUp                           { Initialize Dialog Manager }
         ( MyMemoryID );                      { Program ID for memory blocks }

      MenuStartUp                             { Initialize Menu Manager }
         ( MyMemoryID,                      { Program ID for memory blocks }
             LoWord( ToolsZeroPage^ ) + $600 ); { Address of 7th zero page }

      Refresh( nil );           { The nil means "display entire screen:" }

   END; { InitGSEnviro }


PROCEDURE MainEventLoop;

{ Handles all program operations. }


   VAR

      event : EventRecord;      { Describes the event }
      code  :  integer;         { TaskMaster's code for an event }


   BEGIN

      event.TaskMask := $1FFF;  { Allow TaskMaster to do everything }
      Done := 1;                { When 0, program ends }

      REPEAT

         code := TaskMaster(-1, event); { Get event code }

         CASE code OF

               NullEvent:   ;
               MouseDown:   ;
               MouseUp:     ;
               KeyDown:     ;
               AutoKey:     ;
               UpdateEvt:   ;
               ActivateEvt: ;
               SwitchEvt:   ;
               DeskaccEvt:  ;

                { Task Master Events }

               wInDesk:       ;
               wInMenuBar:   ProcessMenu(event.TaskData);
               wInSysWindow: ;
               wInContent:   ;
               wInDrag:      ;
               wInGrow:      ;
               wInGoAway:    ;
               wInZoom:      ;
               wInInfo:      ;
               wInSpecial:   ;
               wInDeskItem:  ;
               wInFrame:     ;

         END; { case }

   UNTIL Done = 0

END; { MainEventLoop }


PROCEDURE ProcessMenu( codeWord : Longint );

{ Perform the menu command identified by codeWord }

   VAR

      menuNum : Integer;        { The menu number }
      itemNum : Integer;        { The command item number }


   BEGIN

      menuNum := HiWord( codeWord );    { Extract the menu number }
      itemNum := LoWord( codeWord );    { Extract the item number }

      IF itemNum = QuitItem THEN
         Done := 0;

      HiliteMenu( FALSE, menuNum );     { Un-highlight menu title }

   END; { ProcessMenu }
```

Listing continued.

it can't examine variable ToolsZeroPage, which is local to the unit's body and, therefore, invisible to programs.

Listing 4, RES.PAS, shows a different kind of unit, which Apple Pascal programmers might recognize. In this unit, the interface and body—called the IMPLEMENTATION part—are compiled together.

The advantage of both kinds of units is you can make any change you like to the body (or to the IMPLEMENTATION part) and recompile the unit. You can then link the newly compiled unit to your program and you're done. There's no need to recompile any other unit or program file.

With this feature, called "separate compilation," you write modular programs in pieces, then join those pieces to produce a finished result. A change often requires nothing more than modifying one or two pieces, rather than recompiling the entire program. If you change something in the interface section, however, you must then recompile all programs and units that use that interface. Another advantage that's expected is the ability to write modules in more than one language in a single program.

ERROR HANDLING IN TML PASCAL

Every toolbox routine reports whether an error occurred. In assembly language, you check for errors by examining the carry flag. If the carry flag is set, then the accumulator contains the error code. If the carry flag isn't set, the toolbox call was successful.

In Pascal there normally would be no way to check the carry flag and accumulator. As a solution, TML Pascal adds two elements that do the same thing. The Boolean function isToolError is TRUE if the carry flag is also TRUE. Integer variable ToolErrorNum contains the error code of the most recent toolbox routine. You use these items as the following program fragment demonstrates:

```
PROCEDURE AnyTool; Tool 3,10;
BEGIN { program }
    AnyTool;
    IF isToolError THEN
    BEGIN
        writeln( 'Error #',
                 ToolErrorNum );
        halt
    END;
{ continue program }
END.
```

AnyTool might be any toolbox routine. After calling the routine, check

whether isToolError is true. If it is, use the error-code value in ToolErrorNum to decide how to handle the problem. In this example, the program simply ends after displaying the error code.

Remember that isToolError and ToolErrorNum are additions to TML Pascal. They are not in the GS toolbox and might not exist in other languages. Also, be careful not to make intervening calls to toolbox routines between checking isToolError and using the ToolErrorNum value. Every toolbox routine changes ToolErrorNum, whose value is meaningful only immediately following a toolbox call.

COMPILING GSDEMO

Because I'm using a very early version of TML Pascal, it's impossible for me to give step-by-step instructions for compiling and running GSDEMO. Anything I would tell you here is likely to change and, therefore, I'd rather not guess. In future articles, I'll describe how to build applications. Essentially, though, you type in the four listings and compile in this order:

RES.PAS
USERINTF.PAS
USERINTFB.PAS
GSDEMO.PAS

The order is critical because of the relationship among the units. GSDEMO must be last because it uses the programming in UserIntf and Res. UserIntf must come after Res because it uses the programming in that unit.

Compiling these program listings produces not a working program, but four more files with an assembly-language translation of each program piece. Just to give you an idea of what the compiler produces, following is the assembly language for the Pascal statement Height := FixMenuBar from **Listing 3**:

```
;;  Height    := FixMenuBar;
        pha
        ldx     #$130F
        jsl     $E10000
        sta     toolerrornum
        pla
        sta     $E5
```

After compiling the program, you then assemble the 65816 translations to produce object code—the raw modules in nearly ready-to-run form. But you're not done yet. To complete the process, you must link the program modules together with various run-time routines, which you might think of as still more tools in the Pascal language itself.

Listing continued.

```
PROCEDURE SetUpMenus;

{ Create and display the program's pull-down menu bar. }

   VAR

      Height : Integer;

   BEGIN

      InitResources;              { Initialize the Menu Strings }

   { NOTE:  The parameters to NewMenu MUST not be local variables
     or expressions.  NewMenu maintains pointers to the string passed
     to it and, therefore, only global variables work. }

      InsertMenu( NewMenu( @FileMenuStr[1] ), 0 );       { File Menu }
      InsertMenu( NewMenu( @AppleMenuStr[1] ), 0 );      { Apple Menu }

      FixAppleMenu( AppleMenu );  { Add desk accessories to apple menu }
      Height := FixMenuBar;       { Set sizes of menus }
      DrawMenuBar                          { Draw the menu bar }

   END; { SetUpMenus }

{ NOTE: The following global variables are not out of place.  TML Pascal
  allows you to declare new variables anywhere.  They are still global--
  that is, they always occupy space--but the program doesn't know about
  them until after the following declaration. }

VAR

   myWind:      NewWindowParamBlk;      { Window definitions }
   myWindTitle: Str255;                 { Window title in drag region }
   myWindPtr:   WindowPtr;              { Pointer to window record }

   PROCEDURE SetUpWindows;

   { Create and display a test window with scroll bars, close button,
     zoom button , resize button, and horizontal and vertical controls }

   BEGIN

      myWindTitle := 'GS Demo Window';

      WITH myWind DO

         BEGIN
            param_length := sizeof( NewWindowParamBlk );
            wFrame       := $DDA0;
            wTitle       := @myWindTitle;
            wRefCon      := 0;
            wZoom.top    := 26;
            wZoom.left   := 0;
            wZoom.bottom := 190;
            wZoom.right  := 620;
            wColor       := nil;
            wYOrigin     := 0;
            wXOrigin     := 0;
            wDataH       := 200;
            wDataW       := 640;
            wMaxH        := 200;
            wMaxW        := 640;
            wScrollVer   := 4;
            wScrollHor   := 16;
            wPageVer     := 40;
            wPageHor     := 160;
            wInfoRefCon  := 0;
            wInfoHeight  := 0;
            wFrameDefProc:= nil;
            wInfoDefProc := nil;
            wContDefProc := nil;
            wPosition.top    := 40;
            wPosition.left   := 20;
            wPosition.bottom := 100;
            wPosition.right  := 360;
            wPlane       := -1;
            wStorage     := nil;

         END; { with }

      myWindPtr := NewWindow(myWind);

   END; { SetUpWindows }

   PROCEDURE ShutDownGSEnviro;

   { Unload the tools that InitGSEnviro loaded and prepare to
     end the program. }

      BEGIN
```

Listing continued.

Listing continued.

```
        { Perform deinitializations }

           GrafOff;
           MenuShutDown;
           LEShutDown;
           CtlShutDown;
           DialogShutDown;
           WindShutDown;
           EMShutDown;
           QDShutDown;

        { Shut down any RAM tools }

           DeskShutDown;
           MMShutDown(MyMemoryID);
           TLShutDown

        END; { ShutDownGSEnviro }

END.
```

End of Listing.

All of this may seem complex, but in practice you'll have only one or two commands to type. Most of the compiling, assembling, and linking occurs automatically and, once you understand in general how it works, you can forget the details and concentrate on your program.

HOW TO USE GSDEMO

Under control of APW, the Apple Programmer's Workshop (ByteWorks), you simply type GSDEMO to run the program. Under control of ProDOS, you run the demo by double clicking its icon in the desktop, or by selecting it from the Launcher. (Depending on how you compile GSDEMO, you might have to change its filetype to S16 to get ProDOS16 to recognize the program as an application.)

The program starts by loading the various tools it needs and then displaying a window with the title "GS Demo Window." It also displays the menu bar with Apple and File menus. The Res unit defines the menu commands using a sort of mini-language in the form of strings, which you pass to toolbox procedure InsertMenu. In future articles, I'll explain more about designing pull-down menus.

The test window has all the features of other windows you've probably seen in other GS programs. Its drag bar on top lets you move the window anywhere on the display. The Zoom button in the upper right corner expands the window to full screen size—or deflates an expanded window to normal size. The resize button at the lower right lets you change the size and shape of the window. The scroll bars along the bottom and right

Why do some mail order houses engage in negative advertising against RamWorks® and other Applied Engineering products?

It began after we told them we didn't want them as a dealer. Applied Engineering doesn't accept just anyone as a dealer. In a few cases, for some very good reasons, with our customers' interests in mind, we just have to say no.

Most dealers sell both Applied Engineering products and others. These dealers don't practice "knock the competition." You'll notice that it's only the dealers that can't carry our products that are engaging in this practice.

We know that most people are turned off by this approach, but if you are ever tempted by imitations of our products that claim to be compatible, give us a call. Whether you're concerned about performance, compatibility, service, or price, you'll discover why we outsell all the rest.



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window borders work, but have no visible effect in this example, because there's nothing in the window.

There are two menu commands in the demo, About GSDemo and Quit. The About GSDemo command doesn't yet do anything. Eventually, I'll show you how to design the dialog boxes this command requires. The Quit command ends the program and returns it to APW.

SNEAK PREVIEWS

TML Pascal will come in two flavors although only one will be available initially. The plain-vanilla package—the one I used to write GSDEMO—runs under control of the Apple Programmer's Workshop (APW). To use this version of TML Pascal you must also purchase APW at about $100. You use APW's editor, ORCA/M 65816 assembler, and two linkers along with the Pascal compiler to create finished programs.

The other version of TML Pascal, which should be available by the time you read this, is a stand-alone, window-based compiler with its own text editor. It has everything you need to write GS programs and doesn't require APW.

Each version is $125, but which is for you? If you're terribly serious about programming, then get the APW version, which lets you combine portions of programs written in Pascal, C, and assembly language. It also lets you use advanced linking features that, among other things, change how programs load into memory.

If you're a beginner or a casual programmer, then get the stand-alone version. Although I haven't yet seen the product, I expect it to be easier to use than the APW-based system. Not only does this package save you $100, but it comes with its own mouse-based editor.

Apple Pascal programmers might want to look at Pecan's Power System, the newest UCSD Pascal system for the GS. Although source compatible with Apple Pascal, according to a Pecan press release, the new software runs under ProDos and takes advantage of GS sound, graphics, and extended memory.

One advantage of UCSD Pascal is that it lets programmers transfer and run programs on Apple, Macintosh, IBM PC, Amiga, and other computers—without recompiling. This capability comes with a reduction in speed, however. UCSD Pascal is fast, but usually not as fast as native-code compilers such as TML Pascal.

Listing 4. RES.PAS.

```
UNIT Res;

(*
 * PURPOSE  : Isolate program "resources"
 * SYSTEM   : Apple IIGS - ProDos16 - TML Pascal
 * AUTHOR   : Tom Swan (from an original program by Tom Leonard)
 *
 *)

INTERFACE       { Things visible to programs }

   USES

      QDIntf,              { QuickDraw }
      GSIntf;              { Various GS Tools }

   CONST

      AppleMenu    = 300;          { Apple pull-down menu ID }
      AboutItem    = 301;          { About program command ID }

      FileMenu     = 400;          { File pull-down menu ID }
      QuitItem     = 401;          { Quit command ID }

   VAR

      AppleMenuStr : Str255;       { Menu definition strings }
      FileMenuStr  : Str255;

PROCEDURE InitResources;

IMPLEMENTATION  { Things not visible to programs }

PROCEDURE InitResources;

{ Initialize menu definition strings }

   BEGIN
      AppleMenuStr := '>>@\N300\0==About GSDemo\N301\0.';
      FileMenuStr  := '>>  File  \N400\0==Quit\N401\0.';
   END; { InitResources }

END.
```

That's it for the first installment on programming with the GS toolbox. Next month, I'll look into QuickDraw graphics. Until then, don't forget to write.■

Write to Tom Swan at Swan Software, P.O. Box 206, Lititz, PA 17543.

More Power for APPLEWORKS™

MACROWORKS

by Randy Brandt
$34.95–Apple IIGS, IIc and 128K IIe
For AppleWorks version 1.3 or earlier.
(Version 2.0 requires Super MacroWorks.)

"...THE BEST SINGLE APPLEWORKS ADD-ON AVAILABLE TODAY."
–A+ Magazine, October 1986

"What is your FAVORITE Apple II software for 1986?"
1. AppleWorks
2. The Print Shop
3. MACROWORKS
–InCider Magazine's "Reader's Choice" Poll

MACROWORKS PUTS *YOU* IN CHARGE OF APPLEWORKS

After updating your AppleWorks disk once, you can put the MacroWorks disk away, then use AppleWorks like you always do. MacroWorks remains invisible until you need it. Most new features are accessed using the SOLID-APPLE (🍎) key (or IIGS OPTION key). All standard AppleWorks commands remain in effect.

Here are some of the new features that MacroWorks adds to AppleWorks:



APPLEWORKS MOUSE CONTROL
Optionally use your mouse for quick, precise control of menus, scrolling, highlighting, etc.

❑ **CREATE YOUR OWN MACROS**
Convert any series of AppleWorks keystrokes into a new single-keystroke AppleWorks command or "macro." Use our built-in macros or create your own.
For example, 🍎-N could type and center your name and address. Or 🍎-P could print (or save) *all* of your Desktop files, nonstop.
Or you could set up a macro that skips unwanted questions like *"How many copies?"* and *"Are you sure...?"*.

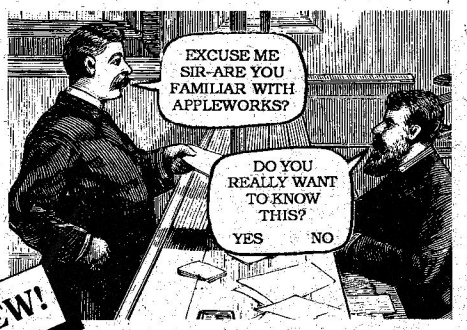
❑ **NEW SINGLE-KEYSTROKE WORD PROCESSOR COMMANDS**
- Character-delete and Word-delete
- Jump to the start or end of a line
- Erase an entire line
- "Undo" the last delete command
- Many more.

❑ **FOR THE WORD PROCESSOR, DATA BASE AND SPREADSHEET**
Create macros for all three applications. For example, in the Spreadsheet, you may find yourself typing the same series of keystrokes every day to sort a column of numbers. Set it up as a one-key macro!

❑ **PERSONALIZED HELP**
Rewrite AppleWorks' "Help" screens to display whatever information you want.

❑ **DESKTOP EXPANDER COMPATIBLE**
Works with the Applied Engineering™ and Checkmate™ Desktop Expanders.

❑ **NOT COPY PROTECTED**
You can install MacroWorks on a floppy disk, 3.5" disk, hard disk or RAM disk.



NEW!

SUPER MACROWORKS

by Randy Brandt
$49.95–Apple IIGS, IIc and 128K IIe
For new AppleWorks version 2.0.
(Version 1.3 & earlier requires MacroWorks.)

←MACROWORKS FEATURES PLUS...

Super MacroWorks provides the same AppleWorks enhancements and improvements as MacroWorks (left), **PLUS** the features below.

❑ **AUTO STARTUP**
Boot AppleWorks and it gets itself up and running without another keypress. You can also have any file automatically load, so you're ready to go to work!

❑ **DIRECTORY DATABASE**
Quickly read the file names from any or all of your ProDOS disks into the Data Base. Search and sort by file name, type, date, etc., and make printouts, to see what's *really* in that disk library of yours.

❑ **ON-THE-SPOT COMPILING**
Create and compile new custom macros "live" without leaving AppleWorks.

❑ **NO MORE TYPING PATHNAMES!**
When you want to access another disk or directory, you now select from a menu instead of typing a pathname. Simply highlight the directory name you want–it's just like loading files.

❑ **LINKED FILES**
Many possibilities–like the ability to define custom macros that work with a particular file. One keystroke can load a file, then load its associated macros.

❑ **READ-THE-SCREEN MACROS**
Lets you do many things, like convert characters, words or paragraphs from lower-case to UPPER-CASE and back.
And now you can cut and paste *anywhere*, including from field-to-field and record-to-record in the Data Base.

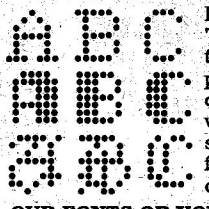
❑ **LOCAL/GLOBAL MACROS**
Define macros that work differently in different applications. For example, you could make 🍎-N do 3 different things:
- Word Processor ..... Type your name
- Spreadsheet ..... Type "3.14159"
- Data Base ..... Sort by Zip code

❑ **TIME & DATE MACROS**
One 🍎-keystroke automatically types the current date or time in any document.

POWER PRINT

by Rob Renstrom
$39.95–any Apple II (64K minimum)

POWER PRINT LETS YOUR PRINTER DO WHAT IT WAS *DESIGNED* TO DO.



Power Print lets you "download" a second typestyle into your printer's memory so you can alternate printing with your printer's standard font and a new font with special characters and symbols.

OUR FONTS OR YOURS
Ten different fonts are included on the disk. An easy-to-use font editor lets you redraw any character in our fonts or design your own fonts from scratch.

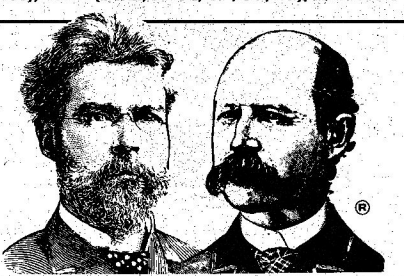
APPLEWORKS COMPATIBLE
In fact, Power Print is *everything* compatible. Just download a font (in less than 2 seconds), then boot AppleWorks, AppleWriter, ProDOS, DOS 3.3–or practically anything else–and custom printing is yours!

MIX GRAPHICS AND TEXT
Design up to 96 custom characters that combine to print a small illustration.



You may then include this drawing as part of your regular printouts.
←This logo was actually typed with AppleWorks and printed on an Apple ImageWriter. Other software and printers work equally well.

FULL-SPEED AHEAD!
Unlike other font software, Power Print *won't* slow your printer down one bit. Power Print works with most full-font downloadable printers, including:
APPLE DMP and **IMAGEWRITER** (I and II), **BROTHER** M1509, **CITIZEN** (20, 25), **EPSON** (EX, FX, JX), **OKIDATA** (92, 93, 192, 193), **PANASONIC** (1092, 1093), **STAR** (Delta, Radix, SG, SD, SR), and others



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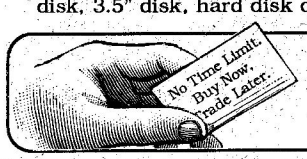
Orders only, Toll Free* **1-800-345-1750**
Orders only, California* **1-800-992-4022**
*Mon-Fri, 9am-4pm Pacific
Order by MODEM (24 hours) **1-619-296-6490**



Trade Up to SUPER MACROWORKS

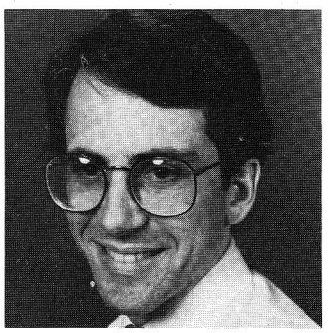
MacroWorks owners with AppleWorks 2.0 may get a Super MacroWorks trade-in by mailing the front cover of their MacroWorks manual+$22.50 to Beagle Bros. (Calif. add $1.20 tax)

AD #361

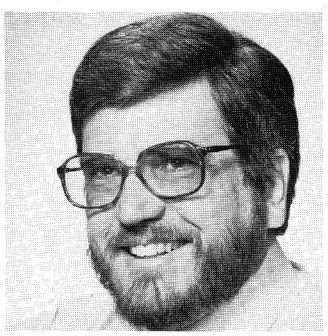
Circle 229 on Reader Service Card.

Slide Show

Use your Apple to get your audience's attention with color and motion.



by David Goodrum



and Joel Robbins

Getting people's attention is the hardest part of communicating. With all the fliers, worksheets, posted announcements, and other handouts bombarding us, it's no wonder we ignore most of them. Here's a novel way to get your audience's attention and deliver your message.

Computers, TVs, color, and motion are attention getters, and can make your communications task easier. So, if you're looking for a new way to announce upcoming events, or you need to attract your club members' attention, try using the accompanying BASIC **Program listing**, Slide Show.

Slide Show displays your message with a series of MousePaint pictures (or those you create with a similar drawing program) from a disk drive, RAM disk, or both, letting you control the number of slides, the timing between them, whether they change manually or automatically, and whether the series of pictures runs once or continuously.

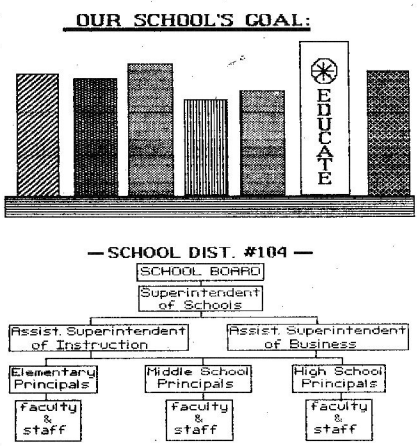
You don't have to be a da Vinci to use MousePaint or similar drawing programs to create simple but effective slides. **Figure 1** shows examples of a bar-chart format and an organizational chart for committee presentations.

Since these pictures load quickly onto the screen, using the same background for a group of slides creates an interesting effect. Loading one slide atop another blends the pictures, making the screen look as if only the message is changing. **Figures 2**, **3**, and **4** show examples of this effect.

All you need is a large TV monitor (a 25-inch color set works nicely). Hook it up to your Apple and place it near a hall or office window, or wherever there's a lot of traffic. You can provide updates and directions to people coming through the door, or to students in the lunchroom or study hall.

You can create the empty book (**Figure 2**) and scroll (**Figure 3**) fairly easily, and make the cartoon man with the pointer (**Figure 4**) from ovals of different sizes. Clip art is popular for school newspapers; now your pictures can become clip-art templates on which you can type new information. Then again, why not have the student artists in your building create

Figure 1. Chart formats created with Slide Show and MousePaint.



a variety of templates for daily announcements and special school activities?

There are, of course, fancier drawing programs than MousePaint, but its strong points for these applications are the various fonts and smaller file size hi-res pictures require, compared to double-hi-res. But if you've bought an Apple Mouse, you already have MousePaint, so why not use them to benefit the whole school?

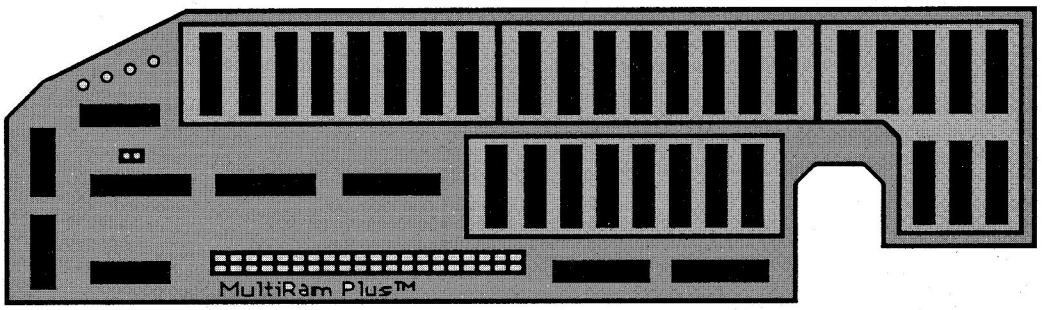
SAVING YOUR PICTURES

Save your Slide Show pictures as PIX1, PIX2, PIX3, and so on. As long as you number them consecutively, your group of slides can start with any number, and you can save more than one short slide set on a disk. The program asks you for the numbers of the first and last slides. This might come in handy, especially if you have a 3½-inch UniDisk or a hard disk on which to store a large number of slides.

ENTERING THE PROGRAM

Format a blank disk with ProDOS and copy the PRODOS.SYSTEM and BASIC.SYSTEM files to it; it automatically boots and takes you to the BASIC prompt. Type in the **Program listing** and save it with the name SLIDE.SHOW. Run the program by

//e
MEMORY THAT REMEMBERS



17 MEGABYTES

Start with 1 megabyte on the Checkmate MultiRam™ RGB card. Then add from 256K up to 4 megabytes with Checkmate's MultiRam™ Plus card (or 16 meg when the 4 meg chips become available in 1987). You can now take control of enough memory in your //e to eliminate ever having to load application programs again. Load AppleWorks™, Pinpoint™, spelling checkers, modem software and other applications just once. Retire your floppy disks forever! No more searching for misplaced disks!

BATTERY BACK-UP

The memory on the MultiRam™ Plus card can be fully protected against power failures and brown-outs with the External Power Module option. MultiRam™ Plus even has its own built-in trickle charger for rechargeable batteries.

POWER OPTION

The power option for the MultiRam™ Plus consists of a wall power pack, a battery holder for four size "C" batteries and a cable. Alkaline or rechargeable NiCad batteries can be used (not included). The Alkaline batteries can maintain power to 1 megabyte of memory for up to 20 hours.

ZERO POWER CONSUMPTION

Eliminate the danger of a large memory card overheating or damaging your computer's power supply. When the wall power pack is connected, the MultiRam™ Plus card is totally powered by the external power source–no danger of damage to the computer's power supply.

INSTANT SAVES

We all know better than to allow a large file to remain in memory without saving the data every few minutes. Or do we? That huge AppleWorks file takes forever to save, and sometimes we make the risky decision to put convenience before safety. Normally if you try to save an AppleWorks file, you watch the cursor take a coffee break. With Checkmate's MultiRam™ Plus card, you're back inputting data within seconds.

BUILT-IN HARD DRIVE ABILITY

Hard drives are nice, but after a few years they often sound like a washing machine. Head crashes and other horror stories have kept many from purchasing a large storage device. Now there is a better way: MultiRam™ Plus can be used as an ELECTRONIC HARD DISK DRIVE. **NO** moving parts to wear out. **NO** heads to crash. **NO** big box sitting on the desk. The MultiRam™ Plus fits neatly inside the Apple //e. The biggest reason for electronic chip failure is the current surge of the on and off cycle. The Plus card seldom (if ever) needs to be powered down, thus significantly improving the life expectancy of the IC's.

PRICING

Good news! Because the MultiRam™ Plus card mates together with the MultiRam ™ RGB card, the cost of battery back-up is very reasonable. The duties of double HIRES graphics and 80 column displays, RGB color and standard protocols of the //e are all handled by the MultiRam™ RGB card. The MultiRam™ Plus card only performs the job of providing extra memory and battery backup. Even the memory chips are different on the MultiRam™ Plus card. Using modern 18-pin, power-saving CAS before RAS memory chips gives MultiRam™ Plus the power and expandability to use the new 4 megabit RAM chips when they become available. Note: The MultiRam™ Plus requires MultiRam™ RGB with at least 64K for installation.

Checkmate's MultiRam products are available from your favorite dealer.

	Suggested Retail Prices
MultiRam™ Plus (256K)	**$249.95**
External Power Module	**$39.95**



Checkmate Technology™

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Circle 227 on Reader Service Card.

Figures 2 and 3. Clip art forms a background on which only the message appears to change.

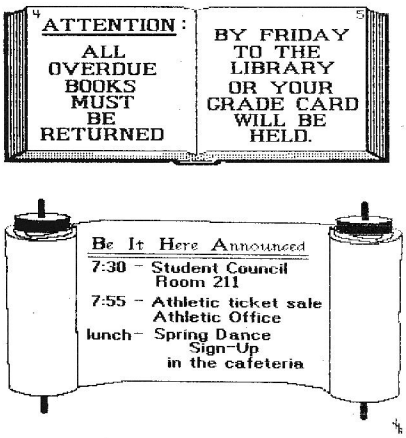
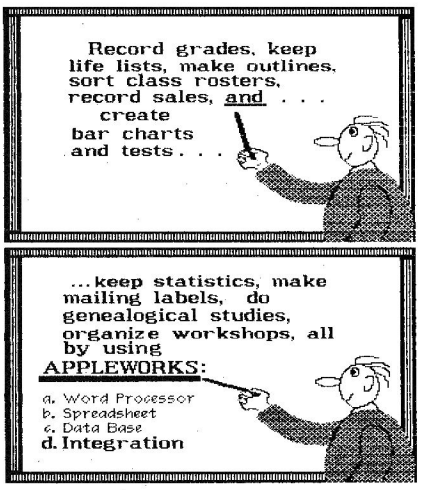


Figure 4. Cartoon created with ovals.



Program listing. Slide Show (save as SLIDE.SHOW).

```
1000  REM   SLIDE.SHOW BY DAVID GOODRUM WITH JR
1010  REM
1020  REM                    ******  SETUP ******
1030  HOME
1040 AUT = 0:DISK = 0:XMEM = 0
1050  INPUT "NUMBER OF FIRST SLIDE? ";FIRST: PRINT
1060  INPUT "NUMBER OF LAST SLIDE? ";LAST: PRINT
1070  IF LAST < FIRST THEN 1060
1080  PRINT
1090 XMEM =  PEEK (49048) - 128
1100  IF XMEM >  = 48 THEN XMEM = 1:DISK = FIRST + 7
1110  PRINT "DO YOU WANT AUTOMATIC CHANGE OF SLIDES? (Y/N)";:
      GET G$
1120  IF G$ = "N" OR G$ = "n" THEN  GOTO 1150
1130 AUT = 1: PRINT : PRINT
1140  INPUT " NUMBER OF SECONDS PER FRAME? ";SECS
1150  PRINT : PRINT
1160  PRINT "   DO YOU WANT TO REPEAT THE SLIDE SET? (Y/N)";:
      GET G$
1170  PRINT
1180  IF G$ = "Y" OR G$ = "y" THEN LOOP = 1
1190  IF XMEM THEN  GOSUB 4000
2000  REM
2010  REM                  ****** DISPLAY PIX ******
2020  REM
2030  HGR : POKE 49234,0
2040  REM
2050  FOR COUNT = FIRST TO LAST
2060  IF COUNT =  > DISK THEN  PRINT  CHR$ (4);"bload pix"COU
     NT",d1": GOTO 2080
2070  PRINT  CHR$ (4);"BLOAD/RAM/PIX"COUNT"
2080  GOSUB 3030
2090  NEXT COUNT
2100  IF LOOP = 1 THEN 2050
2110  END
3000  REM
3010  REM                  ******** PAUSE OR NOT **********
3020  REM
3030  IF AUT THEN  FOR PAUSE = 1 TO 1000 * SECS: NEXT : GOTO
     3070
3040  IF  PEEK ( - 16286) > 127 THEN 3070
3050  IF  PEEK ( - 16287) > 127 THEN COUNT = COUNT - 2: GOTO
     3070
3060  GOTO 3040
3070  IF LOOP = 0 THEN 3100
3080  IF COUNT < 0 THEN COUNT = LAST - 1
3090  RETURN
3100  IF COUNT < 0 THEN COUNT = 0
3110  RETURN
4000  REM
4010  REM                  ******  RAM LOAD  *******
4020  REM
4030 X = LAST: IF LAST - FIRST + 1 > 7 THEN X = FIRST + 6
4040  FOR COUNT = FIRST TO X
4050  PRINT  CHR$ (4);"BLOAD PIX"COUNT",D1
4060  PRINT  CHR$ (4);"BSAVE/RAM/PIX"COUNT",A$2000,L$2000
4070  NEXT
4080  RETURN
```

typing -SLIDE.SHOW at the BASIC prompt. If you want the disk to boot directly to the Slide Show program, save a STARTUP file containing the line:

```
10 PRINT CHR$ (4);"-SLIDE.SHOW"
```

Slide Show works with any 64K machine that runs ProDOS, though it must then load the pictures from disk if you have only the minimum memory.

In line 1090, the program checks to see if you have a 128K machine and can load pictures into the RAM disk (see below for details). Seven pictures fit into the extra 64K of memory, which ProDOS recognizes automatically. If you want no further disk access after initially loading your drawings into RAM, don't use more than seven pictures. If you stay within these limits, you can take your disk and walk away after setting up the computer.

The first part of the program sets up the actual slide show. Line 1110 asks if you want manual or automatic slide changing. If you choose automatic, you set the approximate time (in seconds) between slides in line 1140. Line 1160 asks if you want to repeat the slide set (good for automatic displays that run continuously) or run it only once (presentations).

The program then goes to the subroutine starting at line 4000, which loads up to seven pictures into RAM (for 128K machines). Afterwards, or if your Apple doesn't have extra memory, lines 2000–2090, which load and display the slides, first decide where to find the next slide to display (line 2060). Since seven is the maximum number of slides that fit into the extra 64K in RAM, the variable DISK is set for the number of the first slide (the FIRST variable) plus seven if you have extra memory. If you request more than seven, the program accesses the disk for pictures, starting with the eighth one.

When a slide loads onto the screen, the subroutine starting at line 3000 checks to see if you chose automatic or manual slide changing. If you chose automatic, the program pauses the requested number of seconds before displaying the next slide. If you requested manual change, the program waits for a keypress indicating whether you want to go back to the previous slide (press the open-apple key) or continue to the next (press the solid-apple key).

If you own a joystick, you can escape the computer keyboard during a Slide Show presentation. The two but-

tons are equivalent to the open- and solid-apple keys on the IIe and IIc; most joysticks give you about a three-foot tether away from your computer.

An Apple with 128K and a 5¼-inch disk drive can run up to 23 slides unattended: After slides 1 through 7 load into memory and start to run, you could place a data disk with up to 16 more slides into the drive. If you operate Slide Show manually, you're limited only by the careful disk switching you'd need to perform.

/RAM THE DISK DRIVES AND FULL SPEED AHEAD!

If you've tried the slide shows included with some drawing programs, you'll remember that your poor disk drive ran almost continuously. Nothing worries a computer owner more than constant disk access—and nothing accesses a disk drive like a computer slide show that grinds continuously.

One way to avoid excessive disk and drive wear during a lengthy presentation is to find an extra-memory Apple and set aside a portion of its 128K-or-so memory as a RAM disk that simulates a disk drive. You can load, save, catalog, rename, and delete files in a RAM disk as if it were a regular disk drive. The RAM disk, though, won't retain files when you turn your computer off.

As indicated above, the 64K /RAM extension that ProDOS automatically sets up when you load BASIC into a 128K computer is perfect for temporarily storing up to seven MousePaint or similar pictures filled with information, announcements, or the results of your classes' artistic struggles. From here, the pictures can run all day or all evening long, and you can rest peacefully in the silence of your disk drives. Another bonus is the high speed with which pictures and information transfer to your screen.

If you've installed a memory card in your Apple and now have more than 128K, you can easily adjust the program to take advantage of the extra memory. For example, you can install a RAM disk with the software utility that comes with your RamWorks or MultiRam card. If you have an Apple Memory Expansion card for your IIe or IIc, you automatically install a RAM disk (called /RAM4) when you boot a ProDOS disk. Give your RAM disk an appropriate name in lines 2070 and 4060, and enter the maximum number of pictures that fit into it in line 1100.

By combining a memory-expansion card and a 3½-inch UniDisk, you can create, store, and run a lengthy slide show with high speed and relatively little disk access.

Next month, we head back to the AppleWorks spreadsheet for math drills for your students at school or your children at home. ■

David Goodrum and Joel Robbins are developers of SchoolWorks templates for AppleWorks, published by K-12 MicroMedia Publishing, and other educational software. Write to them at Tulip Tree House 1016, Bloomington, IN 47401. Enclose a stamped, self-addressed envelope if you want a personal reply.

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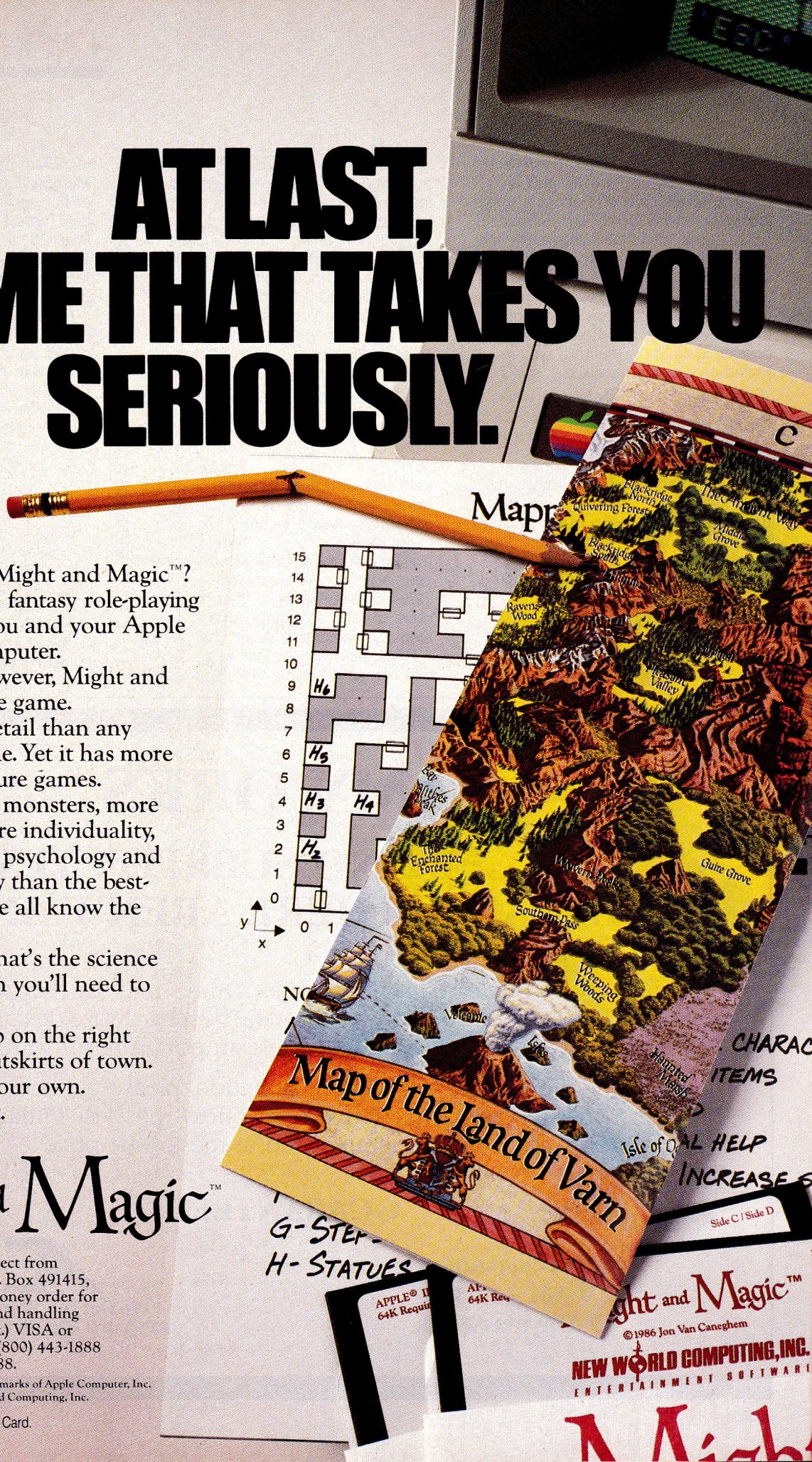

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Circle 194 on Reader Service Card.

Continued from p. 28.

Term Paper Writer then prints your paper in perfect Turabian, MLA, or APA style, automatically indenting and single-spacing long quotations you've indicated with the control-Q command. You can change the program's default settings for margins and line spacing, but you probably won't need to unless your teacher asks you to follow modified guidelines.

A FEW QUIRKS

Term Paper Writer would receive a rave review were it not for a few admitted imperfections. First, APA format requires embedded footnotes citing author and year of publication. Term Paper Writer can't take care of that, forcing you to edit your paper before final printing. Second, Term Paper Writer may not properly alphabetize multiple works by the same author, requiring you to edit your bibliography before printing. Neither deficiency is a total drawback, just a pain in the neck.

There's one other potential problem. The program is copy-protected, and a backup ($10) can take two weeks or more to reach you. It's wise to order the backup as soon as you purchase the program, lest you sit down at your Apple the night before your paper is due and find your program disk disabled.

It's unfortunate, too, that the program version reviewed here lives in a world unto itself. Working under Diversi-DOS, a proprietary operating system, Term Paper Writer data disks are formatted by the program itself, and Term Paper Writer files appear to be incompatible with other word-processing programs.

Keep these minor problems in mind, but by all means investigate Term Paper Writer. You may not enjoy the process of writing research papers any more than before, but now you can concentrate on your paper's content instead of worrying about its form.

HOMEWORKER: TRICKS OF THE TRADE

While Term Paper Writer helps you organize and prepare research papers, Homeworker, with its six modules (Textwriter, Outliner, Flash Card Maker, Calendar, Grade Keeper, and Calculator), helps you organize your life. No kidding—Davidson & Associates' broad-based student toolkit offers most of the tricks of the trade successful students have been using for years.

Learning the Homeworker program shouldn't drain away too much valuable brainpower. Its AppleWorks stacking-file-card interface and on-screen prompts keep the program nearly command-free. The few open-apple-key commands you need to remember are mnemonic and are consistent from one module to the next (for example, Open apple-P prints—class notes, an outline, or flashcards), and OA-? gives you context-sensitive reminders about the other commands.

The Homeworker interface looks a lot like AppleWorks'. It's a cinch to add files to the desktop to type your biology notes, make French flashcards, or outline your English essay. Need to quickly translate English-system measurements to metric? Call on Homeworker's four-function, pop-up calculator, with built-in conversions.

You even get your own personal gradebook: You can record marks and test results in each class with the Homeworker Grade Keeper. This mini-spreadsheet also lets you play "what if" to determine the score you'll need on the next history exam to maintain that B or move up to an A.

One point should be clarified: Homeworker's Textwriter module is strictly for typing your lecture notes. It isn't a term-paper writer—it doesn't do footnotes or automatically format research papers. It lacks certain ordinary word-processing functions, such as underlining and boldface, and it can handle only about ten pages at a time. But, then, it's not intended to be a full-featured word processor.

Homeworker can swap files with AppleWorks, though, so when it's time to type a term paper, you can transfer information to AppleWorks, then dress up and print these longer documents.

EXTRAS

The Homeworker manual includes a Quick Tour, and the program disk contains sample files. Besides the manual, the package also offers pencil, pen, ruler, and highlighter, and a tidy book called *How to Study for Success*, written by Dr. Jan Davidson, the company's founder and a teacher.

A ProDOS-based program, Homeworker appears to be compatible with the UniDisk 3.5. Version 1.1, an early (and mildly buggy) version I tested, was unable to format a 3½-inch disk, but readily saved and loaded files from a 3½-inch data disk previously initialized with Apple's System Utilities. According to a Davidson & Associates' spokeswoman, though, the program wasn't designed for the UniDisk 3.5 and at press time hadn't been tested on that device.

Homeworker, like Term Paper Writer, is copy-protected. A backup costs $10 and may not arrive for up to two weeks.

Both products reviewed here offer students a chance to become more organized. Homeworker is designed for daily use, while you'd need Term Paper Writer only intermittently.

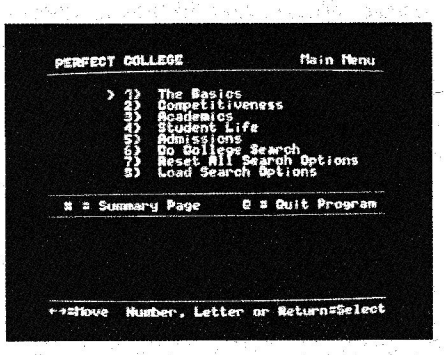
Despite its faults, Term Paper Writer is an effective program that should appeal to nearly every high-school and college student.

Homeworker, on the other hand, may attract a smaller audience. The scholarly student will probably adore a program that does everything he or she already does—but much more easily. For this type of student, Homeworker is a real productivity package.

For students who have never been organized but are motivated to do better, Homeworker can be an effective guide. Sometimes success in school comes from learning a few new tricks.

At $69.95 and $99.95 (including backups), Term Paper Writer and Homeworker don't come cheaply—but neither does success. ■

Cynthia E. Field
Wakefield, RI



Big Decisions

THE PERFECT COLLEGE

Mindscape, 3444 Dundee Road, Northbrook, IL 60062

College-selection database; any 64K Apple II
$19.95 (free with The Perfect Score SAT program, $69.95)
Rating: ■■■

Deciding which college to attend ranks with the major choices you'll have to make in your life. But how

do you decide? There are more than 3000 colleges and universities in the United States. The Perfect College can help you narrow the field to a manageable list, as long as you know what you're looking for.

The Perfect College is a database of 1657 accredited four-year colleges in the U.S. (Two-year and nonaccredited schools aren't included, so that trims your choices a bit.) Tell the program what you're looking for in a college (majors offered, sports, campus housing, and so on), and the database will come up with two lists—an A list of schools that match your criteria exactly and a B list of institutions matching all but one or two. If your criteria are too exacting, the A list may be short or you may see only a B list.

CHOICES, CHOICES

The program's main menu lets you indicate college-shopping criteria in five categories—The Basics, Competitiveness, Academics, Student Life, and Admissions. Within these groups are 26 individual criteria covering all the aspects in which you'll be interested when choosing a college.

The Basics includes such general information as location, size, setting, type of school (liberal arts, technical, business, and so on), religious affiliation, whether the school is public or private, climate, and the all-important cost of tuition.

In the category of Competitiveness, you can select overall competitiveness, average SAT and ACT test scores, average GPA, and percentage of applicants accepted. These figures are helpful in determining your chances of being accepted at a particular school.

Academics lets you specify information about the course of study you plan to pursue, and how you plan on pursuing it. This portion of the program lets you choose up to five possible majors from a list of more than 80 and indicate any special programs, such as junior year abroad, ROTC, or designing your own major, that may be important to you. You can also select the student/faculty ratio you'd prefer.

The Student Life category includes all the extracurricular activities and other factors that will affect your daily life as a student—male/female ratio, student-body characteristics, housing, student activities, and sports. These are matters of preference, but they're important in determining where you'll spend the next four years of your life. There's more to the college experience than just going to classes.

In the Admissions category, you can indicate certain requirements, such as tests you need to take or courses you need to complete, admission options, academic-calendar systems such as semester versus trimester, and application deadlines.

READY, SET, SEARCH

After you examine possible criteria and specify those that are important to you, it's time to escape to the main menu and choose Do Search. Again, if you're too demanding or specific, The Perfect College may not find any candidates for you. On the other hand, if your search parameters are too broad, its lists will be too large to be of much help.

The secret is to indicate just the criteria that are important to you. For instance, you may not care about campus-housing arrangements, but be eager to play basketball. Or you may not care how far your college is from home, as long as the student body is more than 75 percent female (or male, depending on your point of view).

After a minute or two's search, the program will indicate the number of schools it has found for the A and B lists. From there, you can see both lists or individual records (five screens of overview information describing each school's statistics).

Being able to rank or prioritize your selected criteria would have been a nice feature. As is, The Perfect College gives equal weight to your choice of location, majors offered, and intercollegiate sports (for example). There's a way around this if one aspect is of utmost importance to you—specify just that criterion, leaving the others blank. The resulting A list will include schools that meet that requirement, while the remainder of the database is list B. This is a helpful way to search if you're sure you want a school in a specific state or area, or one that offers a particular sport or major.

THE RESULTS ARE IN

You can print just about any information you obtained from The Perfect College's files, as well as the search criteria you've selected. You can print a summary page of your chosen options, a page of search results, the A or B list, descriptions of schools in either list, or the description of a school of your choice. When you exit the main menu, the program gives you the option of saving the current search settings to disk.

According to the documentation, The Perfect College has been tested with the Apple Super Serial, Microtek, Tackler, and Grappler Plus interface cards, and the ImageWriter I and II and various Epson printers. It should work with most other serial and parallel interfaces and dot-matrix printers, as well.

It's easy to navigate through The Perfect College's menus with the keyboard or joystick, and the documentation is accordingly slim. It does include a convenient list of abbreviations used in the program. It also gives some general advice on characteristics and school facilities for which you should look and how to go about applying once you've decided.

The Perfect College isn't a substitute for the detailed information college catalogues and comparative guidebooks contain, but it's a handy, low-priced tool when it comes to choosing a college from the myriad institutions across the U.S.■

Lafe Low
inCider *staff*

Clip and Save

PAPERCLIP 1.0

Batteries Included, 30 Mural Street, Richmond Hill, Ontario, Canada L4B 1B5

Word processor with mail merge; 128K IIe, IIc, IIGS
$59.95
Rating: ■■■

Next to the IIGS and AppleWorks add-ons, the biggest trend in Apple software these days seems to be the invasion of the Commodore word processors. PSI's Fleet System 3 was the first to enter the field (see review, November 1986, p. 38); now Batteries Included has adapted one of the most popular word processors around, PaperClip, to the Apple IIe and IIc.

The two programs have similar 80-column or wider text displays, print-preview modes, and embedded formatting commands; PaperClip lacks Fleet System's spelling checker and thesaurus, but has more editing power and convenience, is noncopy-

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protected, and costs $20 less. Its mail merge is mediocre at best, but that's balanced by impressive skill in arranging, sorting, and adding columns. Overall, PaperClip is a flexible performer for moderate word-processing jobs.

CONTROLLING THE EDITOR

PaperClip uses ProDOS and transfers easily to a 3½-inch disk or hard disk; it saves documents in a special format instead of ASCII text, though you can load a PaperClip file into AppleWorks or an ASCII document into PaperClip (telling the program it's a mail-merge data file) with a few minutes' editing and reformatting.

After loading PaperClip (to a slightly annoying beep tone), new users must cling to the manual—there are no menus or help screens, though inverse-video bars indicate line and column position, whether insert mode is active, and amount of memory remaining. PaperClip's standard document size is a maximum 585 lines of a minimum 80 on-screen columns; Control-N lets you specify a line length of up to 250 characters for horizontal scrolling of columnar tables, though changing length wipes out any text in memory. You can create longer documents by chaining files at print time.

As with Fleet 3, text always fills the screen, with word wrap at 80 or more columns; a choice of output to printer or video lets you preview spacing, justification, and margin settings as they'll appear on paper. Except for the delete key (backspace), and Escape and the arrow keys for cursor movement (up and down a screen or to the left or right end of a line—there's no way to move the cursor one word at a time), PaperClip relies on control-key combinations for editing, using some of the line-oriented approach of other low-end word processors.

Control-D deletes a line (without the Y/N confirmation of range or phrase deletions, all of which are irretrievable). Control-L adds one or more lines, the best way to insert material in the middle of your text—regular insert mode, toggled with the open-apple key, sluggishly drops characters during word wrap. Control-R lets you mark a range of lines as a block to delete, move, copy (up to 255 times in one shot, though I can't imagine why), or save to disk.

Unlike Fleet 3, however, blocks aren't restricted to whole lines: You can mark a phrase, advancing by word, by sentence (the next period, skipping any exclamation or question marks), or by arrow keys, then delete or copy it or change it to all upper- or lowercase. It's sometimes awkward—moving a phrase requires copying it to its new location, then deleting the original occurrence, and deleting a word takes Control-PW, Return, Control-PD, Y. There's no clipboard or buffer, so once you've deleted a range or phrase, it's no longer available for copying. Overall, though, PaperClip is an effective worker once you learn its commands.

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Designed by Bob Brice Software by Bob Sander-Cederlof

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The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. **$34.95**

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This permits the use of most 16-pin I/O devices with the APPLE //e or //c. The only limitations are those devices that use the annunciators or the $CØ4Ø strobe. **NOTE:** The //c does not support the use of two joysticks. **$14.95**

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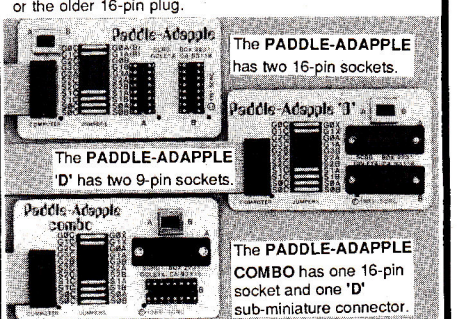

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BEYOND THE BASICS

None of these features is extraordinary; neither is the WordStar-style inconvenience of putting the cursor at the end instead of the beginning of a search phrase (which ties in with PaperClip's half-cute, half-clumsy way of handling search-and-replace or mail-merge changes and deletions—it backspaces over the old text). But PaperClip has some intriguing abilities, such as letting you specify up to five search-and-replacements with one command.

Another is its flexibility with embedded "tic" commands (PaperClip's name for the single left quote on the tilde key). You type them on lines by themselves or in sequence to format the text below them, as in *'lm8:rm62* to set left and right margins.

Besides controlling everything from page breaks to headers, footers, and hanging indentations, "tic" commands govern a feature promoted on the package but omitted, except for a line in the command reference list, from the manual: macros, letting you define Escape plus an upper- or lowercase letter for up to 52 short (limited to the current line length) phrases. Since macros are stored as nonprinting lines in each document instead of on the PaperClip disk, you'll have to type each phrase at least once, but afterwards PaperClip types them for you at lightning speed.

PaperClip's mail merge is the simplest kind—it sequentially replaces text markers (made with Control-V Delete) with lines from a data file on disk. You must be careful about ensuring that the number of data fields matches the number of markers in your document, and must retype items to be repeated instead of reusing them as with database-field merge programs (*Dear John Doe: You know, John, someone in the Doe family may be a big winner*).

My test merges ran smoothly with short, simple items like address lines, but stumbled when I tried putting long text phrases within paragraphs: After a couple of successful letters, PaperClip's backspacing and retyping started to fall behind, lopping off parts of phrases and then getting progressively out of sync (*Dear 22 Main Street, Someone at the Doe family may be a winner*).

DISKS AND DECIMALS

You needn't save a form letter or document before printing it, but loading or saving a PaperClip or data file is easy. Control-F opens a Finder window with a menu of disk operations; after moving the cursor to a command, you can press Return and select from a directory or type a filename or path directly to load, merge, save, or delete a file, format a disk, or change the current directory. You can also view or scroll through another file and return to the document in memory, though you can edit only one file at a time. (Two features of other PaperClip versions, "dual text windows" and "auto text protection,"



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slipped into the Apple paragraph of a recent Batteries Included ad.)

Other word processors have numeric (decimal) tabs and support horizontal scrolling for wide tables, but PaperClip excels at handling columns of numbers or text. Control-C and the arrow keys let you mark a series of short lines as a column, then move it anywhere in your document (even to the right of lines above, the carriage returns after which vanish); if you count the number of lines per printed page, you can produce two- or three-column documents.

Another command types the sum of a numeric column. Still another can sort a text column in ascending or descending order (numeric columns are sorted by first digits, so 72 comes after 615), even letting you sort by specified fields (items separated by spaces or other delimiters) so that a list of friends starting with first names can be sorted by last name. It takes a few seconds, but it makes PaperClip a makeshift mini-database or report generator.

Summing up, PaperClip's price is reasonable, its manual is a little skimpy, its column handling is delightful, and its everyday editing power is adequate. I'd say it's worth a look, but I can't echo the rave reviews it's had in the Commodore world. We Apple people are harder to please.■

Eric Grevstad
inCider *staff*

Slow Solutions

TK!SOLVER

Universal Technical Systems, 1220 Rock Street, Rockford, IL 61101

Problem-solving spreadsheet; 64K, 80-column IIe, IIc, IIGS
$99
Rating: ■■■■

I like math. My idea of doodling is deriving the quadratic formula from $ax^2 + bx + c = 0$. TK!Solver is software for math fans—they may be professional physicists, radio astronomers, or civil engineers, but their avocation is math. Similarly, TK!Solver can convert units of measurement and plot tables and graphs, but its heart lies in solving equations. Its only drawback is that, on an Apple II, that heart beats slowly.

The program lets you solve a simple equation ($x + 4 = 6$) or a number of simultaneous equations ($x + y = 6$ and $x - y = 2$). TK!Solver can handle the first with its direct solver; a system of equations requires the iterative solver to kick in.

Down through the dim years you may recall several ways to solve a system of equations. You might add the two equations above to eliminate the y and come up with $2x = 8$. You might also change the second equation to $x = y + 2$, reason that in that case the first could be rephrased as $(y + 2) + y = 6$, and compute that $2y$ must be 4. The rest I leave to you.

But you might have frustrated your weary algebra teacher and guessed. "Three and 3 is 6," the class wiseacre reasoned. "But 3 less 3 is nothing, which is smaller than 2. So x must be bigger than 3, and y must be smaller." The lucky kid has hit it, to the teacher's dismay: "x must be 4 and y must be 2!"

Algebra teachers discourage this kind of thinking; TK!Solver uses just such "iterative" reasoning to solve difficult equations. A computer iterates easily—it happily repeats operations over and over. If your first guess is far from right, or the equation far from simple, repeating guesses until you get it right can take time. (That's why teachers discourage iterative solving: A ninth-grader will be wriggling in his or her seat before a computer warms up.)

I don't hold iteration against TK!Solver: It's the way computers work best, and any computer can iterate faster than any human. But on a Cray supercomputer—or even an IBM PC—an iterative solution is quick. On an Apple II, I'm sorry to report, it's slow. (I once told *AmigaWorld* tech editor Bob Ryan, "An Apple II can do anything." "Slowly," Bob agreed.)

INDIRECT GUESSES

TK!Solver doesn't solve everything by iteration. If you give it an equation like $f = ma$ or $s = (gt^2)/2$ in which two of the three variables are given, TK!Solver uses a "direct solver." The direct solver, to my pedantic former-schoolmaster's mind, doesn't really solve equations; it evaluates them. It replaces an algebraic equation's variables with numbers and churns out an answer, instead of logically deducing that x must be 2 or -2 if $x^2 - 4 = 0$.

The iterative solver simply uses the direct solver again and again, assigning guesses to the variables. Instead of throwing in the towel when a value doesn't work, as the direct solver would, the iterative solver makes a better guess and starts over. You decide how many times the solver iterates.

MODELS IN MOTION

What TK!Solver actually solves is a mathematical model, a set of related equations that describe a specific situation. The fundamental domain of TK!Solver is real numbers—the roots of algebraic equations, with no transcendentals—further limited by the Apple to numbers with (absolute) values between 10^{-254} and 10^{254}. TK!Solver returns only positive roots. That's not a complaint, just something the user needs to know.

A simple model on the second (unprotected, DOS 3.3) disk that accompanies TK!Solver is a model of gravity. Issac Newton figured that three rules govern falling apples: $v = gt$, $s = gt^2/2$, and $g = 32\ ft/sec^2$. TK!Solver puts these equations on a "rule sheet," one of the three windows into which I looked most often. The others were the "variable sheet" and the "list sheet."

The variable sheet in the gravity model holds v, t, s, and g—variables that stand for velocity, time, distance, and acceleration because of gravity. The variable sheet is where the action is: You fill in the values of known variables in TK!'s "input" column, hit the "action key"—that's the exclamation point, but what do T and K mean?—and it returns the other variables' values as output. Type in $t = 1$, and TK! tells you that, after one second's fall, an apple has reached a speed of 32.173985 feet per second and traveled 16.086993 feet.

Tables and graphs get interesting when you jump to the "list sheet." In this window, you can set a range of values for each variable; I set t between zero and 60, to see how far and how fast my apple would drop if it had a minute.

My other Apple, a IIe, took five minutes and 20 seconds to reckon a minute's free fall. Strange are the ways of science, slow the ways of the Apple II. (A IIGS did the job in 2:14, though an unenhanced IIe with an Applied Engineering TransWarp was no faster than the standard IIe.)

In the "plot sheet" and "table sheet," I drew a graph of velocity and distance against time, and listed a table. The table was the better picture. Lists may have less pedagogic

value than graphs, but graphing is not TK!Solver's strength—its charts are crude and lack detail. Reading the graph, I learned that the poor apple stood stock still in the first 10 seconds of its fall before accelerating suddenly at the eleventh second.

TK!Solver supports much more complex models than gravity in three equations. You can create models yourself, or buy template models from Universal Technical Systems that work in mechanical engineering, building design and construction, financial management, and introductory science. A call to UTS revealed that the templates are $70 each; others are available, mostly for the IBM (on which TK!Solver began its career as a minor success and major technical achievement in 1983).

"When we bought TK! [from Software Arts] last year," a helpful operator told me, "we decided to support Apple users, but most of the third-party support goes to IBM." (He agreed that TK! is "awfully slow on the Apple, isn't it?") I found some useful models in a copy of *TK!Solver for Engineers* (Victor Wright, Reston Publishing, 1984), such as one for electric-power transformation that contains 14 rules and 25 variables. It would take as long for my Apple to solve as for me to type it in.

SHADES OF IBM

TK!Solver's user interface harks back to VisiCalc with its slash commands; AppleWorks folks like me will often hit the escape key in vain to switch back to a previous window or reconsider a decision. I often forgot if I wanted /P or =P to plot a graph. (It's the latter; /P makes TK!Solver print, with no way to turn back or stop printing.) TK!Solver isn't hard to use, it's hard to learn.

The documentation is extensive, but oriented toward IBM (references to the "break" key, for instance, handled by the Apple's Control-C). An Apple appendix explains what you'll have to suffer—which keys are different, don't use slot 3, and so on. This information is also in the first chapters of the instruction manual. Everything is explained at least twice in TK!Solver documentation—a nice touch for those of us who like big books or "another way to put it."

While the manual explains every command clearly, it's no help for setting up specific applications—TK!Solver is a complex, abstract program, and the documentation is necessarily vague on possible uses. I don't know that any book could do better, unless an engineer who wanted to build bridges could find a copy of *Apple II TK!Solver for Engineers Who Want to Build Bridges.*

The manual misses one thing—TK!Solver is software that has a great chance to teach. You could learn a lot about math from this book; instead, you get bogged down in sheets, lists, rules, and commands. In defense of the manual, however, there's more to TK!Solver than I have space to mention here—specifically, a number of built-in mathematical functions and the ability to create your own.

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- Fast conversion (.078 MS per channel)
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- User programmable input ranges are 0 to 10 volts, 0 to 5, −5 to +5, −2.5 to +2.5, −5 to 0, −10 to 0.

The A/D process takes place on a continuous, channel sequencing basis. Data is automatically transferred to its proper location in the on-board RAM. No A/D converter could be easier to use.

D/A SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- On-board output buffer amps can drive 5 MA
- D/A process is totally transparent to the Apple (just poke the data)
- Fast conversion (.003 MS per channel)
- User programmable output ranges are 0 to 5 volts and 0 to 10 volts

The D/A section contains 8 digital to analog converters, with output buffer amplifiers and all interface logic on a single card. On-card latches are provided for each of the eight D/A converters. No D/A converter could be easier to use. The on-board amplifiers are laser-trimmed during manufacture, thereby eliminating any requirement for off-set nulling.

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Our 8 channel signal conditioner is designed for use with both our A/D converters. This board incorporates 8 F.E.T. op-amps, which allow almost any gain or offset. For example, an input signal that varies from 2.00 to 2.15 volts or a signal that varies from 0 to 50 mV can easily be converted to 0-10V output for the A/D.

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The I/O manual includes many programs for inputs and outputs.

Some applications include:
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I like TK!Solver. It does the job it claims to. The trouble is that the program was written for MS-DOS, and it shows—the Apple hardware cruelly limits this software. For the scientist or engineer who really needs TK!Solver, the Apple II is out of the question—buy a cheap IBM PC clone.■

Paul Statt
inCider *staff*

Small Talk

TALKING TEXT WRITER

Scholastic Software, Dept. JS, 730 Broadway, New York, NY 10003

Educational word processor; 128K IIe, IIc, Echo Plus or Cricket voice synthesizer
Retail price: $373.75 with Echo board, $248.75 without
Educators' price: $199.95 with Echo, $149.95 without
Rating: ■■

As an educational program, Talking Text Writer fits somewhere between Bank Street Writer and a specialized word processor for the blind: It's a simple word processor that can repeat letters, words, or documents aloud, using Street Electronics' Echo Plus voice-synthesizer card for the IIe or Street's Cricket synthesizer for the IIc.

I wasn't particularly impressed with the "Talking" side of the program, because of its slow speech-response time—after a key was pressed, it took a fat fraction of a second for the Echo to speak. On the other hand, I was pleased with the "Text Writer" 's ability to display 20-, 40-, and 80-column text on screen, making it perfect for young school-age children or special-needs students.

On the darker side, I was totally unimpressed by the support offered by Scholastic Software. I called several times with questions, none of which could be answered immediately. I was told that the company would call back, but neither I nor my answering machine ever received a single call.

INSIDE THE PACKAGE

Considering its potential, Talking Text Writer isn't an expensive program at its classroom price. The price you pay depends on the configuration you need. If you're an educator, the program costs $199.95, including the Echo Plus board. If you're a smart educator who already owns an Echo Plus, you can purchase Talking Text Writer by itself for $149.95, or in a "Lab Pack" (five copies of the program, one set of documentation, no Echo boards) for $254.95.

Talking Text Writer comes bundled in a three-ring notebook binder with read/write program disk, read-only program disk, file-maker disk, sample-files disk, tutorial manual, and Echo Plus board. The documentation is broken down into four guides—getting started, reference, teaching, and classroom activity. I was very impressed by the "Getting Started" guide, because it let me begin making the program talk in seconds.

I tried Talking Text Writer on a IIe with 5¼-inch drives and an Echo Plus and on a IIc with 3½-inch drives and a Cricket. In both cases, I got basically favorable results from the software, but did manage to crash Talking Text Writer twice.

HARDWARE BEHIND THE SOFTWARE

The Echo Plus is an unlimited-vocabulary text-to-speech board made by Street Electronics Corporation of Carpinteria, California. It's the most widely supported low-cost speech-synthesizer board in the Apple marketplace, and for good reason: The Echo Plus has a stand-alone text-to-speech algorithm, a crisp robotic voice, music and sound effects, and a fixed female-voice vocabulary of more than 4000 words. (Street Electronics is currently building a speech synthesizer for the IIGS called the Echo IIb.)

I've owned an Echo Plus for several years, and, without sounding like a fanatic, I can't praise the card enough. The Echo can speak any word and reproduce human speech with robotic accuracy. The Echo Plus can also work with Applesoft BASIC, old Integer BASIC, ProDOS, and DOS 3.3 programs.

The software end of the Echo Plus is a disk-based text-to-speech algorithm, containing screen and keyboard drivers. This machine-language software, called Textalker, is available in either ProDOS 1.1.1 or DOS 3.3 formats. Textalker opens a pathway between the Apple's keyboard and screen, sharing all keystrokes and screen text with the Echo Plus. Thanks to the Echo Plus—or Cricket, which simply plugs into a IIc's modem port—Talking Text Writer can accomplish its educational task.

Talking Text Writer isn't a powerful word-processing program; it's mainly intended for the mainstream or special-education classroom. The program does, however, have features often found in "grownup" word processors, such as cut-and-paste editing and block moves and deletions.

When you first boot the program, it presents you with a welcome screen, then prompts you to insert a data disk and press the spacebar to continue. A list of current disk files then appears on the File Menu screen, which also presents menu options such as G to get a file, N to start a new file, and C to copy a file to another pathname. I was pleased with this arrangement, because it lets a beginner get quick access to any file.

The Edit screen lets you insert, delete, copy, cut, or paste your text, and change speech options on the fly. You can make Talking Text Writer repeat every keystroke, or instruct the program to speak only whole words. Pressing the open-apple and question-mark keys brings help from any point in the program.

On the whole, Talking Text Writer does its job of vocally reinforcing children's letter or word skills, but doesn't go far enough. Based on my knowledge of the Echo Plus, making the program voice all menu screens and prompts would be simple. Talking Text Writer would then also be an educational tool for blind children.

Compared to other talking programs in its class, Talking Text Writer stands in the middle of the road. Next to Word-Talk from Computer Aids Corporation (Fort Wayne, Indiana), Talking Text Writer suffers from slow speech-response time and its inability to voice menus and prompts as well as keyboard input. Contrasted with Braille-Edit from Raised Dot Computing (Madison, Wisconsin), Talking Text Writer stands its ground, because both Talking Text Writer and Braille-Edit offer large-print capability.

But when all is said and done, Talking Text Writer lives up to its claims. It's a simple word-processing program aimed squarely at young schoolchildren and learning-disabled students, with easy menus, helpful display and print options, and friendly, if limited, speech functions.■

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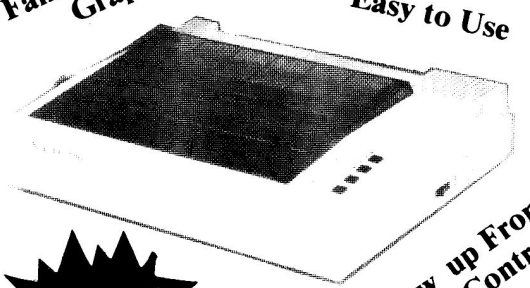

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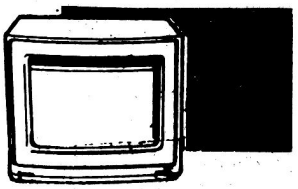

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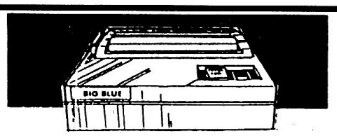

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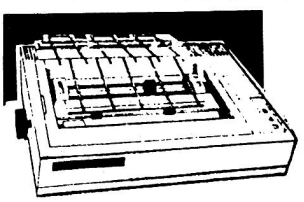

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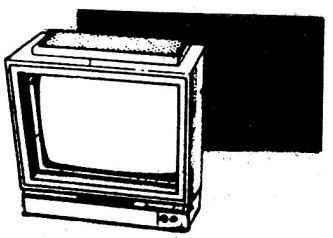

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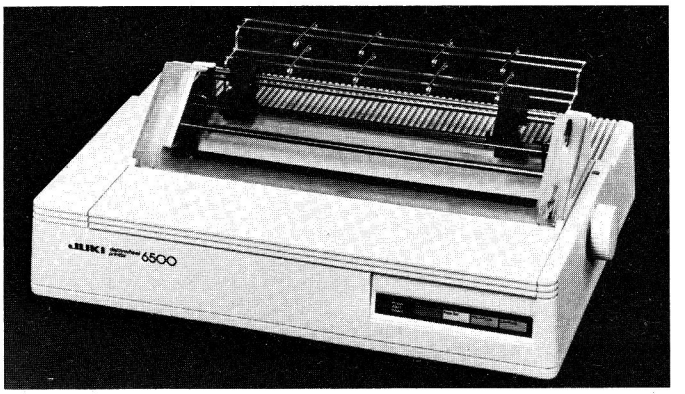

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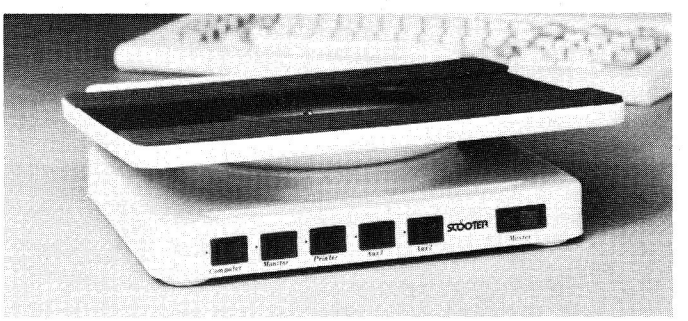

The Scooter SP500M monitor stand provides protection from spikes, surges, and electrical noise.

Software

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The Body Systems II Series includes three programs to help you **learn how your body works**. The Endocrine System: The Body in Balance explores the hundreds of chemicals that system produces. In The Nervous System: Our Information Network, a friendly neuron named Mind Master demonstrates how information travels to and from the brain. The Blood System: A Liquid of Life teaches you about plasma, red and white blood cells, transfusions, and blood diseases. Each program in the Body Systems II Series sells for $39.95, the entire set for $99.95, from Marshware, P.O. Box 8082, Shawnee Mission, KS 66208, (800) 821-3303. For more information, circle Reader Service number 351.

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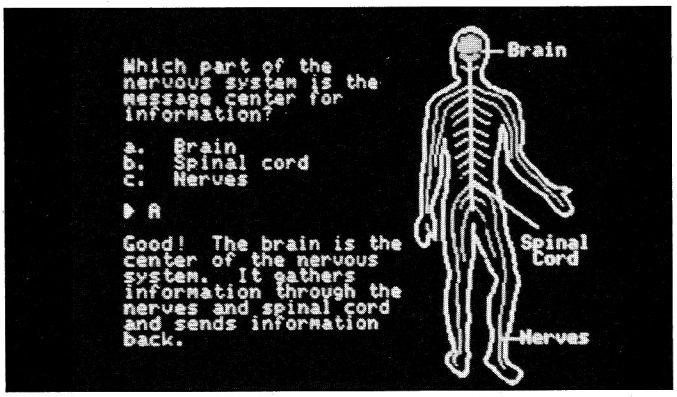

The Nervous System: Our Information Network takes you on a tour of the brain, spinal cord, and nerves.

The program includes macros for "one-key" commands and a full-featured text editor with word wrap, text-block moves, margins, and on-line disk utilities. CommWorks 16 for the Apple IIGS sells for $49.95, from PBI Software, 1111 Triton Drive, Suite 205, Foster City, CA 94404, (415) 349-8765. Circle Reader Service number 354 for more information.

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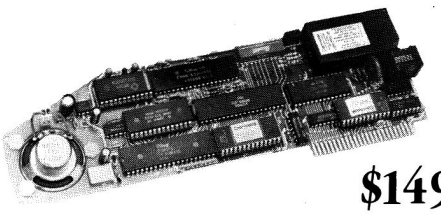

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Record, edit, and save digitized sounds directly on your Apple. FutureSound is a complete **digital-recording package** for the GS, featuring two input sources (microphone and direct recording, each with its own amplifier), input-volume control, microphone, and sample programs and routines you can use in your own applications.

FutureSound takes advantage of the IIGS' sound capabilities to give you multitrack recording with variable sampling rates and visual sound editing. The program includes cut-and-paste, and lets you mix sound among tracks and generate special effects. FutureSound retails for $149.95, from Applied Visions, One Kendall Square, Suite 2200, Cambridge, MA 02139, (617) 494-5417. Circle Reader Service number 350 for more information.

LITTLE ROBOTS

Pick your robot, check your cards, and you're off in search of treasures. Robot Rascals, a new multiplayer card/computer game from Electronic Arts, takes you hunting for the items pictured on your cards, such as a digital doughnut or a transistor taco. Two to four players choose among ten robots, which move through forests, mountains, and swamps looking for their items.

Robots can also teleport themselves to other parts of the board from one of five teleport terminals. The game's direction can change at any time, as players swap cards and a variable alters the rules of play at the beginning of each round. Robot Rascals sells for $44.95, from Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, (415) 571-7171. For more information, circle Reader Service number 353.

MOUSE COMMUNICATIONS

Transmit data in a Mac-like environment with MouseTalk **mouse-based telecommunications software**. The latest addition to the ASCII Express family, this package features mouse-driven operation and pull-down menu, with a keyboard-command option. MouseTalk includes a built-in visual text editor and a sophisticated macro system. It offers terminal emulation and accommodates data-transfer speeds of up to 19,200 bits per second with all popular external modems. MouseTalk retails for $149.95, from United Software Industries, 8399 Topanga Canyon Boulevard, Suite 200, Canoga Park, CA 91304, (818) 887-5800. For more information, circle Reader Service number 365.

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Students who need help **organizing notes, creating outlines, and writing well-organized research papers** will benefit from Term Paper Writer. The package is actually four programs in one—Notetaker, Outliner, Writer, and Footnoter and Bibliography Compiler.

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Product Updates

● Roger Wagner Publishing is offering owners of Version Soft's Mouse Word the opportunity to upgrade to the latest edition of **MouseWrite**, a word processor for the Apple IIe, IIc, and IIGS, at a significant discount. Interested Mouse Word owners can contact Roger Wagner Publishing at 10761 Woodside Avenue, Suite E, P.O. Box 582, Santee, CA 92071, (619) 562-3670.

● Creating sports pages with The Newsroom will be easier from now on. Springboard's **Clip Art Collection Volume 3** includes more than 600 illustrations of football, baseball, tennis, skiing, camping, golf, volleyball, hunting, aerobics, and fishing. The first two volumes featured illustrations of people, places, and businesses. Clip Art Collection Volume 3 sells for $29.95. Contact Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435, (612) 944-3915.

● Manzanita's **Business Accountant** package now runs on Apple compatibles. Version 3.1 runs on the Laser 128 and Franklin Ace 2000 series, and includes System Manager, General Ledger, Accounts Payable, Accounts Receivable, Inventory Control, and Payroll. If you already own version 3.0 and want to run it on your Laser or Franklin, contact Manzanita for an update at One SierraGate Plaza, Suite 200-A, Roseville, CA 95678, (916) 781-3880.

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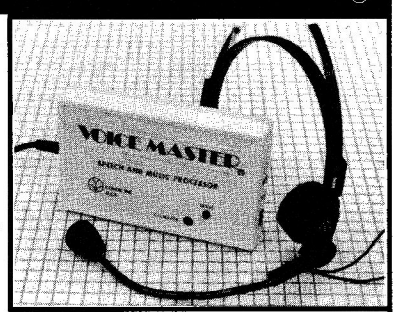

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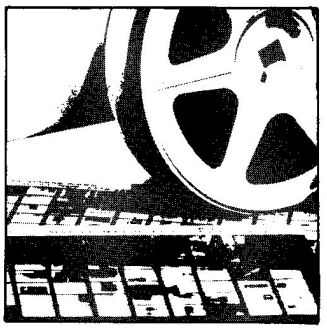

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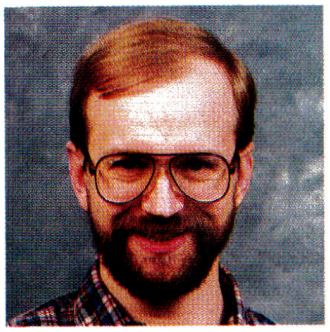
On Line and Face to Face: The Revolution in Apple Games



"Technological improvements such as high-speed modems and LANs are going to revolutionize games."

by Scott Mace

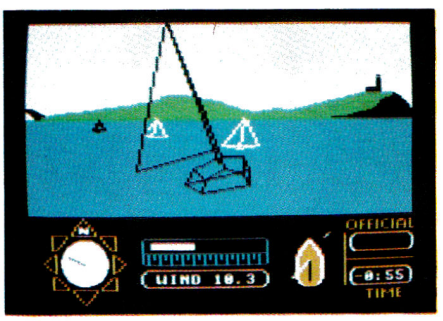
Today's "multiplayer" games hardly deserve the name. These contests are almost exclusively to see who can get "high score." In game after game, it's the player's ability to shoot an opponent or connect with some computer-generated target that's important.

True multiplayer gaming pits human player against human player in a contest of cunning and skill. The computer intrudes minimally—mostly to receive commands, update the screen's graphics and text, provide an electronic sparring partner, and perhaps introduce random events into the contest to keep it interesting.

But technological improvements such as high-speed modems and local-area networks, spurred on by businesses needing improved data communication, are going to revolutionize games.

ON-LINE GAMING

For instance, one of the initial uses of the AppleTalk network was to play a game called **Maze Wars**—32 players, sitting at separate Macintoshes, maneuvering through a giant maze and interacting in real time. The network and the game software kept track of each player, refreshed the screens, and so on. Like many other good ideas, Maze Wars was a product of Xerox's Palo Alto Research Center, which inspired the Macintosh.



Try your hand at sailing in Mindscape's American Challenge.

Telecommunications, combined with true human-versus-human gaming, recently produced an outstanding new Apple II game, **The American Challenge** from Mindscape (3444 Dundee Road, Northbrook, IL 60062, 312-480-7667).

Tom Snyder and company have combined the intricacies of a complex sport—sailing—with the capabilities of the modem to create something unique. You'll need a friend with another Apple II (or an IBM PC, running the MS-DOS version of the program) to make the connection. You'll see your opponent's boat sailing across your screen, he or she will see yours, and it all happens in real time, with ten or a thousand miles of phone line separating the two players (or a few feet of serial cable, if you choose to play via direct-connect linkup).

Although I hadn't mastered the controls of American Challenge, I found it easy to call the Apple II at Tom Snyder Productions for a few minutes of real-time one-on-one sailing. An easy series of menus led me through the dial-up process; all I had to supply was the phone number. Win some practice races first to polish your skills, though, so that you spend your telegaming time wisely and keep your phone bill from going through the roof.



COMPUTER GAMES IN THREE DIMENSIONS

Multiplayer gaming doesn't have to keep you at the keyboard, though. You may have heard of **Photon**—a chain of three-dimensional-video arcades springing up around the country. Inside these parlors, usually found in abandoned storefront space in shopping centers, participants strap on a pistol and "shoot" other players equally armed. It's all perfectly safe

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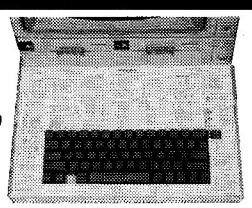

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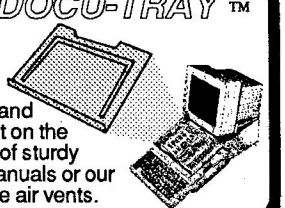

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MACE ON GAMES

and a whole lot more interesting than blasting computer-controlled space invaders on a flat CRT.

Photon and Maze Wars are the Pong of multiplayer gaming excitement—that is, just the beginning. Inevitably we'll see both arcade and home versions of these multiplayer games, perhaps coupled with new peripherals to simulate the controls of a robot or jet plane.

There's no reason to tie ourselves to the keyboard, either. (The mouse already opens things up quite a bit.) We may even be able to dial into the local arcade and compete with players using the more elaborate simulators at those locations.

WHAT'S BEHIND THAT POKER FACE?

Multiplayer games are also moving in a second direction: pitting players face to face as well as keyboard to keyboard. Although players can type messages to each other (in American Challenge, such communication is necessary to settle disputes when boats collide), nothing beats the feeling of staring at your opponent across a table.

We play games for entertainment, for education, and as a social pastime. A deck of 52 cards in four suits by itself is solitaire, but bridge, hearts, eights, and blackjack are social games. Computer gaming is the same: Watching a computer screen is still nowhere nearly as interesting as trying to find out what lies behind a poker face.

Software designers have been trying to capture some of that social exchange on disk. The first modest success is **Robot Rascals**, developed by Ozark Softscape for Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404, 800-245-4525, 800-562-1112 in California).

The "board" is generated on your Apple screen. The object is to move a robot across the board—representing the surface of an imaginary planet—in a scavenger hunt. The items you and up to three others need to find are determined by a hand of cards you're dealt from a deck that comes with the game. This solves the problem of ensuring the same kind of secrecy in computer games that you get, say, in bridge. (I've never taken seriously any computer game that asked participants to avert their eyes while one player looks at confidential information.)

LUCK OF THE DRAW

Some of the Robot Rascals cards help you reach your goal, some have no effect, and some hinder you. With each turn, a player draws a "luck card" that may let him or her steal a card from another player, then give that player an undesirable card in exchange. The interplay of cards passing between players is as important as what's happening on the computer screen.

And if desktop publishing continues to catch on, there's no reason your Apple and printer couldn't generate playing cards *during* the game. If bar codes were included, you could feed new game facts into your computer (such as "I just got an Energy card from my partner") for endless variety. And they wouldn't do away with the suspense of traditional card games—wondering what your opponent's hand holds.

Either way you go—multiple terminals linked electronically or new variations on old party games—your Apples will offer you and your friends plenty of entertainment. Best of all, the first efforts in those directions are here today. ■

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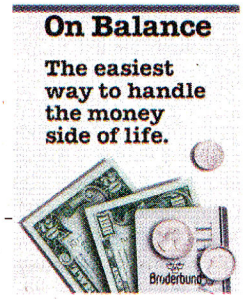

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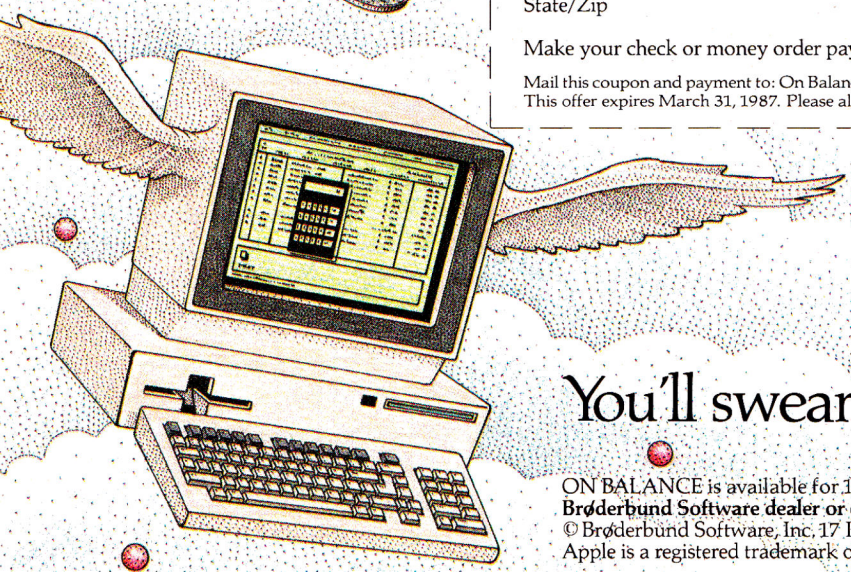

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Apple users know that there's always an easier way to get the job done. A shortcut here, an elegant twist there. That's what Hints/Techniques is all about. It's an information swap for readers who want to share their programming pointers, DOS tips, hardware secrets, AppleWorks applications, WPL enhancements, and all those other insights that make you go "Aha!" in the night.

Apple Access RAM Disk

by Brian L. Zimmerman

Here's a tip for the telecommunicator with extra RAM who frequently downloads large files, yet whose communication program has only a limited recording buffer. You can download these files to a RAM disk and avoid waiting for the program to write the file buffer to disk. Writing the file buffer to a RAM disk is instantaneous, thereby saving you both time and money on connect charges. Once you've finished your on-line session, you can transfer your files from the RAM disk to a floppy.

In my case, I wanted to use the Apple Access II program on my Apple IIc and download files to a RAM disk set up on a Z-RAM card. I encountered a few problems, though: 1) creating a disk that automatically sets up a RAM disk and loads Access; 2) fitting all the program files and other utilities on a standard floppy disk; and 3) avoiding the slot 3, drive 2 interface the RAM disk normally uses, which Access disables. Here's how I solved these problems.

A NEW ACCESS DISK

First, make a new copy of the Access disk, copying all files except the three with "80" as part of the filename onto the back of the disk, and all files except the three with "40" as part of the filename onto the front of the disk. Call it /ACS, like the original. This creates extra space on the disk and lets you use the front with an 80-column screen and the back for 40 columns. Next, copy the files listed below onto both sides of the disk:

1) BASIC.SYSTEM (a ProDOS file)
2) PRODRIVE (from Applied Engineering, Z-RAM)
3) PARTITION (from Applied Engineering, Z-RAM)
4) SLOTCHANGER (from Applied Engineering, Z-RAM)
5) FILER (from Apple, but you can also use Copy II Plus from Central Point Software)

Before you copy SLOTCHANGER, you should first change lines 2000 and 2030 as follows:

```
2000 SLOT = 7
2030 DRIVE = 2
```

This automatically designates slot 7, drive 2 as the RAM drive, and Access won't disable it. The PARTITION program is optional, but you can use it to modify PRODRIVE if you want to change the size of the RAM disk PRODRIVE sets up.

If you use Copy II Plus (which I prefer, because you don't have to type in pathnames when copying files), copy only the file named UTIL.SYSTEM (you don't need the entire program, and it won't fit on the disk), and save it with a name that's easy to remember, such as COPYFILES or COPYIIPLUS.

Now, save the following one-line program with the name STARTUP (again, to both sides of the disk):

```
10 EXEC STARTUP.1
```

Next, create the following EXEC file, calling it STARTUP.1:

```
BRUN PRODRIVE
RUN SLOTCHANGER
PREFIX /ACS
-LOADER.SYSTEM
```

Listing 1. RAM-disk EXEC file.

```
10 D$ = CHR$ (4)
20 PRINT D$;"OPEN STARTUP.1"
30 PRINT D$;"WRITE STARTUP.1"
40 PRINT "BRUN PRODRIVE"
50 PRINT "RUN SLOTCHANGER"
60 PRINT "PREFIX /ACS"
70 PRINT "-LOADER.SYSTEM"
80 PRINT D$;"CLOSE STARTUP.1"
```

To create the EXEC file, enter ProDOS BASIC, type NEW, and type in the BASIC program in **Listing 1**.

Now, type RUN to save the EXEC file to disk. Run it again to save it to the other side of the disk. When you're finished copying the files above, you should still have about 13 blocks of free space on each side of the disk.

DOWNLOADING TO RAM DISK

Your disk should now contain an 80-column version of Apple Access II on one side and a 40-column version on the other side, and should automatically set up a RAM disk at startup. To use the RAM disk for downloading, select "close the recording file and open a new one" from the "set up communications" menu, then specify /RAM/filename as your recording file.

When you quit Access II, ProDOS should display the message "Enter prefix (Press return to accept)" followed by "/ACS" on the next line. Press the return key. ProDOS now displays the prompt "Enter pathname of next application." To run your file-copying program, type in its name and press Return (or type /ACS/filename). You can now use the Filer or Copy II Plus to transfer files from your RAM disk to a floppy disk.

This procedure may apply only to this particular combination of hardware and software, but perhaps you can adapt it to your own system. It might be handy, for example, when running Apple Access II or other communication software, to use the /RAM volume ProDOS normally sets up to capture files quickly while on line.

One last word of warning: You can easily lose files in a RAM drive. Booting ProDOS with Open apple-Control-Reset or turning your Apple off will destroy the RAM drive and any files located there, so be sure to save them carefully to disk.■

Write to Brian L. Zimmerman at 14732 Esther Lane, Chester, VA 23831.

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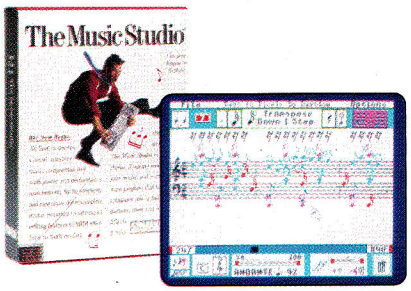

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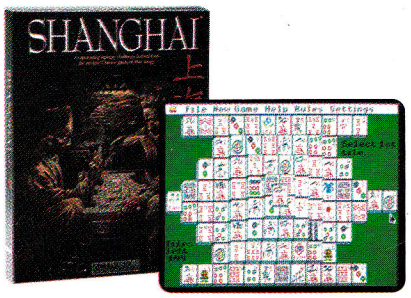

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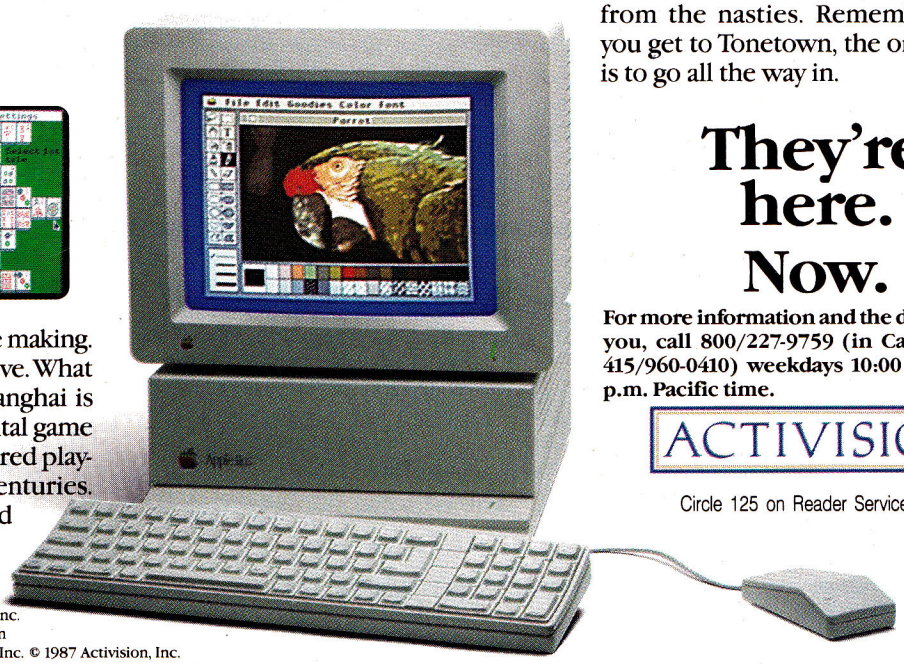



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Applesoft Rounding

by Jason Jones

Have you ever wanted to round numbers in Applesoft—not just chop off all digits after the decimal with X = INT(X)? Rounding in Applesoft isn't impossible—but the required expression, X = INT(X) * (INT(X + .5) = INT(X)) + INT(X + .5) * (INT(X + .5) < > INT(X)), is cumbersome, especially if you need it six or seven times in a program.

The USR(X) (use a machine-language subroutine) command provides a better way to round numbers. When Applesoft encounters a USR, it evaluates the expression in parentheses (via $DD7B) and stores the result in MFAC (the main floating-point accumulator), then jumps to the subroutine (JSR) at location $0A. When the machine-language subroutine returns from the USR, Applesoft expects to find a new value in MFAC. (The rounding program takes the number out of MFAC, rounds it, and then puts it back before returning from the subroutine.)

Listing 2. Rounding program.

```
0300.030F: A9 4C 85 0A A9 0D 85 0B A9 03 85 0C 60 20 AF EB
0310.031F: 20 63 EB 20 A0 E7 20 23 EC 20 1E EB 20 53 EB 20
0320.032F: 41 03 20 1E EB 20 23 EC A9 02 85 16 20 6A DF A5
0330.033F: 9E F0 0A 20 41 03 20 53 EB 20 23 EC 60 20 53 EB
0340.034F: 60 A2 00 B5 98 95 A5 E0 04 F0 04 E8 4C 43 03 60
```

Listing 3. BASIC averaging program.

```
10 PRINT "Enter 10 numbers to be averaged:":PRINT
20 FOR G = 1 TO 10:PRINT G": ";:INPUT "";A:X = X + A:NEXT
30 PRINT:PRINT "The rounded answer is "USR(X/10)
```

This fit my needs exactly, and with a little memory-map searching, I came up with a routine (see **Listing 2**) that performs the equivalent of the expression above in machine language, and, needless to say, is faster.

This routine basically consists of jumps to floating-point ROM routines, plus a little routine to move values to SFAC, the secondary floating-point accumulator. The program in **Listing 3** uses the rounding routine and averages ten numbers.

You'll notice that Applesoft uses the USR command the same way it does INT (integer), SQR (square root), ATN (arctangent), and so on, following it with an expression in parentheses. After you type in **Listing 2**, type BSAVE ROUND,A$300,L$50 to save it. To hook up the USR jump, just BRUN **Listing 2** from Applesoft.

The routine as written often gags on negative numbers and returns a positive, incorrectly rounded result. Can anyone suggest a modification?■

Write to Jason Jones at 3115 Bryan Street, Dallas, TX 75204.

Magic Numbers Update

by Steven D. Clements, O.D.

For baseball fans and statistics wizards, here are a few suggestions to make *inCider*'s Magic Numbers program (July 1986, p. 101) more accurate.

1) Line 1160 should read:

```
1160 MN = (W2 + (162 - (W2 + L2))) - W1 +1
```

(This equation produces a magic number representing the number of games a team needs to clinch their division.) Line 1170 should then read:

```
1170 IF MN = 1 THEN PRINT "THE " NAME$;" HAVE CLINCHED A TIE": GOTO 1200
```

And line 1180 should read:

```
1180 IF MN < 1 THEN PRINT "THE " NAME$;" HAVE CLINCHED THE DIVISION": GOTO 1200
```

2) Change ##.### to #.### in lines 5130 and 5560 to line up the decimal points.

3) The second paragraph of the introductory text should state, "But if your Magic Number is greater than *twice* the number of games you have left to play—it's time for the showers."

Let's say the Red Sox are 86-57, and the second-place Yankees are 77-66. They both have 19 games left to play, and the Yankees are nine games out of first place. The Yankees' magic number is 29; and since that's less than twice the number of remaining games (2 x 19 = 38), there's still hope for the New York team. (See **Table 1** for the analysis.)

Table 1. The Yankees can still edge out the Red Sox in the race for the division.

Red Sox	Yankees
86 - 57	77 - 66
9 - 10	19 - 0
95 - 67	96 - 66

or

Red Sox	Yankees
86 - 57	77 - 66
0 - 19	10 - 9
86 - 76	87 - 75

Table 2. With a magic number of 39, the Angels tie the Red Sox for first place.

Red Sox	Angels
86 - 57	67 - 76
0 - 19	19 - 0
86 - 76	86 - 76

A team with a magic number greater than 2 x 19 = 38 can't clinch the division, but a 39 could at least tie. If the California Angels, say, were 67-76 (see **Table 2**), their magic number would be 39.■

Write to Dr. Steven Clements at 9504 Fairview Avenue, Boise, ID 83704.

Disk II Write-Protect Modification

by Martin Lavoie

The write-protect procedure published in *inCider* (see "A Simple Write-Protect Indicator for the Apple II," December 1983, p. 100) describes the modification of your Apple disk drive to indicate with an LED whether the disk in the drive is write-protected. While using my drive with this modification over the course of three years, though, I erased three disks, burned another, and burned the circuit board.

That system tells you whether the disk in your drive is write-protected, but doesn't protect it from inadvertent saves to disk or initializations, which occur when tabs are too soft, deleting your disk contents. The modification described here, though (which voids your Disk II warranty), protects your disks at the flip of a switch without tabs, and you don't have to notch them to use the other side.

You'll need an on-off switch (Radio Shack part number 275-645, less than $2), a ¼-inch-diameter drill, a soldering iron, and some solder.

First, open your Disk II by removing the four screws in the bottom of the drive, and take off the cover and front panel. Remove the LED and unscrew the black switch on the left. Cut the switch wires and solder the new switch to these wires.

Now drill a hole beside the one for the LED, and attach the switch there. Replace the LED, the front panel, and the cover. You're in business—just flip the switch and you'll be sure your Apple gets the message to write-protect your disk.■

Write to Martin Lavoie at 11720 Boulevard Lacordaire, Apt. 5, Montreal-Nord, Quebec, Canada H1G 4K4.

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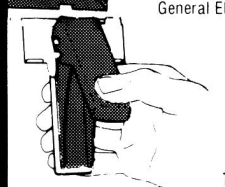

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HINTS/TECHNIQUES

Better Keyboard Control

by Richard Carney

Many BASIC programs, especially games and utilities, use the keyboard to control icon or shape movement. Programmers usually assign four keys to move up, down, left, and right. But this kind of control can be frustrating, especially when you must press the direction keys repeatedly or use another key to stop movement.

A more efficient method of keyboard control is to read the contents of the keyboard strobe (location $C010) instead of the keyboard buffer (location $C000). This method yields a value similar to that of a paddle button, and you don't have to reset the strobe after each keypress.

Type in and run the following program, which lets you draw a line whose direction you control from the keyboard:

```
10 HGR2: HCOLOR = 3: X = 140:
   Y = 190
20 K = PEEK(49152)
30 IF K = 201 THEN Y = Y - 1
40 IF K = 205 THEN Y = Y + 1
50 IF K = 202 THEN X = X - 1
60 IF K = 203 THEN X = X + 1
70 HPLOT X,Y: GOTO 20
```

Use the I, J, M, and K keys to control the line's direction of travel. Because the computer doesn't clear the keyboard buffer after each keypress, the line continues in the direction indicated by the last key you pressed. The only way to stop the line is to press a key other than one of the four direction keys.

To see how reading the strobe instead of the buffer enhances control, change line 20 to K = PEEK(49168) and run the program again. Notice that the line advances only while you hold down one of the direction keys, which function just like paddle buttons.■

Write to Richard Carney at Box 5833, APO NY 09012.

DOS 3.3 Header

by Vincent D. O'Connor

The DISK VOLUME name your Apple displays when you catalog your DOS 3.3 disks is boring and uninformative. Apple corrected this problem with ProDOS, which lets you name disks when you format them, but I wanted the same ability with DOS 3.3.

Header (**Listing 4**) lets you change the disk-volume name to give your DOS 3.3 disks more descriptive names. You can use up to 12 upper- or lowercase letters, numbers, and any of the special characters (except mousetext) on the Apple II Plus, IIe, or IIc.

Include Header as a routine in an existing Hello program, or save it as a Hello program so that it runs each time you load a disk. To avoid having to enter the disk heading every time you boot your disk, delete lines 1015–1045 and 2000–2010 and add these lines:

```
1015 A$ = "(your heading)"
1020 FOR I = 1 TO LEN(A$):B$(I) =
     MID$(A$,I,1) :NEXT I
```

Header will automatically alter your DOS 3.3 disk so that it prints your new heading each time you catalog it.■

Write to Vincent O'Connor at 2607 Hayes NE, Minneapolis, MN 55418.

Listing 4. Header.

```
1000 DIM B$(12)
1005 FOR I = 1 TO 12:B$(I) = " ":NEXT I
1010 HOME:VTAB 12:PRINT "ENTER HEADING: ";
1015 I = 1
1020 GET B$(I)
1025 IF B$(I) = CHR$ (13) THEN B$(I) = " ":GOTO 1050
1030 IF B$(I) = CHR$ (8) AND I > 1 THEN 2000
1035 IF B$(I) < CHR$ (32) OR B$(I) > CHR$ (125) THEN 1020
1040 PRINT B$(I);
1045 I = I + 1:IF I < 13 THEN 1020
1050 FOR I = 12 TO 1 STEP -1:HEAD$ = HEAD$ + B$(I):NEXT I
1055 FOR I = 1 TO 12
1060 POKE 45998 + I, ASC(MID$(HEAD$,I,1)) + 128
1065 NEXT I
1070 HOME:VTAB 12:PRINT "HEADING INSTALLED"
1075 END
2000 B$(I) = " ":I = I - 1
2005 PRINT CHR$ (8);" ";CHR$ (8);
2010 GOTO 1020
```

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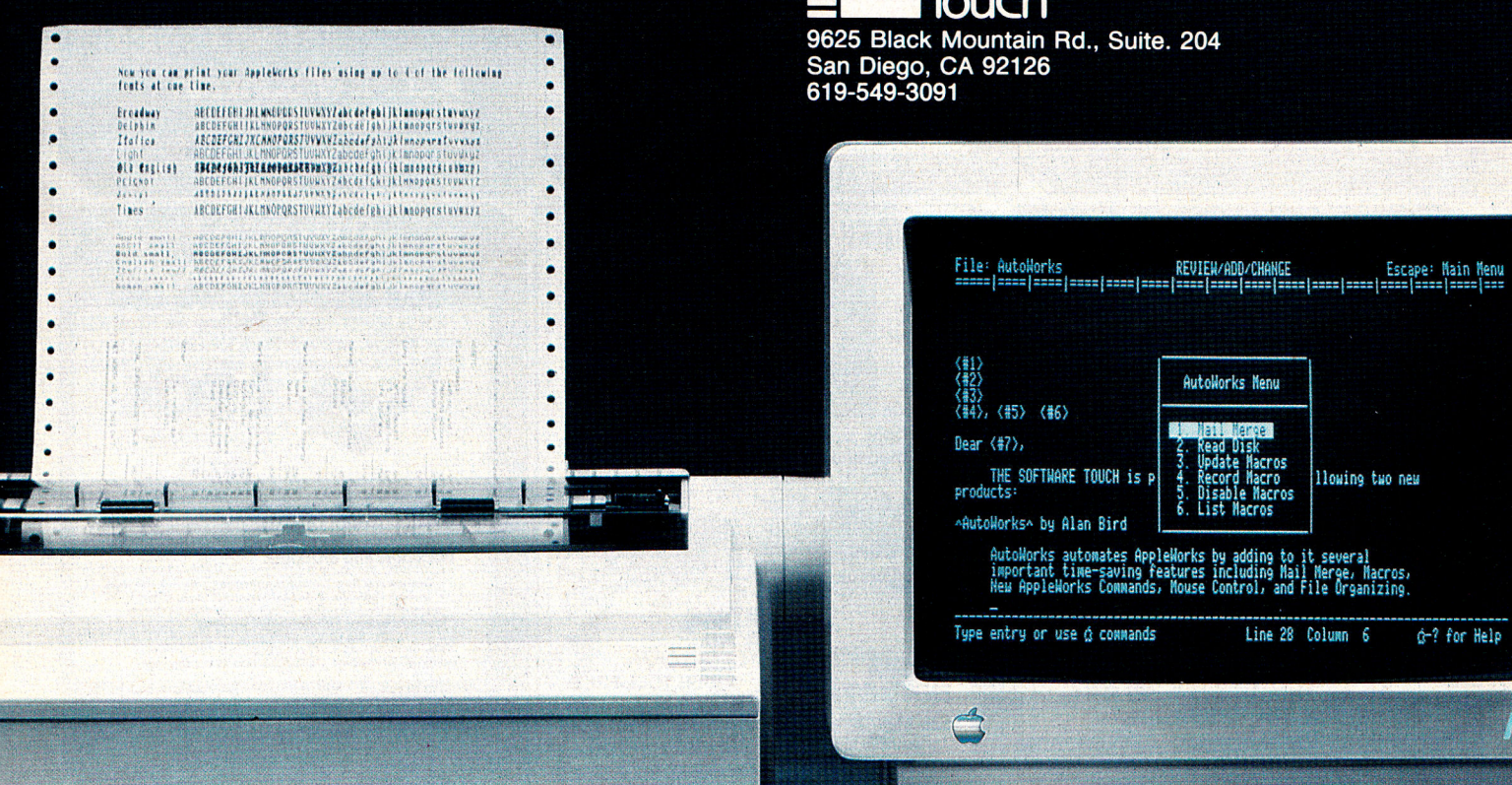

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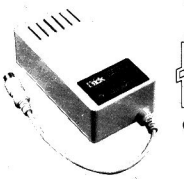

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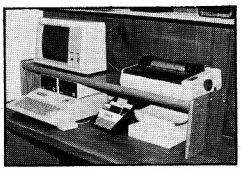

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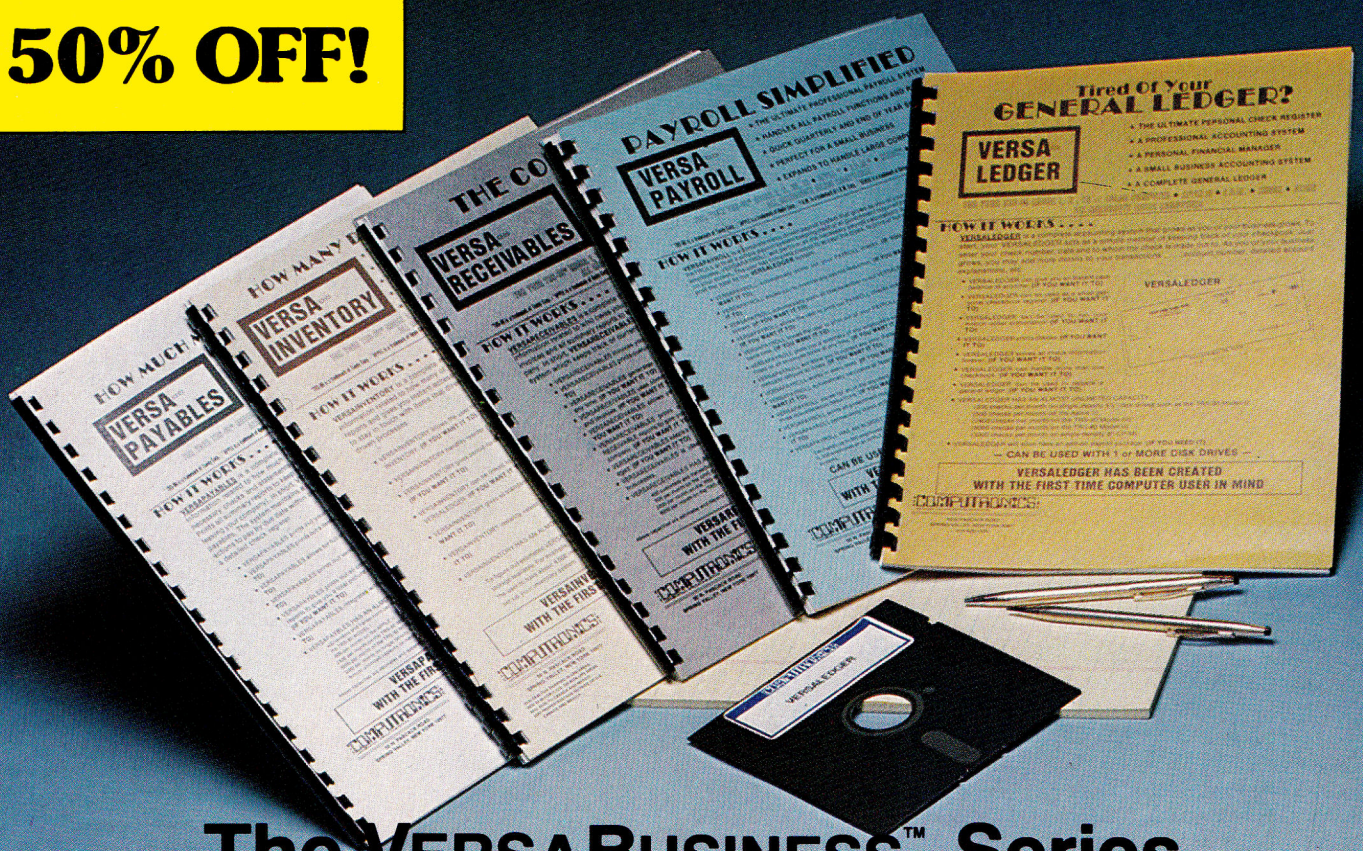

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GraphicWriter: Genuine GS Software

The IIGS hasn't exactly sprinted out of the starting gate. As of Thanksgiving, buyers were still waiting on dealers' doorsteps, our GS columnist was still exploring his new computer, and the review editor was in a continual funk over the lack of 16-bit software. When we received a program that not only said "Production Version 1.0" instead of "Preliminary Version 0.8," but also merged the MacWrite and MacPaint concepts in a deft display of GS potential, he hijacked the back page: "I don't care if it's slow. This deserves Editors' Choice."

While some companies send us demo disks with gray "command not implemented" menus, **GraphicWriter** is an impressive, mouse-controlled mix of word-processing and drawing functions. It's no match for Macintosh desktop publishers that support variable letter spacing or automatically pour text into columns, but it's an effective page-layout tool. Most of all, by letting you subdivide a document into adjustable, rearrangeable regions, GraphicWriter makes it easy to combine text and graphics on the same page, with a bonus of 48 super-hi-res colors.

The word processor offers simple cut-and-paste editing, pull-down menus for typestyles and sizes, and a ruler for paragraph-oriented margins and tabs. It also features a set of icons supporting object-oriented graphics for drawing, dragging, resizing, or rotating rectangles, rounded boxes, triangles, circles, or lines of five thicknesses. Shapes can be empty or appear, like text, in any color from GraphicWriter's paint palette; a choice of "Heavy Paint" or "Water Color" lets you draw a pale blue box, for instance, so that black text beneath shows through.

You can use your document as one big "object mode" region, or work with independent areas, dragging them around a "Show Full Page" display or moving objects between regions. If simple shapes aren't artistic enough, specify a "canvas mode" region for freehand color painting. GraphicWriter can't move these bit-oriented images as it does objects, and it can't fill or color user-created shapes as MacPaint and its clones do, but you're free to maneuver canvas regions around your page or shuffle them through a Macintosh-style scrapbook as easily as you cut text to the clipboard.



While it's great fun, GraphicWriter is also representative of GS shortcomings: Since Apple's late in delivering print routines, DataPak Software is shipping its program without LaserWriter or high-quality ImageWriter printer drivers. (Buyers are promised a free upgrade.) It's also a definite reminder that the 65C816 CPU isn't as strong as the Mac's 68000—after a few paragraphs, GraphicWriter's text entry grows sluggish and page layouts require pauses.

But if you're not looking for the ultimate GS word processor or desktop-publishing program, GraphicWriter is a remarkably successful software sampler. In the words of Technical Editor Paul Statt, "GraphicWriter is a plucky little program. It does a great many things—it doesn't do any of them particularly quickly or well, but that's the fault of the microprocessor, not the software. As is, it's like MacWrite, MacPaint, and the clipboard all in one program; it's a great introduction to what desktop publishing in color is going to be like." Besides, adds the review editor, it's not vaporware.

GraphicWriter costs $149.95 from DataPak Software, 14011 Ventura Boulevard, Suite 507, Sherman Oaks, CA 91423, (818) 905-6419. It requires a IIGS with 3½-inch drive and 256K of memory (512K recommended). ■

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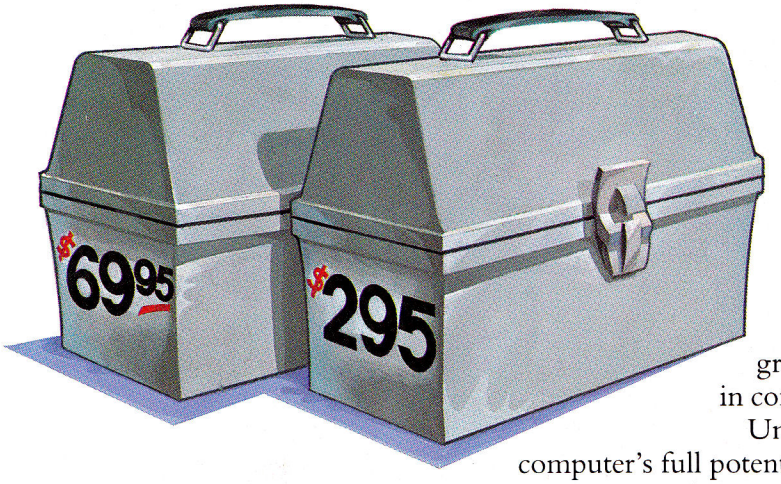

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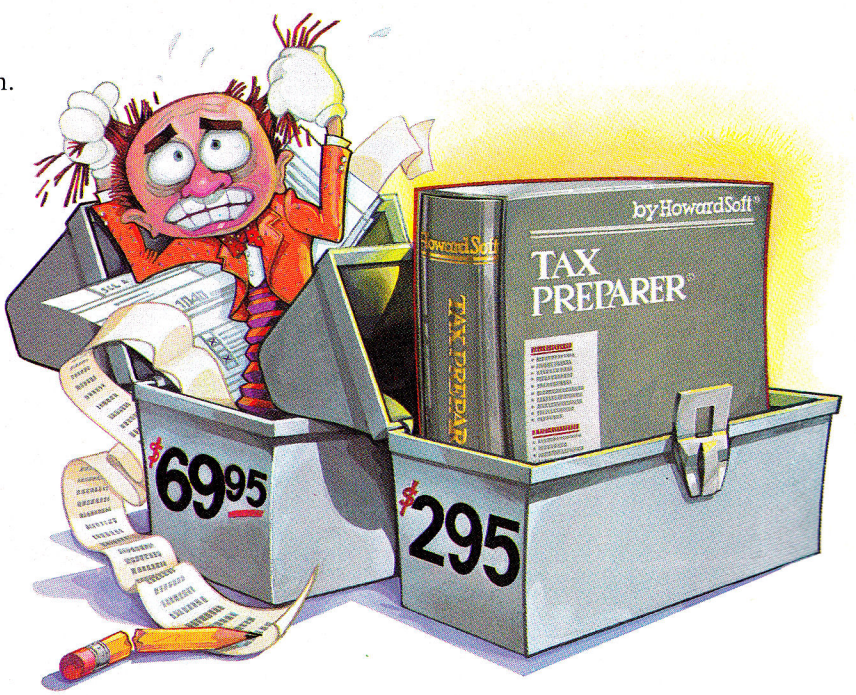

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