THE APPLE II MAGAZINE

inCider

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Special Section on Education
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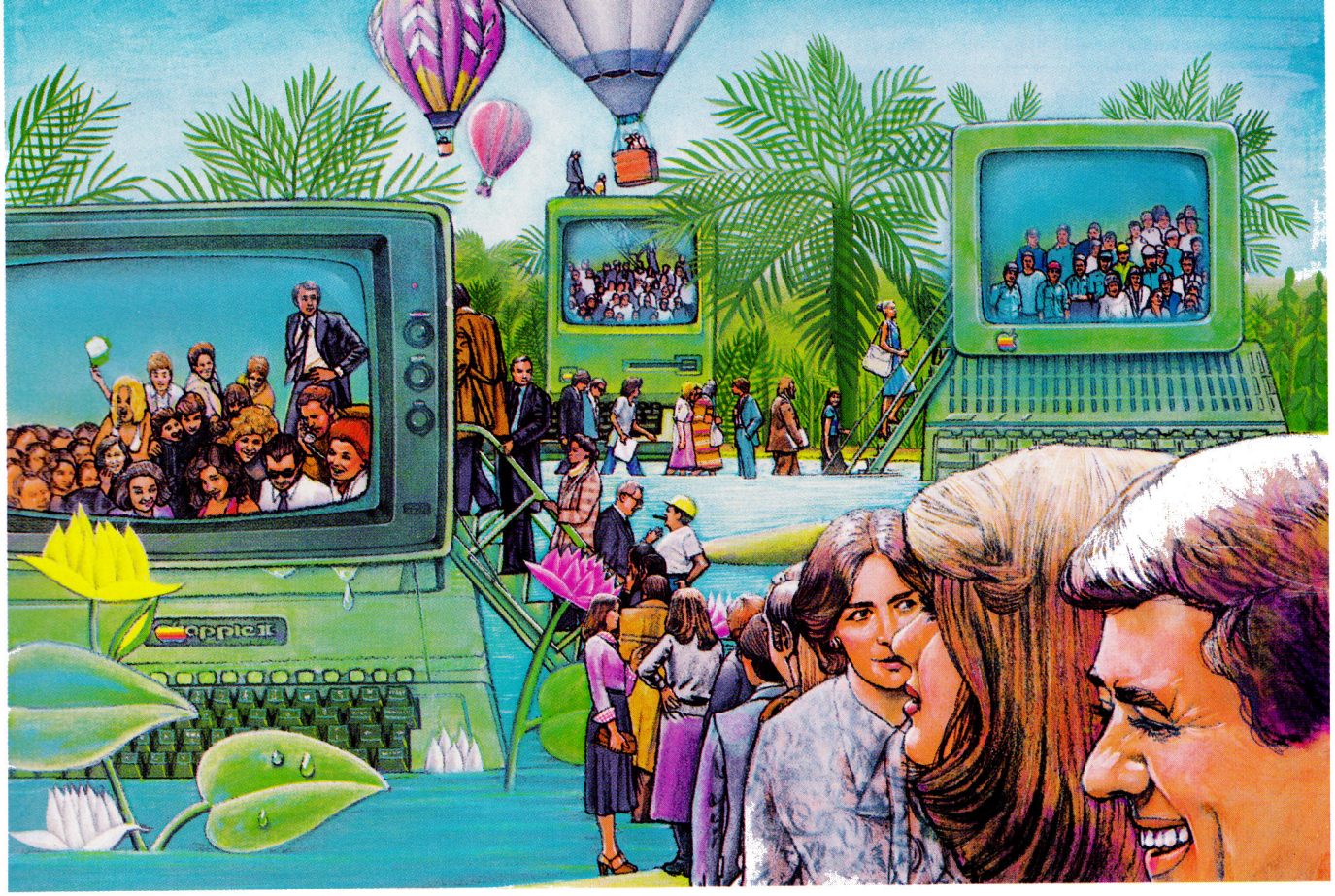

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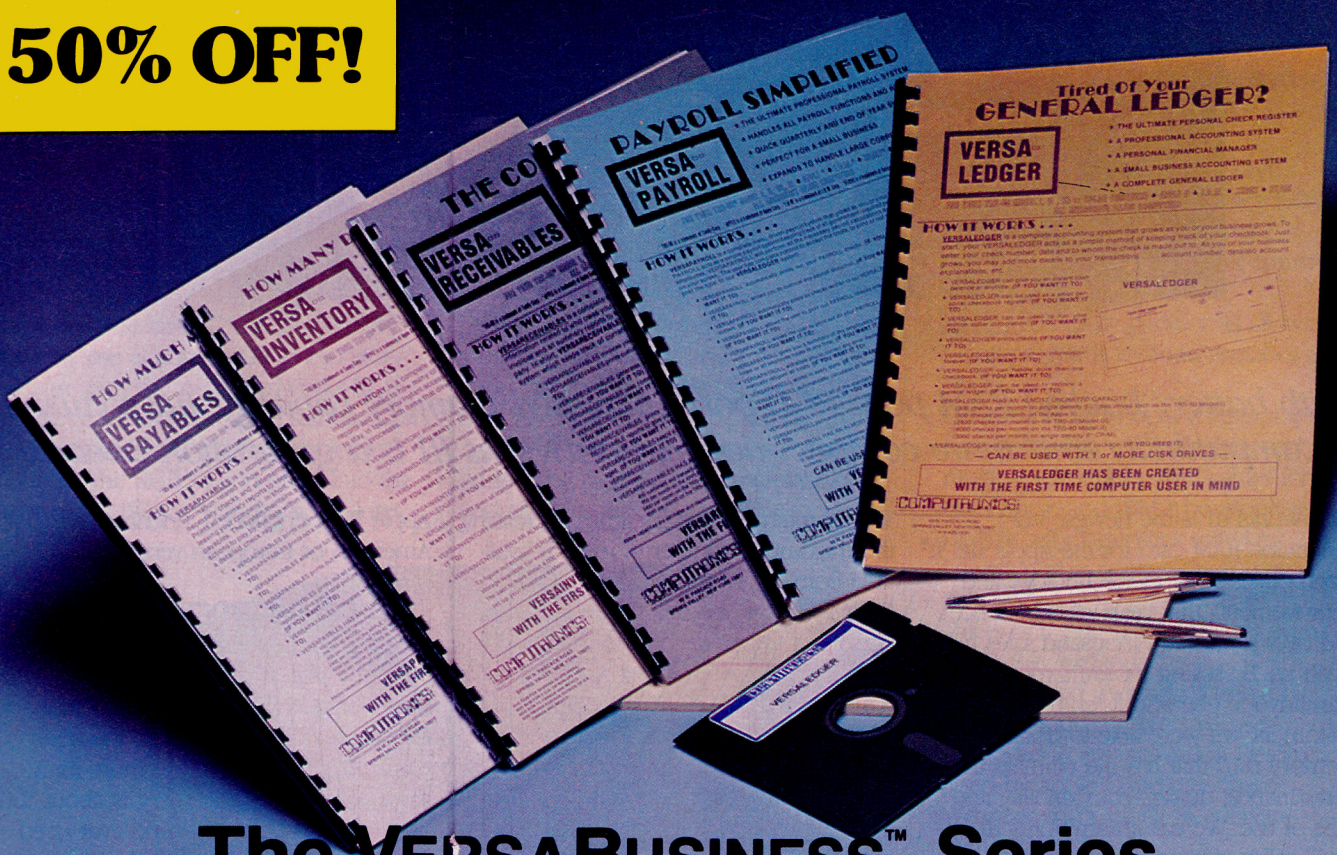

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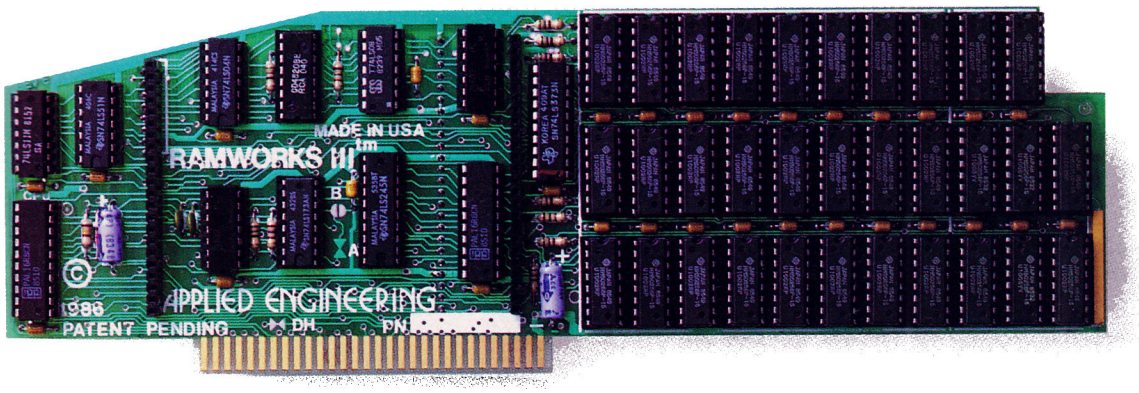


With battery backed RAM port, RGB port, increased memory capacity, full software compatibility and more compact design, RamWorks III is a generation ahead.

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

The AppleWorks Amplifier.

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

Only RamWorks eliminates AppleWorks' internal memory limits, increasing the maximum number of records available from 1,350 to over 25,000. *Only* RamWorks increases the number of lines permitted in the word processing mode from 2,250 to over 15,000. And *only* RamWorks (256K or larger) 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, MacroWorks or Jeeves 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, The Spread Sheet, Managing Your Money, SuperCalc 3a, and Magi-Calc 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 auxilliary slot providing our super sharp 80 column text in a completely integrated system while leaving expansion slots 1 through 7 available for other peripheral cards.

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

Highest Memory Expansion.

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

It Even Corrects Mistakes.

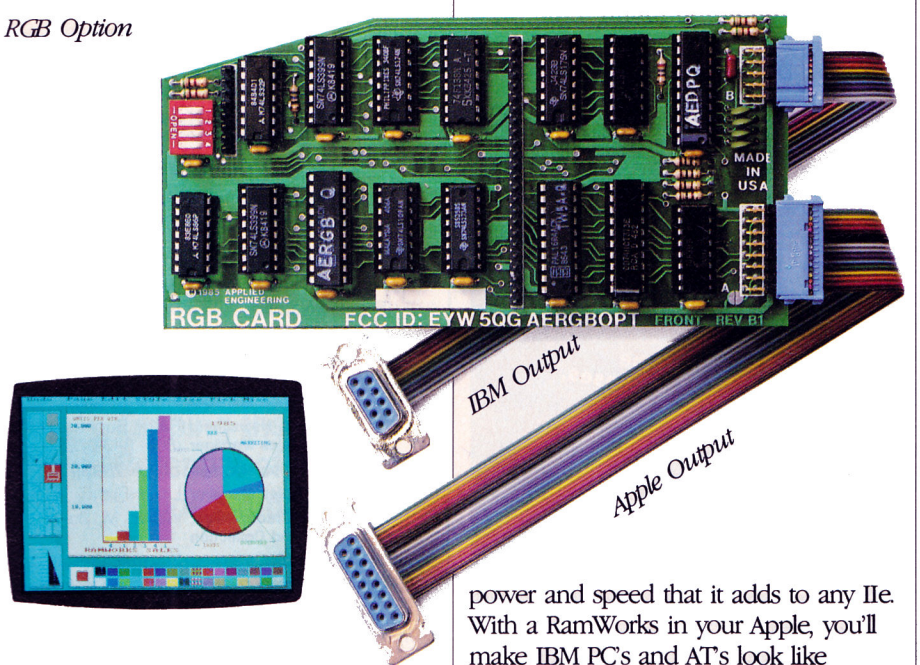
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

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

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

RGB Option



True 65C816 Bit Power.

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

Endorsed by the Experts.

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

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

Steve Wozniak, the creator of Apple Computer

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

Quality and Support of the Industry Leader

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

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- Much, much more!

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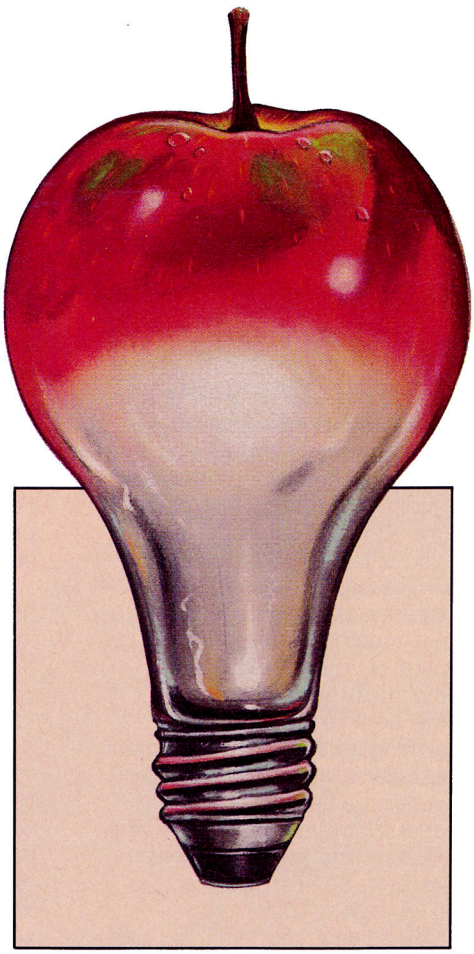
inCider

Vol. 4 No. 9
September 1986

ON THE COVER

42 Teachers' Best: 16 Winning Ideas

How are computers being used in education? *inCider* attended Apple Computer's Pacesetters' Symposium on classroom computing and came away impressed with what teachers are doing with Apple II's.



42

ARTICLES

50 Orchestrating the School Office

With an Apple II and the right business software, school administrators can manage everything from bus routes to departmental budgets.

56 Tapping the Potential of Special-Needs Students

For a child with special needs, a computer can mean the difference between frustration and inspiration.

60 Spreadsheets for All Reasons

There are as many uses for spreadsheets as there are people to use them. *inCider* looks at five leading Apple II spreadsheets and helps you decide which is best for you.

71 Design a Student Data Base

Keep track of student records with this AppleWorks data base.

TUTORIALS

Applesoft Adviser 74
BASIC Printer Control
by Dan Bishop

AppleWorks in Action 81
Working with a Customer Data Base—Part 2
by Ruth K. Witkin

Pascal Primer 86
Meet the Pascal 6502 Assembler
by Tom Swan

DEPARTMENTS

***inCider*'s View** 6
3-D and Beyond
by Deborah de Peyster

Letters 8

News Line 14
Extras for the //x; Capturing a Buffalo; Classrooms of Tomorrow; Let's Get Static; New ProDOS: Window Dressing?

Apple Clinic 20
Mousetext Characters; Colorful Characters; Special Characters; Your Own Characters; Buffer Headaches; Big-Blue Blues; Disk Tricks; Mini Problems
by Bob Ryan and Paul Statt

Reviews 30
Fisher-Price on Disk; ReportWorks, MegaWorks, ThinkWorks; The Bard's Pro-Am Writing System; Titan /// plus //e; MindPlay; Newsroom: The Scholastic Edition; CommWorks; Paul Whitehead Teaches Chess

New Products 106

Stattus Report 110
Marketing
by Paul Statt

Game Room 113
Star Fleet 1; Reach for the Stars; Carriers at War
by Brian J. Murphy

Hints/Techniques 118
Enhanced INPUT; Inverting Hi-Res Graphics; Running AppleWorks from Your RAM Disk

Coming Attractions 124

Reader Services 124

Editors' Choice 128
Talk Back: Telecommunications Made Tolerable

MPA

ABC

INCIDER'S VIEW

3-D and Beyond

"Leaping off the screen is exactly the next step in 3-D software."

by Deborah de Peyster

Just when you feel you've seen one too many spelling checkers, sorcerer adventures, and word processors and heard one too many promises of "all new features," something happens that gives you hope. One software developer (Infocom) offers you a pair of 3-D glasses to use in following along with its story (The Leather Goddesses of Phobos, to be released late this month), and suddenly 3-D enters the world of Apple II software.

Now that's a pretty simple use of 3-D, but it's just the beginning. Quality 3-D graphics is coming to the computer screen in a big way. Later this year, Mindscape will be distributing games developed by Master Designer Software, a company that views the computer monitor as a movie screen. We've seen horses gallop across the screen in all their full-color glory—horses that look so real you think you can reach right in and touch them. Characters move among the props, and cuts, pans, and closeups simulate real movie action. And, as Master Designer is currently developing for the Atari ST and Amiga, we expect that same quality to appear on the anticipated 16-bit Apple II.

Developers at Master Designer say, "The computer game will never be the same." And from what we've seen so far, we wholeheartedly agree. The images on the computer screen are so vibrant and alive they almost leap right off.

Leaping off the screen is exactly the next step in 3-D software. Leading the way with a new category of software that Activision's vice president of marketing Bill Cleary refers to as "CAD [computer-aided design] for the home" is Broderbund Software. Its new product called Toy Shop literally puts what you design on the screen into your hands.

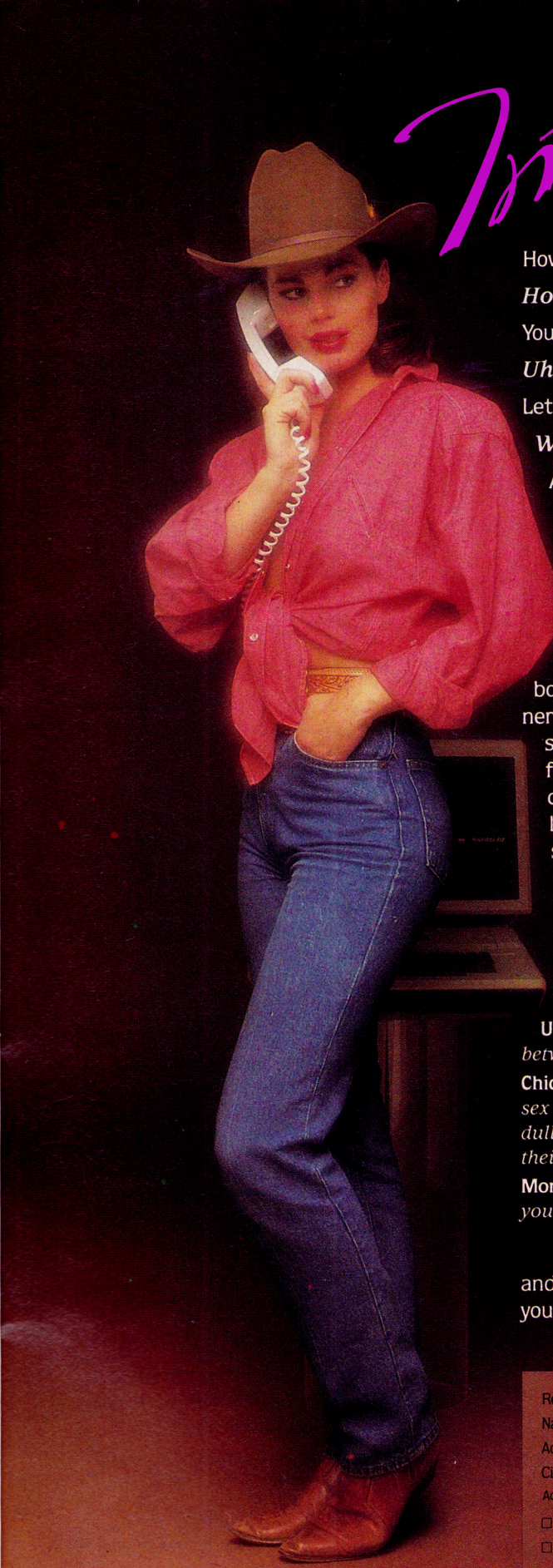
It works like this. You custom-modify designs that come with the program, then print them on computer paper. You glue the paper to sticky cardboard that comes with the software and construct the various projects, including 20 mechanical models from steam engines and balloon-powered jet dragsters—and they actually work.

Activision has a similar idea, code-named Paper Models, under development. This product lets you design and build small villages, airplanes, or ships.

While these programs are intended for hobbyists, they open up the potential for more directly useful products, such as home-addition design kits and home-decorator packages. Have you ever seen those kits advertised in the back of home magazines? They come with cardboard cutouts that let you move furniture around on a floor plan and get it right before actually budging a thing. Other kits let you knock down walls and build cardboard decks and additions before you destroy your house. Why can't you custom-design such tools on your computer?

We think you will. Computers such as the Macintosh already have software that lets you design floor plans and homes, but all the designs stay on the screen. We expect that the graphics and power of the anticipated new Apple II will spur developers to combine the best of design software with the Broderbund concept of taking it off the screen and putting it into your hands to help with a number of home CAD projects.

And, of course, the *n*th degree of 3-D is the actual existence of these images completely off screen. Famed developer Nolan Bushnell (a founder of Atari and Chuck E. Cheese, to name a few of his ventures) and our Apple II hero Steve Wozniak are said to be working together on projects that "take the video game from the screen and put it on the floor." Of course, once you've done that you don't need a computer at all, so we'll stop here. It's clear that the possibilities are endless. As Cleary says, "The future is just beginning." ■



Interlude II

COWGIRL CAPER—Interlude #125

Howdy, partner.

Howdy, partner???

You've got a date with a cowgirl tonight.

Uh oh. Have you been playing Interlude again?

Let's see ...I'll need a hat, boots, chaps...and maybe spurs.

What time does the rodeo start?

As soon as you walk through the door, Cowboy!

Interlude II. The long-awaited sequel to the first adult computer game in history is finally here. It's provocative and playful! Outrageous and romantic! It has all the excitement of the original Interlude, plus significant new features.

The computerized interview, which is taken by one or both players, has been greatly expanded. It probes your innermost desires to discern your mood of the moment, your secret longings, your special fantasies, and then suggests for your pleasure one of its more than 160 Interludes. You can ask the computer for an Interlude for now, or one for later. Special options give each player added control over surprises and special erotica hidden in the Interludes.

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FORUM Magazine: *"The Interludes are imaginatively and sensitively written... the computer's recommendations are uncannily appropriate."*

US Magazine: *"The most edifying third party to join couples between the sheets since* The Joy of Sex."

Chicago Tribune: *"This marriage of computer technology and sex is natural... erases forever the image of computer-users as dull guys with slide rules in their pockets and square roots on their minds."*

Money Magazine: *"Sometimes it's easier to tell a computer what you want than it is to tell your partner."*

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LETTERS

Dish It Out

Recently I purchased a satellite dish for receiving video programs. I've been told there are ways to pick up data, and I'd like to know if there is any information on this subject. How would I hook up my satellite dish to my Apple? There's been talk about scrambling video signals, and I wonder if someone out there in Apple computer land has software for descrambling these signals.

Larry Durnil
1325 Chestnut Street
Columbus, IN 47201

*Picking up signals from space with your satellite dish and Apple II is a neat idea. We're not certain just what you're looking for, though—*Dallas *or data? We don't know at this time what kinds of data are transmitted via satellite.*

Jim Sather, inCider *Apple Clinic columnist, says in our May 1986 issue (p. 22) that although it might be possible to engineer video-descrambling circuitry for an Apple peripheral slot, no descrambling cards or programs are currently available for the Apple. If we really wanted to make our Apple a satellite peripheral, though, we'd call the wizard, Don Lancaster, at (602) 428-4073, and ask him which of his books addresses the problem. —eds.*

Taming of the Files

Referring to the article "The Taming of the Screen" (April 1986, p. 67), I'm having a heck of a time trying to figure out how to put my own files under headings and choose files with the mouse. The author says you should change the program's delay statements and put in individual menu options, but I don't quite understand how. Do you use PRINTs, or what?

Jeff Trudeau
2613 South Santa Barbara
Mesa, AZ 85202

The information you need is found on pages 70 and 72. Line 100 of Listing 2 contains a REM statement: Routines to Determine Mouse or Keystroke. You have to build your own mouse routine in this section. Lines 500, 600, 700, 800, 900, and 1000 begin the display routines for individual menus. Once you've determined whether the mouse has been pressed, direct the program to one of those menus, depending on which selection was made with the mouse.

Explanations of the routines that handle the mouse and keyboard are on pages 70 and 72, under "Reading the Mouse," "Calculating the X,Y Position," "Pushing the Button," and "Reading the Keyboard."

There's a slight error in the four-line listing just above "Reading the Mouse" on page 70. Line 20 should read:

```
20 PRINT CHR$(27);: INVERSE: REM
   ENABLE MOUSE TEXT
```

You should have moderate programming skills in ProDOS to use Menu-Control Demonstration—it would be difficult for novices. For further reference, check "The Mouse That Roars" in the October 1984 inCider *(p. 72) and the series "Using ProDOS" by Lee Swoboda (February, April, May, June, July, and August 1985). —eds.*

Good Choice

Having recently purchased an ImageWriter II, I was interested in your April Editors' Choice column. I agree with the editors that it's a fine printer.

Dawn Matthews said something that puzzled me, though: "I had a good time running the test for color printing and using the accompanying DiskWare utility to print pictures. . . ."

What accompanying utility? I didn't receive any with my ImageWriter, nor could my dealer find any information that any Tool Kit disk should have been packed with my printer. Did I read too much between the lines? Is this one of Apple's new promotions?

Of course, the Tool Kit won't work with the ImageWriter II. So where do I go from here, short of actually purchasing a good dumping program?

J.K. MacNeal, Jr.
1430 Marshall Road
Waterloo, NY 13165

Some printers are more choice than others. The ImageWriter II inCider *received was an early model, and Apple included some items it later decided to hold out on, like the ImageWriter Tool Kit disk—sorry about that. It seems to be the same old ImageWriter Tool Kit that worked so well with the ImageWriter I (version 1.5, Apple part number 680-0225-B), though. Ask for it by name—you'll have the same tools with which Dawn was working. —eds.*

A Fresh Start

My program, Super Startup (April 1986, p. 106), has caused a bit of confusion for some readers. There are three places in which there are supposed to be a certain number of spaces between two pairs of quotation marks. Because the beginning set of quotation marks is on one line and the end set is on the next, this isn't immediately obvious.

There's also a minor bug in the program that causes an error when you move to a subdirectory on disk, change disk drives, move to a subdirectory on the new disk, or move back a level with the backspace key.

Here are the modifications that should solve both problems:

```
340 IF KK = -11 THEN VTAB LP + 2 :
    HTAB 1 : CALL -868 : PRINT
    "SLOT:" : VTAB LP + 2 : HTAB 7 :
    GET SN$ : POKE -16368,0
360 IF KK = -11 THEN SN = VAL
    (SN$) : DN = VAL (DN$) : PRINT
    D$;"PREFIX/" : SD = 1 : LE = 0 :
    GOTO 60
370 VTAB LP + 2 : HTAB 1 : CALL
    -868 : PRINT "TYPE 'LETTER' YOU
    WISH TO ";OP$; : POKE -16368,0
520 HTAB 1 : VTAB LP + 2 : CALL
    -868 : POKE -16368,0 : PRINT B$;
    OP$; " "; DI$: PRINT D$; B$; OP$;
    DI$: B$ = "": RETURN
```

The formula should read:

```
ME = 768 + (P * 128) + (KK * 128) -
(768 + (P * 128) + (KK * 128) >
1921) * 984 - (768 + (P * 128) +
(KK * 128) > 2945) * 984
```

Sorry about any inconvenience this may have caused.

Scott Bowers
Route 5, Box 1338
College Station, TX 77840

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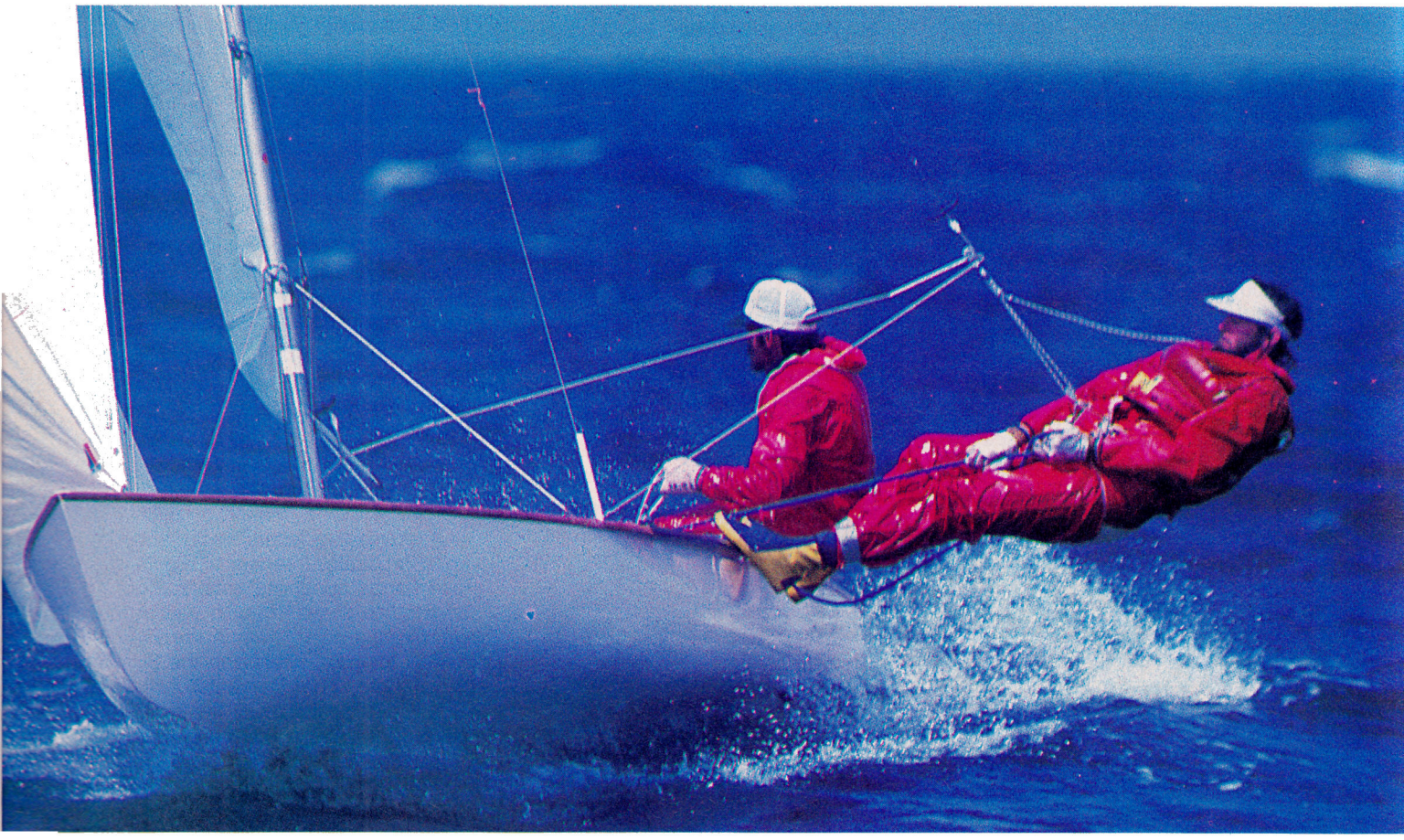

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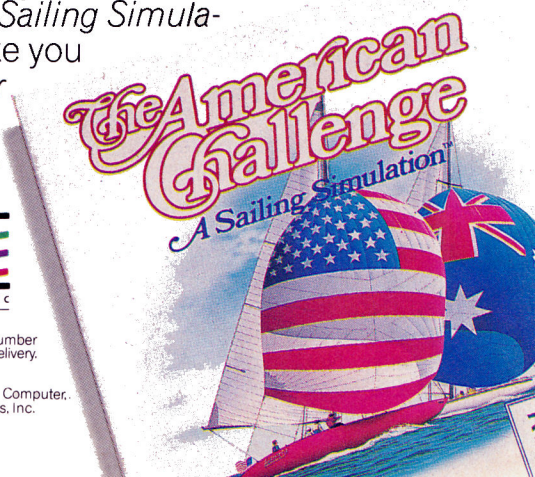

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Learning Languages

This letter is to applaud you, on one hand, for your plea to use computers to make students think ("Do Drills Make Drones?" April 1986, p. 52). We must certainly work to meet that challenge.

On the other hand, I take strong issue with your statement (p. 54) that "some areas of learning, such as arithmetic and foreign languages, are best served by rote memorization of facts. . . ." There seems to be a rampant misconception of the nature of language acquisition, repeated throughout literature.

Language is a communicative activity, and in most situations is best learned by active use, not by rote memorization. A self-taught student thousands of miles from English-speaking people may need to do a lot of textbook memorization. But in most other situations, memorization is the least effective approach to learning a language. Effective instructors are now creating materials and activities designed to teach functional language use.

Therefore, computer programs for learning language, no less than programs for social studies or other subject areas, must be interactive, providing many opportunities for students to use the language in a real context. Simulation games, for example, make for excellent language practice. Critical-thinking skills are as important for language as they are in any other area. Rote memorization for language learning is not enough.

Helen L. Jorstad, Associate Professor
Second Languages
& Cultures Education
University of Minnesota
159 Pillsbury Drive SE
Minneapolis, MN 55455

A Quick Copy

I was very interested in your review of Sylvia Porter's Personal Financial Planner (April 1986, p. 36). After purchasing the program, I was also disappointed that side 1 of the program disk was copy-protected. After several days of wondering how to deprotect the disk, I believe I've come up with the answer.

First, copy the original disk with a standard disk-copying program (I used Copy II Plus). Then boot the copied disk and press control-C immediately. Next, type LOAD HELLO, then LIST. You'll see the following:

```
5 &
10 PRINT CHR$ (4)"EXEC START"
```

You'll need to delete line 5, which would make the ampersand run the last loaded program. Since DOS doesn't recognize SAVE, you'll have to use CALL 41881 "HELLO". The disk drive will load the revised program and return with ?SYNTAX ERROR. Verify that the program has been saved correctly by typing LOAD HELLO. You should now see the following line:

```
10 PRINT CHR (4)"EXEC START"
```

Now you have an unprotected copy of the program you can store on a UniDisk 3.5 or a hard disk.

Clark H. Gabriel
909 North Chelton, #1205
Colorado Springs, CO 80909

No Free Lunch

I'm sure everyone has heard the expression, "There's no such thing as a free lunch." Well, the same holds true in the world of telecommunications.

When I purchased my modem a year ago, I found ads from Dow Jones News/Retrieval Service and NewsNet enclosed in the instructions. NewsNet offered $50 worth of free use, which I graciously accepted. Within a month, I had the starter kit and all the other necessary information to go on line with NewsNet.

On a Saturday evening, I logged on and downloaded a file of free-access bulletin boards and looked through some other directories. After 76 minutes on line, I knew this wasn't something I could really afford. Don't get me wrong—it's easy to use and stocked with enough variety to satisfy anyone, but I really couldn't justify it for myself.

That week, I wrote to the company's representatives to thank them for my free time and ask them to cancel my membership. One year later, I received a letter from a collection agency asking for the $68 I owed NewsNet. Add that to the $50 worth of free time I received, and that's $118, or $1.55 per minute—more than $93 per hour.

Now, I could accept that if somewhere in the starter kit or advertisement the company had mentioned that its evening rate was $93-plus per hour, but the starter kit said its evening/weekend rate was $18. Seventy-six minutes at that rate is $22.80, plus a one-month subscription fee of $15—$37.80 total. Somewhere, an extra $80 was added to my account.

After three unanswered letters and two months, I called NewsNet's toll-free subscription hotline (by this time, I had received another $50 free-use ad). After ten minutes on the phone with three different people, I was told that no one knew exactly what the problem was, but they assured me they'd take care of everything. One month later, I received another collection notice.

I'm still not sure what's going on here, but let me remind you, "There's no such thing as a free lunch, and watch out for NewsNet." Keep up the good work with your magazine.

Rod Christen
1337 Schultz
Waterloo, IA 50702

Easy Enhancement

After reading letters from discouraged, frustrated readers throwing up their hands about the enhanced //e, I decided to share this with you. About two months ago, I was in the same boat. I found a solution in the Switchback board, from Computer Accents. This board is absolutely the greatest piece of hardware I've bought for my Apple //e.

Switchback holds enhanced and unenhanced ROM chips (not microprocessor chips) and plugs into the sockets of the unenhanced ROM chips on the motherboard. This way, it doesn't use up a valuable slot in your computer. A pushbutton switch on the cable that fastens to the outside of your computer lets you go from enhanced to unenhanced and vice versa. The board costs $59.95, and that's all you spend—not $20 to $50 for updates to each of your unenhanced programs.

The company's address is Computer Accents, P.O. Box 5905, Kingwood, TX 77325, (713) 664-9727. I hope this information will help all those users in the same situation.

Carl Inpyn
2 Maria Lane
Kinnelon, NJ 07405

See this month's Apple Clinic, p. 20, for Jim Sather's additional comments on the Switchback board.
—eds.

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A Quick PEEK

I typed in the short, but useful, program Peek to Poke (*inCider*, September 1985, p. 71) without first examining it, and was very surprised by lines 40 and 50. Portnoy must be a meticulous labeler—he carefully marked the beginning and ending addresses of each binary program. I don't, and I suspect others don't, either.

Therefore, I deleted lines 40 through 120, and replaced them with the following:

```
40 HOME: PRINT "THE LAST BLOADED
   PROGRAM STARTS AT ";: BA =
   PEEK (43634) + PEEK (43635) * 256:
   PRINT BA ; " DECIMAL ";: A$ =
   STR$(BA): GOSUB 530 : PRINT "AND
   $"; HX$ ; " HEXADECIMAL
   ADDRESS" : PRINT
50 PRINT "LENGTH IS ";: L =
   PEEK(43616) + PEEK(42617) * 256:
   PRINT L ; " DECIMAL ";: A$ =
   STR$(L): GOSUB 530: PRINT "AND$";
   HX$ ; " HEXADECIMAL"
260 PRINT SL;"REM POKES FOR ";F$;
    " SUBROUTINE AT ADDRESS:";BA;
    " LENGTH:";L;" BYTES"
```

I could have alternately calculated EA, or end address. By creating a variable input CA for changed address, and making BA into CA in lines 260 and 270 (but not 310), I can alter the memory location of the file loaded from Applesoft. I probably don't need the routines at 420 and 520 with this modification, but I usually BSAVE with A$, L$, so I like to see it.

Richard J. Greenwood, M.D.
Chester County Medical Building
606 East Marshall Street
West Chester, PA 19380

Editor's note: Dr. Greenwood's modifications will work only in DOS 3.3.

To the Point

I've recently started using Pinpoint, and I think it's an excellent program. My only complaint is that I have to change disks on my dual-drive system.

I have an Applied Engineering RamWorks II card, so I load AppleWorks into memory (except the print module). The AppleWorks start-up disk is almost empty (195 of 280 blocks are free), so I copied the printer section and the Pinpoint modules to it. This lets me boot with the start-up side, flip the disk, and load the main AppleWorks modules. Then I flip the disk back to the start-up side.

This means I never have to change disks for Pinpoint or the AppleWorks printer module. Drive 2 is free for a data disk, and Pinpoint is in memory at all times.

The entire operation is pretty simple, and it makes AppleWorks with Pinpoint a joy to use.

Wes Wyrick
Box 5253
APO SF 96366-006

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.*

CORRECTION

In our July issue, we failed to list a phone number for The Engineering Department ("Industry Skeptics Look at 'Little Blue,'" p. 16). The number is (408) 446-1444.

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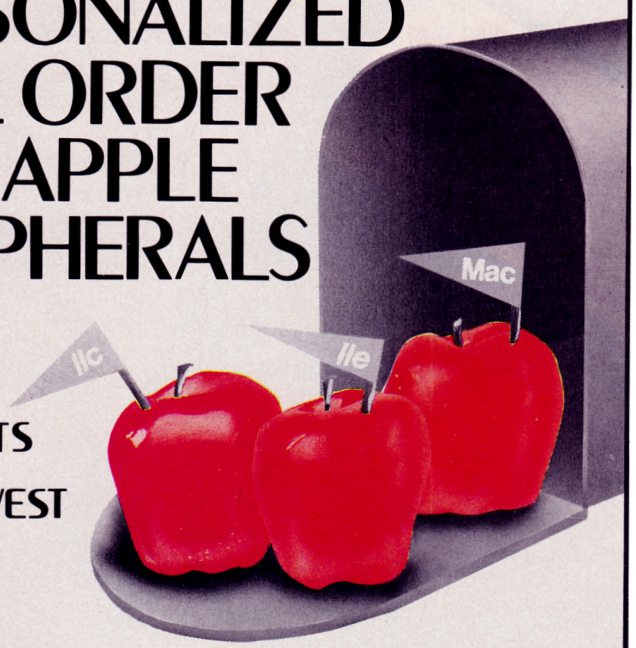

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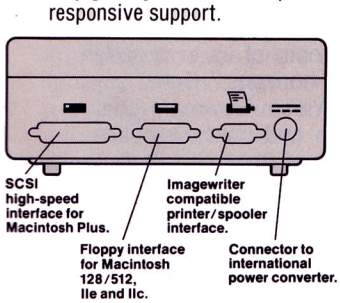

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NEWS LINE

edited by *inCider* staff

Extras for the //x

When the new 16-bit Apple //x arrives this month, it will be accompanied by a new version of AppleWorks, designed to take advantage of the machine's larger memory, and a number of peripherals, software and hardware developers say.

The new edition of AppleWorks, dubbed 2.0, will run faster than current versions and have a much larger desktop. It will also automatically copy itself into memory, to save disk-access time, sources say.

AppleWorks 2.0, though, will not have the full mouse-driven, icon-enhanced user environment (similar to a Macintosh's) industry observers expected. Development of that feature-rich AppleWorks has been delayed about six months because of problems between Apple and original developer Rupert Lissner, software developers report. Apple has contracted with a new developer to design the Mac-like version of AppleWorks.

Meanwhile, software will be available when the new machine appears on retailers' shelves sometime in September. According to our sources in software development, the list of vendors planning to introduce new versions of existing Apple II packages grows longer every month. It includes Satellite Software International in Orem, Utah, with a new version of its WordPerfect word processor; VIP Technologies in Bakersfield, California, with its 16-bit VIP Professional integrated spreadsheet; Haba Systems in Van Nuys, California, with an expected AppleWorks-style product; and International Solutions in Sunnyvale, California, with a mouse-driven, menu-rich, integrated, AppleWorks-style package.

And major Apple II software developer Software Publishing in Mountain View, California, has been showing some interest in developing for the new II, but won't divulge specific details.

According to developers, the only hardware lacking in the new //x is a hard-disk drive. (The new II includes most of the standard enhancements already.)

The AST-2000, a 20-megabyte hard-disk drive that uses the small computer systems interface port, was introduced in May for the MacPlus (which has a built-in SCSI port) and the //e (which uses AST's own SCSI-port enhancement). Sources expect the AST 2000 will also work with the new II's anticipated built-in SCSI port.

AST is expected to introduce three new products for the Apple //x and sell the SCSI-port enhancement for the //e as an upgrade.

The popular Sider hard-disk drive and B-Sider tape backup from First Class Peripherals (Xebec) work without modification on the new //x, sources say.

Memory expansion isn't as important with the new //x, because it's expected to have at least 256K of built-in memory. As a result, companies such as Applied Engineering and Checkmate Technology, which make memory add-in boards, are looking to broaden their product lines. Applied Engineering's president Dan Pote notes with a touch of irony that "Apple's cooperating with third-party developers wonderfully now—and leaving them very little to develop with the new //x."

—D.de P. and P.S.

Courtesy of Taurus Photos/Richard Burda

Capturing a Buffalo

When one software company acquires another, is the result a stronger company or fewer creative forces in the marketplace?

Two software-company executives recently involved in mergers and acquisitions maintain that increased cash flow and the melding of ideas lead to greater creativity and stability in the market. But not everyone agrees. Tom Snyder, president of Tom Snyder Productions and author of Snooper Troops, believes that something is lost when smaller companies lose their independence.

Joel Berez, president of Infocom, a Cambridge, Massachusetts-based software company recently purchased by Activision (Mountain View, California), thinks the user benefits when two companies with complementary product lines and philosophies come together. "Whenever you get different groups of people together, new ideas tend to emerge, and ideas tend to get traded back and forth. One of the effects of the merger will be for both of us to broaden our horizons," Berez says.

William Bowman, chairman and chief executive officer of Spinnaker Software Corporation in Cambridge, Massachusetts, agrees that everyone benefits when smaller companies become

part of a larger firm. (Spinnaker bought out Lowell, Massachusetts-based Hayden Software Corporation in May.) Bowman says some companies have imaginative products, but can't afford to market them. Users benefit when those companies' product lines are supported by larger firms with more resources. For example, Bowman says, "The graphics and sound of the new Apple II will allow us to enhance the capabilities of [Hayden's] chess series."

Tom Snyder, though, sees a down side to these types of mergers and acquisitions. "It's like capturing a buffalo and expecting it to be a buffalo. Have you ever seen one in a cage? It's depressed, and it doesn't act like a buffalo anymore."

The Infocom-Activision merger brings together two companies with different approaches to game software. Infocom is known for its line of interactive text-only fiction games. Activision produces a wide range of home-computer software, including games that use lively, sophisticated graphics.

"We've been spending a fair amount of time talking to each other, sharing ideas. We're looking at graphics a lot," says Infocom president Joel Berez.

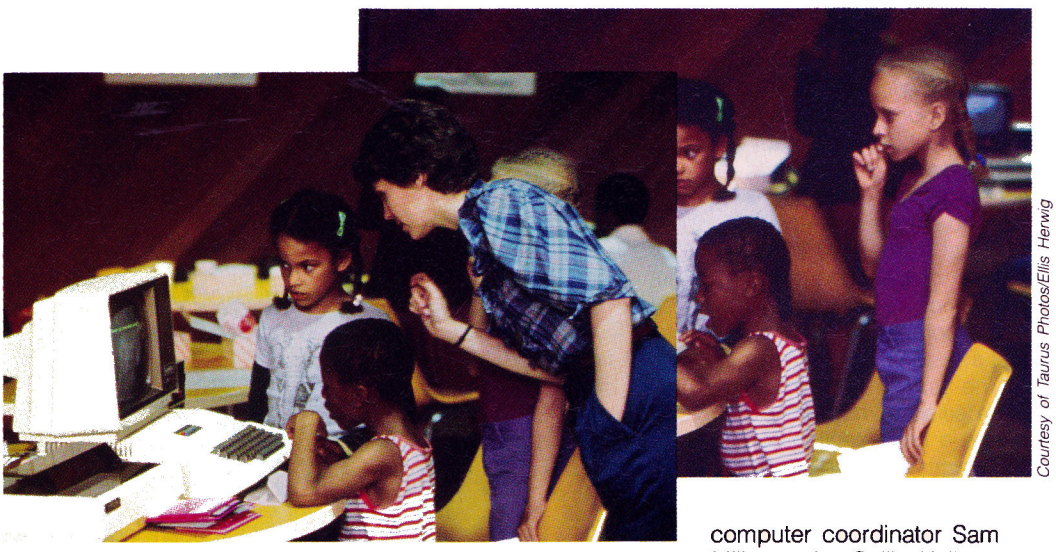
Sources at Infocom say Activision is interested in Infocom's parser capability. (A parser is software that interprets English-language input and lets a program formulate an appropriate response.) Infocom's parser technology makes a product much easier to use, sources say. Activision is expected to use parser software in future products.

While Infocom has become a wholly owned subsidiary of Activision, the two companies will retain separate headquarters and will market products under their own names, according to Infocom's Berez.

The purchase of Hayden, however, will have no direct effect on Spinnaker's product line, according to Bowman: "We will continue to support and enhance Hayden's Apple II and Macintosh product line [notably Scholastic Aptitude Test preparation programs and the Sargon series of computer chess games]."

In addition, Bowman says, "The move will increase Spinnaker's presence in the Apple II specialty-channel market." (Spinnaker is known primarily as a mass merchandiser, according to the company chairman.) "This demonstrates our commitment to the Apple market," Bowman adds.

Does the outspoken Tom Snyder ever see the day when his company will be owned by a conglomerate? "I refused to be bought out by Gillette Personal Care Products Division," he says, "but we are working on a mousse-based software product." **—D.M.**



Courtesy of Taurus Photos/Ellis Herwig

Classrooms of Tomorrow

Apple's Advanced Development Group is conducting a series of research projects nationwide to gain first-hand information about how computer-equipped classrooms can function most effectively.

"We're trying to gain knowledge about knowledge workers, namely students," explains Martin Engel, education manager of Apple Computer's Classroom of Tomorrow project. "A lot of people write papers about the computer-based classroom, but no one really has hard data, which is why we developed what are essentially little laboratories at school sites."

Apple is using seven classroom sites around the country to explore issues surrounding computer-equipped classrooms. Apple has contributed 60 computers (30 //e's for school use and 30 //c's for home use) to each participating classroom, as well as a supplemental income for the computer coordinator for each of the seven projects.

According to participating computer coordinator Sam Miller at the Collin Kelly Middle School in Eugene, Oregon, "We want to answer questions like: Is this worth the investment? What's the toll on teachers? What do students and teachers really want? And what works best? What's the reaction of parents, staff, and students to a computer-dominated environment? We're not looking to raise test scores, but to explore the best way to use the computer as a teaching tool."

Miller has done some preliminary tests, though, on the 26 sixth-graders who participated in the year-long project at Collin-Kelly; he's discovered a slight improvement in students' attitudes toward school, and improvement in their math scores and the quality and quantity of their writing.

So far, Miller notes, the most important lesson he's learned is that the teacher is the critical factor in making the computer-equipped classroom a success: "It is possible to do a great deal for math, science, and writing classes with existing software, such as Logo and AppleWorks, but only if the teacher knows how to plan

and prepare and is willing to invest the necessary time."

Another insight Miller has gleaned from the project is that the home-school link is not really that important to children's success in a computer-dominated classroom. He observed that after being in front of a screen all day, children want to go outside and do physical things, like play football or take bike rides, instead of working on their home computers. "I think that's healthy," Miller says.

The students at each site were selected randomly to create a cross-section of high achievers and average performers, reports Apple. Schools were chosen on the basis of their previous work in teaching total curriculum on a computer.

The other six participating schools are Blue Earth Public School in Blue Earth, Minnesota; West High School in Columbus, Ohio; Stevens Creek School in Cupertino, California; Black Middle School in Houston, Texas; Lester Elementary in Memphis, Tennessee; and Dodson School in Hermitage, Tennessee.

—W.L.McK.

Let's Get Static

What can load AppleWorks in a flash, wait five years, and load it again? It's not a floppy disk. It's not a hard disk. It's not a RAM disk, one of the fast phantom drives set up by memory-expansion cards, though that's close. It's static RAM (SRAM), a storage device that combines a RAM drive's lightning speed with a physical disk's stability—and, says Checkmate Technology of Tempe, Arizona, it should be on sale by the time you read this.

Checkmate's SRAM drive, promised for fall delivery at less than $300, is a box resembling a half-height floppy drive with four slots for cartridges holding 128K, 256K, or 512K apiece, emulating a ProDOS hard disk except for its nearly instantaneous response. That's nothing a good //e memory-expansion board can't do—until you turn off the computer, tuck the three-inch capsules into your pocket, and walk away. The cartridges' lithium batteries keep the low-power CMOS memory intact for up to ten years.

At first glance, SRAM may look like a technology in search of a market: The capsules are too expensive to replace floppy disks, though their write-protect switches are handier than sticking and unsticking adhesive tabs over a disk notch, and the unit's 2-megabyte maximum (four times 512K) is no threat to 10- or 20-meg hard drives. But no other storage medium matches RAM speed. Putting that speed into a portable, palm-sized capsule is convenient, and overcoming RAM disks' volatility—their instant obliteration in the briefest power failure—has irresistible appeal.

As for portability, while the SRAM drive will initially connect to a socket on Checkmate's MultiRam RGB memory card for the //e expansion slot, the firm doesn't intend to slight the potential market among non-MultiRam owners—or non-Apple owners, for that matter. Besides a version that plugs into a regular Apple peripheral slot, Checkmate's vice president of marketing, Richard Blanco, told *inCider*, there'll be one that plugs into an IBM PC or compatible. While the drives' hardware connectors may differ, they'll use the same cartridges, opening the possibility of home-to-office commuters' transferring data files.

The SRAM drive was announced at the Comdex/Spring '86 trade show in April; by late May, Blanco said Checkmate was within a month of finishing work on the hardware and waiting for production quantities from its cartridge supplier. *inCider* will review a production model when one becomes available. **—E.G.**

New ProDOS: Window Dressing?

There'll be icons and mouse support, but the version of ProDOS planned for the new 16-bit Apple II will be something of a disappointment for the original author of the operating system.

"At the risk of sounding like an emotional programmer, I'm afraid that Apple is not going to do some things that would give maximum flexibility and power to the user," says James Huston, who, as an Apple employee from 1977 to 1984, wrote the original ProDOS kernel and BASIC .SYSTEM. "Instead, [the new ProDOS will have] an emphasis on user friendliness, which admittedly may be more important to some users than the features I want to see."

Huston, now vice president of software engineering at The Engineering Department in Campbell, California, explains that he planned ProDOS with future hardware in mind, ranging from 16-bit processors to optical compact disks for mass storage: "There were hooks put into the software to encompass future applications requiring larger memory." Most of his plans, Huston told *inCider*, involved "being able to add network capability, device drivers [for more sophisticated input/output management], and larger volumes. That'll become important as CD-ROMs become more available; the 32-megabyte volume limitation is probably the biggest problem when you're talking about 400- or 800-megabyte disks."

Instead of his power users' wish list, Huston says, Apple is pursuing the Macintosh tradition of ease of use. "The file system will definitely be ProDOS; [Apple's] not changing that at all in terms of the way files are stored on the diskette, though they'll probably have some new file types. I'm not sure exactly what [else] will happen, but my overall impression from discussions with them...is that what you'll see is something more akin to the switchers or desktops around [such as Quark's Catalyst or International Solutions' Mouse Desk].

"It's not so much that they're not doing what I'm suggesting, it's that they've found priorities elsewhere," Huston says of Apple's decision to put a Mac-like shell around a basically unchanged ProDOS. "They have limited resources, and I think they pushed it more toward convenience [for now]. I think you'll see [technical] changes when there's market pressure for them, when there are CD-ROM's, when 40 or 80 megabytes is not uncommon."

—W.L.McK. and E.G.

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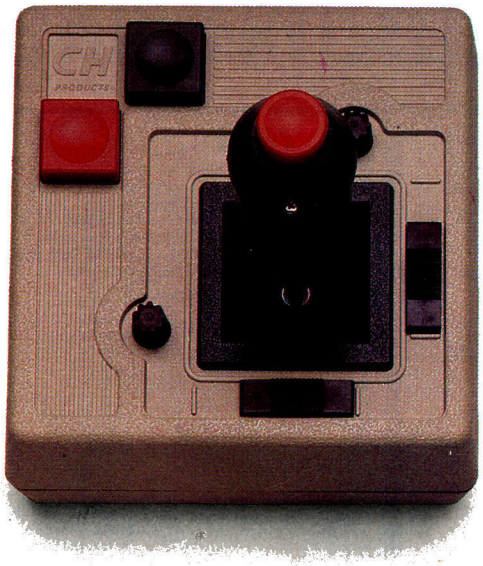

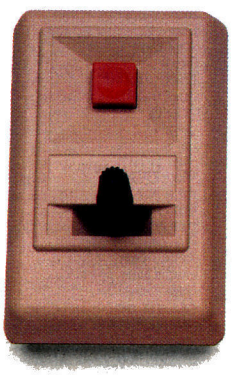

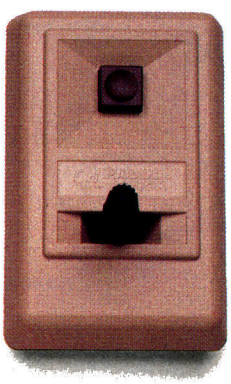

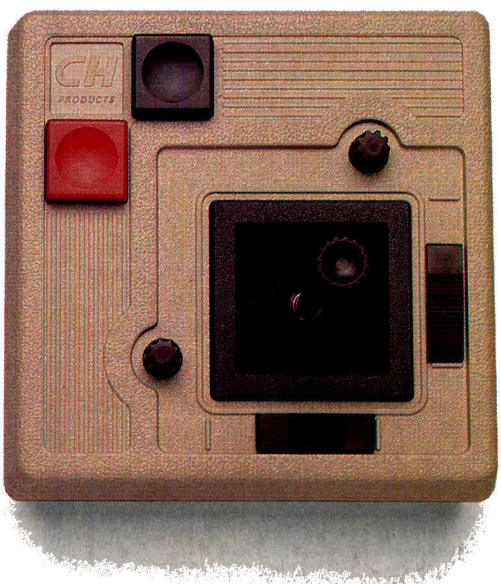

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APPLE CLINIC

by Bob Ryan and Paul Statt

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.*

Mousetext Characters

I recently purchased an Apple //e enhancement kit to expand the range of usable software for my //e. I've encountered a problem, though, with WordStar 3.31 on my Microsoft Softcard II. WordStar's menu selections utilize inverse capital letters, but with the enhancement kit installed, they're now displayed in mousetext. The enhancement kit's documentation says this problem occurs with certain software, but cheerily suggests that you can still use the program—it'll work just fine!

I want to know if I can reinstall the original character-generator ROM and still take advantage of the other features the enhancement kit offers. WordStar is virtually useless without the capital-letter menu displays. Any ideas?

Jerry Patterson
Huntsville, AL

Character-generator ROM's contain the pixel patterns of all the letters, numbers, and special characters your Apple can display on its text screen. The character-generator ROM that comes with the //e enhancement kit has mousetext characters as its alternate character set instead of inverse capitals. (All Apple II character-generator ROM's have two character sets: the primary set and the alternate set.) The old character-generator ROM was produced before mice became a part of the computer user's menagerie.

You can easily replace the enhancement kit's character-generator ROM with the old one. Reinstalling an old ROM chip won't harm your machine or affect operation of any software package. It will have a definite effect on the "look" of any software you run that uses mousetext characters, though.

As an experiment, I replaced the enhanced character-generator ROM in Paul Statt's //e with an old one. The computer booted without a hitch, and Apple Writer 2.0 (the ProDOS version) ran like a charm. I next booted MouseWrite from Roger Wagner Publishing. Once again, the program ran just fine, but, since MouseWrite accesses the alternate character set, the screen display was a mess. Instead of the arrows, lines, and boxes of mousetext characters, I got what I expected—a display full of inverse capital letters.

If you want to run mouse-driven software on your Apple, resign yourself to getting used to strange WordStar menus—or get a new word processor. If you enhanced your //e to boot from hard disks, use the mini-assembler, and use lowercase in Applesoft, then by all means replace the new character-generator ROM with the old one. You can't have it both ways—unless you want to swap the character-generator ROM chip every time you go from WordStar to a program that uses mousetext. (By the way, I left the old ROM chip in Paul's machine—I wonder how long it'll take him to notice the difference?) —R.R.

Colorful Characters

I use a Taxan RGB monitor with the Taxan RGB-IIB interface card with my Apple II Plus. I'm unhappy with the quality of the text. As you can see from the pictures I've enclosed, it's multicolored instead of monochrome. Is this the best I can expect? Should I replace the interface card, or is there a simple adjustment I can make to improve the quality?

Eugene H. Eisman
North Miami, FL

The pictures you sent show that your software doesn't use the Apple's built-in text characters—it uses Apple hi-res graphics to produce text characters.

It's nearly impossible to ensure that graphics-produced characters will appear white on the screen. The color of an individual pixel on the Apple hi-res screen is affected by the byte (even or odd) and the state of neighboring pixels. Thus, although all the graphics can be produced with the color set to white, the final result will be a mixture of white, green, and violet. While a good graphics programmer can minimize this "color clash," it's difficult to eradicate from graphics-produced text.

If your monitor has a switch for monochrome display, you could use that to force the display into one color. This would be a handicap, of course, if your program also displays graphs or other nontext graphics. The other solution is to get a different software package—one that uses true text characters or double hi-res graphics. Because the even and odd rows of bytes that make up a double hi-res screen reside in different banks of memory, color clash isn't a problem with double hi-res graphics.

If your monitor doesn't have a monochrome switch and you don't want to change software, I know of only one other solution. Don Lancaster's book, Enhancing Your Apple II *(volume I), describes a quick hardware modification that lets you kill the color in your color-graphics displays. You control the color-kill switch with a simple POKE before running your software. If you have an aptitude for fiddling with hardware, check out Don's solution. —R.R.*

Special Characters

I own a 64K Apple //e with two disk drives and a printer. I've seen several disk-catalog listings with unusual filenames. Some begin with special characters such as exclamation points or asterisks; others begin at the left margin, where the file type and size are usually displayed. Still others show inverse and flashing filenames and other effects. How can I modify my disk directories to do these tricks?

Vinay Bhaskar
Cupertino, CA

The directories you describe are possible only on DOS 3.3 disks, with which you can use any character in a legal filename. These filenames have been modified with some type of

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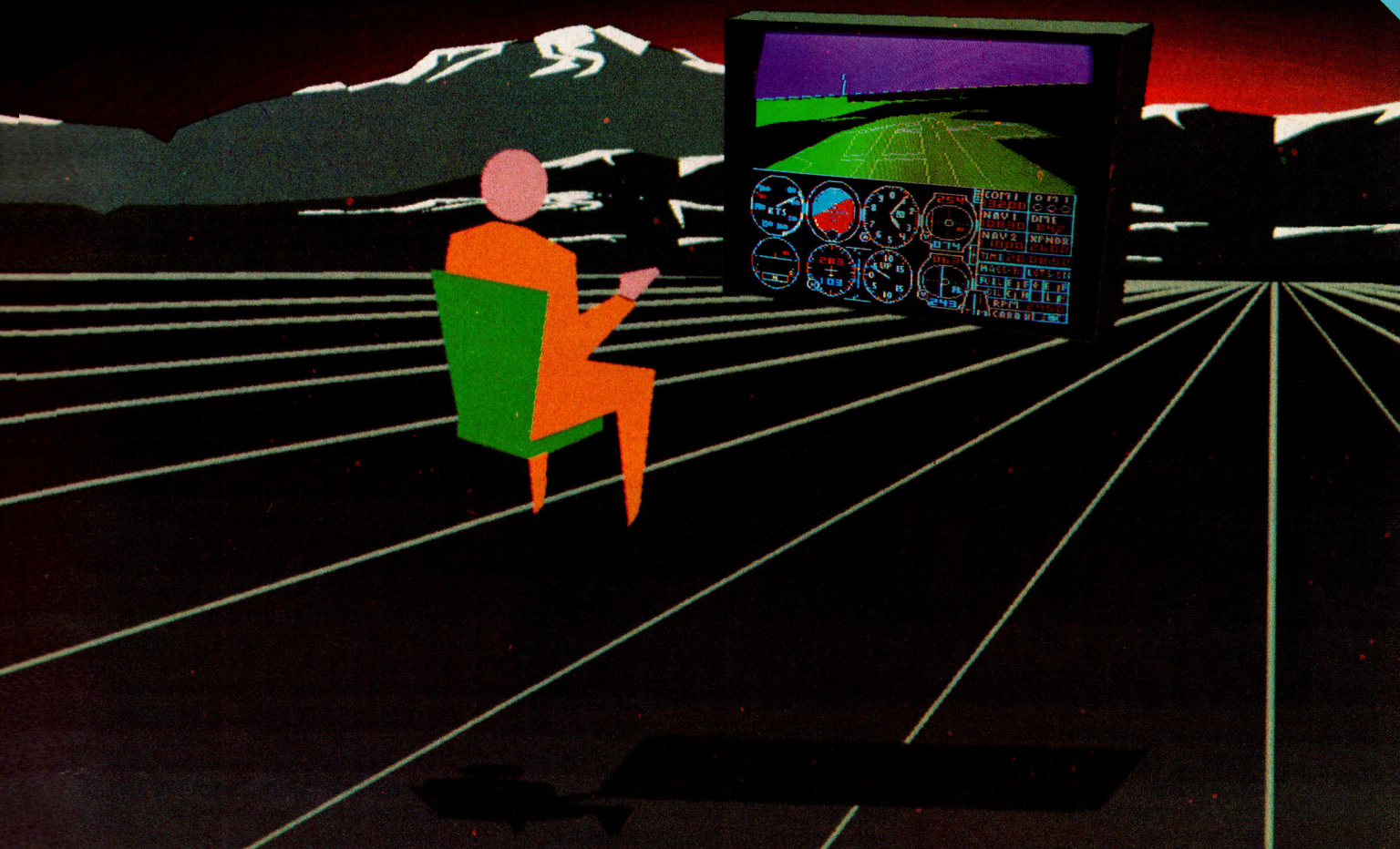

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disk-zap utility, which lets you directly modify bytes on a disk. If you know how a disk is laid out, you can easily modify filenames and perform tricks such as personalizing the disk-volume message.

Assuming you can get your hands on a disk-zap utility, the information you want to modify is on track 17 (the catalog track) of a DOS 3.3 disk. Filenames are stored beginning in sector 15, and working back to sector 1, if needed. By inserting a control-H character into a filename, you can backspace the name so that it begins at the left margin. You can produce flashing and inverse characters by using the correct ASCII codes. In catalog listings, decimal values between zero and 63 produce inverse characters; values between 64 and 126 produce flashing characters.

I don't know of any practical reason to use these characters in your own filenames, since you can't reproduce these effects when loading a program from the keyboard. They do add a splash of life to otherwise dull catalog listings, though. —R.R.

Your Own Characters

How can I create my own characters for the text screen? I want to display special characters when I hit a key, instead of the built-in ones. Can you help?

Travis Jones
Hinckley, UT

The only solution that would work under all circumstances is to produce a custom-made character-generator ROM for your Apple. Unless you're into EPROM burning, though, I don't suggest you take on such a project.

The other solution is less comprehensive, but you may find it useful. You can design a custom character set to be displayed on the graphics screen. In the July and August 1984 issues of inCider *(pp. 92 and 112), Don Fudge tells you how to display text on the hi-res screen. In addition, special graphics programs such as The Complete Graphics System from Penguin Software let you create and edit hi-res character sets for your system. They're not available to most commercial programs, but you can use them in any program you write.* —R.R.

Buffer Headaches

I have an Apple //e with 5¼- and 3½-inch UniDisk drives. I plan to eventually convert all my software to the 3½-inch format. To this end, I've been using the conversion utility on the User's Disk to convert from DOS to ProDOS. In several cases, I've received the message NO BUFFERS AVAILABLE when trying to run converted programs from the 3½-inch disk. Can you tell me what I need to do to make a converted program run properly?

Robert J. Kolouch
Vienna, WV

ProDOS generates the message NO BUFFERS AVAILABLE in two situations. The first is when you try to open more than eight files at one time. ProDOS allocates a 1K buffer to each file it opens, and allows only eight open files at a time. If you try to open a ninth, ProDOS will tell you there are NO BUFFERS AVAILABLE.

Remember that the CATALOG, EXEC, and - commands all temporarily open a buffer. If you try to invoke one of these commands with eight open files, you'll once again wind up with NO BUFFERS AVAILABLE.

The second situation occurs when you issue a ProDOS command that alters a reserved area in memory. This is a little involved, so bear with me.

At the top of user memory, just below the hardware memory beginning at location $C000, you'll find the ProDOS System Global Page. This page contains pointers that let ProDOS communicate with the hardware and system software of your Apple. Tucked away in this area is the System Bit Map, a 24-byte chunk of memory that tells ProDOS which pages of memory it's allowed to alter, and which ones are sacrosanct. Each bit of the 24 bytes of the System Bit Map refers to one page of memory in the lower 48K of an Apple II system. If the bit is set, ProDOS won't perform any operation that alters the corresponding page. This doesn't mean that a program can't alter a page of memory reserved by the System Bit

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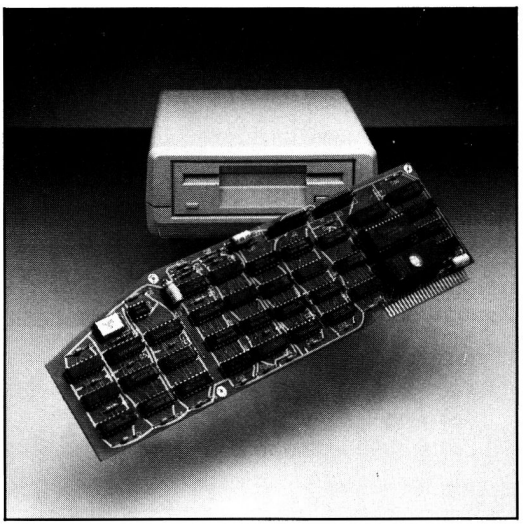

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Map; it just means that the reserved page can't be altered by a ProDOS function or command.

If you get a NO BUFFERS AVAILABLE message, and you know you don't have more than eight files open, then you've probably run afoul of the System Bit Map. One explanation is that the program has tried to BLOAD a file into an area ProDOS uses. Remember that ProDOS takes up more room than DOS 3.3 (DOS uses memory down to $9600, ProDOS to $9000), so binary files that fit nicely beneath DOS 3.3 in memory might conflict with ProDOS. You'll have to give such files new BLOAD addresses.

Other sources of conflict are programs that try to BLOAD files directly to text-page 1, which begins at location $0800. For some reason, ProDOS doesn't mess with the text page. If you have a program that loads a file directly to the text screen, you can get around the problem by BLOADing the file elsewhere in memory, then PEEKing and POKEing it to the screen.

Another alternative is to alter the System Bit Map to "unreserve" any memory you want to use. This can be dangerous, so I suggest you limit yourself to altering the reserved status of text-page 1. You can find information on the System Bit Map in the ProDOS Technical Reference Manual. *Your local user group may have a public-domain program that lets you play with the System Bit Map. If not, MicroSPARC can sell you one called RAM Reservation Center.* —R.R.

Big-Blue Blues

Like many other Apple users, I face a frustrating computing situation. At home, I use an Apple; at work, nothing but "Big Blue." So far, the only solution I've found is to use CP/M on both machines. This isn't practical, though, since most of the software I use at work is written for MS-DOS. Since it's possible to use CP/M on an Apple, is it also possible to run MS-DOS on an Apple?

Keith Mankins
Austin, TX

There have been a number of attempts to make the Apple MS-DOS compatible, but I don't know of any that have succeeded. The most visible failure was a box from Rana Systems that contained a PC clone. The only parts of the Apple the box used were the keyboard and video display. The problem is that you'd have to spend as much to make the Apple run MS-DOS as you would to build a PC clone. Consequently, it's just as cheap, and eminently wiser from a compatibility standpoint, to buy a PC clone instead of an add-on box that probably can't run a lot of MS-DOS software. Rana Systems is now out of business because it failed to realize that.

Currently, the best "MS-DOS board" for the Apple II comes from The Engineering Department, a company in Campbell, California (408-446-

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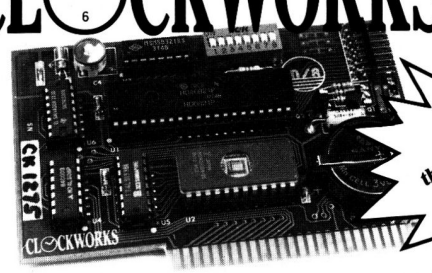

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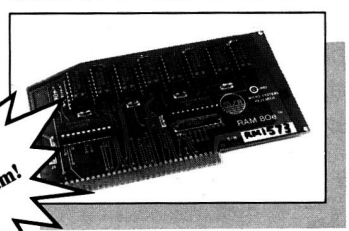

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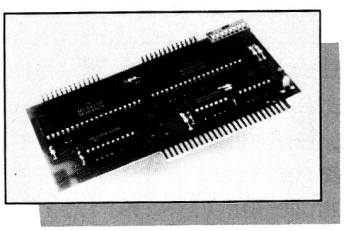

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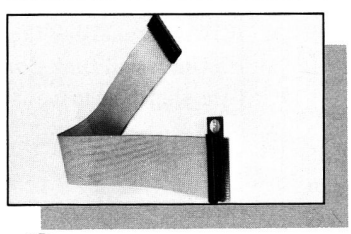

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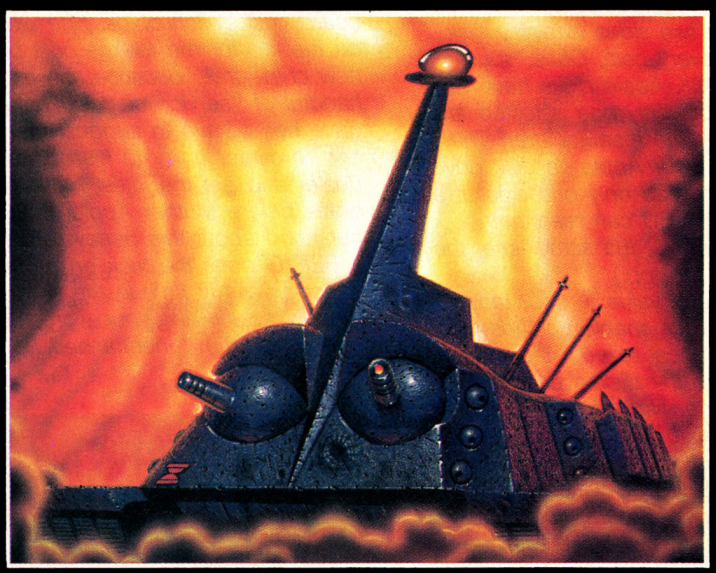

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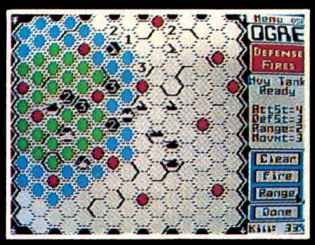

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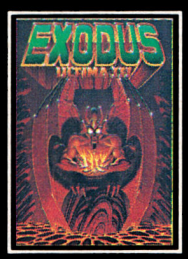

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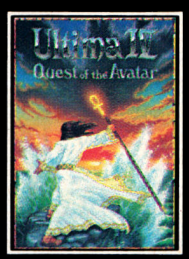

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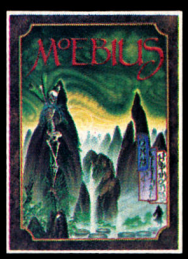

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Disk Tricks

I own an Apple //c and have a question about certain types of disks. Recently I obtained some new blank Nashua disks—double-sided, double-density, soft-sectored, with hub ring. Are there any limitations in using these disks? Must both sides be formatted alike, for instance?

Christopher Hash
Rising Sun, MD

There are two sides to every disk as well as every coin, Chris. Your plain old 143K Apple disks have two sides, too, but only one is tested and approved by the manufacturer. The trouble with your Apple //c disk drive is that it can read only one side at a time. (An IBM PC can read both sides of a disk at the same time; the Apple, only the top.)

To be of any value to you, those disks need write-enable notches on both sides, because you need to physically flip the disk over to get to the other side. No notches? Some folks cut their own, but for some reason manufacturers frown on that. If your disks have two write notches, however they got them, you should be able to do as you like with the disks—mix operating systems, have ProDOS on the top with Pascal on the flip side, merge price/volume analysis and love letters—it's up to you. —P.S.

Mini Problems

I'm a new Apple //c user, teaching myself assembly language. I'm excited about the "mini-assembler" on my computer, but frustrated in my attempts to access it. I tried CALL – 151, followed by an exclamation point (!) and RETURN, but got only the asterisk Monitor prompt (*) back. The //c's at my local software store react the same way.

Of course I can boot the DOS 3.3 System Master, enter Integer BASIC, enter the Monitor, and type F666G, but that's a pain, particularly since I work in ProDOS. I hear that FEF1 works on the enhanced //e, but not the //c. What's wrong? The only modification made to my //c was a motherboard swap that corrected the timing problem I had with a non-Apple 1200-baud modem. Any help? I'm going crazy.

James Gibson
Indio, CA

You're not crazy, Jim, just misinformed. Have you considered adding a UniDisk 3.5 to your system? I'm not trying to change the subject, but if you buy a UniDisk 3.5, your ever-helpful Apple dealer will swap yet another motherboard into your //c—Little Orphan Apple—and that motherboard will have Apple's latest ROM chips, including the instant mini-assembler. It's free with the UniDisk 3.5.

My dealer tells me it isn't necessary to actually swap the whole motherboard, just switch chips. She would do the job for me for the cost of the new chip—free, because she has a handful of "service chips" Apple gave her. I have to suggest that every //c owner hurry to his or her local dealer and get the latest motherboard gratis *before Mother Apple changes her mind about this benevolent policy.*

FEF1G does the trick on my enhanced //e; my //c's in the shop, though, so I'll take your word that it doesn't on the "unenhanced //c." —P.S.

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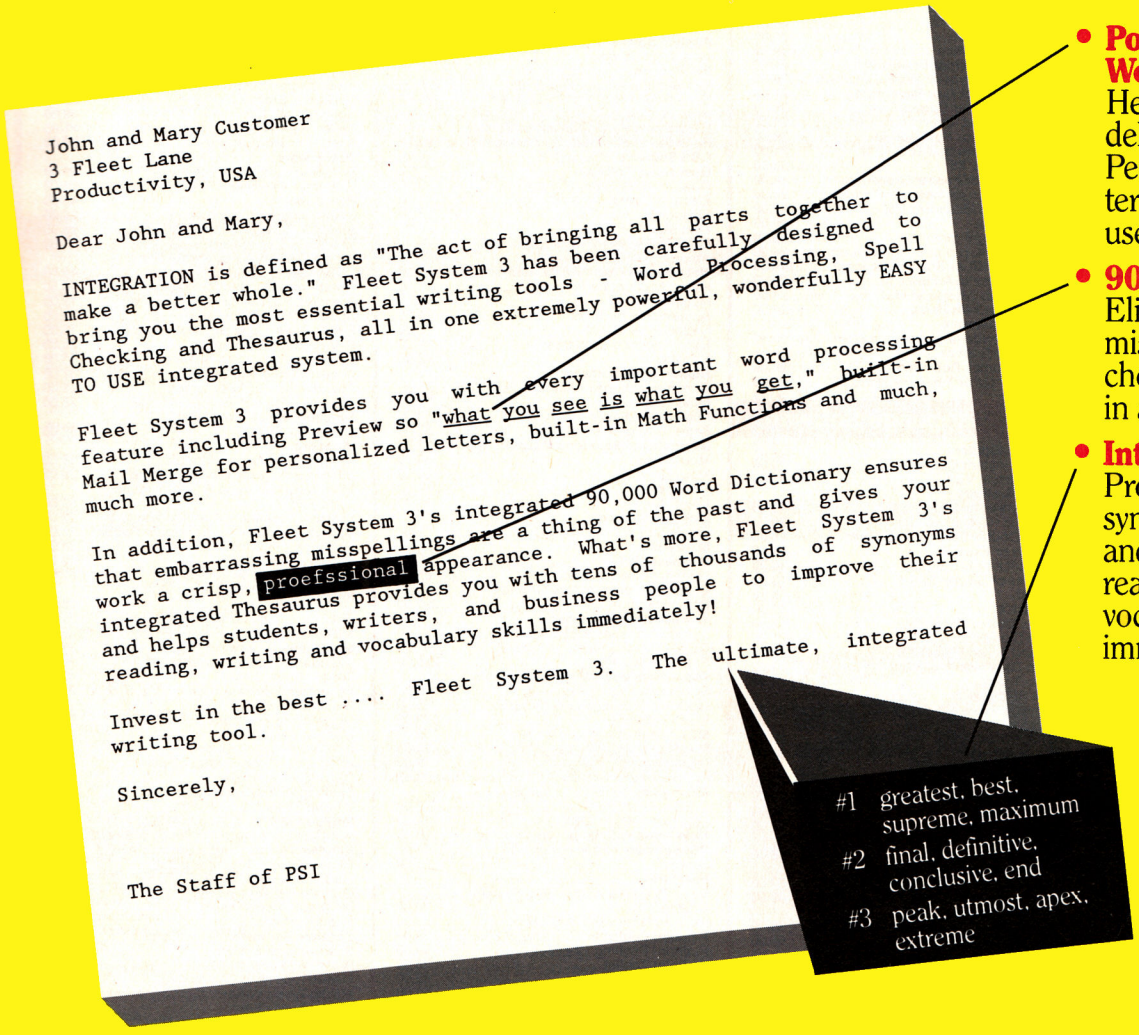

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meaning of a new vocabulary word, and you often have to choose the best title for a story or pick out a moral.

If you get any answers wrong, the program lets you go back and see why. When all your answers are correct, Baloo applauds you and gives you an adventure assignment: looking for one of the five animals you must pass in the jungle to locate Bagheera the panther and win the game. You guide Mowgli through dense tropical forests; when he finds the animal, he makes it hide by speaking the magic words given to him by Baloo the bear.

The software actually "talks" at this point, but the words are sometimes difficult to understand unless the speaker volume is turned all the way up. Even then, you might be surprised by the "adult" voice that comes from such a little boy. A highlighted area on the package box claims "This Program Talks." It does, but not much, and not too clearly. ■

Cynthia E. Field
Wakefield, RI

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Support	■	■
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Megahaus' trio of AppleWorks accessories bring new possibilities to your word processor, spreadsheet, and data-base files. ReportWorks, the most complicated of the three, retrieves information from AppleWorks spreadsheet or data-base files, then manipulates it in reports you design. MegaWorks offers a simple spelling checker with an easy-to-use mail-merge. ThinkWorks automatically draws up outlines to help you organize your ideas.

These three programs aren't integrated and don't use identical AppleWorks commands, but they do share the familiar AppleWorks-desktop format. ReportWorks and ThinkWorks can take advantage of hard-disk storage, the Apple UniDisk 3.5, and the Apple II Memory Expansion card. Since both programs require frequent access to disk (making them slow), you'll be happier if you can copy them to a RAM disk.

Megahaus provides 30 days' free support to registered owners, but charges $50 for an extra year of support for one program and $25 more for each additional program. Guaranteed updates and backups cost $25 per program per year. In three calls to Megahaus, I found the staff courteous and helpful. Not until the third call, though, did I find someone who could tell me why field names weren't working in ReportWorks (a bug in version 1.0). The support people promised to call back with answers to other questions, but didn't.

ReportWorks: Versatile but Complex

Imagine a program that retrieves customers' names and addresses from one file, outstanding balances from a second, current orders from a third, and prices from a fourth, then automatically enters the current date, calculates the number of days overdue (with interest penalty), and prints complete customer bills in zip-code order. Finally, the program summarizes all the orders, amounts, and maximum, minimum, and average numbers of days overdue.

That's just one small example of what you can do with ReportWorks. Although it's definitely harder to use than AppleWorks itself, ReportWorks is unique among Apple II programs. If you need its features, ReportWorks is worth the money and effort.

Each report requires one master file for the primary information and can

match corresponding information from as many as eight other "lookup" files. You can get text or data from any column or category in the lookup files as long as it has a field in common with the master file.

The program is flexible, letting you create simple or complex reports. Every report can begin with a title page and end with a summary, with numbered pages or entries in between. (There's also work space for information required by calculations that won't appear in the report.) Each entry can be a single line—like the list of calls on your phone bill—or a page long; you can determine page size, layout, headers, and footers. Version 1.1 reports can be as many as 256 pages; version 1.2, released at presstime, allows 60,000 pages.

You format each entry by creating fields for ReportWorks to fill with information. After you've determined the size of a field (up to 255 characters), ReportWorks lets you position it on the page. A menu takes you step by step through the process of naming the field, establishing its type (text, number, date, time, or "any"), and identifying its source. Your report can include information from four sources—spreadsheet, data bases, the keyboard, and formulas that manipulate data or text.

At each decision point, a window drops down to present your options. For instance, if you've established that a particular field will hold a number, the window shows you the formatting possibilities: Precede the number with a dollar sign, separate numbers with commas, add a percent sign to the number, and set the number of decimal places. You need to remember the columns in which spreadsheet data are stored, but ReportWorks fetches filenames and data-base categories from disk for your selection.

A comprehensive range of formulas and functions allows sophisticated manipulation of information. A partial list includes arithmetic operations, number functions that operate on particular values (including rounding up and down), and those that operate on a range of values (such as averaging, counting, and returning maximum or minimum). You can convert numbers to text, and text to uppercase, lowercase, or initial capitals.

Other functions calculate the difference between two dates, add a number of days to a date, or extract the day, month, or year from a date. A variety of logical operators (such as "greater than," "equal to," "begins with," and "contains") work with the IF function in any type of field.

These logical operators also help you define the criteria of your printed report. For example, you could restrict your report to customers in a certain zip-code range or a particular state, or to customers whose names begin with M. You can sort report entries alphabetically or numerically before printing.

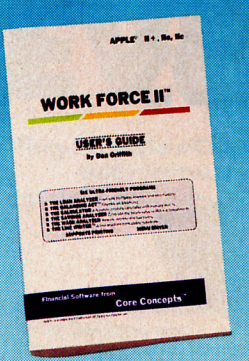
Criticisms

Most of ReportWorks' features do what they're supposed to. In version 1.0, the program sometimes has trouble finding fields named in the workspace for calculations, though. (Reports created with version 1.0 must be completely reconstructed with version 1.2 to avoid "buggy" results.) And ReportWorks may save part of your file to disk before discovering there isn't enough room for the whole file.

The 100-page manual, while clearly written, includes only a minimal index and isn't detailed enough in some areas. It took me hours, for example, to discover that a field must be large enough to contain not only its text, but also any special printer codes.

Although I appreciate ReportWorks' fail-safe features, it's frustrating to have to move ponderously back and forth between designing and building a report when you just want to check a design change. Even with a hard disk and accelerator card, producing reports is a slow process.

ReportWorks adds to this complexity by redefining such standard AppleWorks commands as OA-F and OA-S. OA-P means "print" in one part of the program, but serves a different function in another area. Even with the handy quick-reference card, it took me more than an hour to use the program comfortably if I hadn't used it for a few days.



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Because ReportWorks looks into columns rather than rows, I needed to redesign some spreadsheets to retrieve data. And if you don't use an ImageWriter or comparable printer, you'd better bone up on your printer codes (in hex).

The pain may be worth the gain, though, because even a day or two spent designing an automatic report format represents less of a headache than creating each report, one at a time, over months.

MegaWorks: Simple Spelling Checker

MegaWorks is a spelling checker and mail-merge for AppleWorks. Both modules are very straightforward in operation.

To check the spelling of an AppleWorks word-processing file, simply follow the menu prompts to select the file you want to check, insert the dictionary disk, and decide what to do with misspelled words, displayed in context. Your options are to correct one occurrence, replace all occurrences, skip this occurrence, ignore all occurrences, add to the dictionary, or quit. When you've finished editing, MegaWorks saves the corrected version with the original filename and the initial version as Megaworks.Spell.

As it checks the words in your document, MegaWorks tells you the total number of words, the number of words it has checked, and the number misspelled. It works through your file at a rate of about 100 different words per minute. The MegaWorks dictionary comes with 50,000 terms (versus Sensible Speller's 80,000), and you can add 10,000 more.

Although MegaWorks is easier to use than some other spelling checkers, it doesn't suggest correct spellings or let you build special-purpose dictionaries. Among the correct words it mistakenly identified as misspelled in this article were *misspelled*, *spreadsheet*, *ASCII*, *alphabetically*, and—most annoying—several plurals and verbs ending in *s*.

Basic Mail-Merge

The mail-merge feature works in three simple steps. First, create a form letter and name the fields to be merged—for example, $$NAME, $$LOCATION, and $$MESSAGE. Second, using the AppleWorks word processor or data base, list the items you want to merge and separate each set with a backslash (\):

```
$$NAME:High Tech Computer Center
$$LOCATION:Springfield, PA
$$MESSAGE:You do good work!
\
```

Finally, follow the menu prompts to merge the form letter with the list. The result is an AppleWorks word-processed document automatically stored on the same disk as the letter and list. If the merged file is larger than 30K, MegaWorks automatically segments the file and numbers its parts.

The MegaWorks mail-merge includes several especially welcome features. For instance, the number of fields in the MegaWorks list is limited only by AppleWorks file size. (In comparison, HabaMerge, despite its strengths, is limited to nine fields.) If a field is missing, MegaWorks prompts you to type it in as it merges files: For a short job, you can create a dummy list and type in the information as the program proceeds.

You can also edit the merged file as you would any other AppleWorks word-processing file. And within a paragraph, MegaWorks will close up any space caused by differences in item length or a blank field. An empty field in an address line, though, will leave a blank line.

Long lists are a problem for MegaWorks. The easiest way to create the merge list is to transfer the AppleWorks data base with the clipboard to the word processor. The clipboard is limited to 250 lines, though (fewer if the desktop is getting full), so you have to move the list in chunks. You can't avoid the problem by printing the list as an ASCII file, because that deletes the item names so easily created with the data base.

MegaWorks comes on three disks (program, dictionary, and examples). Version 1.0 couldn't access files on a hard disk or UniDisk 3.5; version 1.1 can.

ThinkWorks

If you're the kind of person who likes to work from an outline, ThinkWorks may be just what you need.

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With only a few keystrokes, ThinkWorks will arrange and—more importantly—rearrange your facts and ideas. You can use it with or without AppleWorks.

As you're organizing, ThinkWorks creates a standard outline form:

```
I. Microcomputer
   A. Software
      1) Apple
         a) Apple II
            1) ThinkWorks
   B. Hardware
II. Minicomputer
```

Beginning with the first line, you can add entries at the same level or any lower level. You can, if you like, create all the top-level (Roman-numeral) headings first, then fill them in. Or you can work from the top level down to small details, one section at a time, or go back and forth among levels. With open apple-Z, you can change the number of visible levels, leaving only the top-level headings, two levels, and so on. (You can't have more than 950 entries at any one level.)

The real power of ThinkWorks lies in its ability to help you rearrange your ideas and to automatically renumber the outline. You can manipulate entries with open-apple commands, including *M*ove, *E*dit, *C*opy, *I*nsert, *F*ind, *R*eplace, and *D*elete. You can *G*et all or part of another outline from disk and insert it into the one in memory at any level. And you can *S*ave all or *K*eep part of the current outline on disk.

With most of these commands, you have only to identify the highest heading of the block you want to manipulate, and ThinkWorks will automatically move, copy, delete, or insert all subordinate parts. You've now learned almost all of ThinkWorks' commands, and, if you forget, you can find them listed on your screen.

Finally, you can print the entire outline or select the number of levels you want to print (only Roman numerals, for example) and the range of levels (say, I to X). You can print hard copy or to disk as an AppleWorks word-processor file. You can print with the outline tabs or, if you want to turn the outline into regular prose, print it left-justified.

The program's restructuring power makes ThinkWorks particularly valuable. When a topic requires only a brief outline, though, many people prefer Arabic numbers and decimals:

```
1.     Microcomputers
1.1    Software
1.2    Hardware
```

Some word processors, such as HomeWord Plus, include automatic outlining and allow a selection of outline styles. That choice would add significantly to ThinkWorks' versatility.

My other criticisms are relatively minor. ThinkWorks wouldn't configure properly to work with my C. Itoh F-10, although the Apple Dot-Matrix Printer worked perfectly. (Since you can print the outline from AppleWorks, that's not too serious a problem.) Although ThinkWorks lets you change the active drive, the program would be improved if you could change filenames, create directories, and format and catalog disks.

It's not hard to be organized when you have ThinkWorks. While it's slow and clumsy compared to sophisticated Macintosh outliners, ThinkWorks fills an important need for Apple II users. ■

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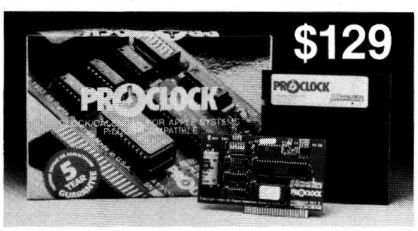

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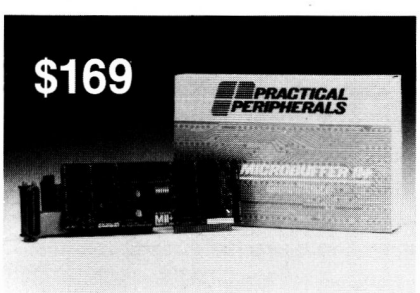

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Ease of use ■■■
Documentation ■■
Support ■■■■
Overall ■■■

If your budget and your writing needs are both on the light side, you should give The Bard's Pro-Am Writing System a whirl. While the "Am" in the name "Pro-Am" should be emphasized, that's not necessarily a put-down of the program. Some users will consider this three-in-one word processor a welcome change from strictly command-driven programs like Apple Writer II or overly easy entries like Bank Street Writer.

At home or at school—the disk-based word-processing tutorial is good enough for classroom demonstrations—The Bard provides software that can grow with you and with your hardware. The system is composed of three word processors with different capabilities.

The first two programs, found on the Apprentice disk, offer Starter and Experienced levels, respectively. The first, suited for beginners of all ages, includes only the most basic functions: Type, Print, Save, Load, and New. Since the package includes a formatted data disk, you won't even have to prepare one, although formatting is an easy job at any level of The Bard's System.

At the Starter level, commands are practically nonexistent. Everything you need to know is printed in big, friendly letters on screen: "Press Esc to see things you can do," for example, compared to the Experienced screen's "Press Esc for command menu." Both levels show program functions in pop-up windows, with a highlighting cursor controlled by the arrow keys. Help screens ("Advice and Helpful Hints") are a few keystrokes away.

Ascending Levels

Moving up from the skimpy Starter level, the Experienced level offers block operations, find and replace functions, and one-shot cursor moves to the beginning and end of a file. Extra utilities let you catalog a disk, print the catalog, delete files, hide or show carriage returns, and work with various file types—saving your work in Bard or ASCII format and importing files from Apple Writer II, Bank Street Writer, HomeWord, and other DOS 3.3 word processors.

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The Experienced level (like the third, or Professional, level) lets you view the page as it would appear if printed. Unlike other word processors that print formatted text to the screen, The Bard's System splits the screen vertically. The left side depicts a white piece of paper with words represented by blackened blocks, giving you a clear view of page-layout features such as justification, extra carriage returns, or widow lines. The right half of the screen lists commands you can use to tidy up the page then and there, ensuring that printouts will look the way you want.

Another feature shared by the Experienced and Professional levels is the spelling checker, whose pop-up menu options let you skip a suspect word, correct it immediately, or mark it for later correction. The 50,000-word dictionary can be expanded if necessary (while *mongoose* is there, *boysenberry* isn't). The checker is reasonably fast, though one-drive users have to shuffle among program, data, and spelling disks.

The Professional level adds certain editing and formatting options the Experienced level lacks. You can toggle between insert and overstrike cursors, specify a footer or header, or append individual files for long documents. If your printer supports different fonts, you can typeset a block of text.

Another "Pro" feature is the ability to prepare "quicks," what many word-processing programs call *macros*—words, phrases, or print-command sequences (up to 255 characters each), kept in files similar to Apple Writer II's glossaries. To use a "quick," you type in a short code instead of the entire phrase.

Experienced and Professional writers can use control commands to invoke functions. Typing control-S will save your file faster than going to the command menu and moving the highlighting cursor to the 11th option.

An Old-Fashioned Value

The Bard's manual is somewhat cluttered, though easy to read and understand. There's no index, however, so looking for a specific item can be a chore. The system's three "flippy" disks are noncopy-protected, and free technical support (there's no toll-free number, but you're invited to call collect) is as close as your phone.

My only reservation about this program is that it's DOS-based, when the Apple world seems to be moving to ProDOS. The Bard's System doesn't support peripherals like Apple's UniDisk 3.5, for instance.

Otherwise, the Pro-Am Writing System seems to combine Apple Writer's features with a simple AppleWorks-like interface and Bank Street Writer's ease of learning. Throw in the essentially free spelling checker and you have a remarkably good software value the whole family can use. ■

Cynthia E. Field
Wakefield, RI

Editor's note: According to vice president Richard Cummins, Writing Software International is finishing a ProDOS version of Bard's Pro-Am that requires only one disk drive and (at the Professional level) supports wide-carriage printing. Other planned upgrades include footnoting, a two-column newsletter format, and legal-sized page preview and line numbering.

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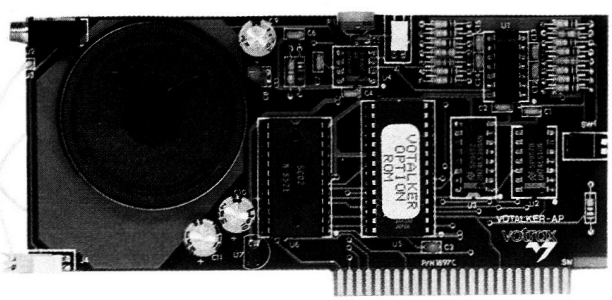

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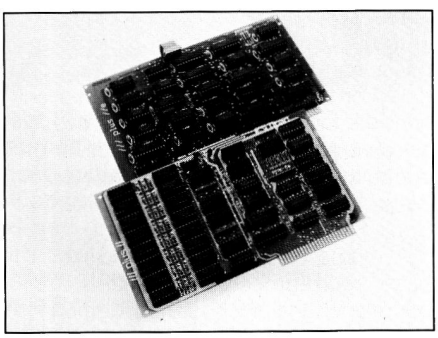

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Continued on p. 94.

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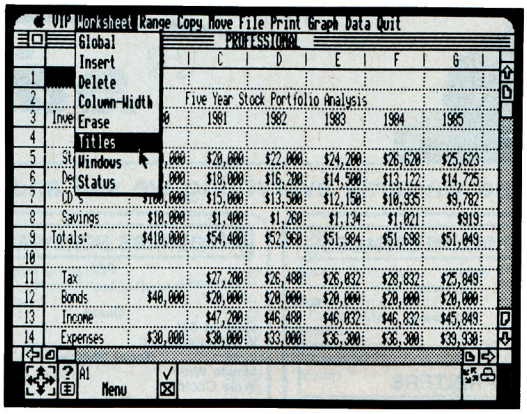

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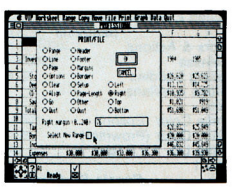
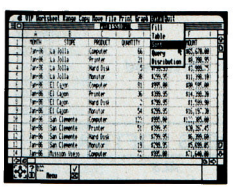
But Professional goes beyond Lotus, making it oh so easy to use—and even more powerful. Pull-down menus, dialogue boxes, mouse ranging, scads of icons, scroll bars, column "grabbers", grids—everything you need for ease of use, everything Lotus lacks. Plus, Professional adds things that were left out of Lotus, like a giant 8,192 row by 256 column spreadsheet, and the ability to use up to four megabytes of memory.





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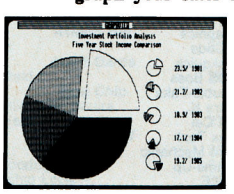

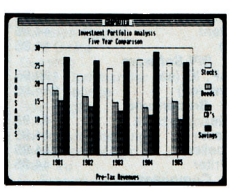

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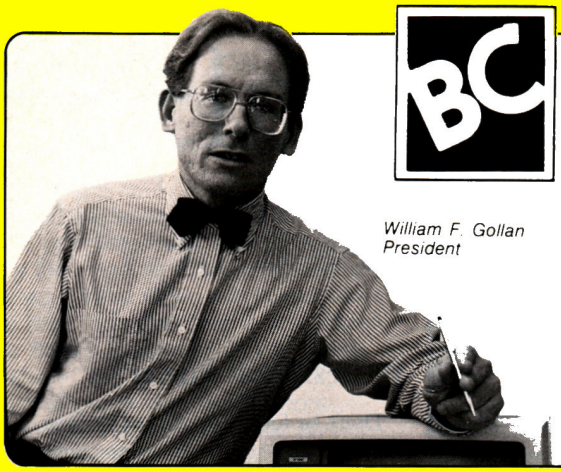

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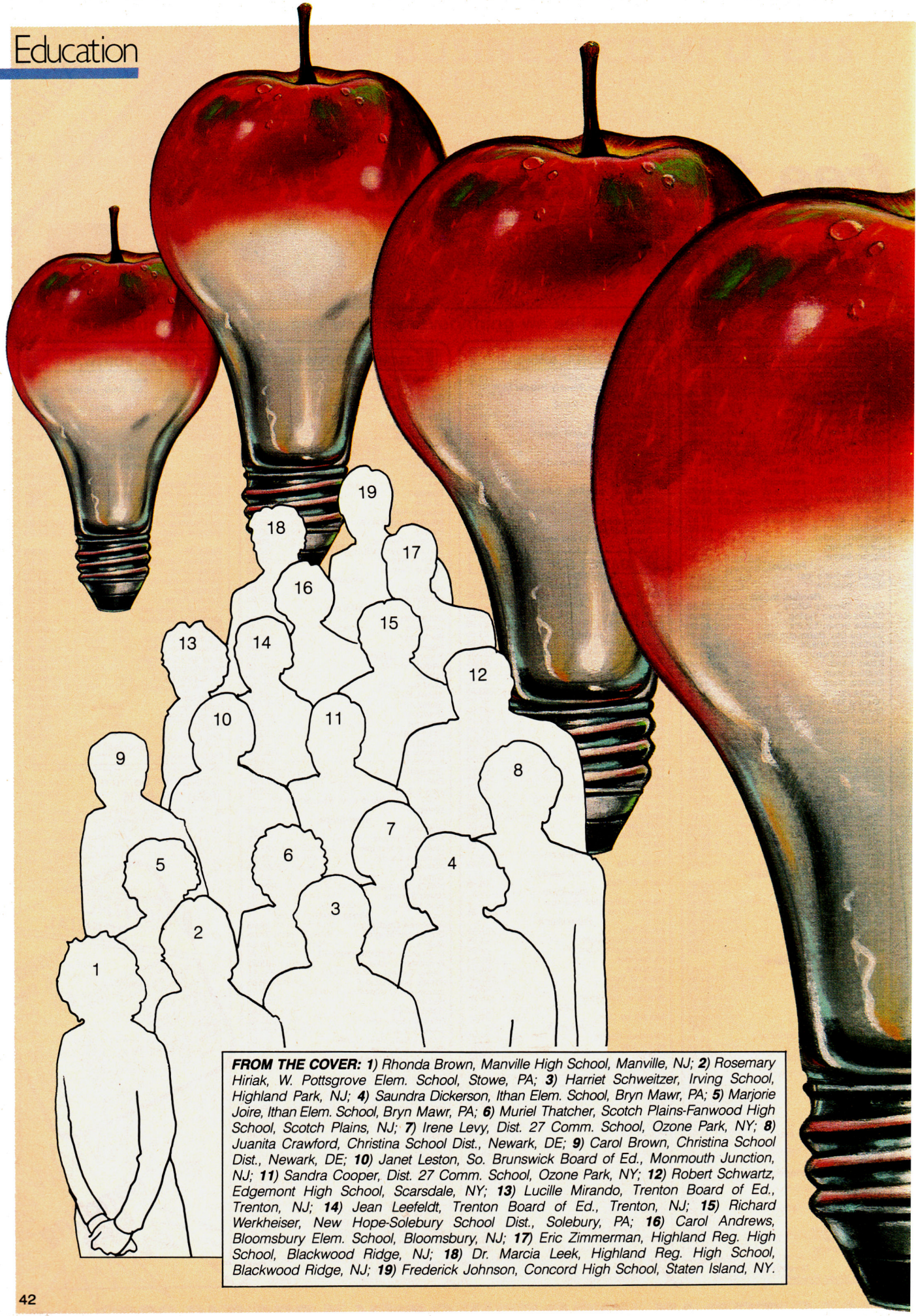

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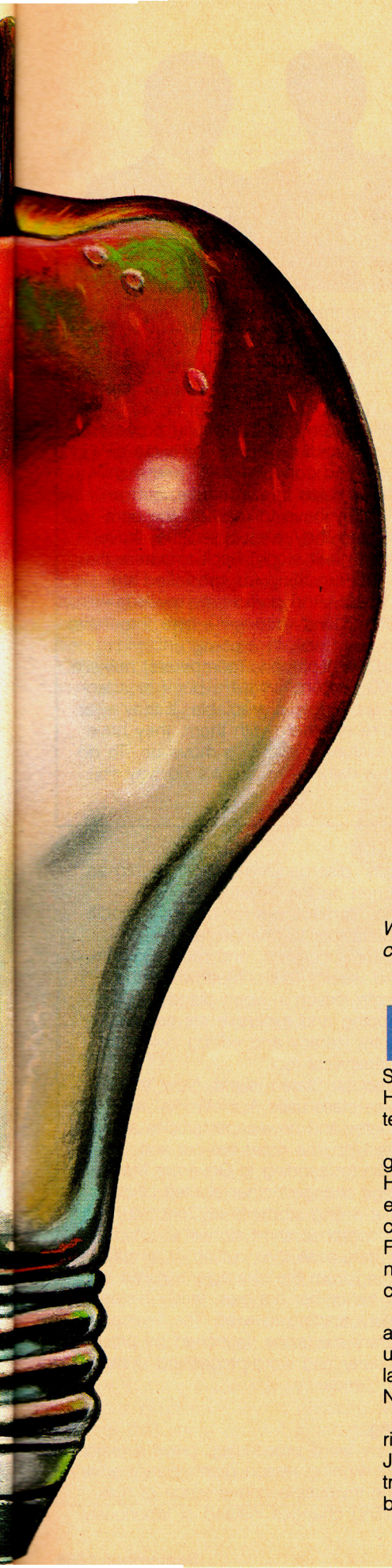

In every area of computing—from telecommunications to music to desktop publishing—teachers and students are coming up with lively, creative new ways to use Apple II's in the classroom.

TEACHERS' BEST: 16 WINNING IDEAS

by Eric Grevstad, *inCider* staff

We never really did drill and practice. My opinion is, if I'm going to sit at a computer for 45 minutes, it's got to be creative. —*Dorothy Johnson, teacher, The Wilson School, Mt. Lakes, NJ*

Kids at the West Pottsgrove Elementary School in Stowe, Pennsylvania, are passing notes in class—not to each other, but to students in New South Wales, Australia. Third-graders in Highland Park, New Jersey, have outgrown Stickybear ABC; they're shuffling files through AppleWorks' clipboard. At the New Hope-Solebury (Pennsylvania) Elementary School, a learning-disabled class mastered Newsroom well enough to teach the gifted and talented kids.

What's going on? Computers are coming out of computer rooms, the segregated housing for 75 percent of micros in U.S. schools (according to a Johns Hopkins study cited by Apple vice president Thomas Marano), and taking seats in everyday classrooms. Educational software has expanded to include "real" applications such as AppleWorks along with beginners' tools like Bank Street Writer. Finally, today's computing lessons are grass-roots ideas from teachers in all fields, not top-down dicta from school boards or technical experts. Computers are in more courses than ever, and classes are freer and more fun to boot.

Apple Computer sees these trends as cause for applause—to quote educational account executive Marlene Teichert, "[We want] to celebrate teachers who [are] using computers as tools, with application-type software, in the classroom on a regular basis." The first such Apple celebration drew nearly 800 teachers to Teaneck, New Jersey, on May 2 for a "Pacesetters' Symposium" on classroom computing.

Besides sharing ideas with each other, the teachers came to hear success stories: presentations of 19 Apple-selected lessons from schools in New York, New Jersey, Pennsylvania, and Delaware. Three winners used Macs in class, but the trusty Apple II accounted for 16, ranging from a Junior Achievement-style printing business to synthesizer riffs for a music class.

These ideas weren't theoretical suggestions, but ongoing projects—real applications being used by teachers and kids (by a lot of teachers and kids; Apple received entries from almost 100 school boards in the four states during its two-week talent hunt). *inCider* attended the symposium looking for something different from drill and practice, and found teachers taking more innovative steps than we'd imagined—and students sometimes running ahead of teachers. Here are sketches of the 16 Apple II-using pacesetters.

AppleWorks in Action

To many //e or //c owners, the phrase "application-type software" stands for AppleWorks. In Highland Park, New Jersey, according to Bartle School principal Ronald Erikson, the usually adult program has proven so popular that third-graders threatened to go on strike to get more than one computer for their classroom. Not only has AppleWorks made the writing process less painful, it's combined data-base and math theory and tracked kids' resolutions for behavior modification.

Project Tool/Chest, created at Highland Park's Irving Elementary (the project, the third grade, and Erikson moved to the Bartle School this year), begins as a writing workshop. Each student receives a data disk for revisions of a story first written by hand and typed (misspellings and all) into AppleWorks by an adult. The Sensible Speller program is available, but not for automatic corrections—kids paste its list of suspect words to their stories, then head for the dictionary to do their own spelling check.

Besides learning the convenience of word processing compared to manual editing—classroom posters list open-apple commands as equivalent to erasers or paste; the save command, copying a file to disk before further changes, is the "copying machine"—children use the clipboard to move their drafts' disorganized sentences into an outline, simultaneously open on the desktop.

Yakov Epstein, Harriet Schweitzer, Ronald Erikson, The Bartle School, Highland Park, NJ (Project Tool/Chest).

Ronald Erikson:

"We think we've found the way to make computers the kind of instrument everyone's dreamed of: [Just have it] in the room. You don't use the blackboard or the dictionary or the thesaurus all day, but it's there. Now the computer's there like anything else in the room when you need it. [And how the third-graders have responded] has been mind-boggling. It's been beyond our wildest dreams.

"When I was a kid, I might get 100 on a spelling test, but when I wrote a paper I'd get some of those same words wrong because it wasn't spelling [class. Now our students have] made that transition that what you learn in one area should be carried over into another. That's something we didn't teach; it's come about."

Mel Sonier, Linda Loughran, Richard Werkheiser, New Hope-Solebury Elementary School, Solebury, PA (Learning-Disabled Newsroom).

Richard Werkheiser:

"[My class] has really gotten into the writing process. Before it used to be just two-dimensional—give me a rough copy, give me a good copy. Now with so many steps—a beginning, many steps in the middle, and an end—[it's opened up]. They have to read on the computer and know which step they're at; when they have problems, they can [trace their steps] back to where they were before. That's a real big thing for special-ed students; they don't like to fail. And particularly my kids—they don't read well, they don't write well—here they have to do both.

"From the special-ed point of view, [computers] make a student concentrate 100 percent, where a book or a lecture doesn't—the kids are highly distractable. If they're at the computer and you're not there with them, they have to read and do it themselves in order to move on. To do something like that on a daily basis, there's no way you can't make progress."

Others use AppleWorks' spreadsheet for behavior modification, listing goals or behaviors to change, entering a "1" in the daily column for successes, and receiving a printout of their daily and weekly totals. Meanwhile, the data base supports a math lesson in Venn diagrams, the circular charts of overlapping and exclusive set contents. What began with computer literacy and editing skills has become an all-purpose analytical tool.

At Concord High School on Staten Island, New York, Frederick Johnson's civics class uses AppleWorks' word processor to transcribe notes and newspaper articles about air pollution. From the desktop, the notes are cut and pasted into a letter suitable for sending to Governor Mario Cuomo or (with mail-merge changes) other elected officials.

Michael Blyth's creative-writing students at Concord High also use AppleWorks to compose short stories about characters they create on a data-base-style outline or template: It lets them pick everything from the character's name, address, and hair color to his or her hobbies, family history, and religious beliefs before starting to write. The finished stories wind up in a literary magazine, launched by proud authors at a combined party and word-processing demonstration for parents and friends.

Beyond Word Processing

Writing, as enhanced by word processing, plays a major role in many of the prize-winning lesson plans. Every adult computer user knows the invaluable convenience of making quick, on-screen editing changes instead of laboriously

rewriting entire drafts. For children, teacher after teacher told *inCider*, word processing can make the difference between a creative pleasure and being turned off writing for life. In addition, word processors and printers are great equalizers: A child with poor handwriting or coordination can produce work that looks as good as the class valedictorian's, with a corresponding boost in self-esteem.

In Trenton, New Jersey, Mott Elementary first-graders divide their time between Lucille Mirando's language-arts class and Jean Leefeldt's computer center. After learning noun and verb structure from chalkboard exercises and flash cards, kids progress to typing their own sentences on a //e with Spinnaker Software's animated Story Machine.

Next, it's on to more vocabulary practice and longer sentences. Soon, students are creating pictures with Delta Drawing—first learning its cursor-movement commands by drawing letters of the alphabet—and using Bank Street Writer to type stories about them. The pictures and stories form a booklet for the classroom library.

New Jersey's Hopatcong Borough Schools adopted a "process-oriented" writing model in 1983: After choosing a topic and writing random ideas about it, seventh- through twelfth-graders progress to a formal outline, a rough draft, corrections, and a finished version. Created for composition paper, the process proved even better when Susan O'Banion, Lawrence Schroth, John Sissick, and Carol Ferreni adapted it for The Write Choice word processor.

From a stream-of-consciousness "idea chart," writers move to a chronological outline of topic sentences and ideas, which in turn is expanded with the insertion of supporting text. As headings are deleted, the computer file changes from an outline to a rough draft, then to a final one.

Sandra Cooper, Irene Levy, P.S. 215, Far Rockaway, NY (Electronic Pen Pals).

Irene Levy:

"The kids have taken to it beautifully. I have two Chinese children in my class who came in not speaking very much English, and now they're writing letters on the computer with everybody else. It's a terrific thing; I can't imagine not having a computer in my class again.

"There are a lot of differences between these children [and their pen pals], and so far it hasn't made any difference at all. [The other] class has more girls than boys; I thought that'd be a problem, but no one said, 'Yuck, I've got a girl pen pal.' I've got some kids in my class who are not great at discipline, and I've never had a problem with them when they're at the computer. They approach it with respect and treat each other with respect around it.

"I'm not saying that we couldn't do it without the computer, but it's made something that could have been a tedious experience into a pleasure. We are doing all the things that you'd do in a fourth-grade class, we have our curriculum and everything, but we are enriched by having this instrument in our class."

Jeff Hohman, Rosemary Hiriak, Chuck Forsythe, Holly Jobe, West Pottsgrove Elementary School, Stowe, PA (The Australian Connection).

Rosemary Hiriak:

"Most of [our] projects started out as reading or language-arts activities, where the computer was pulled in as an enhancement; they didn't start as word-processing activities. [Now, our district has] the lowest income per student in the county, but kids are just blossoming. We're producing writers I would not have imagined five years ago. We had two fifth-grade essay-contest winners, and the superintendent said, 'If it can happen at West Pottsgrove, it can happen anywhere.'

"Not only are our kids disadvantaged materially, but culturally, they don't know there's a world beyond Pottsgrove. It just flipped the kids out that [the Australians would] write to us and we'd get it the day before they sent it, that they were going on summer vacation at Christmas; it went from what we thought would be a kind of academic exchange to where the kids took over. They wanted to know what [the Australian kids] did at home, what clothes they wore, what music they listened to, and what they found was that they're a lot like us. Except Australia doesn't have Halloween, so they had their first Halloween party with us. We sent M&M's and they sent Smarties."

The Art of Writing

Writing is too important a skill to restrict to writing classes. Marjorie Joire and Saundra Dickerson's "Writing Across the Curriculum" project (Ithan Elementary, Bryn Mawr, Pennsylvania) encourages teachers to promote writing in all subjects—for example, to assign a compare-and-contrast essay instead of a fill-in-the-blanks quiz. For students, the project includes tricks to overcome blank-page anxiety for any topic, whether a fairy tale or a geography report.

While Joire and Dickerson use Magic Slate, their ideas work with any word processor. Here are some of their suggestions: To make students concentrate on their ideas instead of how their writing looks, try five minutes' brainstorming with the monitor turned off. Use editing commands to join columns of prefixes and root words, or to tie simple pairs ("Milk has calcium," "Calcium helps build bones and teeth") into complex sentences.

Children who hardly glance at textbook sentences pay close attention to search-and-replace puzzles, decoding text whose every *e* has become an asterisk. Creative writers are challenged by putting a story's first and last sentences at the top of the screen, with the cursor between "One day, Elizabeth looked out of the window" and "She

wondered whether Sarah would escape the shark." The assignment: to insert the body of the story, ending before the last sentence scrolls off the screen.

While the Ithan program stresses writing in all classes, Apples supply a specific cross-curricular link at Manville, New Jersey, High School, where computer coordinator Rhonda Brown has joined Linda Silvonek's English and Lucille Soffel's art classes. Silvonek's students, formerly unexcited at the prospect of writing poetry, are more enthusiastic and even willing to polish their poems at home when they get to type their final versions on a word processor—and when they know Soffel's students will see their work, illustrating the poems with Mouse Paint or another graphics program. The poems and pictures are exhibited in a prominent location such as the library.

Stop the Presses

What's better than different classes sharing their respective words and pictures? One class mixing graphics and text on a daily basis. Barbara Youngman's journalism students at Concord High on Staten Island use Springboard Software's Newsroom to produce a monthly school newspaper, complete with crossword puzzles created with Mindscape's Crossword Magic.

At New Hope-Solebury Elementary in Solebury, Pennsylvania, teacher Richard Werkheiser, assistant Linda Loughran, and principal Mel Sonier gave the school's first crack at Newsroom to a learning-disabled class. After studying newspaper concepts and terms, kids follow outline-style flow charts to write short articles, assembled with Newsroom graphics into *The New Hope News*. They also use Newsroom clip art to compile comic strips, and even share their expertise with another resource-room class and the school's gifted class in team-teaching workshops.

Carol Andrews' students at Bloomsbury (New Jersey) Elementary School are experts with Broderbund's Print Shop. In fact, they've formed "Fifth-Grade Enterprises," selling Print Shop-created notepaper, posters, greeting cards, and letterheads. Student customers appreciate the bargain prices (35 cents a card), but the young entrepreneurs have to learn business from the ground up: learning the software, choosing patterns and clip art to offer along with custom or personalized orders, designing a catalog, developing and market testing a mistake-proof order form, planning a distribution campaign, and remembering to include a new order form with each delivery.

Charting a Course

The Newsroom and Print Shop lessons illustrate a theme that runs through many of the Pacesetters' projects: Computer literacy (learning software or running a program) is a straightforward but secondary part of the classroom experience. The point is to produce a product with the computer, to promote teamwork, managerial or analytical skills, or self-esteem. The computer becomes a means instead of an end. To use the symposium's most popular noun, it's a tool to keep on hand, whose potential uses are kept in mind.

For instance, just as Ithan Elementary promotes writing across the curriculum, Scotch Plains-Fanwood High School (Scotch Plains, New Jersey) encourages applying Apple graphics to different courses. Arlene Marasco, Elinor Peter, and Manuel Cancella use PFS:Graph, Apple Logo, and the KoalaPad for a variety of projects, from plotting weather patterns in science class to graphing survey results from a marketing questionnaire or social-studies poll.

Art students visit the Metropolitan Museum of Art to study Islamic and primitive patterns, then use Logo to create their own. Other art students use the KoalaPad in an advanced drawing class, while a social-studies unit draws Koala diagrams of tombs and pyramids for their Egyptian Studies reports.

For more conventional computer graphics, visit the industrial-arts department at Scarsdale, New York's Edgemont High School. Since the mechanical-drawing class started too late to use computer instructor Kathleen Greenberg's purchase of T&W Systems' CAD (computer-aided design) software, shop teacher Robert Schwartz borrowed it for his students, who've hardly touched pencils or T-squares since. Regardless of their drawing skills, students can use the software, a mouse, and a plotter to design plastic or woodworking projects.

On-Line Adventures

Pen-pal letters to other schools are nothing new, but fourth-grade classes in Far Rockaway and Ozone Park, New York, trade letters via the Apple Modem. With a little help from computer coordinator Sandra Cooper, Irene Levy and Barbara Dubler's students find pen pals by matching interests or data-base entries (such as "Hobbies," "Pets," or "Favorite TV Program") on PFS:File disks sent between schools. Once correspondents are paired up, they leave messages on the school district's bulletin board—mastering data-base, word-processing, and telecommunications work while comparing notes on bikes, cats, and He-Man.

If that's not impressive enough, consider that Ozone Park's P.S. 64Q is primarily white and middle-class, while Far Rockaway's P.S. 215 is mostly black and Hispanic—but, as Dubler says, "In [the kids'] letters they have the same interests. They're developing friendships, they're very excited to meet each other. That's one thing I see [again and again] in the letters—'I really want to meet you,' 'Can you call me?', 'Can we keep in touch?' " When *inCider* called after the symposium, the two classes were planning a party together, meeting to celebrate eight months' correspondence and the end of the school year.

In Monmouth Junction, New Jersey, schools are taking even greater advantage of telecommunications. According to coordinator Marylu Simon, there's an Apple with a modem in the library of each school in the South Brunswick School District—five elementary, one middle, and one high school, plus several more in individual classrooms. The district specializes in on-line data-base work, accessing information from Dow Jones News/Retrieval; a high-school chemistry class scans the science news instead of a dull periodic table to learn about elements and their uses, while elementary language-arts students study movie reviews for examples of critical thinking, evaluation, and bias.

At Stowe, Pennsylvania's West Pottsgrove Elementary School, principal Jeffry Hohman, reading coordinator Rosemary Hiriak, and computer specialist Holly Jobe use everything from Magic Slate to AppleWorks for lessons similar to those described above: alphabet practice, stories illustrated with Print Shop graphics for a classroom booklet, a school newspaper, or a story on disk passed from one school's third-graders to another, each class adding a paragraph.

But West Pottsgrove's most ambitious project is "the Australian connection"—14 talented fourth- and fifth-graders, sending letters via The Source and Telenet to a

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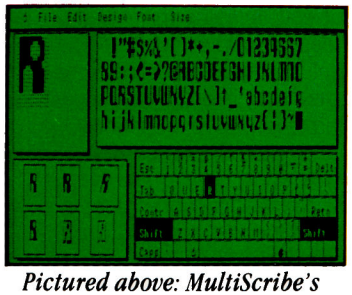

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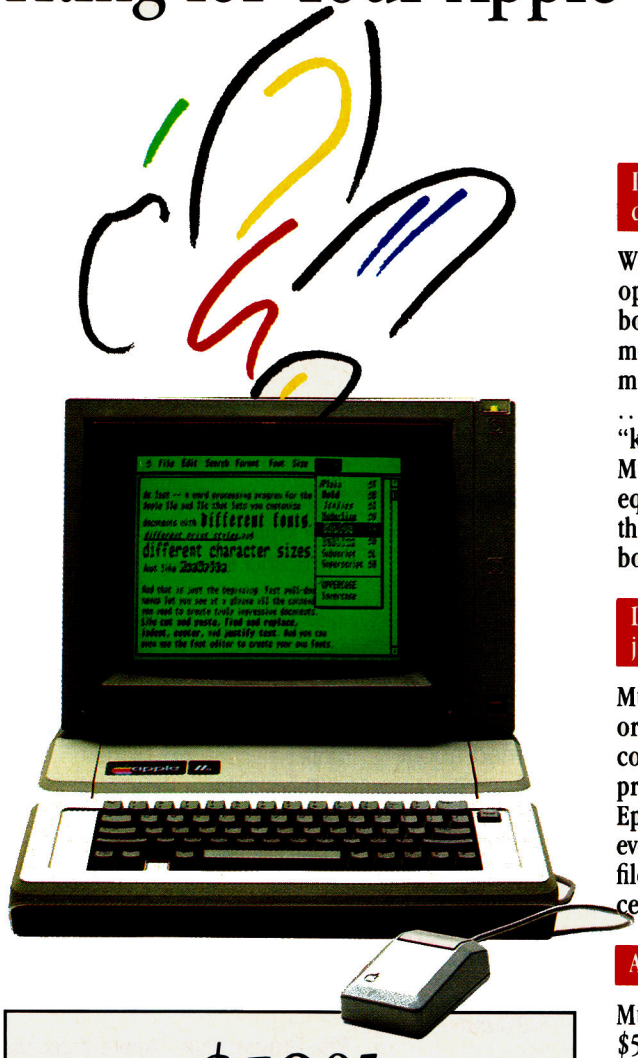

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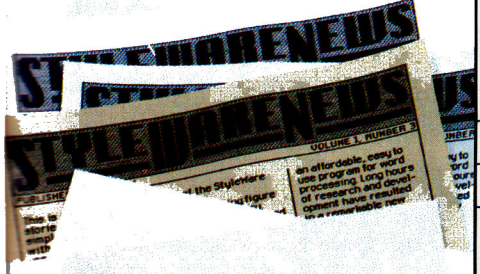

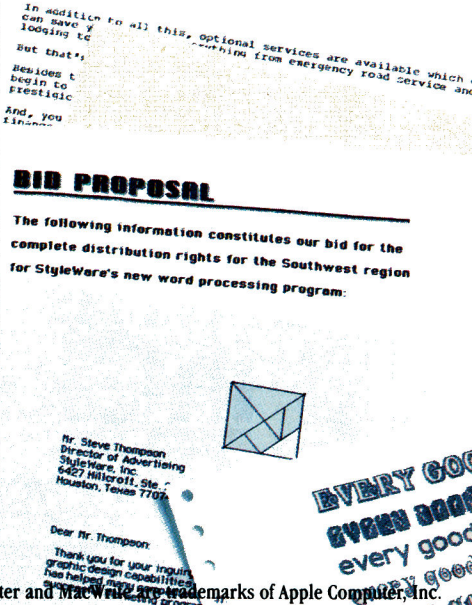

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school in New South Wales. To minimize connect charges, files are written ahead of time rather than typed interactively or on line (the Aussies are asleep during U.S. school hours anyway). According to Hohman, even the traditional introductions get kids thinking cross-culturally: "My name is Bill and I'm five feet two inches"; "My name is Paul and I'm 160 centimeters."

Music, Science, Mind Expansion

Besides connecting to other Apples, the //e can connect to a six-voice Roland CMU-800 music synthesizer. Juanita Crawford, music teacher at the John R. Downes School in Newark, Delaware, uses hers to accompany first- through third-graders. She plays the bass line to their melody, and patiently loops through a tune to help them sing rounds, or plays different parts on different channels.

Besides easing her orchestration ("I've done this before and I've had to have eight arms"), Crawford says the //e and synthesizer have genuinely helped kids' performance: "The instrumental groups play better, they feel the beat better—[the Roland] will go as slowly as they need to to learn. The children have better intonation, a better key feeling; they carry the tune better and their voice quality has improved."

If all these innovative applications make you think no one teaches programming any more, visit Joan Kahn, Margo Wolfson, and John Yeakley of the Science/Engineering Specialized Learning Center in the Freehold Regional High School District (Englishtown, New Jersey). Their biology simulation, "Was Mendel Right?", gives students the necessary mathematical formulae and challenges them to write Pascal programs to calculate standard deviation and chi-square statistics for testing Mendel's genetic laws. That done, students use a genetics program from COMPress Software to simulate hundreds of generations' cross-breeding and find where the 19th-century botanist's observations do and don't match today's knowledge of chromosomes and crossovers.

Programming also plays a part in teacher Eric Zimmerman and science supervisor Marcia Leek's "Holistic Teaching" project, although learning the basics of Applesoft is only part of the Highland Regional High School (Blackwood Ridge, New Jersey) course titled Science Exploration. Students also try everything from Typing Tutor II to AppleWorks, PFS:File, and math and chemistry software in the process of fulfilling myriad assignments.

Writing assignments include an essay on computer applications or careers, a laboratory report, and a scientific-research report; a timed typing exercise makes sure students' word-processing skills are up to snuff. There are also critical-thinking exercises, mathematical and graphing tasks, and scientific work such as lab-interface data collection for spreadsheet presentation. By term's end, students have been exposed to almost every aspect of the scientific method—and become pretty fair Apple applications users as well.

Overall, that's the impression *inCider* took away from the Pacesetters' Symposium: Not only are teachers coming up with more original ideas, but kids are eagerly keeping up with adult-level applications. Between that and Apple's renewed dedication to a market it once seemed to take for granted, anyone who thinks classroom computing is dull these days should go back to school. ■

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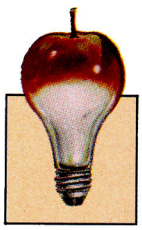


Each new academic year brings a fresh challenge to the school administrator: how to scale a veritable Mount Everest of data. Keeping track of students generates volumes of paperwork. Each student must be tracked for daily attendance, scheduled into a class, assigned to a bus route, graded, evaluated, and channeled into the proper curriculum. Books must be purchased and inventoried, the science-club budget managed, and teachers paid. Likewise, teachers must be monitored according to work load, sick leave, employee performance, and special curricular and extracurricular activities.

Traditionally, this information was stashed away on the regional or county mainframe, where local school administrators couldn't find it or use it. Thus, like their counterparts in commerce, educational administrators are turning to personal computing as a way to harness the power of timely information. Like other managers, school principals want to see graphs, charts, and reports that accurately depict the state of affairs in their spheres of authority.

An ample supply of software awaits the administrator who has chosen to run his or her office using the Apple II. More than 100 programs specially tailored to the needs of the school office, and at least 70 packages that fall within the category of general administrative software—accounting programs, word processors, spreadsheets, database managers, and so on—are available, according to *Swift's Educational Software Directory 1984–5* (Apple II edition). (This guide will not be published this year, however.)

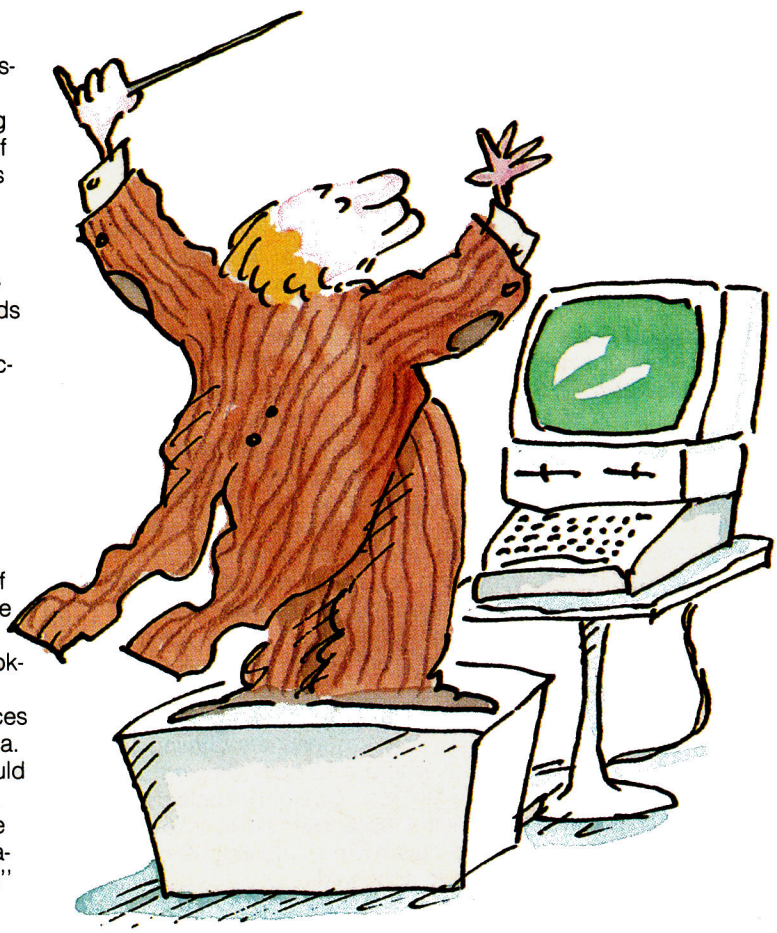
Other resources for finding administrative and educational software include the EPIE Institute's *Educational Software Selector*, the Teachers' College Press, and organizations such as Trade Service Publications, Inc., of San Diego, which provides program evaluations. (See the Product Information box on p. 70 for details.)

Perhaps the best place for an administrator to start looking for software is to talk to colleagues, suggests Violet Hakola, coordinator of the administrative computer services of the Mounds View School District in St. Paul, Minnesota.

"The person who wants to computerize his office should start by talking to a school district that's been through it already, which is not to say he should blindly follow what he hears," Hakola notes. "The administrator should merely analyze, research, and review as much information as possible."

Hakola's district has six Apple //e's installed in school libraries, where they're used in conjunction with Corvus hard disks. The libraries, two at secondary schools and four at elementary sites, use Winnebago's Library Circulation Systems software to maintain book inventories and monitor student checkouts. The software is used with a bar-code reader, which saves a lot of time. It's one of the main reasons the district selected the Winnebago package, according to Hakola. It also chose this software because it generates year-end inventory reports, she says.

Another eight Apple //e systems are used in administrative offices at three secondary and five elementary schools to run the Minnesota Educational Computing Corporation's



An array of specialized and general-business software products for the Apple II can help the busy school administrator manage scheduling, inventory, recordkeeping, and budgeting.

Student Record Keeping and Student Attendance modules. The software has eased the headache of tracking and reporting the attendance activities of 2000 students, then compiling that information into a format for state reporting, Hakola says.

She adds that plans are underway to add M.E.C.C.'s class-scheduling software next year, but on a more powerful system than the Apple //e. "We tried using a scheduling package on the Apple II, but it was just too slow for handling so many kids," she says.

Priming for Performance

One way to reduce disk-access time and thus speed throughput on the Apple is to add a memory-expansion card, as Kirk R. Lewis, dean of the Community Educational Services division of the Riverside Unified School District, of Riverside, California, discovered. Lewis fortified two of his ten Apple //e's with AST SprintDisk cards, which can ultimately be upgraded to 2 megabytes of memory per card. These AST memory upgrades have reduced the time staff members spend on report generation with PFS:Report from an hour and 15 minutes to 45 minutes.

Lewis has also increased the efficiency of his office by adding networking capabilities. Networking lets the staff share large data files and handle them in a more timely fashion than floppy-disk storage permits. His ten Apple //e's are on a Corvus network with two 20-megabyte Corvus hard disks.

Lewis was prompted to investigate networking when six staff members needed to share identical data on a rapidly growing student population—which blossomed from 66 enrollees in the 1983-84 school year to its current 380 members. He explains that he decided to install a network a year ago when his staff complained of being "overwhelmed" by the challenge of locating student files on three separate floppy disks.

At the same time, teachers in different rooms often needed access to the same information, he says. And, of course, the master floppies and extra sets had to be updated nightly with new additions.

"Networking has been the right answer for us, particularly since we work in different rooms and frequently need to look at the same records," Lewis says.

Although a great deal of software tailored for school administrators is available, Lewis prefers AppleWorks and the PFS:Write, File, Graph, and Report series for running the business of his office. He and his staff use these programs to process attendance information, transcript data, program evaluations, and assorted student records. "I like the flexibility of more generic software," Lewis states.

Lewis relates that computerization has done more than speed up tedious recordkeeping: It has given him the ability to examine trends and make correlations that would be otherwise impossible. For example, using PFS:File, Report, and Graph, he searched for performance data on his students. He used this information to develop a graph he could share with other staff members.

The evaluation revealed that regardless of current grade classification, many of the students corresponded to an eighth-grade achievement level. The data were essential in helping him plan curriculum needs for the coming school year, he says.

Customized Answers

Like Kirk Lewis, principal Earl Torris of Ontario High School in Ontario, Oregon, gives high marks to general-

Apple II's in Education

If the long-awaited 16-bit Apple II comes to market this month, Apple loyalists will have the powerful machine they want for crunching out business applications. But in the meantime, the trusty old 8-bit Apple II can still solve many an administrator's computing problems.

The success of that Apple II solution, though, will depend on your workload, support needs, and the amount of money you're willing to spend. In general, the II is most successful in elementary or small- to medium-sized secondary-school offices managing up to 1200 students, according to Apple Computer and users in education. School offices in that size range tend to not exceed the processing limitations, they say.

Moreover, the II can be expanded to meet greater processing needs. Apple recommends adding an internal memory card, accelerator card, and a hard disk. The internal memory will act as a RAM disk to load data faster or will provide a larger desktop for software such as AppleWorks; the accelerator card will speed up the microprocessor; and the hard disk will provide more storage and faster loading than a floppy. A hard disk also frees the user from the aggravation of loading, changing, switching, and swapping floppy disks.

Some of the more popular hard disks for Apple are Apple's own ProFile, the Quark QC10 and QC20, and The Sider in 10- and 20-megabyte versions. (For additional ideas on hard disks, see "Hard-Driving Disks" in *inCider*'s September 1985 issue, p. 24.) Titan Industries makes an accelerator card that it says speeds up your processor by a factor of three to four; Apple, AST Research, Applied Engineering, and Checkmate Technology all make memory-expansion products that receive generally high ratings (see "Two Roads to Memory Expansion" and "Four Leading Choices," August 1986, pp. 46 and 54).

If price is your chief consideration, the Apple //e is an attractive choice for the school office, according to Samuel J. Agronow, a research associate at Riverside Unified School District in Riverside, California. Apple's strategy is to provide a cost-effective solution, according to Betsy Pace, Apple's K–12 education marketing manager. Apple sells its //e Administrative System bundle for less than $2000, including a 128K //e, two disk drives (a 5¼-inch and 3½-inch with Catalyst), 256K memory-expansion card, monitor, and ImageWriter printer.

Given the large installed base of Apples in K–12 classrooms, an added bonus for the school administrator is the ready source of skilled on-site support he or she is likely to find in the computer-lab teacher or a local computer buff, says Kirk R. Lewis, dean of the Community Educational Services division of the Riverside Unified School District. The large installed base of Apples might also appeal to an administrator who wants to share data among computers or make data collection easier since so many classrooms use the Apple II already, Lewis notes.

Administrators planning to enhance their systems might seize the opportunity to learn from others who can help them avoid costly mistakes. In addition to contacting colleagues who have already automated their organizations, a good way to locate experienced users is to log on to the Microcomputer-networked Apple User Group (MAUG) or visit a local computer club. Those not yet members of Apple user groups can contact International Apple Core in Santa Clara, California, at (408) 727-7652 for a listing of clubs in their areas.□

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purpose software and relates that AppleWorks, Bank Street Writer, and The Print Shop are popular items among his staff members for word processing, inventory management, and school-budget reporting.

Torris' office is equipped with four 128K Apple //e's to keep up with the paperwork demands of the 600 students who attend the school. Unlike Lewis, though, Torris uses specialized software to handle the bulk of his class scheduling, grading, and daily-attendance records. The HARTS III School Administrative System on which Torris relies is an integrated package offering scheduling, grade-reporting, enrollment, letter-writing, and attendance-reporting modules.

"With the HARTS system, we have transformed our office from a somewhat messy, 'hit-or-miss' operation into a cleaner, more businesslike environment," says Torris. "We've been able to eliminate many human errors and to cut down dramatically on our clerical time."

For instance, Torris says it used to take a clerk and an aide a half-hour every day to mark attendance records. Now that task is completed in five minutes.

Other significant time saving has been in the area of class scheduling. Torris explains he used to start preparing class schedules for the next school year at the end of February. The information had to be put on cards, batched, and sent to a computer company. It was usually well into the summer before this information came back to the school office. Now Torris can complete all his scheduling in April, a procedure that's not only faster, but gives him more control over the process.

"I wouldn't know how to translate our productivity improvements into dollars," says Torris, "but the time saving has been fantastic."

Torris likes the concept of "one-stop shopping" behind the HARTS system, particularly its ability to share data easily among its five modules. He also cites excellent support from the vendor. His only serious complaint is the excessive disk swapping required to execute the program. The vendor doesn't intend to address that problem by adding a hard-disk option, though, because floppies pose less of a danger of system downtime than a hard drive, according to a company spokesman.

Since the HARTS III system can operate with a minimum amount of hardware—a 48K Apple computer, two floppy-disk drives, and a printer—Torris reports he hasn't felt constricted by the processor limitations of his Apple systems. In fact, he says, his staff hasn't yet tapped the full potential of the four office machines.

The Right Solution

The experiences of these three administrators illustrate that the Apple II can be the right answer for school offices that handle small or moderately-sized student bodies and need a cost-effective means of automating their operations. Yet, the 65C02 processor may be too slow when data demands grow beyond a certain point. Meanwhile, as data files expand, administrators can take intermediate steps, such as adding a hard disk, enhancing their systems with memory-expansion and accelerator cards, and going to a networking solution to share identical data among many users.

As long as the administrator's "horsepower" requirements are within the range of the Apple //e, and the school principal has done his or her homework to clearly define business needs, the Apple II can be an appropriate, cost-effective solution for bringing greater order and efficiency to the school office. ■

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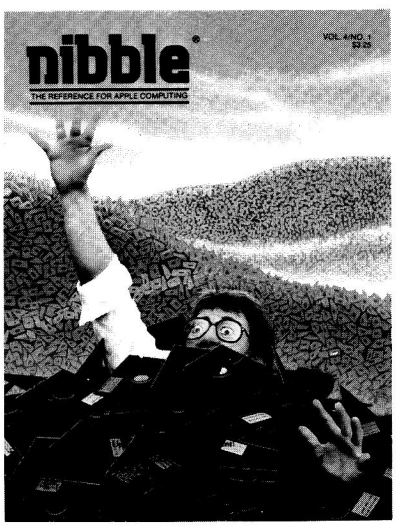

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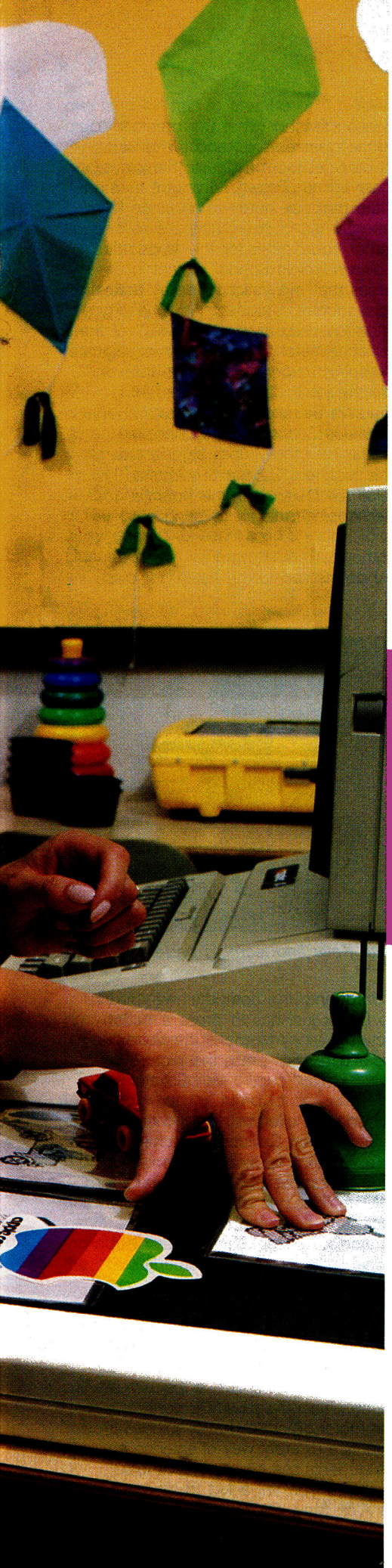
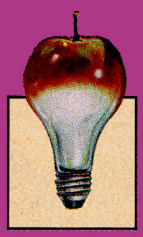
For special-needs students at any level, Apple II's can mean the difference between apathy and a new motivation to learn.

Derek and teacher Susan Van Splinter work on improving Derek's verbal skills with the help of an Apple //e, Chalk Board's PowerPad (see inset above), and the Votrax speech synthesizer.



TAPPING THE POTENTIAL OF SPECIAL-NEEDS STUDENTS

by Lafe Low, *inCider* staff



Brian has experienced many of the problems associated with special-education students. He was very withdrawn and often didn't even come to school. His emotional disturbances had led to unsuccessful early school years, so when he said he wanted to work with the Apple //e's his school (the Cape May County School for Special Services) had recently received, he was sent to Ruth Brown's classroom.

He sat down with the computer and a manual and "just took off from there," according to his teacher. Brian slowly came out of his shell. He began to express his feelings through the stories he wrote and his intelligence through BASIC programming. His ability to interact with others and his class attendance improved dramatically. Within about six months, it was recommended that he return to the public school's computer class for an hour a day.

Brian's progress was "just amazing," Brown says. "He had the immediacy of the machine, he didn't have to interact on a personal level, and he was getting all this positive reinforcement." Whenever he switched classes, the other students would ask him what he was doing in the public school's computer section, Brown adds. "It built his ego right up. He's been a real success story."

A New Sense of Pride

For Brian and many special-needs students like him, using a computer means the difference between remaining an outsider and becoming a participating member of the class. For instance, computers can remove certain physical barriers, such as the need to hold a pencil, that may hold kids back. With a computer, a special student can print material that looks just like everyone else's, regardless of physical limitations.

Through the computer, many special-education students can overcome the handicaps that keep them from expressing their creativity and intelligence. They often experience a new pride in their work, greater motivation, and remarkable progress in learning.

The computer also makes the teacher's job easier. Assignments can be tailored quickly to meet a range of student needs, and progress can be monitored more closely.

As a result, the computer helps further the concept of *mainstreaming*—integrating special-needs students into a classroom of regular students. Donald Brady, a teacher at Highlands Elementary School in Highlands, New Jersey, says, "For the first time, the special-needs kids' handicaps become less visible."

Special Success

Mary Lou Purpura, an English teacher at the H.B. Whitehorne Middle School in Verona, New Jersey, uses Apple //e's in her classroom for both mainstreamed and regular students. The success of two of her special students is typical of what can be accomplished when computers become part of the classroom.

One boy was "almost incorrigible" and spent more time out of class than in, Purpura reports. Once he began working with the computers in her English section, though, he became "very proficient." With programs like Broderbund's Print Shop, he made signs and banners for bulletin boards and for teachers with whom he had previously had many problems. "He was so pleased with himself," Purpura observes.

One young multiply handicapped girl at the same school was frustrated in her desire to work on the school newspaper because her perceptual and physical disabilities kept her from contributing legibly written material. Using a computer, she has become an accepted staff member. "I really don't think that without the use of the word processor, they'd have any respect for what she does," Purpura says.

For one recent article, she interviewed the chairman of Whitehorne's science department. She then used Bank Street Writer, a word-processing program, to put her information together, and the school paper published the story. Now she attends staff brainstorming meetings, and even selects her own article assignments. "It's let her be involved in something," Purpura notes. "It's been a wonderful experience for her."

Using a word processor gives special-education students protection from embarrassment and other children's criticism. "It has a way of equalizing a product. Somehow it looks professional," Purpura says.

Alex May, a teacher in Millville, New Jersey, had a mainstreamed student in his classroom for six weeks before he even realized it. "She kept right up with all the other students," he says. "When I found out this young lady was classified, I tried to keep an eye on her. I think she's built up her own self-esteem because she's been so successful in using this machine."

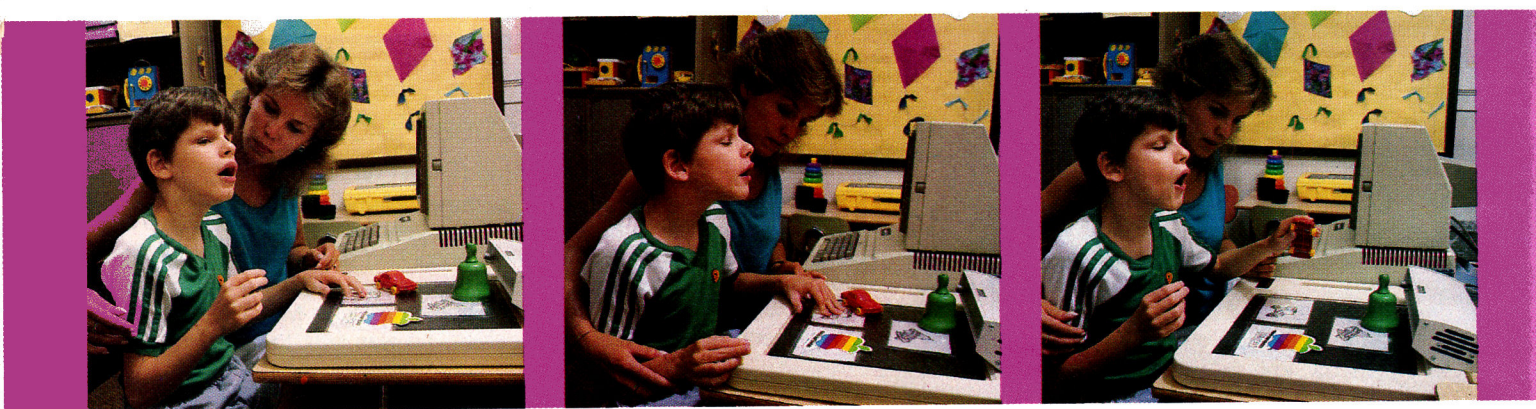
Motivation

Ask any special-education teacher what the greatest benefit of a computer in a classroom is, and the answer will be *motivation*. "If I can get them in there [her classroom] once or twice," says Ruth Brown, "I've got them hooked. That's our whole purpose here—to motivate kids to want to come to school."

Richard Sutor, computer coordinator for the Appoquinimink (pronounced *ap-o-kwin-i-mink*) School District in Odessa, Delaware, agrees that motivation is a key factor in the success of special-education students, but he urges educators to examine the "novelty and uniqueness" of the computer. He warns teachers "not to bank on the magical lure" of the machine keeping students interested forever. "The content has to do the job," Sutor observes.

Derek is a primarily nonverbal student in Susan Van Splinter's class at the Perkins School for the Blind in Watertown, Massachusetts. He mostly uses sign language to communicate, but his teachers wanted to stimulate his speech. Van Splinter also felt Derek had the potential to speak, so she used her Apple //e to try to bring out that ability.

A Votrax speech synthesizer and PowerPad (a large, square input tablet) are connected to the //e in her classroom. She programs words into the computer with Touch 'n' Speak software, so Derek just has to press a button on the PowerPad's picture overlay to make the Votrax say the word. "If he wants a cup, he'll press the picture of the cup, and the Votrax will say 'cup,' " Van Splinter explains.



At the Perkins School in Watertown, Massachusetts, students like Derek and his classmate Katie find learning easier thanks to the Apple //e.

The computer has been very effective as a "motivator and reinforcer," according to Van Splinter. With the //e and the Votrax, the variety of Derek's speech has gone from essentially nonexistent to a number of simple sentences. "He'll say things like 'More juice,' which for Derek is a lot," she reports.

Students like Derek, who have something to say but can't because of physical limitations, show remarkable growth with classroom computers. "The computer can help lessen or remove some of these communication barriers. It creates a new avenue of expression," Sutor says.

For other students, it's not speaking but writing that's difficult. Some students find that "a paper-and-pencil task presents an obstacle," says Phyllis Taistra, a teacher at Whitehorne Middle School, where Mary Lou Purpura also works. In cases in which motor difficulties have inhibited progress, the computer presents a different way of entering answers, so special-needs students see it as an easier task.

"You run into a real wall if you tell a kid to retype a ten-page paper," says Alex May. "If it's a ten-page file on

disk and he has to change only a few paragraphs, he's much more willing to try to make it perfect."

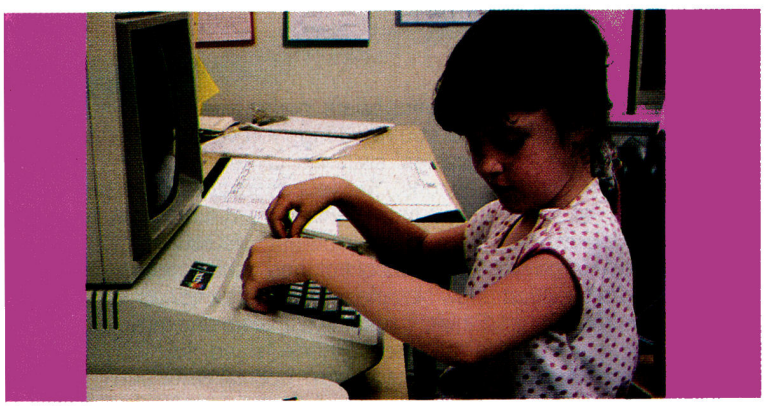
And when the product looks good, it encourages students to work at making their stories and essays longer. "The kids you can't get to put ten words together with a pen will go on and write three paragraphs with the machine. It keeps their attention much longer than we [teachers] can," Purpura adds.

Individual Attention

Not only is the computer a tool that gives the special-education student immediate benefits, but it also helps teachers focus on each student's particular requirements.

One of the best things about computers, according to May, is that they can provide for individual needs. For instance, May can easily prepare differentiated assignments. When he prints a set of easy, moderate, and difficult versions and passes them out to his students, they all look alike. "They [the students] aren't unaware, but it's not blatantly obvious that there's a hard one and an easy one."

The curriculum at Highlands Elementary School is specially geared to each child's instructional level. Teacher Donald Brady, who prepares fourth-, fifth-, and sixth-graders for mainstreaming in seventh grade, looks at each



child's learning profile to make an individual educational prescription.

Brady's computers seemingly allow him an extra set of hands when working with his special-education students. "They have audible cues," he says of his Apple //e's, "so I can do what I'm hired to do, which is sit with the child and give individual instruction." If he hears a student making a number of mistakes, he knows he needs to spend more time with that child.

These educators and their colleagues have found the computer a most promising tool for special-education students and teachers. Increased motivation and the time for individual instruction the computer affords have enriched the education of special-needs students.

"When I first started using a computer, I was a little afraid of it, as a lot of teachers are," says Phyllis Taistra, "but the more I used it, the more I realized it really could be very valuable."

And, as Ruth Brown points out, a newfound sense of self-esteem is the Apple II's unique contribution to special-needs students: "Because they're working with computers, they think they're smarter." ■

Product information for education features on p. 70.

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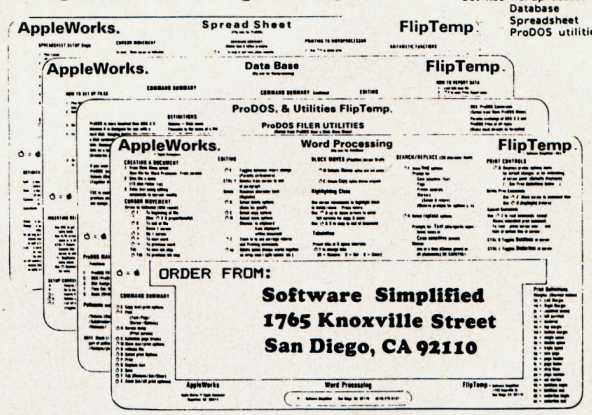

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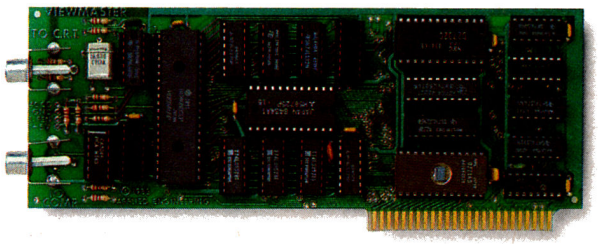

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OMNIVISION		✓					✓	✓	
VIEWMAX 80	✓	✓			✓			✓	
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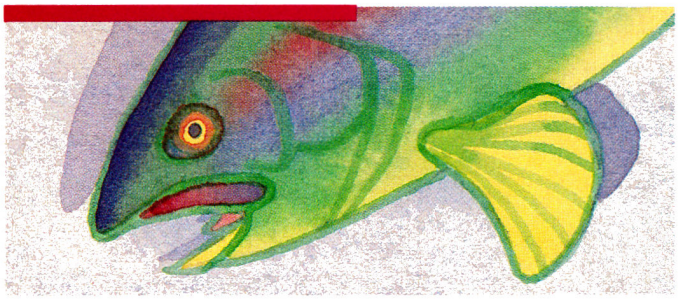

before the first dedicated gradebook program appeared on the scene. When it did, he stayed with his spreadsheet program because he found it more flexible.

The business of science is numbers. And spreadsheets handle numbers the way word processors handle words. For her master's-degree thesis project, Frances Lonardo, a graduate student at the University of Rhode Island, raised rainbow trout in tanks. She fed them various dietary supplements to improve their size and appearance. Both characteristics are important to gourmet restaurants that serve seafood.

She kept data in a standard laboratory notebook (fish farms can be tough on computer hardware). When it came time to determine if her volumes of data had any significance, Frances turned to VisiCalc Advanced and an Apple //e to quickly and easily perform the statistical analysis.

On the home front, students use spreadsheet programs to budget allowances, keep track of science-fair projects, and tally payments from paper-route customers.

When kids aren't using the household Apple, parents boot up spreadsheet programs to design family budgets, monitor tax-deductible expenses, and manage club and organization accounts.

Investors, whether full-time or part-time, use spreadsheet programs to play what-if with real estate, stocks, postage stamps, and pork bellies. Some investment clubs use preconfigured files called templates that work with programs such as VisiCalc. These templates have most labels and formulas already built in. All you do is type in pertinent information at the prompts. Many users, like electrician Richard Ethier, create their own templates.

Spreadsheets can be productive additions to a small business. Not only can you prepare estimates, but you can also track income and expenses without purchasing an expensive accounting program. It's a snap to run off a copy of your spreadsheet *anytime* your accountant asks for one. One independent heating contractor in Fall River, Massachusetts, uses Magicalc and an Apple II Plus to get a grip on his bookkeeping chores.

While it may not be practical to set up an Apple and AppleWorks or SuperCalc3a next to a cash register, an electronic spreadsheet can do wonders for retailers. For instance, the proprietor of The Smoky Gazette, a newsstand in Providence, Rhode Island, wanted to keep track of the literally hundreds of magazines she sold when she learned that certain publishers give store owners royalties, in addition to the usual retail markup. To collect, she needed documentation, and VisiCalc provided it.

What's on the Shelves

Although the veteran spreadsheet program VisiCalc is no longer available, at least five other software packages fill the void: Magicalc, AppleWorks, SuperCalc3a, Mouse Calc, and PFS:Plan. Regardless of the hardware you have, the interface you like, and the features you need, at least one of these programs can give an immediate boost to your personal-computing power. (See the accompanying Product Information box for details on manufacturers

and prices; check the **Table** for *inCider*'s ratings for each product.)

Anatomy of a Spreadsheet

When it comes to spreadsheets, the old saying, "If you've seen one, you've seen them all," generally applies. Most spreadsheet programs are so much like their progenitor, VisiCalc, that we refer to them as Visi-clones. The computer screen is divided into cells lined up in columns. Usually each spreadsheet can hold 63 columns and 254 rows. Each cell is named with a coordinate, such as A1 (the upper left-hand cell) or D5 (the fifth cell under the fourth column). You type labels (words), values (numbers), or formulas (mathematical expressions) into the cells.

Magicalc, the AppleWorks spreadsheet, SuperCalc3a, and Mouse Calc might all be considered Visi-clones. The first three programs require you to memorize some commands and use the keyboard at all times. Mouse Calc, with its pull-down menus, scrolling elevators, and mouse input is Macintosh-like in operation and requires little memorization.

The most avant-garde of the spreadsheet programs I've used is PFS:Plan. You don't see the usual "all-purpose" individual cells on screen. Instead, the display is divided into distinct "regions," where you enter values, column and row headings, or formulas. You don't type formulas using cell coordinates as you would in a Visi-clone. Instead, you type in formulas that use English-language words. The expression "@SUM(A1...A24)" in a clone might be expressed as "@TOTAL SALES" in PFS:Plan.

Fools Rush In...

At $100 and up, you probably don't want to be impulsive about purchasing a spreadsheet program. Before you select the one that's best for you, you have to consider the hardware you have, what you want to do with the program now, and what you might use the program for later on. The following are some areas to consider to help ensure that your investment in a spreadsheet program pays off.

Hardware

You don't have to own the latest and greatest Apple hardware to find a good spreadsheet program. The DOS 3.3 version of Magicalc runs fine on a 48K Apple II Plus. Artsci, Magicalc's publisher, has played a software trick that lets you see an almost 80-column display (actually, it's 70) without an 80-column card.

If you have a 64K Apple //e, you could also choose the ProDOS version of Magicalc or the AppleWorks spreadsheet. If your computer is a //c or 128K //e, your range of options widens: You could select Mouse Calc or PFS:Plan. Only SuperCalc3a requires that your //e be enhanced with the 65C02 chip, the one built into the //c.

None of the spreadsheet programs reviewed here requires two drives, but life is a lot easier if you have two. Most programs, like PFS:Plan and Magicalc, use the second as a data drive.

AppleWorks, Mouse Calc, and the ProDOS version of PFS:Plan are provided in 5¼-inch and 3½-inch formats and are compatible with Apple's UniDisk 3.5. SuperCalc3a, an-

Table. Product ratings for five Apple II spreadsheets.

	Magicalc	Mouse Calc	SuperCalc3a	PFS:Plan	AppleWorks
Ease of learning	■■	■■■■	■■	■■■	■■■
Ease of use	■■	■■■■	■■	■■■	■■
Documentation	■■	■■■	■■■■	■■	■■■■
Support	■■	■■■	■■■	■	■■■
Overall	■■	■■■	■■■	■■	■■■

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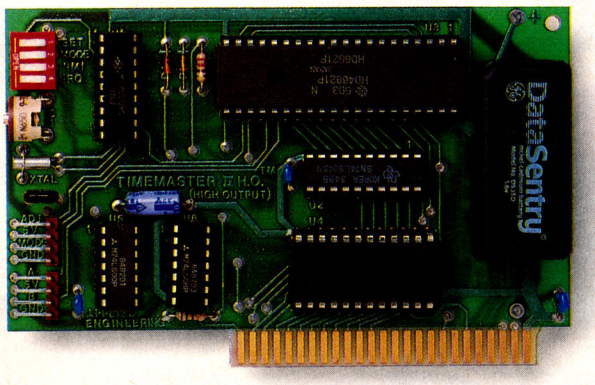

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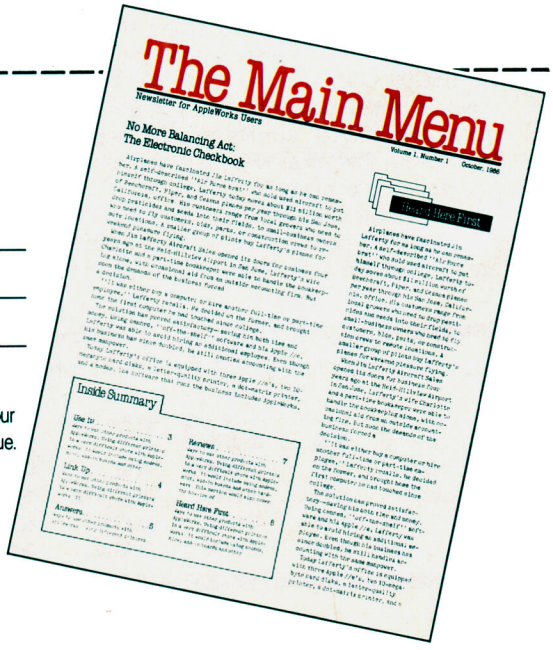
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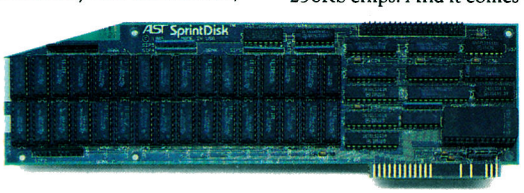

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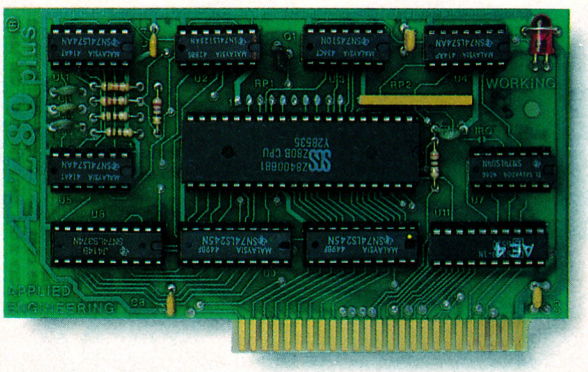

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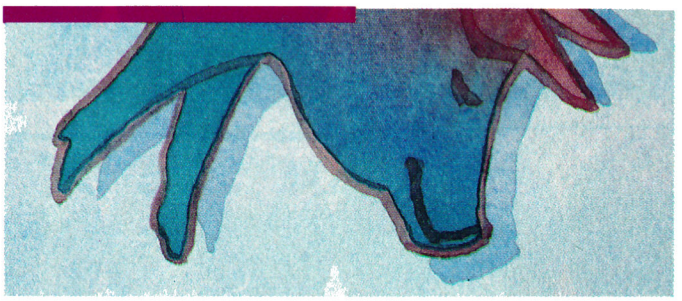

other ProDOS-based spreadsheet, comes on three floppy disks, but isn't copy-protected. You can install it on a 3½-inch disk with Quark's program selector, Catalyst 3.0.

ProDOS versions of Magicalc and PFS:Plan are copy-protected, but have been successfully installed on ProFile hard-disk subsystems. A master disk is required as a "key," though.

Spreadsheet programs can usually be configured to communicate with any printer. While daisy-wheel printers work fine for printing small spreadsheets, dot-matrix printers are necessary if you want to print long spreadsheets in compressed mode or if you want to print graphics. If you like color charts, you'll want a color monitor and color printer, such as the ImageWriter II or the Scribe.

If you have a hardware clock, SuperCalc3a and AppleWorks will automatically date-stamp your files.

Memory

Generally speaking, once a spreadsheet program is loaded, a 128K Apple will have 40K to 88K of working memory remaining. You can build spreadsheets of at least a few thousand cells with this much RAM.

Four of the five programs reviewed here are compatible with memory-expansion cards for the //e. Magicalc recognizes added RAM provided by cards from Legend Industries, Titan Technology, and Prometheus Products.

Mouse Calc works best with the Apple II Memory Expansion card and the AST SprintDisk. SuperCalc3a and the AppleWorks spreadsheet are compatible with the Apple II Memory Expansion, Applied Engineering RamWorks, and Checkmate Technology MultiRam cards.

A notable exception is PFS:Plan. This program is restricted to 36 columns and 70 rows (the equivalent of about 2500 cells) in the "values region." This inherent limitation applies, no matter how much memory your Apple has.

Files

All spreadsheet programs reviewed here can share files with other programs. An AppleWorks spreadsheet can be saved as (or produced from) a DIF (data-interchange format) file, an ASCII (text) file, or a VisiCalc file. The same flexibility extends to SuperCalc3a and Mouse Calc. Magicalc and PFS:Plan are less versatile.

A feature that distinguishes SuperCalc3a from other Apple spreadsheets is a built-in utility that lets you transmit files created on an Apple in a form that an IBM PC can decipher.

Graphics

VisiCalc and some of its clones claim to have graphics capability. In reality, this is no more than substituting asterisks for numbers (*** for 3; ****** for 6) to create an amazingly crude bar graph.

If you need authentic graphics capabilities, consider either Mouse Calc or SuperCalc3a. Charts prepared by either program can be printed with a black ribbon, but to take full advantage of the programs' color graphics you'll need to invest in an ImageWriter II, Scribe, or other compatible printer or plotter.

Mouse Calc is less versatile than SuperCalc3a when it comes to turning data into picture form, but both pro-

grams are easy to use and quick-on-the-draw. Mouse Calc can create line graphs or three-dimensional bar charts. If you like pie charts, SuperCalc3a is the program of choice. SuperCalc3a also helps you customize your graphs with labels using dressy fonts.

Functions

Spreadsheet programs vary in the number and kinds of functions with which they're equipped. For example, a chemical engineer needs a program that has logarithmic functions. An astronomer needs trigonometric functions. An investor wants financial functions. The rest of us probably need only the basic arithmetic functions for summing and averaging.

The most bare-bones spreadsheet program is PFS:Plan. With about a dozen functions built in, it performs the basics. At the other end of the spreadsheet spectrum is SuperCalc3a. It comes "loaded" with more than four dozen capabilities, including arithmetic, trigonometric, calendar, financial, logic, and search functions.

Mouse Calc, the AppleWorks spreadsheet, and Magicalc fall in between with about one to two dozen built-in functions.

Bells and Whistles

If you find yourself repeatedly typing complicated formulas, you may need macros, or keystroke abbreviations. In VisiCalc Advanced, macros were contained in Keystroke Memory. In SuperCalc3a, they're stored in Execute Files.

Those who require sorting or data-base capabilities should investigate AppleWorks, which includes a data-base management program, or SuperCalc3a, which has some built-in data-base functions.

Spreadsheet consolidation is handy for those who must prepare reports showing cumulative results. With a consolidation feature you can add this month's sales figures to year-to-date results, for example. Most available spreadsheets offer consolidation features, though sometimes it's called something different—such as "merge" in Mouse Calc.

Printouts

Practically all spreadsheet programs sold today let you customize the appearance of your work—at least in terms of margins and page numbering. SuperCalc3a comes with a utility that lets you print your long spreadsheets sideways. Except for Magicalc, the spreadsheet programs reviewed here let you print the spreadsheet work screen exactly as it appears.

Integration

The only truly integrated program among those discussed here is the AppleWorks spreadsheet. The AppleWorks program includes a data base and word processor. To include a spreadsheet in a document is as easy as copying the spreadsheet to the electronic clipboard and moving the cursor to the desired spot in the document.

Artsci's Magic Office System is a DOS 3.3-based integrated system that includes OfficeCalc (alias Magicalc), as well as a word processor, spelling checker, and graphics generator. Unlike AppleWorks, the individual modules in the Magic Office System use different commands and integration is less smooth.

Other spreadsheet programs are members of a series that can be integrated. Mouse Calc spreadsheets can be added to Mouse Word documents, for example. PFS:Plan worksheets can use PFS:File data.

Enhancements

If you want a spreadsheet program with potential, you owe it to yourself to consider AppleWorks. The program has proven so popular that many developers are writing software that looks like and works with AppleWorks.

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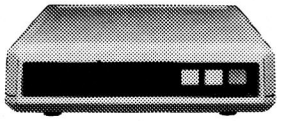

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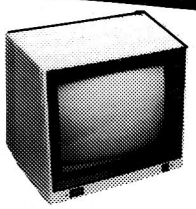

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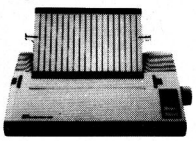

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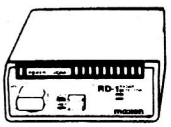

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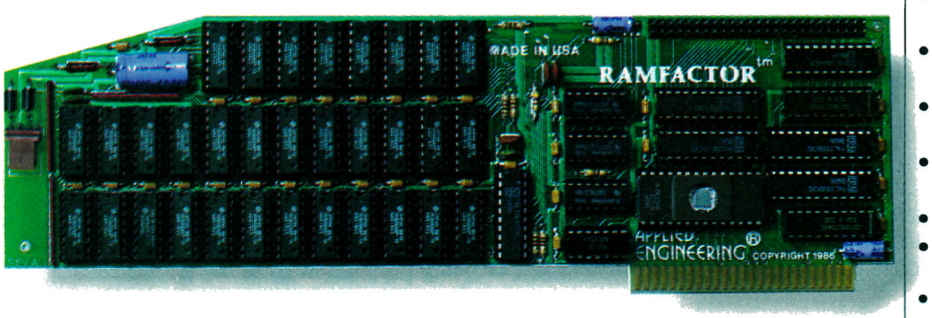

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Quicken, from Intuit, is an electronic checkbook and money-management program. Quicken data files can be read into AppleWorks spreadsheets for budgeting or accounting purposes.

FontWorks, from The Software Connection, lets you print AppleWorks documents, data-base reports, and spreadsheets using fancy typestyles—even sideways.

Pinpoint, from Pinpoint Publishing, offers a set of accessories to make computing with AppleWorks more convenient.

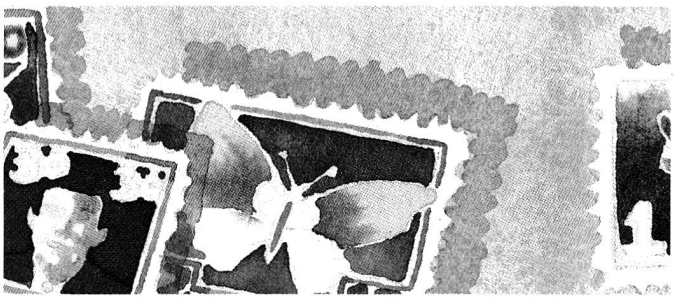
Strengths and Weaknesses

Magicalc, perhaps the most traditional spreadsheet program, offers VisiCalc's array of features, but organizes them into subsystems. Still, the program requires you to memorize some commands and is based on the "old" laundry-list interface. This program may be appropriate if you have a basic hardware setup and prefer the DOS 3.3 operating system.

The AppleWorks spreadsheet is part of what has proven to be the primary ProDOS-based integrated system for the Apple II. The AppleWorks pop-up index-card menu interface has set a new standard for mouseless software—a standard many publishers are emulating. There are mnemonic commands to memorize and a relatively small number of built-in functions. Overall, this well-rounded product is recommended for personal, professional, and small-business use.

Mouse Calc is the only mouse-driven spreadsheet program available. Its Mac-like appearance makes it easy to learn and use. Its color-graphics capabilities are a practical and pleasing bonus. Some users have commented that Mouse Calc is painfully slower than other spreadsheets when you insert, move, or recalculate. Nevertheless, this congenial program should be a hit with novice spreadsheet users who enjoy the Mac interface.

SuperCalc3a is the most full-featured spreadsheet program I've used. Its interface is standard. Its graphics capabilities are unparalleled in the Apple II spreadsheet world. A program with so many possibilities takes more time to learn, though. Still, you can prepare and chart your first simple spreadsheet in less than a half hour. This totally professional spreadsheet/graphics program may be overkill for the ordinary user, but technical professionals—whether in business or science—will fully appreciate it.



PFS:Plan brings to the Apple II world the first spreadsheet program that speaks the same language we do. It has some convenient features, such as automated labeling (type "January," and the program will enter "February," "March," and so on). Unfortunately, the number of built-in functions is limited almost as much as total spreadsheet size is. This light-duty program would be most popular with users of other products in the PFS series. ■

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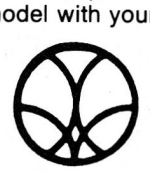

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AppleWorks' versatility lets you design a student data base to meet your school's specific recordkeeping and reporting needs.

by Conlyn L. Hart

At the General Henry H. Arnold Elementary School, located on the Dover Air Force Base in Dover, Delaware, the AppleWorks student data base is the primary administrative file. It serves as a control file for student enrollment and as a source of information relating to all students in the school. The challenge in setting up this system wasn't simply to create a student data base, but to use it in creative, innovative ways to make the elementary-school office function more efficiently and effectively.

The Arnold School office has an enhanced Apple //e with two disk drives. An Applied Engineering 512K RamWorks II card replaces the original Apple 80-Column Card. The Apple //e is interfaced through a selector switch with an ImageWriter printer and a Canon AP400 electronic typewriter. A True Data Micro Mark I card reader is used for scoring math tests and maintaining cumulative math records for students in grades one through three. Since August 1985, the school has made extensive use of the AppleWorks program in handling student data and managing office functions.

While AppleWorks with its three-part structure is applicable to various office functions, it's the data-base-management portion of the program that lends itself to maintaining student information for a total school population. AppleWorks is somewhat limited, though, in the number of categories permitted. The AppleWorks data base holds up to 30 categories per record, an adequate number for most student data-base applications. The number of records per file can be increased far beyond the requirements of any elementary school, so for most elementary-school office applications, AppleWorks' limitations are negligible.

Setting Up a Data File

The availability of sufficient RAM to accommodate a student data base and related files on the AppleWorks desktop is a problem for most schools. The ability to have multiple files on the desktop at the same time depends on the size and number of files and the available RAM. A typical student data base for a 500-student school would use about 100K of RAM. Related files tend to be much smaller, but grow larger as information on students who transfer or withdraw from school is moved from the data base to a related file. While schools vary in their RAM requirements, computers with 64K or 128K simply don't have sufficient memory for serious office applications; a number of memory-expansion cards are available to serious users, though.

The student data base at the Arnold School consists of one record per child, with a maximum of 30 categories of information the office can maintain for a total school population. While the categories in each record remain the same, you can change the information within categories. (For instance, room numbers may be the same for some children, while student names or identification numbers would be different, of course.)

In setting up the data base, consider the type of information your school needs to maintain and the type of information that will let it operate more effectively and efficiently. Also consider the way your school will use the data and those who will need to access the information. It's helpful to identify categories for the student data base that are component parts of various reports the office must complete.

Your student data base is an evolutionary process that will probably improve with age and experience; but the better data bases are the ones most carefully thought out and logically developed. Even with planning, though, there's no way to anticipate future data requirements. If you need to make changes, there's some security in knowing that AppleWorks lets you easily edit your file structures.

Once you identify categories of information for your data base, it's best to use the shortest abbreviations possible to describe each category, as they'll use less of the Apple's available memory.

Listing the Categories

The following is a list of category names and descriptions for the Arnold School student data base:

Category 1. ID (Identification Number): An identification number the school assigns and/or CAT/CTBS (California Achievement Test/Comprehensive Tests of Basic Skills) identification numbers assigned by the State Testing Center. Numbers supplied by the State Testing Center may be assigned to children who haven't previously been tested in

Delaware. These same identification numbers are used for recordkeeping purposes in the Addison-Wesley Math Management program.

Category 2. (S)LN: Enter the student's last name.

Category 3. (S)FN: Enter the student's first name.

Category 4. BIRTHDATE: Enter the child's birthdate in this form: 3/5/81. Because of the letters DATE in the category name, AppleWorks automatically converts the date to March 5, 1981, and the computer will arrange and sort records on the basis of information contained in that category.

Category 5. MALE: Place a 1 in this category if the child is male. Leave it blank if the child is female. This is a calculated category that instructs the computer to count the number of males in a given formatted report and print that number at the bottom of the report.

Category 6. FEMALE: Place a 1 in this category if the child is female. Leave it blank if the student is male. This calculated category functions in the same manner as Category 5.

Category 7. GR (GRADE): Enter the child's current grade level. Use k for kindergarten, 1 for first grade, 2 for second grade, and so on.

Category 8. RM# (Room Number): Enter the child's homeroom number.

Category 9. TCHR (Teacher): Enter Miss, Mrs., or Mr. and the last name of the child's teacher.

Category 10. (P)LN (Parents' Last Name): Enter the last name of the child's parent(s).

Category 11. (P)FN (Parents' First Names): Enter father's first name, comma, space, and the mother's first name.

Category 12. ST ADD (Street Address): Enter the child's full street address.

Category 13. H/PH (Home Phone): Enter the child's home telephone number (seven digits).

Category 14. D/PH (Duty Phone): Enter one parent's seven-digit work number.

Category 15. SP (Speech): Enter SPEECH if the child is enrolled in a speech program.

Category 16. BS MATH (Basic Skills Math): Enter BS MATH if the child is enrolled in a Basic Skills Math program.

Category 17. BS READ (Basic Skills Reading): Enter BS READ if the child is enrolled in Basic Skills Reading program.

Category 18. G/T (Gifted/Talented): Enter G/T if the child is enrolled in gifted/talented program.

Category 19. SAI (School Ability Index): Enter SAI for students taking the Otis-Lennon School Ability Test (third grade only).

Category 20. BUS (Bus Number): Enter the child's bus number.

Category 21. RACE: Enter W for White, B for Black, H for Hispanic, AI for American Indian, or O for Oriental.

Category 22. CON (Confidential): Enter only confidential information.

Category 23. # (Counter): A standard value of 1 appears in all records. This calculated category instructs the computer to count the number of entries in a given formatted report and lets AppleWorks print the total number of students per class on school rosters.

Category 24. CITY/ST/ZIP: Enter the child's city, state, and zip code (Dover, DE, 19901). Use a standard value when all entries in a category are the same.

Category 25. ECO (Entry Code): Enter the child's entry code (E1, E2, and so on).

Category 26. EDATE (Entry Date): Enter the date of the child's first day of school. The letters DATE in the category name let AppleWorks sort or arrange records on this category. AppleWorks also provides for arrangement of records in chronological or reverse-chronological order on the basis of information in this category.

Category 27. T/W CO/TO (Transfer/Withdrawal Code and Destination of Child): Enter the child's transfer/withdrawal code and the state in which he/she will attend school next.

Category 28. T/W DATE (TRANSFER/WITHDRAWAL DATE): Enter the date of child's transfer or withdrawal. The letters DATE let AppleWorks sort or arrange records on the basis of information in this category.

Category 29. FLEXCat 1 (Flexible Category 1): Enter only temporary information in this category.

Category 30. FLEXCat 2 (Flexible Category 2): Enter only temporary information in this category. FlexCat 1 and 2 are intended to accommodate short-range information. For example, when you finish sectioning for new year, place room assignments into one of the flexible categories. AppleWorks makes rosters for next year's classes immediately available.

Versatile Report Generation

Some of the categories listed above remain the same for all schools, but you'll have to change some categories to reflect local needs. Make one of the flexible categories SPED for special education, for instance. Entries in this

Figure 1. *Sample roster produced with AppleWorks student data base.*

FIGURE 1

File: Student Data — Page 1
Report: ROSTER — 3/14/86
Selection: TCHR equals MRS. HANDLER
and RM # equals 107
and GR equals 2

I/D	(S) LN	(S) FN	#	BIRTHDATE	MAL	FEM	BUS	ENT	ENTRY DAT
115317	Ardmore	Adam	1	Aug 16 77	1			E1	Sep 3 85
662231	Book	Mark	1	Oct 4 78	1		E	E1	Sep 9 85
223344	Cole	Brandon	1	Oct 17 77	1			E1	Sep 3 85
712468	Dalton	Margo	1	Jul 19 77		1		E2	Sep 23 85
179261	Donaldson	Donna	1	Aug 17 78		1	A	E1	Sep 3 85
290145	Evans	Earl	1	Nov 21 77	1		E	E1	Sep 3 85
178355	Farmer	Frank	1	Jul 6 78	1			E2	Nov 11 85
864217	Jenkins	Jacob	1	Sep 3 78	1		E	E1	Sep 3 85
164744	Lester	Lori	1	Feb 22 77		1		E2	Nov 4 85
098739	Logan	Jodi	1	Jun 23 78		1	A	E1	Sep 3 85
341274	Marker	Mallory	1	Apr 17 78		1		E2	Oct 25 85
712426	Martin	Marty	1	Jan 21 78		1		E1	Sep 3 85
517560	Mathers	Marvin	1	May 21 78	1		E	E2	Feb 3 86
763234	Morgan	Megan	1	Mar 22 78		1		E1	Sep 3 85
517533	Numbers	Page	1	Jun 3 78		1	B	E1	Sep 3 85
323283	Phillips	Phillip	1	Mar 18 78	1			E1	Sep 3 85
467070	Richter	Randy	1	Jan 26 77	1		A	E1	Sep 3 85
887018	Sampler	Susan	1	Aug 20 78		1		E1	Sep 3 85
437261	Sharp	Karen	1	Mar 6 78		1		E1	Sep 9 85
623234	Smart	Sally	1	Dec 1 77		1		E1	Sep 3 85
188735	Smithers	Maxwell	1	Mar 1 78	1		B	E2	Nov 12 85
			21*		10*	11*			

Figure 2. Categories included in various Arnold School data-base reports.

FIGURE 2
CATEGORIES OF INFORMATION INCLUDED IN FORMATTED REPORTS

CATEGORIES	FORMATTED REPORTS						
	DEAP INFO	BASIC SKILLS	ROTARY FILE CARDS	MAILING LABELS	SPECIAL PROGRAMS	PARENT NA/ADD/TEL	ROSTER
1. ID	*	*	*		*		*
2. (S) LN	*	*	*		*		*
3. (S) FN	*	*	*		*		*
4. BIRTHDATE	*		*		*		*
5. MALE	*						*
6. FEMALE	*						*
7. GRADE	*	*	*		*		
8. RM #		*	*		*		
9. TCHR							
10. (P) LN			*	*		*	
11. (P) FN			*	*		*	
12. ST ADD			*	*		*	
13. H/PH			*			*	
14. D/PH			*				
15. SPEECH					*		
16. BS MATH		*			*		
17. BS READ		*			*		
18. G/T		*			*		
19. IQ							
20. BUS			*				*
21. RACE							
22. CON							
23. COUNTER		*			*		*
24. CITY/ST/ZIP				*			
25. ECO							*
26. EDATE							*
27. T/W CO/TO							
28. T/W DATE							
29. FLEXICAT 1							
30. FLEXICAT 2							

category could include the child's special-education classification, which would let the school not only establish special-education rosters, but also track special-education students, if you've included the appropriate categorical information in the basic file structure.

Once you've entered information into a student's record, it's ready to be accessed for a variety of purposes. Reports can be as simple or as complex in scope as the situation demands. For example, you can develop a simplified roster on the basis of only two categories per record. The computer can select the names of all students assigned to a particular teacher or room. So the initial entries in a student data base might include, for example, only the teacher or the room number and the child's name. You can add other entries as time permits.

You can include different categories of information in various formatted reports, to customize your reports for specific purposes. AppleWorks can retrieve any combination of data. Rosters, for example, are nothing more than retrieving and printing information contained in ten categories (see **Figure 1** for a sample). This information is formatted in one of eight report designs called "roster." Three of the categories (# counter, male, and female) are calculated categories and provide total number of boys per class, total number of girls per class, and total number of students per class. These numbers are printed at the bottom of each roster.

Figure 2 lists the categories in each formatted report in the Arnold School's student data base. An asterisk indicates the categories included in each report.

It's important to select categories for your student data base that are relevant to your school's particular requirements, and AppleWorks lets you choose any combination that suits your individual needs.■

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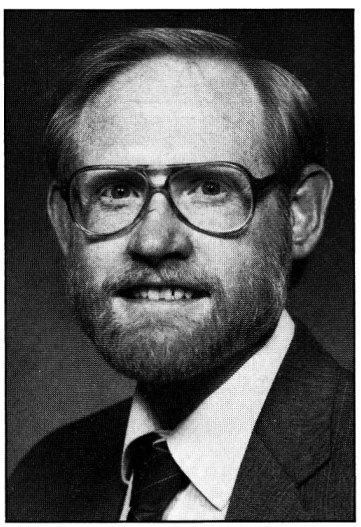

by Dan Bishop

Most computer owners are aware of the variety of print modes and styles of which their printers are capable. After all, the advertisements and hardware reviews in *inCider* hardly miss a point when a new printer reaches the market. And it makes good sense to know what you're buying. As long as your programs let you type special codes or characters to make the printer underline, double strike, or use a certain font, you don't give the printer a second thought.

But what do you do when your application program doesn't allow for printer-control commands? The program always prints in standard font (probably pica, ten characters per inch). But what if you want enlarged characters in bold print? Here's where an understanding of BASIC's printer-control commands can help.

Graphics is another area in which you can put BASIC's printer-control commands to work. Many printers have sophisticated graphics capabilities. But to use them outside a program designed specifically for graphics, you have to know how to find (and interpret) the appropriate codes, and how to send them to your printer.

My column this month should give you the information you need to use BASIC to control your printer. Since there are so many different kinds of printers, though, each with its own set of control commands, all I can present here are some generalizations with a few specific examples. You'll have to use your printer owner's manual and take it from there.

The Owner's Manual

Some of the worst writing I've ever tried to make sense of has come from printer owner's manuals. But within those pages lies the information you need if you want to use BASIC to control your printer.

Browse through your printer manual until you find a table or list of codes and the printer functions they control. You can refer to the contents of the table as escape (or ESC) codes, since most of them begin with an ESC character. There's no standardization among printer manufacturers here, so you'll have to obtain your printer's specific codes to carry out the following exercises.

The **Table** lists some common control codes for four popular printers. A blank column is provided for you to fill in the corresponding codes from your own printer manual. The rest of this article uses the values from the Epson FX-80 column. Be sure to use your own printer's codes for each example instead.

The **Table** also lists the code sequences ESC G and ESC H to set and cancel bold-print mode. In BASIC, each sequence corresponds to two specific characters you must send to the printer with a PRINT command (assuming a PRINT CHR$(4);"PR#1" command has already activated the printer). The ESC character's ASCII code is 27, so you transmit it to the printer from BASIC with PRINT CHR$(27);. Using their own ASCII codes, CHR$(71) or CHR$(72), you can transmit the letters G and H, but they're also printable characters: You can send them simply as G and H. Since the character comes immediately after the ESC code, the printer interprets it as a control code rather than a letter to be printed. So the command for bold-print mode looks like this:

```
PRINT CHR$(27);"G";
```

and the command to deactivate bold-print mode is:

```
PRINT CHR$(27);"H";
```

The trailing semicolon in each command prevents the printer from adding an automatic line feed after executing the control command. Normally, you won't want line feeds to accompany control commands.

You can chain control-code sequences together in a single PRINT command. Suppose you want to use double-strike mode (ESC G) for elite type size (ESC M) in italics (ESC 4). The corresponding PRINT command is:

```
PRINT CHR$(27);"G";CHR$(27);"M";
      CHR$(27);"4";
```

Of course, controls that select print size and font characteristics aren't available with daisy-wheel printers. As the ComRiter column in the **Table**

Table. Partial list of printer-control commands for four popular printers.

Print Pitches	C. Itoh	Epson MX	Epson FX	ComRiter
Compressed print ON	ESC Q	15	15	
OFF		18	18	
Elite pitch (12 cpi)	ESC E		ESC M	
Pica pitch (10 cpi)	ESC N		ESC P	
Enlarged print ON		ESC W 1	ESC W 1	
OFF		ESC W 0	ESC W 0	
Proportional print ON	ESC P		ESC p	ESC P
OFF				ESC Q
Print Styles				
Bold print ON	ESC !	ESC G	ESC G	ESC F
OFF	ESC "	ESC H	ESC H	ESC &
Shadow print ON				ESC W
OFF				ESC &
Emphasized print ON		ESC E	ESC E	
OFF		ESC F	ESC F	
Underline ON	ESC X	ESC - 1	ESC - 1	ESC E
OFF	ESC Y	ESC - 0	ESC - 0	ESC R
Italics ON		ESC 4	ESC 4	
OFF		ESC 5	ESC 5	
Superscript ON		ESC S 0	ESC S 0	ESC D
OFF		ESC T	ESC T	
Subscript ON		ESC S 1	ESC S 1	ESC U
OFF		ESC T	ESC T	
Line-Feed Control				
1/6 lpi*	ESC A	ESC 2	ESC 2	
1/8 lpi	ESC B	ESC 0	ESC 0	
n/72 lpi		ESC A n	ESC A n	
n/216 lpi		ESC 3 n	ESC 3 n	
n/244 lpi	ESC T n			
Unidirectional print	ESC >	ESC U 1	ESC U 1	ESC 5
Bidirectional print	ESC <	ESC U 0	ESC U 0	ESC 1

*Lines per inch

shows, though, even daisy-wheel printers offer several options for the knowledgeable user. You can form subscripts and superscripts by using the command that rolls the platen forward (ESC U) or backward (ESC D) half a line feed, then using the opposite command to return the paper to its original position.

Occasionally, you may run across control commands requiring three or four characters in succession. For example, the Epson FX-80 sequence to activate superscript mode is ESC S 0, while ESC S 1 activates subscript mode. Handle these codes as follows:

```
PRINT CHR$(27);"S";CHR$(0);
PRINT CHR$(27);"S";CHR$(1);
```

Finally, codes you must follow with a value require that value to appear as the argument of the CHR$ function, as well. For instance, the Epson FX-80 code for setting form length to a given number of inches (n) is ESC C 0 n. The command that sets the form length to seven inches is:

```
PRINT CHR$(27);"C";CHR$(0);CHR$(7);
```

Sending the Codes

Several techniques are available for transmitting control codes to the printer. You should select the method that's appropriate to a given situation.

If you often use a particular sequence of commands before writing notes or letters with your word processor, you could write a three- or four-line BASIC program to pass the codes to the printer. Simply run this BASIC program before calling up your word processor. For example, the following program switches an Epson FX-80 printer to bold-print, elite mode with a ten-inch form length:

```
10 PRINT CHR$(4);"PR#1"
20 PRINT CHR$(27);"G";CHR$(27);"M";
30 PRINT CHR$(27);"C";CHR$(0);CHR$(10)
40 PR#0:CALL 1002
```

Line 10 activates the printer, while line 40 (using a suggestion contributed to *inCider* by Mark J. Yannone, "Programming Proper Printouts," September 1983, p. 120) returns control to DOS. Type in this program and save it to disk as PRINT ELITE 10 BOLD. You can devise other similar short programs to initialize the printer to any obtainable characteristics you'd like.

If you're writing a BASIC program, you can insert these lines into your program wherever you want to set or reset the printer modes. Typing CHR$ codes is rather tedious, but you can use assignment statements (such as those shown below) near the beginning of the program to provide variables with the codes for each printer function you want to activate:

```
10 DS$ = CHR$(27) + "G"
11 EL$ = CHR$(27) + "M"
12 PC$ = CHR$(27) + "P"
```

When needed, you activate the printer and use the desired variables:

```
2020 PRINT DS$;EL$;"STUDENT ROSTER"
```

Cautionary Notes

Three points of caution are in order at this point. First, remember that your printer returns to its original default settings when you turn it off. This is often the quickest way to reset the printer. It can also be a problem if the power goes off in the middle of a print job.

Second, once you send a control code to the printer to put it into a specific print mode, the printer stays in that mode until you turn it off or send it another control code that countermands the first. So don't forget to include the reset commands in your program.

Finally, some application programs send a printer-initialization code before printing begins, which could wipe out any settings you've made previously. In this case, your only hope for changing the printing pattern the application program produces is to alter the program itself. That's easy if the program is written in BASIC or some other high-level language. If it's written in machine language, or if it's compiled or protected, though, you'll probably just have to live with it.

DIP Switches

I quickly learned about DIP switches when I bought my first printer. Following the directions in the photocopied sheets that came with it, I managed to hook up the printer without much trouble. But two things happened when I tested it. First, when I used a simple BASIC loop to print ten lines of text, all ten lines appeared on the same line, overstriking one another. Second, although my BASIC program clearly called for printing English text, what appeared

on the printer was a long string of Japanese characters!

After some frustrating minutes spent trying to figure out the meaning of several pigeon-English paragraphs, I discovered that a small rectangular box with eight miniature switches sticking out of the top was hidden in the bowels of my printer. These switches controlled different *default* settings for my printer. One switch let me select Japanese or English characters. Another let me choose an open zero or a zero with a slash through it. Still another choice was cryptically referred to as "line feed after carriage return." I then realized that both problems described above were the result of improper switch settings.

This particular printer required me to remove its outer case to get to the DIP switches. (If this is the situation with your printer, be careful not to break any wire connections between the circuit board and the switches and LED's on the cover when you lift it off.) By changing the switch configuration to select English characters and line feed after carriage return, my printer began to behave itself, and I breathed a sigh of relief.

You should check your printer manual for the DIP-switch controls available with your printer. Remember that the settings you choose are the *default* settings. That is, these are the settings the printer recognizes when you first turn it on. Most of them can be changed through software commands as described above. Fortunately, the DIP switches in most newer printers (usually two chips with four to eight switches each) are located in an easily accessible compartment, making it easier to change settings.

The line-feed switch is probably the one you'll change most frequently. If all printing occurs on one line with no line feeds, you obviously need to change the setting to *on*. If all printing adds extra line feeds (two line feeds instead of one for single spacing, for example), you'll set this switch to *off*. Different application packages handle line feeds in different ways. It's likely that at some time you'll have two applications requiring different settings with this switch.

The TOF Gremlin

One of the frustrations I'm frequently called on to address is an apparent malfunction in the printer's TOF, or *Top of Form* settings. For example, a multipage document shows several blank lines in the middle of every page, and the text runs through the perforations. The operator insists he or she set the paper in the printer at the perforation when printing began. The printer just seems to have a mind of its own sometimes.

To understand what's happening, you have to "think like a printer." The printer thinks the paper is set at Top of Form when it's first turned on. And if the printer expects 66 lines per page (through default), it will keep track of every electronic line feed, counting from one to 66, at which point it assumes the paper is at TOF again. Whenever the computer sends

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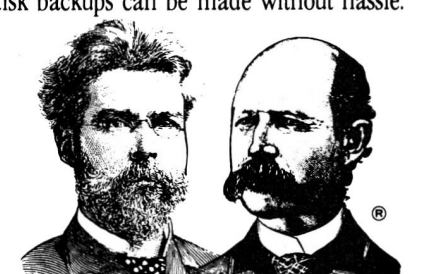

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AD #PP1

a line-feed command, and whenever you press the line-feed button on the printer, the printer adds that line to its line counter. When you reach over and scroll the paper forward or backward, though, the printer can't detect this intervention, so it can't add or subtract lines from its line counter.

Now suppose you've just finished a BASIC program-printing sequence that used only half a page (33 lines) and didn't finish the process with a form-feed. The line counter in the printer's memory is at 33. You now go to your word processor, type in a document, and try to print it. Since you notice the paper is at the halfway point, you scroll the platen to get the printer to start at the perforation. Unfortunately, the printer prints only half a page (while the line counter increments from 33 to 66), then, right in the middle of your document, it executes a form-feed, resulting in several blank lines.

The easiest way to avoid this is to turn the printer *off* before scrolling the platen. Then scroll the paper to the perforation, turn the printer *on*, and the printer correctly assumes it's at TOF. Incidentally, most printer manufacturers also recommend you scroll the platen manually only when the printer is off, to avoid undue wear on the printer's stepper motor.

> *"Take some time to experiment with the printer-control commands listed in your manual."*

Conclusion

Take some time to experiment with the printer-control commands listed in your manual. Just write a three-line BASIC program that uses the command you want to play with, and type RUN. For example, to compare compressed, elite, pica, and proportional print sizes on the C. Itoh printer, try the following program:

```
10 PRINT CHR$(4);"PR#1"
20 PRINT CHR$(27);"Q";"THIS IS A TEST"
30 PR#0:CALL 1002
```

When it prints THIS IS A TEST in compressed mode, change the Q in line 20 to E and run the program again. Continue this with the other codes you want to test.

Unfortunately, there are so many possible combinations of computers, operating systems, and printers, that any problems you have with your particular system are best handled by someone who can actually tinker around with your equipment until the right configuration of switch settings and control protocols is worked out. So, although I encourage you to write to me (include a self-addressed, stamped envelope and, if applicable, program listings), please note there aren't many printer-configuration problems with which I can help you through the mails.

Good luck, and keep komputing!■

Write to Dan Bishop at 4124 Beaver Creek Drive, Fort Collins, CO 80526.

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1792k **MULTIRAM**	519.	-

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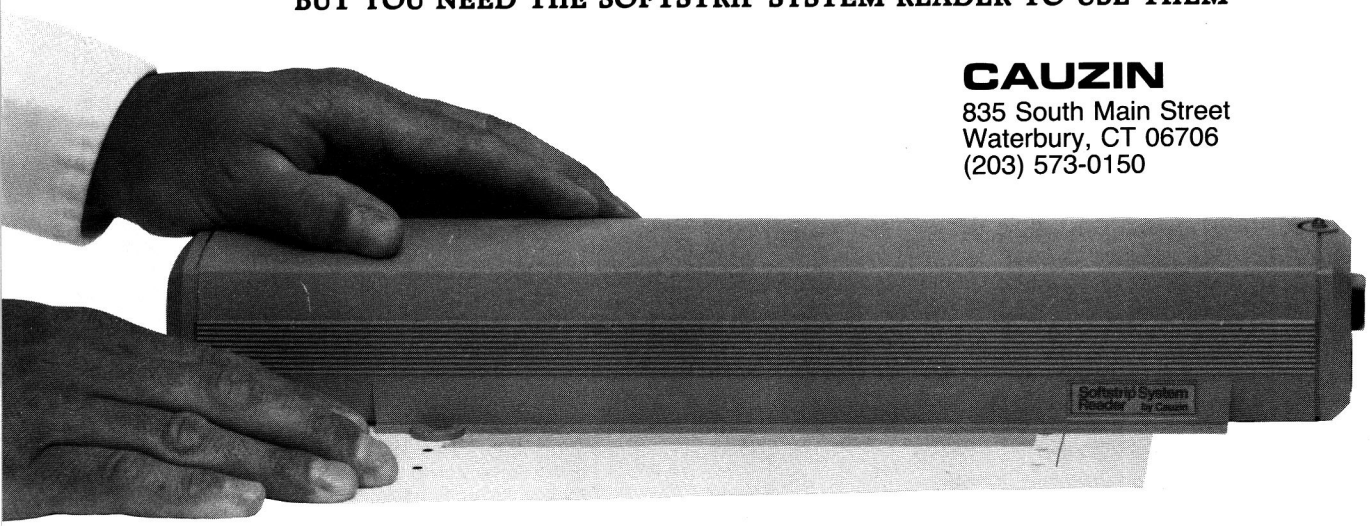

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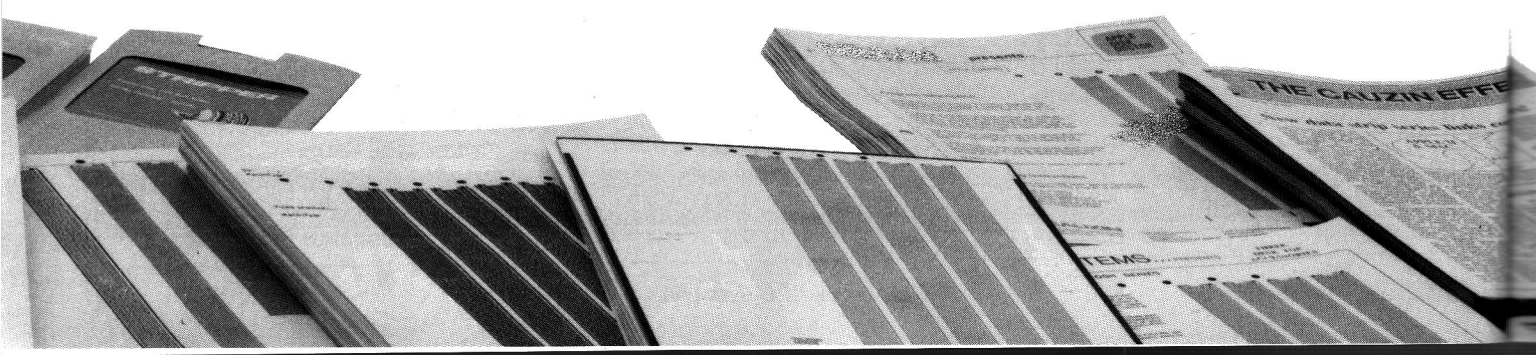

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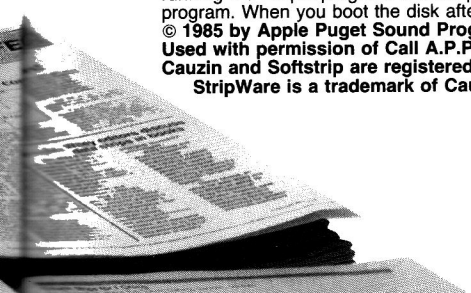

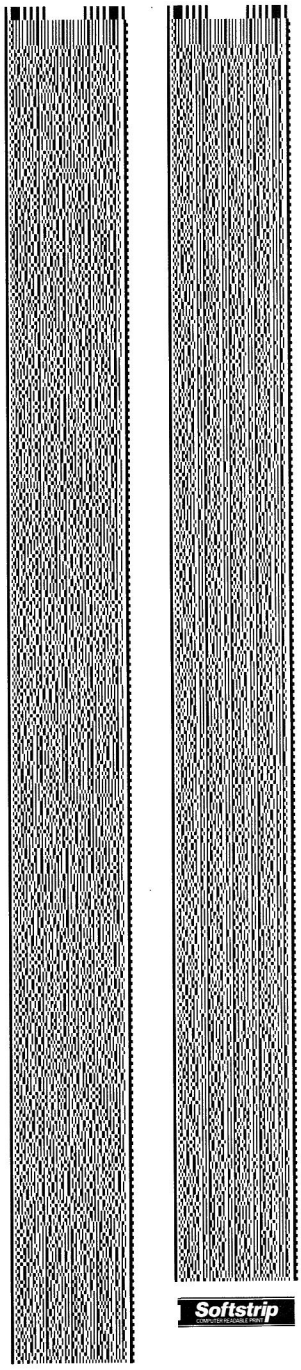

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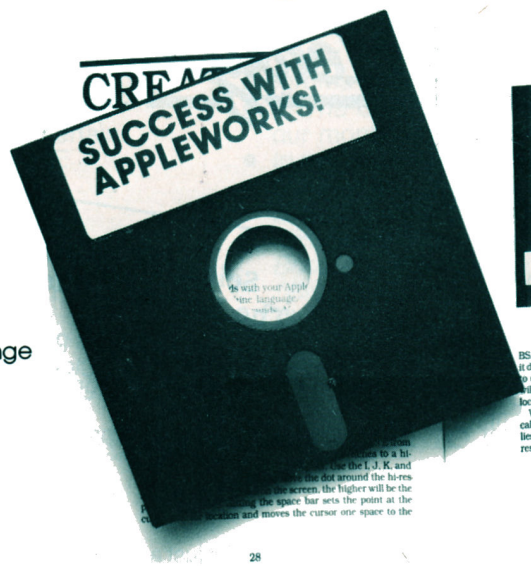

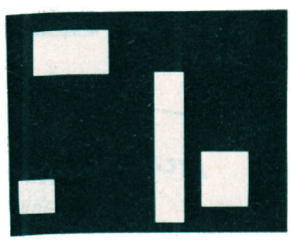

Photo 2. Example using the FILL routine.

BSAVE it with different parameters. FILL should be saved so that it doesn't cross a page boundary. Once you relocate FILL, be sure to change the CALL statement to reflect its new location. You will also have to relocate HIMEM to protect the routine in its new location.

When using FILL, be certain that the point you HPLOT before calling the routine is inside the object you want to fill. If the point lies on the border or outside of an object, you'll get some strange results. ■

28

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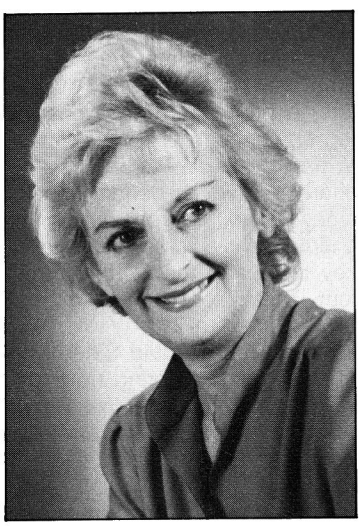
APPLEWORKS IN ACTION

Working with a Customer Data Base—Part 2

"These reports can highlight salespeople who are real producers and those who are marginal."



by Ruth K. Witkin

With last month's AppleWorks in Action (August 1986, p. 71), you created a customer data base and printed a master account list. In this session, you use that data base to produce two reports that contain calculations. The first, shown in **Figure 1**, adds the sales for two years and, in a calculated category, prints the difference by customer. The other, shown in **Figure 2**, groups sales by salesperson and produces the totals. These types of reports can highlight salespeople who are real producers and those who are marginal. Next month, I'll explain how to convert your sales-to-date report into a spreadsheet with which AppleWorks performs calculations that aren't available in the data base.

Creating the Sales-to-Date Report

Start up the AppleWorks program and load your CUSTOMERS file. When the Review/Add/Change screen appears, you should see nine records in the multiple-record layout.

First create a format for the sales-to-date report shown in **Figure 1**. Press OA-P to start the Print command. To select *Create a new "tables" format* and name the new report, type **2**, press the return key, type **SALES-TO-DATE**, and press the return key again.

Only the account number, company name, state, business, last year-to-date, year-to-date, and contact categories are needed in this report. Follow these steps to delete the other categories, starting with STREET and CITY: Press the right arrow key twice and press OA-D twice. For the ZIP and PHONE categories, press the right arrow key and press OA-D twice. Press the right arrow key to move the cursor to the TITLE category and press OA-D again. Press the right arrow key to move the cursor to the B# category and press OA-D. Now press the right arrow key twice to move the cursor to the first SPARE category and delete both spares by pressing OA-D twice. The cursor is now on *Len91*, the print width of the remaining categories.

The next step is to switch the contact names from the middle of this report to a less prominent place. Press the left arrow key four times to move the cursor to the CONTACT category. Now hop the CONTACT category past the other categories and into the rightmost column by pressing OA-> three times.

The AppleWorks standard of ten characters to the inch prints an estimated 80 characters per line. You'll have to pare some categories and widen others, and later we'll insert a calculated category. Still, 80 characters seems to be a reasonable goal. The cursor is on the CONTACT column. Increase its width one character by pressing OA-right arrow. Use the left arrow key to move the cursor to the other columns and change their widths as follows:

YTD$: press OA-left arrow (4 times)
LYTD$: press OA-left arrow (4 times)
BUSINESS: press OA-left arrow (3 times)
STATE: press OA-left arrow (8 times)
COMPANY: press OA-right arrow (7 times)
ACC#: press OA-left arrow (8 times)

The print-width indicator should now read *Len72*.

The account numbers in column A have an unsightly jog at the right edge. To improve their appearance, right-justify them: Press OA-J, press Return to confirm zero decimal places, type **2** to specify the number of blank spaces between categories, and press the return key again. The trio of nines that appear confirms the justification. They won't print on the report.

Adding the Numbers in a Category

This is a financial report, so you need totals for last year's and this year's sales. Press the right arrow key four times to move the cursor to the LYTD$ category. Press OA-T to start the Totals command. Confirm zero decimal places and three blank spaces after the category by pressing the return key twice. The nines and the lines indicate that these entries are totalled. Now do the same for the YTD$ category: Press the right arrow key, press OA-T, and press the return key twice.

Inserting a Calculated Category

Subtracting LYTD$ from YTD$ for each customer makes it easy to compare one year with the other. This is

Figure 1. Sales-to-date report created with the AppleWorks customer data base.

File: CUSTOMERS Page 1
Report: SALES-TO-DATE 9-23-86

ACC	COMPANY	STAT	BUSINESS	LYTD$	YTD$	DIFF$	CONTACT
179	Ace Supermarkets	CT	Food	33722	35999	2277	Gil Freeman
85	Allied Grocers	NY	Food	32100	32645	545	Evelyn Aven
153	American Stores	NY	Variety	0	9321	9321	Ollie O'Day
142	Arbor Sales Co.	NJ	Discount	28560	32742	4182	Ben W. Smith
43	Crown Supermarts	MA	Food	19517	18203	-1314	Homer Capella
56	Dollar Shops Inc.	FL	Discount	30450	32345	1895	Don Johnson
87	Family Centers	NJ	Variety	12564	11070	-1494	Fay L. Byrd
22	Key Markets	MD	Food	10987	13450	2463	Ken Wolin
63	Off The Shelf, Inc.	CT	Discount	25000	28567	3567	Connie Dowd
				192900*	214342*	21442*	

Figure 2. AppleWorks sales-to-date report containing group totals by salesperson.

File: CUSTOMERS Page 1
Report: SALES BY REP 9-23-86

ACC	COMPANY	STAT	BUSINESS	LYTD$	YTD$	DIFF$	REP	CONTACT
179	Ace Supermarkets	CT	Food	33722	35999	2277	CS	Gil Freeman
43	Crown Supermarts	MA	Food	19517	18203	-1314	CS	Homer Capella
63	Off The Shelf, Inc.	CT	Discount	25000	28567	3567	CS	Connie Dowd
				78239	82769	4530		
85	Allied Grocers	NY	Food	32100	32645	545	RJN	Evelyn Aven
153	American Stores	NY	Variety	0	9321	9321	RJN	Ollie O'Day
142	Arbor Sales Co.	NJ	Discount	28560	32742	4182	RJN	Ben W. Smith
87	Family Centers	NJ	Variety	12564	11070	-1494	RJN	Fay L. Byrd
				73224	85778	12554		
56	Dollar Shops Inc.	FL	Discount	30450	32345	1895	RKW	Don Johnson
22	Key Markets	MD	Food	10987	13450	2463	RKW	Ken Wolin
				41437	45795	4358		
				192900*	214342*	21442*		

Figure 3. Another AppleWorks report you can create with the customer data base, containing notes gathered by the sales representatives.

File: CUSTOMERS Page 1
Report: NOTES 9-23-86

ACC#	COMPANY	B#	STAT	PHONE	CONTACT	REP	NOTES
179	Ace Supermarkets	1	CT	203-555-4560	Gil Freeman	CS	Freeman promoted to Pres eff 1/1/87
85	Allied Grocers	1	NY	518-555-0787	Evelyn Aven	RJN	Contact again Oct 14
153	American Stores	2	NY	516-555-8765	Ollie O'Day	RJN	O'Day's daughter running the show
142	Arbor Sales Co.	3	NJ	201-555-2300	Ben W. Smith	RJN	Moving to larger place in November
43	Crown Supermarts	1	MA	617-555-0220	Homer Capella	CS	Selling out to Superior Supermarkets
56	Dollar Shops Inc.	3	FL	305-555-0600	Don Johnson	RKW	Aggressive marketing - growing fast
87	Family Centers	2	NJ	609-555-9876	Fay L. Byrd	RJN	Place looks rundown
22	Key Markets	1	MD	301-555-2621	Ken Wolin	RKW	-
63	Off The Shelf, Inc.	3	CT	203-555-9008	Connie Dowd	CS	Opening 2 new stores - contact in Dec

done in a calculated category, which exists only in the report in which it's created. Insert this category to the left of column G and name it DIFF$, meaning dollar difference. First, press the right arrow key to move the cursor to column G. Now press OA-K to start the Calculate command. Replace *Calculated* by pressing OA-Y, typing **DIFF$**, and pressing Return.

AppleWorks now asks for the calculation rules. You want to subtract each entry in column E from the corresponding entry in column F, show the result without decimal places, and insert three spaces between columns G and H, so type **F-E** and press the return key three times. Have AppleWorks print the total dollar difference, too. Your cursor is in column G, so press OA-T and press the return key twice.

To see how these changes affect the print width, press the right arrow key twice. The indicator shows *Len85*, five characters more than the goal of 80 characters. Clearly, the DIFF$ column can be reduced by five characters. A print width of 80 characters at ten characters per inch is not always a magic number. In this case, 81 characters works perfectly well. Decrease the DIFF$ column by four characters by pressing the left arrow key twice and the OA-left arrow keys four times.

Printing Year-to-Date Sales

Press OA-O to bring up the Printer Options screen. Now follow these steps to increase the top margin and double-space the report: Type **TM** and press Return. Type **.5** and press Return. Type **DS** and press Return. Next, tell AppleWorks to print a zero when there's no entry in a category, such as last year's sales for American Stores, a new customer: Type **PD** and press Return. If a category isn't totalled, AppleWorks prints a dash instead. Press Escape to return to the Report Format screen.

This report format is complete, so turn on your printer and press OA-P. Press Return to confirm the printer (or type a printer number, then Return), type today's date, and press Return twice. When the printer stops, your report should look like the one in **Figure 1**. This time last year, the company had $192,900 in sales; this year, $214,342—an increase of $21,442. Press OA-S to store the re-

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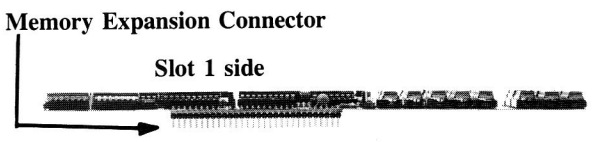

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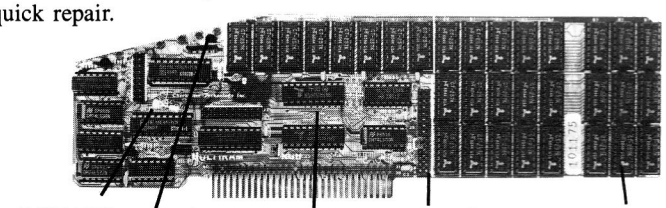

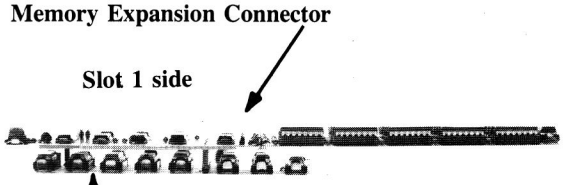

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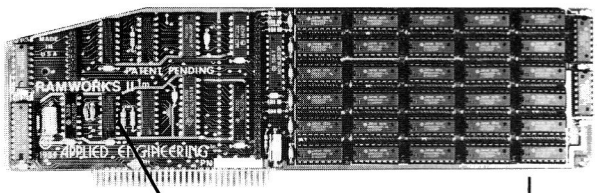

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port on disk, which brings up the Review/Add/Change screen.

Year-to-Date Sales by Salesperson

Imagine a report that shows both total sales and sales by salesperson. Only one hitch—there's no salesperson category. If you had to insert a category now, your custom screen layout would revert to standard, and the formats for your master account list and sales-to-date report would vanish. This is when a spare category really comes in handy. **Figure 2** shows the new report.

Press OA-N to bring up the Change Name/Category screen. Now press the return key to jump the cursor into the category names area. Press the down arrow key 13 times to move the cursor to the first SPARE. Press OA-E to switch to the overtype cursor. Now type **REP**, press OA-Y to delete the E, and press Return. Press the escape key.

The Review/Add/Change screen returns, but without the REP category, which is off screen. You could enter each rep's initials in the single-record layout, but there's an easier way—just move the REP category on screen and make the entries there. First, press OA-L to start the Layout command. Now press the right arrow key 13 times, press OA-< seven times, press the escape key, then Return. And here's the REP category awaiting your entries.

"A simple two-step process produces the group totals."

Dittoing the Previous Entry

Murphy Vending's three reps are CS, RJN, and RKW. One of the advantages of making entries in the multiple-record layout is that you can "ditto" the previous entry. First, press Tab six times to move the cursor to the REP column. Now enter the initials as follows:

Type **CS** (press return)
Type **RJN** (press return)
Press OA-" (2 times)
Type **CS** (press return)
Type **RKW** (press return)
Type **RJN** (press return)
Type **RKW** (press return)
Type **CS** (press return)

Now reverse the process to return the REP category to its position off screen. Press OA-L to start the Layout command. Press the right arrow key six times to move the cursor to the REP category, and press OA-> seven times. Press the escape key, then the return key. The screen appears as it was before you switched categories.

Duplicating a Report Format

The group-sales and sales-to-date reports have a great deal in common—categories, column widths, top margin, and line spacing. The easy approach is to duplicate the report format. Press OA-P to bring up the Report Menu.

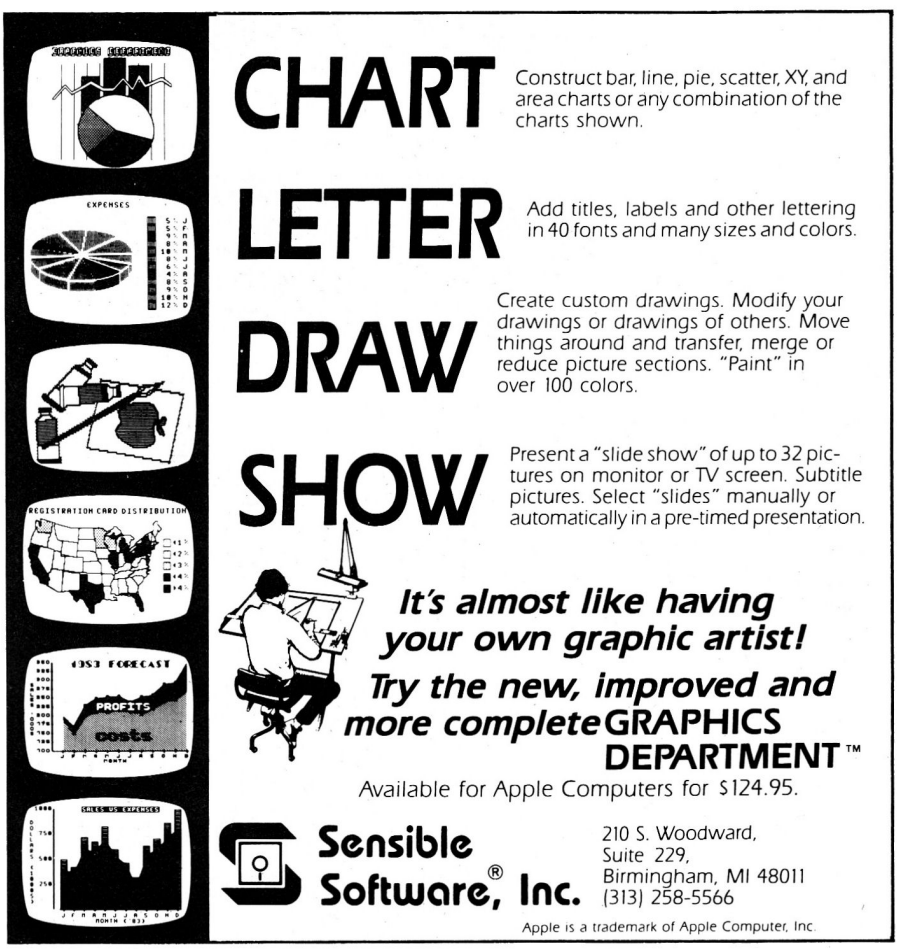
Now select *Duplicate an existing format* by typing **4** and pressing the return key. Select SALES-TO-DATE by typing **2** and pressing the return key again. You should still be working with the overtype cursor. Press the right arrow key five times, press the space bar, type **BY REP**, press OA-Y to delete E, and press the return key again.

Now you insert the REP category, which you deleted when it was a spare: Press the right arrow key seven times to move the cursor to column H. Press OA-I to bring up the Insert a Category screen, where the deleted categories are stored. Type **7** to select REP and press Return. Now press OA-left arrow seven times to reduce the column width.

Calculating Group Totals

A simple two-step process produces the group totals. The first step arranges the REP entries in alphabetical order, which groups the customers by salesperson: Leave the cursor in column H, press OA-A, and press Return.

The second step produces the total sales by salesperson and tells AppleWorks to print all the records on one page: Leave your cursor on column H, press OA-G, and press Return twice. The upper left of the screen shows that group totals will indeed be calculated in the REP column.



Press the right arrow key twice so you can see the *Len* indicator. Inserting the REP category increased the print width to 87 characters, more than you can print at ten characters per inch. The simple solution is to print at 12 characters per inch. Press OA-O. Now type **CI** and press Return. Type **12** and press the return key again. To center the report on the page, increase the left and right margins: Type **LM** and press Return. Type **.4** and press Return again. Type **RM** and press Return. Type **.4** and press Return. Return to the Report Format screen by pressing the escape key.

Printing the Sales-by-Rep Report

Next, print this report so that you can see the calculations on paper. Be sure the printer is on, press OA-P, and press the return key three times. Your report should look like the one in **Figure 2**.

Sales representative CS brought in a total of $78,239 last year and $82,769 this year, an increase of $4530. RJN picked up a new customer and went from $73,224 to $85,778, an increase of $12,554, despite the fact that Family Centers fell behind. RKW went from $41,437 to $45,795, an increase of $4358. AppleWorks will update these calculations automatically when you enter new sales figures. Press OA-S to store this report on disk.

You now have three reports in the customer data base—a master account list and two versions of a sales-to-date report. The report in **Figure 3** is a third version. The remaining spare category is now called NOTES, and contains comments and reminders to and from the sales staff. This data base is well suited for mailing labels, too. Next month, we'll convert the sales-to-date report to a spreadsheet. If you make any changes between now and then, give the data base another name and keep the original version intact. ■

Ruth K. Witkin is a consultant in computer applications for business. She is the author of Managing Your Business with Multiplan *(Microsoft Press),* Managing with AppleWorks *(Howard W. Sams & Co.),* Personal Money Management with Multiplan *(Hayden Books), and* Personal Money Management with AppleWorks *(Hayden Books). Enclose a stamped, self-addressed envelope if you want a personal reply, but please be patient.*

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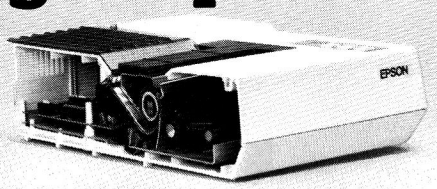

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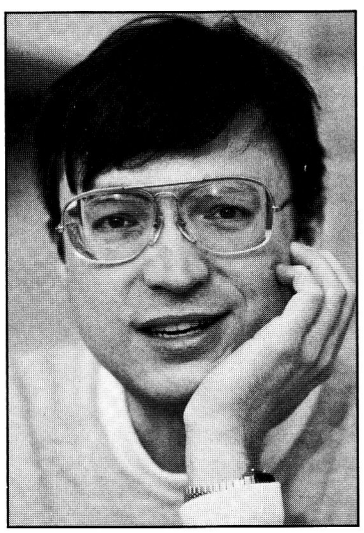
PASCAL PRIMER

Meet the Pascal 6502 Assembler

"By converting certain routines to assembly language, you can make your Pascal programs run up to 20 times faster."



by Tom Swan

Many people are surprised to learn that Apple Pascal comes with a macro 6502 assembler that rivals the best commercial products. This month, I'll show you how to use this assembler to greatly increase the speed of your Pascal programs—speed only assembly language can give.

Why Use Assembly Language?

Because assembly language is more difficult to learn and use than Pascal, you should have good reasons for converting Pascal procedures to native 6502 code, or machine language. One reason is speed. By converting certain critical routines to native code, you can make your programs run up to 20 times faster.

Another good reason is simplicity. Some operations, such as those requiring access to specific areas of computer memory, are easier to write in assembly language than in Pascal.

But simply converting entire Pascal programs to native code to make them run faster isn't the best way to apply assembly language. Studies show that most programs spend 90 percent of their time in only 10 percent of their code. Rewriting that 10 percent in assembly language often greatly improves program speed; rewriting the other 90 percent may have little or no effect. The rule is: Don't bother with assembly language unless you have to.

Using the Assembler

Make sure the files SYSTEM.ASSEMBLER and SYSTEM.LINKER are on your boot disk or on a work disk you insert into drive 2 (drive 2, remember, is called #5: in Apple Pascal). After writing your assembly-language program with the Pascal editor and saving the text on disk, type A to begin assembling. Type the name of your text file when the computer asks, "Assemble what textfile?" When it asks, "To what codefile?" type a dollar sign to indicate the same filename but ending in .CODE, or just press return to send the assembled output to SYSTEM.WRK .CODE. Finally, when it asks, "Output file for Assembler listing?" type PRINTER: for a printed listing (don't forget the colon) or a disk filename (LISTING.TEXT, for example), or press return for no listing at all. Most of the time, just press return; this makes the assembler run faster.

By the way, don't be concerned if some of the prompts I use here read differently from yours. Older versions of Apple Pascal use slightly different wording for prompts. The prompts shown here follow those of the newest version, 1.3.

Listings 1 and **2** present BOOT and BOOTTEST as examples of how to write and use a simple assembly-language procedure. BOOT is a short assembly-language procedure with a single JMP command. By jumping to the Apple's ROM reset vector (a buzzword that means "a pointer to another memory address"), you can end a Pascal program with a message to press return to reboot, the way many commercial programs end. I know of no simple way to do this in pure Pascal.

Look closely at line 3 in **Listing 1**. The .PROC tells the assembler to expect a procedure. (As we'll see later, .FUNC tells it to expect a function.) The name of the procedure follows—in this case, BOOT—and a value, zero, ends the command. The value indicates the number of parameter words a Pascal program passes to the procedure or function. There are none in this example, so the value is zero.

To try the example, use the Pascal editor to type in BOOT from **Listing 1**. (As with all listings in this column, don't type the reference numbers and colons you see along the left edge.) Save your typing in BOOT.TEXT. Next, type in **Listing 2**, BOOTTEST. At line 6 of the Pascal program, called the *host*, you see this procedure declaration:

```
PROCEDURE Boot; external;
```

You can similarly declare any procedure or function as *external* by including that word and a semicolon in place of the usual procedure body surrounded by BEGIN and END. In this way, you tell Pascal you intend to later attach an external assembly-language routine to perform the duties of this procedure. Your external routine runs when you call it from your Pascal host program (see line 20 in **Listing 2**). This process lets you de-

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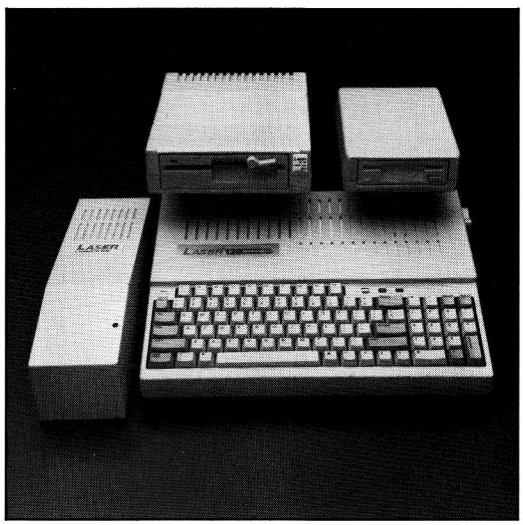

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Listing 1. BOOT.TEXT.

```
0: ; Boot procedure : Apple Pascal 6502 Assembler
1:
2:
3:          .PROC BOOT,0              ;0 words of parameters
4:
5: ;---------------------------------------------------------------
6: ;
7: ;        PROCEDURE Boot;
8: ;
9: ;---------------------------------------------------------------
10:
11:         JMP     @0FFFC            ;jump to ROM reset vector
12:
13:         .END                      ;end of assembly text
```


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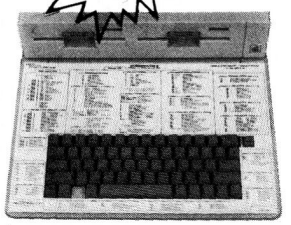

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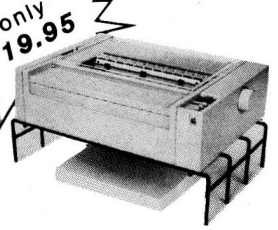

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velop and debug procedures in Pascal, then convert them to speedy native code.

You should now have two disk files, BOOT.TEXT and BOOTTEST.TEXT. Get back to the main Pascal command line and type A to assemble. Type BOOT as the filename, a dollar sign as the output, and press return to indicate no listing. If you receive an error, compare your typing to **Listing 1** and try again.

Next, press C to compile. Type BOOTTEST as the filename, and a dollar sign for the output. Newer versions of Apple Pascal also request a listing filename. If you receive this request, press return to indicate no listing, just as you did with the assembler.

You now have two code files, BOOT.CODE and BOOTTEST.CODE. The first file contains the assembled boot procedure; the second, the compiled Pascal program. Before using the program, though, you have to link these files together.

Linking Files

To link BOOT.CODE and BOOTTEST.CODE, type L to start the Pascal linker and answer several questions. To make it easier for you, here are all the screen prompts, shown with your responses (press return where you see <cr>, which isn't shown on screen):

```
Apple Pascal Linker [1.3]
Link what host codefile? BOOTTEST
Opening BOOTTEST.CODE
Using what library file? BOOT
Opening BOOT.CODE
Another library file (<ret> for none) ?
  <cr>
Map file (<ret> for none) ? <cr>
Reading BOOTTEST
Reading BOOT
Output file (<ret> for workfile) ?
  BOOTTEST
Linking BOOTTEST # 1
  Copying proc BOOT
```

Finally, type X to execute a program, then type BOOTTEST at the "Execute what file" prompt. If you then press any key other than the escape key, the Apple should reboot. As you can see, there are a lot of steps to adding assembly language to Pascal programs, but once you do it a few times, it's not so difficult.

Adding Extra Speed

The best reason for using assembly language is to speed up your Pascal programs. Informal tests show that the examples in **Listings 3** and **4** run

about 19.5 times faster than the equivalent Pascal programming. Such extra speed could turn a sluggish program into a professional product.

The procedure in **Listing 3** is useful for converting strings to uppercase. You can use it in a sorting program in which mixed upper- and lowercase characters might cause the sort to fail, or wherever you want all uppercase characters.

This native-code example has a few new elements. The program passes the parameter string (s) to the procedure for converting. Line 11 tells the assembler to expect a procedure named SHIFTUP, and indicates that one word (equal to 2 bytes) of parameter data is passed to the procedure. Also, unlike the previous example, the procedure must return to its Pascal host program. This requires careful programming.

Lines 19–22 pop the Pascal return address from the stack into a temporary 2-byte variable, appropriately named RETURN. This should always be the first operation in your own native-code routines.

Next, lines 23–26 pop the address of the parameter passed to the procedure. All VAR parameters work the same way, passing to the procedure as the address at which you find the actual variable in memory. Parameters without the VAR preface, called *value parameters*, have their actual bytes on the stack. For example, if you pass a 4-byte parameter to a procedure, you'd have to pop 4 bytes off the stack and save them for the procedure's use.

Lines 28–42 convert the characters in the string parameter to all uppercase by subtracting 32 from the lowercase letters a through z. All other characters are ignored.

Finally, the procedure exits at lines 44–48 by first pushing the previously saved Pascal return address back onto the stack. Notice that it pushes the high byte stored at RETURN + 1 first. After preparing the stack this way, the RTS instruction at line 48 returns to the Pascal program that originally called the routine.

Using the Example

As with the BOOT example, the string converter requires a host Pascal program. **Listing 4**, STRINGUP, is a sample host that shows how to use the native-code SHIFTUP external routine.

To let you compare the two routines, **Listing 4** also includes a Pascal version of the same procedure

Listing 2. BOOTTEST.TEXT.

```
 0: PROGRAM BootTest;
 1: CONST
 2:    escape = 27; (* decimal value for ASCII escape character *)
 3: VAR
 4:    ch : char;
 5:
 6: PROCEDURE Boot; external;
 7:
 8: BEGIN
 9:    page( output );  (* clear screen *)
10:    gotoxy( 0, 8 );
11:    writeln( 'Insert new program disk.' );
12:    writeln;
13:    writeln( 'Press any key to reboot' );
14:    writeln;
15:    write( 'or press ESC to exit...' );
16:    read( keyboard, ch );
17:    IF ch <> chr( escape ) THEN
18:    BEGIN
19:       page( output );  (* clear screen *)
20:       Boot
21:    END
22: END.
```

Listing 3. SHIFTUP.TEXT.

```
 0: ; Convert string to uppercase : Apple Pascal 6502 Assembler
 1:
 2: ;----- Equates
 3:
 4: LCA             .EQU    97.     ;decimal value of lowercase 'a'
 5: LCZ             .EQU   122.     ;decimal value of lowercase 'z'
 6: OFFSET          .EQU    32.     ;ASCII lower to uppercase offset
 7: RETURN          .EQU    0       ;2-byte variable for return address
 8: STRING          .EQU    2       ;2-byte variable for string address
 9:
10:
11:         .PROC SHIFTUP,1         ;1 word parameter
12:
13: ;---------------------------------------------------------------
14: ;
15: ;       PROCEDURE ShiftUp( VAR s : string );
16: ;
17: ;---------------------------------------------------------------
18:
19:         PLA                     ;save return address to Pascal
20:         STA     RETURN
21:         PLA
22:         STA     RETURN+1
23:         PLA                     ;get address of passed string (s)
24:         STA     STRING
25:         PLA
26:         STA     STRING+1
27:
28:         LDY     #0              ;initialize index register Y to zero
29:         LDA     (STRING),Y      ;load string length into A
30:         TAY                     ;register Y now equals length(s)
31:         BEQ     EXIT            ;exit on length = 0
32:
33: $1      LDA     (STRING),Y      ;get one character of string
34:         CMP     #LCA            ;check if ( 'a' <= ch <= 'z' )
35:         BMI     $2              ;do not convert if ch < 'a'
36:         CMP     #LCZ+1
37:         BPL     $2              ;do not convert if ch > 'z'
38:         SEC                     ;clear borrow
39:         SBC     #OFFSET         ;convert char to uppercase
40:         STA     (STRING),Y      ;insert converted char into string
41: $2      DEY                     ;decrease index register
42:         BNE     $1              ;loop if Y is not zero
43:
44: EXIT    LDA     RETURN+1        ;replace return address on stack
45:         PHA
46:         LDA     RETURN
47:         PHA
48:         RTS                     ;return to Pascal
49:
50:         .END                    ;end of assembly text
```

Listing 4. STRINGUP.TEXT.

```
 0: PROGRAM StringUp;
 1: (* Test uppercase string converter *)
 2: VAR
 3:    s : string;
 4:
 5: PROCEDURE ShiftUp( VAR s : string ); external;
 6:
 7: (* Pascal equivalent of above assembly language routine
 8: PROCEDURE ShiftUp( VAR s : string );
 9: VAR
10:    i : integer;
11:    ch : char;
12: BEGIN
13:    FOR i := 1 TO length( s ) DO
14:    BEGIN
15:       ch := s[ i ];
16:       IF ( 'a' <= ch ) AND ( ch <= 'z' )
17:          THEN s[ i ] := chr( ord( ch ) - 32 )
18:    END
19: END;
20: *)
21:
22: BEGIN
23:    page( output );
24:    writeln( 'StringUp: Convert strings to uppercase' );
25:    REPEAT
26:       writeln;
27:       write( 'String? (RET to quit) ' ); readln( s );
28:       writeln( 'Before: ', s );
29:       ShiftUp( s );
30:       writeln( 'After : ', s )
31:    UNTIL length( s ) = 0
32: END.
```


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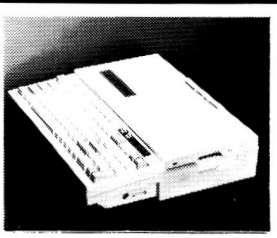

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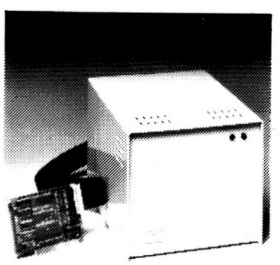

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in lines 8–19. To use the Pascal routine, remove lines 5–7 and line 20. To use the assembly-language procedure instead, surround the Pascal code with comments as shown in **Listing 4**, or completely remove the Pascal procedure.

As you did with the BOOT example, type in **Listing 3** and save it as SHIFTUP.TEXT. Assemble this to SHIFTUP.CODE. Next, type in **Listing 4**, save it as STRINGUP.TEXT, and compile to STRINGUP.CODE. Finally, link these code files together. STRINGUP is the *host*; SHIFTUP is the *library file*. Link these to the output file STRINGUP, and execute that file to run the test.

External Functions

So far, we've seen only external procedures. But you can also write native-code functions to return values to Pascal expressions. The next examples show you how.

Functions are more difficult to write than procedures. There are 4 extra stack bytes, which you must carefully remove (you could use these bytes as temporary work space, but there's seldom any reason for doing so). You also have to remember to pass the function result back to Pascal. Neglect any of these important points, and you'll send your program into exile on the dark side of the moon—until you press control-reset, that is.

Listing 5 contains two functions, Hi and Lo, that are difficult to write in straight Pascal. Hi returns the most significant byte (MSB) of its 2-byte integer parameter (n), and Lo returns the least significant byte (LSB). You can't write the Hi function with the integer division DIV operator because of the way Pascal treats all integers as signed values. The expression (n DIV 256) in Pascal doesn't return the MSB of n, as it sometimes does in other languages.

The .FUNC commands in lines 13 and 45 tell the assembler to expect a Pascal function. In both commands, the 1 indicates that the Pascal host program will pass a single-word parameter to the external functions.

Listing 6 is an example host program that uses Hi and Lo. To try it, first type in both **Listings 5** and **6**. Assemble **Listing 5** to HILO.CODE, compile **Listing 6** to HILOTEST .CODE, then link them. Execute HILOTEST to convert integers to hexadecimal. Notice how the two external functions pass the MSB and LSB of

Listing 5. HILO.TEXT.

```
 0: ; Extract high / low bytes from integers : Apple Pascal 6502 Assembler
 1:
 2: ;----- Equates
 3:
 4: RETURN          .EQU    0       ;2-byte variable for return address
 5:
 6:
 7: ;---------------------------------------------------------------
 8: ;
 9: ;       FUNCTION Hi( n : integer ) : Byte;
10: ;
11: ;---------------------------------------------------------------
12:
13:         .FUNC HI,1              ;1 word parameter
14:
15:         PLA                     ;save return address to Pascal
16:         STA     RETURN
17:         PLA
18:         STA     RETURN+1
19:         PLA                     ;throw away extra 4 bytes on stack
20:         PLA
21:         PLA
22:         PLA
23:
24:         PLA                     ;throw out low byte of parameter (n)
25:         PLA                     ;get high byte of parameter (n)
26:         TAY                     ;save high byte in Y
27:         LDA     #0              ;set A equal to zero
28:         PHA                     ;push zero as high byte of result
29:         TYA                     ;restore high byte from Y to A
30:         PHA                     ;push low byte of result
31:
32: EXIT    LDA     RETURN+1        ;replace return address on stack
33:         PHA
34:         LDA     RETURN
35:         PHA
36:         RTS                     ;return to Pascal
37:
38:
39: ;---------------------------------------------------------------
40: ;
41: ;       FUNCTION Lo( n : integer ) : Byte;
42: ;
43: ;---------------------------------------------------------------
44:
45:         .FUNC LO,1              ;1 word parameter
46:
47:         PLA                     ;save return address to Pascal
48:         STA     RETURN
49:         PLA
50:         STA     RETURN+1
51:         PLA                     ;throw away extra 4 bytes on stack
52:         PLA
53:         PLA
54:         PLA
55:         PLA                     ;get low byte of parameter (n)
56:         TAY                     ;save low byte in Y
57:         PLA                     ;throw out high byte of parameter (n)
58:         LDA     #0              ;set A equal to zero
59:         PHA                     ;push zero as high byte of result
60:         TYA                     ;restore low byte from Y to A
61:         PHA                     ;push low byte of result
62:
63: EXIT    LDA     RETURN+1        ;replace return address on stack
64:         PHA
65:         LDA     RETURN
66:         PHA
67:         RTS                     ;return to Pascal
68:
69:
70:         .END                    ;end of assembly text
```


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parameter v in lines 33 and 34 of **Listing 6**.

The functions in **Listing 5** can serve as starting places for your own external routines. As **Listing 5** shows, you can have two or more externals in one file and assemble them all at the same time. The effect is identical to having separate routines in separate files, which you would assemble and link one by one to a Pascal host.

Notice the way function Hi removes the 4 extra stack bytes at lines 19–22, and pushes the function result on the stack at lines 28–30 before returning to Pascal. Function Lo operates similarly at lines 51–55 and 59–61. Except for these differences, the functions are similar to the other external procedures.

And Finally. . .

You can find more information about the Apple Pascal assembler in the new 1.3 manual. It contains new examples, plus information on using macros to construct complex assembly-language routines you can insert into your programs. Macros let you write a routine once and then use it by name later, in much the same way you'd write a Pascal procedure, then

Listing 6. HILOTEST.TEXT.

```
 0: PROGRAM HiLoTest;
 1:
 2: TYPE
 3:    Nybble = 0 .. 15;     (* four-bit values *)
 4:    Byte = 0 .. 255;      (* eight-bit values *)
 5:
 6: VAR
 7:    value : integer;
 8:
 9:
10: FUNCTION Hi( n : integer ) : byte; external;
11: FUNCTION Lo( n : integer ) : byte; external;
12:
13: FUNCTION HexDigit( n : nybble ) : char;
14: (* Return one of the hexadecimal digits *)
15: (*  0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F for value n *)
16: BEGIN
17:    IF n < 10
18:       THEN HexDigit := chr( ord( '0' ) + n )
19:       ELSE HexDigit := chr( ord( 'A' ) + n - 10 )
20: END; (* HexDigit *)
21:
22: PROCEDURE HexByte( b : byte );
23: (* Display 8-bit b in hexadecimal *)
24: BEGIN
25:    write( HexDigit( b div 16 ), HexDigit( b mod 16 ) )
26: END; (* HexByte *)
27:
28: PROCEDURE ShowHex( v : integer );
29: (* Display v in hexadecimal *)
30: BEGIN
31:    writeln( 'Integer value     = ', v );
32:    write( 'Hexadecimal value = ' );
33:    HexByte( Hi( v ) );
34:    HexByte( Lo( v ) );
35:    writeln
36: END; (* ShowHex *)
37:
38: BEGIN
39:    page( output );
40:    writeln( 'Hi / lo function test' );
41:    REPEAT
42:       writeln;
43:       write( 'Integer value? (0 to quit) ' );
44:       (*$i-*) readln( value ); (*$i+*)
45:       ShowHex( value )
46:    UNTIL value = 0
47: END.
```


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activate it by name in your program. The new manual contains a small library of macros with routines to move memory, add temporary debugging statements to programs, save and restore registers, call routines via a jump table, set and restore bits in bytes, and other routines.

In my next column, I'll discuss ways to break large Pascal programs into pieces with segmentation and units techniques. I've used these methods to construct programs containing more than 10,000 lines of programming. As I'll explain then, there's virtually no job too large for Apple Pascal.■

Tom Swan is the author of the Apple Pascal series Pascal Programs for Business, Pascal Programs for Games and Graphics, *and* Pascal Programs for Data Base Management, *published by Hayden Book Company. Address correspondence to Tom at P.O. Box 206, Lititz, PA 17543. Please enclose a self-addressed, stamped envelope if you want a personal reply.*

Entering Apple Pascal Programs

1) Boot Apple Pascal. Single-drive users boot with disk APPLE3: followed by APPLE0:. Multidrive users boot with APPLE1: in drive 1 and APPLE2: in drive 2.

2) Type E to start the editor, automatically loading a previously edited SYSTEM.WRK.TEXT work file on your boot disk. If it doesn't find an old work file, the editor asks for a filename. In that case, press return to begin a new work file, or type the name of the file you want to edit. (Don't type the .TEXT filename ending—the editor adds it if you don't.)

3) Type I to insert new text, then type in the listing. Ignore the reference numbers and colons to the left of each line of the listing. Type only the text to the right of the colons. You can use uppercase, lowercase, or both.

4) Type control-C (alias Etx, for "End of text," in many editor prompts) to stop inserting. It's a good idea to do this from time to time and then type I to continue inserting. Before you type control-C, your text goes into a temporary memory area; control-C tells the editor you want it to keep that text. If you hit escape instead, you throw the insertions away. Control-C is an important key combination to remember—and use frequently.

5) To correct mistakes, use the arrow keys to move the cursor. (Control-O and control-L serve as up and down keys on older Apples.) Type X to exchange (replace) characters. Type D and move the cursor (or press return) to delete characters and lines. Typing control-C saves your changes; pressing escape throws them away, recovering your original text. Check your Pascal manuals for more information about these and other commands.

6) To save text on disk, type Q to quit the editor and U to update SYSTEM.WRK.TEXT. After writing your text to disk, the editor returns you to the Pascal command line.

7) To run your program, type R. Version 1.3 users must also press return or type a file or device name, such as PRINTER:, at the output-listing prompt. The compiler reads SYSTEM.WRK.CODE, then loads and runs your program. If you see an error message instead, type E to return to the editor and fix your typos.

8) To save your program and start a new work file, type F from the main command line to use the Pascal Filer. Then type S and a filename to save the text now temporarily stored in SYSTEM.WRK.TEXT. For example, to save your work as MYPROG in drive 2, type #5:MYPROG; in drive 1, type #4:MYPROG. (Pascal calls drive 1 #4: and drive 2 #5:.)

9) To start a new program after saving, type N while still using the Filer. Answer Y to the prompt asking whether you want to throw away your work file. This erases both SYSTEM.WRK.TEXT and SYSTEM.WRK.CODE from your boot disk. Finally, press Q to quit the Filer and return to the main Pascal prompt. Continue from step 2 to type in another listing.□ **—T.S.**

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Continued from p. 38.

performance of their computers. I know—I own one. But since Apple canceled that machine, the Apple /// has been locked into only a handful of productive software applications. Titan Technologies is trying to alleviate that condition with its Apple /// plus //e cards.

The Apple /// has always had Apple II compatibility, but it was a software-initiated, 40-column, DOS-based variety with no frills and fewer fans among Apple /// owners. It was a concession, not a feature. When Apple replaced DOS with ProDOS, there wasn't even that. But Titan has changed things.

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The /// plus //e system consists of two boards connected by a small ribbon. You first remove the Apple ///'s video-control ROM and connect a cable from the vacant socket on the ///'s motherboard to another socket on the /// plus //e system. Then insert the boards into slots 2 and 3 on the Apple ///.

When you boot the Apple /// with Titan's special emulation disk, it "becomes" an Apple //e with an apparent extended 80-column card (128K of RAM) in slots zero and 3, a serial I/O device in slot 2, a disk-drive controller card in slot 6 (available for the internal Apple /// drive as D1 and one external drive as D2), a clock/calendar card in slot 7 (if your /// has a clock chip installed), two RAM disks (the Apple //e's standard 60K device in slot 3 and another composed of your Apple ///'s RAM—either 128K or 256K—addressed from slot 5), a joystick port, and Applesoft in ROM.

That's quite an array of features crammed into two of the Apple ///'s four slots. And, of course, your Apple /// becomes DOS- and ProDOS-compatible.

Two jumpers control the other Apple /// slots. When you connect the jumper for slot 1, all output normally directed through it by the Apple II's PR#1 command is sent through the Apple ///'s built-in serial port. Without the jumper, the slot must have either a printer-interface card or any interface card that's Apple II compatible (and, therefore, not available to the Apple ///). Use the slot-4 jumper if you've connected a ProFile hard disk to your Apple ///, but not if you've plugged in an Apple II device (such as a ProFile hard disk with an Apple II interface card).

There's graphics, too. Titan has not only included enhanced video firmware and mousetext characters, but double hi-res capability, as well. And it didn't forget the Apple ///'s native mode. The emulation disk provides a driver that lets you use the /// plus //e's 128K of memory as a RAM disk for the Apple ///.

Quibbles

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with the system. Installation is a snap (you remove one chip from the ///—without removing the motherboard), and the manual is the best piece of Apple /// literature I've seen. But it won't replace that Apple //e or //c you've had your eye on.

First of all, I know only a few Apple /// owners who still have two of the miserly four slots available. Something has to go. On my system, that meant abandoning either the SoftCard for CP/M or the UPIC parallel-printer interface. Ultimately, as my expensive letter-quality printer is parallel, that also meant rearranging the SOS drivers and purchasing a serial-to-parallel converter.

If you're doing quite a bit of telecommunication, Titan reminds you that the Apple /// internal serial interface isn't fully compatible with the Super Serial Card. If your Apple II application expects the SSC, you'll most likely need to purchase one.

One more hardware complaint: These Titan boards are literally packed with chips, which generate heat. Heat has always been a formidable enemy of the Apple ///, so I felt compelled to add a pair of fans to the back of the machine with the /// plus //e system installed.

From a software point of view, the only problem appears to be that Apple II Pascal won't run on the /// plus //e system. Instead, you'll need to work with the ///'s own Pascal. I had no problem running the PFS series, though, which is written in Pascal, in emulation mode. Titan also claims that you can run many //c-specific applications, such as SuperCalc3a, by replacing the 6502B NMOS processor with a 65C02 CMOS chip (Titan sells it as an option).

Despite these quirks, if you're an Apple /// owner who doesn't want to abandon the machine, yet still wants a good amount of Apple //e compatibility, this is the card you've been waiting for—unequivocally.■

Bill O'Brien
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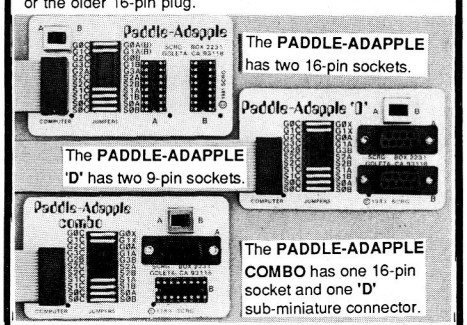

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mer Judi Bliss' son was bored silly with the arithmetic programs available, so she designed Math Magic for him—and Bliss' staff has kept things simple to this day. The programs will run on a trusty II Plus with one drive, though all offer music and hi-res color graphics and six of the 11 support a mouse.

The user's guides, while no more than a dozen pages apiece, are pleasantly complete, with sections and tips for parents and teachers. MindPlay's service policy is excellent: While the programs are copy-protected, damaged disks are replaced during the 90-day warranty period for $5, and backups cost only $7.50. Answers to product questions are just a toll-free phone call away.

Math Magic

In Math Magic, the most popular MindPlay game to date, four- to nine-year-olds use the on-screen paddle and balls to knock down a brick wall behind which they find lurking monsters or hidden presents. When these pop up, so do math questions. Depending on the child's age and ability, questions may involve counting, addition (with or without carrying), and subtraction (with or without borrowing).

Besides reversing the traditional approach—math problems are the reward for playing an arcade game, not vice versa—Math Magic, like all MindPlay games, has a Challenge Upgrade feature that lets you tailor the program to your child's age and skill level. Few children follow identical rates of educational and physical development; the Challenge Upgrade lets you increase problem difficulty while decreasing the level of eye-hand coordination required, or vice versa. If you have a couple of kids in the suggested age range, this feature lets one program do the work of two.

As with most other MindPlay games, Math Magic lets parents and teachers develop custom lessons by entering up to 18 math questions to complement homework sheets or reinforce lesson plans. Whether you use the program's randomly generated problems or your own, Math Magic provides performance scores for each skill tested and a composite score.

Whether one child or a classroomful use Math Magic, they don't seem to tire of it. MindPlay games have enough randomness built in so that even after months of fun, a child may not play the same game twice. When a child achieves a given level, more challenges lie ahead.

RoboMath and Campaign Math

Bliss' first program has spawned other entertaining math games. RoboMath (ages 8 to adult) is an arcade-style game that could earn an endorsement from the Environmental Protection Agency: While Trashbots roam around littering your town, RoboMan can help you pick up the litter if you're deft with your ball and paddle. Quiz Boxes of multiplication and division questions help you raise your score. Ultimately, you can close down the Trashbot factories by hitting a ball through their doors.

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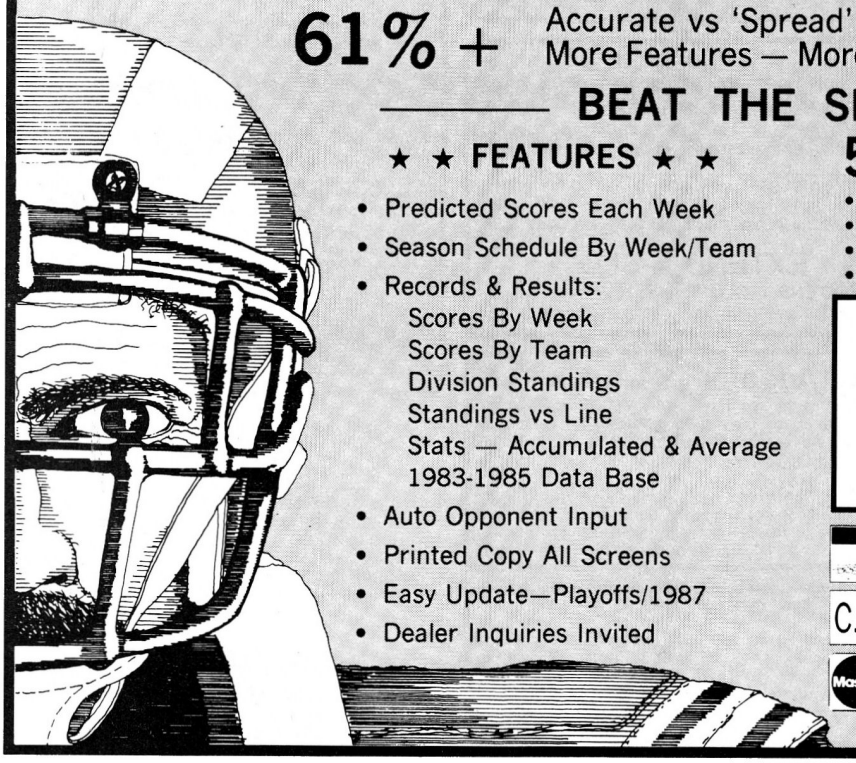

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Sounds easy? If it is, you're probably in Normal mode. Try "Tricky" and "Extra Tricky" instead.

Campaign Math, by contrast, isn't an arcade game, but a one- or two-player simulation of the election process. Besides teaching players (ages 9 to adult) how to solve problems involving ratios, fractions, and percentages, it teaches them about politics.

Like a real campaign, this one begins when your child chooses issues for his or her platform. Polls, the telephone, radio, TV, and the newspaper help players learn where voters stand on the issues—for example, that 45 percent of 20 people in the community favor spending more money on mass transit. How many people is that? Enough to support a campaign platform? The Challenge Upgrade lets you type in your own issues and math material.

Once a candidate picks the issues that will make him or her more popular with the voters, it's on to the next level of the game: fund raising. Here the young pol uses the mailbox and banquet table to contact individuals, groups, and clubs to collect money for deposit at campaign headquarters. Sometimes the Scandal Bugs circulate rumors that cost the candidate money.

After acquiring enough popularity points and cash, the race begins. Candidates meet on a track filled with hurdles they clear by purchasing advertising in the newspaper or on radio, TV, or signs.

Dyno-Quest

While I get really fired up about Campaign Math, MindPlay's Dyno-Quest leaves me feeling lukewarm. In this scientific simulation for ages 8 and up, you accompany Donnie and his dog Doobie back to the age of dinosaurs, searching for a target dinosaur by exploring the Cretaceous, Jurassic, and Triassic eras.

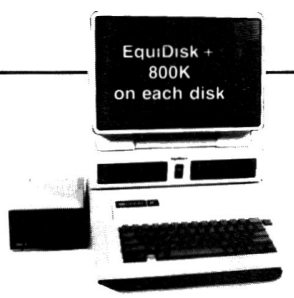
In each era there are five continents to explore; on each continent you learn about the carnivorous and herbivorous dinosaurs living at that time. Each beast's name is spelled out phonetically as well as conventionally. (With dinosaur names, that's a real plus.)

You also encounter hazards like storms and volcanoes, which can damage your vehicle. You begin each journey with a given amount of fuel and food (meat and plants), used to repair your wheels and to feed dinos or bribe them for information. The upgrade feature lets you alter the amount of supplies.

Ace Reporter

Another simulation, Ace Reporter, teaches reading skills in a unique way. Your child (aged 7 to 11) takes the role of Cub, Staff, or Ace Reporter, using the teletype and telephone to collect the Who, What, When, Where, and Why (or How) information to fill his or her notepad and send the story to press. If the facts are right, the reporter can finish the story (and demonstrate his or her understanding of the main idea) by selecting the best headline. Stories with headlines can be printed.

I was disappointed that although



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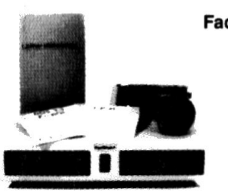

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the reporter must pick out the facts and determine the main idea, he or she has no chance to write the story itself. Instead, the reporter sits somewhat passively as the story appears on screen. Don't we writers wish it were so easy!

When I mentioned my complaint to Judi Bliss, she said that teachers who helped shape MindPlay products suggested that a composition feature might cloud the program's principal intent, which is to help students read for detail and discover the main idea. She added that forthcoming programs will help pre-primary and older students with writing.

Race the Clock

Like Ace Reporter, Race the Clock helps students develop language skills. In this Concentration-style game, children aged 5 to 8 match a verb with an animated scene depicting the action. Scenes and words are hidden in "secret boxes" on the computer screen. A software clock keeps track of your time, which you can set for one to nine minutes per game.

Younger students can match picture with picture; older ones, word with word. Parents and teachers can create their own word lists with new vocabulary, opposites, or anything else—not just verbs—though games you create have no animated-graphics option. Whether you use the 60 built-in verbs or your own words, you can change the number of boxes on screen and thus the number of matches required to win.

An Alternative to Television

MindPlay's success stems not just from Judi Bliss' 20 years' experience with computers but from her nine years' experience as a parent. Her programs are colorful and entertaining—and, thanks to Challenge Upgrade, flexible enough to "always fit." Endorsements from parents and teachers convince me that these programs don't sit on the shelf.■

Cynthia E. Field
Wakefield, RI

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original Springboard version (*inCider*, August 1985, p. 64), The Newsroom is an integrated system for producing newsletters, pamphlets, brochures, flyers, handouts, and just about anything else you can do with a graphics-capable printer.

Going to Press

The Newsroom lets you prepare text with a word-processing function and add graphics from a file of "clip art." You access all Newsroom facilities via departments depicted on the main menu—Press Room, Copy Desk, Layout, Banner, and Photo Lab. An icon menu indicates the functions in each department. You can use keystrokes or a joystick to move the cursor from icon to icon to select, crop, and move your pictures around on a layout block. The program then lets you lay out headlines and banners (in any of three typestyles) and juggle all the elements of the page.

Teachers will find The Newsroom an entertaining vehicle for stimulating interest in creative writing: Children can produce their own illustrated storybooks, poetry, and plays. Its simple operation makes it particularly effective as a classroom tool. The Newsroom's command and control system is easy to learn and should be within the grasp of students in grades 5 and up.

Teachers will have to carefully guide their students through the learning stages of the program, though. The tutorial should be suitable for high-school students, but children in grades 5 through 8 may have trouble following it. Teachers at those levels may find their own simplified course materials more useful. Fortunately, there's plenty of support in the program manual, including a lengthy reference section.

The package comes with detailed instructions for teachers planning to use The Newsroom to publish a student newspaper. It covers the basics of organizing a staff, writing news stories and editorials, preparing headlines, editing copy, laying out an attractive page, and setting up advertisements. Students can also design custom illustrations and graphs for reports.

The Newsroom can also help teachers produce classroom materials that are bright with graphics and headlines: tests, fact sheets, worksheets, and almost any other printed material you're accustomed to preparing for your class. The Newsroom's effectiveness is limited only by the imagination of the teachers and students using it.■

Brian J. Murphy
Fairfield, CT

Falling Short

COMMWORKS

PBI Software, 1111 Triton Drive, Foster City, CA 94404

Telecommunications program; Apple //c or 128K //e with modem
$95

Ease of learning ■■■
Ease of use ■■■
Documentation ■■
Support ■
Overall ■■

CommWorks reminds me of one of those stories in which happy and unhappy events alternate:

I was invited to a party. But the party was 3000 miles away. I got a free airplane ride. But the airplane crashed. fell into a big pile of hay. But there was a pitchfork in the hay.

Although CommWorks offers many happy features, it suffers from a number of unhappy limitations. CommWorks tries to do everything you'd expect from a communications program—and more. But the version I tested [1.06] falls just short of the mark.

Logging On with Macros

Through a series of easy-to-use menus, CommWorks helps you create a separate "communications file" of all the important numbers and technical requirements for each computer you want to call. Each file contains telephone number (pulse or touch-tone), pause lengths, access code, baud rate, number of data bits, parity, and duplex and terminal information (TTY, VT100, VT52). You can choose to transfer data with or without XModem and to save downloaded text in an ASCII or AppleWorks file. For each communications file you can also se-

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lect xon/xoff handshaking, incoming and outgoing line feeds, and automatic log-on.

Automatic log-on requires you to first create macros. A communications file can include 18 different macros of 32 characters each, including control characters. You can chain all 18 macros to work in series with a single telephone number or key press; if necessary, you can create additional files with 18 macros each for the same computer service. The number of communications files is limited only by disk space. To make a call, simply follow the menus to load a communications file, and CommWorks will dial and log on for you automatically.

The macros sound great, but there are a few hitches. Automatic log-on looks for only a single character before responding, so you can't, for instance, look for the hyphen if a bulletin board includes two of them in a prompt (such as "Complete your phone number: 415-349-_____"). CommWorks also can't wait for the @ symbol, a Telenet prompt. Its macro series allows no branching (to get waiting mail, say, or to disconnect if the host computer is shut down). VT100 emulation doesn't permit full-screen editing (at least not on the VAX or 3B2 I tried). The auto-answer default (three rings) doesn't work with all modems. And, most frustrating, you can't change 8 data/1 stop bit to 7 data/1 stop bit from within the program with the Super Serial Card settings CommWorks recommends.

Sending and Receiving

One CommWorks feature pleases me enormously: saving incoming text as either an AppleWorks word-processor file or in ASCII format. Unlike Apple Writer II and many other word processors, AppleWorks can't read ASCII files directly, so you must first change them to AppleWorks format. CommWorks eliminates that tedious process. CommWorks also offers a version of XModem that lets you send or receive AppleWorks files with their file types if you're connected to one of the few programs—such as CommWorks or ASCII Express Pro (ProDOS)—that can accept them.

Two computers using CommWorks are also supposed to be able to transfer an entire disk, but my attempts with three different disks all failed. (If you try this on a long-distance call, be prepared for a big bill; each try took more than 25 minutes.)

CommWorks' standard implementation of XModem is less than satisfactory for me because it saves all downloaded files as binary rather than text files. You'll need some way to change either the file's address (saved as $0000) or its type to use it. The program provides no way to strip line feeds from XModem downloads. These limitations put error-free downloading beyond the capability of novices. CommWorks would be much more efficient if it offered a choice of file type for XModem downloading (as Apple Access II does) or the ability to convert file types within the program.

File Management

CommWorks sets aside 35K of the 128K Apple memory as a capture

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buffer to hold incoming text, but if you have an extended-memory card, you're in for a special treat. The program recognizes Checkmate Technology's MultiRam and Applied Engineering's RamWorks II or Z-RAM boards, and automatically partitions as many as 16 capture buffers of 35K each. (You can also save incoming data to disk.)

This system makes it wonderfully easy to receive information into different files and to send files quickly. You can load a file into the buffer from disk (open apple-L) and even append other files (open apple-A). Other open-apple commands turn recording on and off, change from one buffer to the next, send the contents of a buffer, save a buffer to the current disk or pathname, view the current buffer, or clear it.

Although not intended as a complete word processor, CommWorks' text editor lets you write, change, and delete the contents of the selected buffer. Despite its limitations (you can scroll or delete only one line at a time, for instance), this line-oriented editor does allow changes before sending or saving a file.

Unfortunately, CommWorks uses xon/xoff only for sending, not receiving, on the mistaken assumption that no one will want to take in more than 35K in a single gulp. If you want to download a batch of letters, say, you have to watch the buffer fill up, stop the incoming material with control-S, switch buffers, and start the flow again with control-Q.

Extras

CommWorks follows the AppleWorks convention of stacked index-card menus and uses some of the same open-apple commands. Not every CommWorks command means the same thing it does in AppleWorks, though, and alas, commands aren't always consistent even within CommWorks. For example, open apple-D "disconnects" when you're in one part of the program, but "deletes a line" in another part. Open apple-H (to print the screen) and open apple-P (to print the buffer) didn't work at all, even with a standard Apple Dot Matrix Printer and parallel card.

CommWorks will save you from most possible mistakes—accidentally disconnecting, for example, or changing carefully created macros. It won't warn you, though, if you exit the program with unsaved text still in its buffer, or if you try to load too long a file into the edit buffer.

If you boot up with Jeeves desktop accessories (also from PBI), you'll have access to your calendar, calculator, and notepad. The Jeeves screen clock and alarm clock can't appear when you're actually exchanging information with a remote computer, though.

Documentation and Support

CommWorks' 87-page manual includes a good glossary of terms, detailed instructions on copying disks, and step-by-step explanations of each menu. The booklet lacks an index, but it tells you almost everything you need to know to run CommWorks.

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The group shares an electronic bulletin board to help members get answers to their questions. The board includes an on-line library of AppleWorks word processing, spreadsheet and data base templates.

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You have to work to get some of that information, though. For instance, the documentation tells you to check the settings on the serial card, then—67 pages later, in an appendix—gives you the settings CommWorks requires. Typos, awkward syntax, and sloppy punctuation spoil what is obviously a well-intentioned effort to teach the program.

When I called to ask about the deficiencies in the program, the PBI support staff were friendly and cooperative. They couldn't explain most of the problems, but offered to call back. When I hadn't heard from them in three days, I called again, and once more they agreed to get the answers and phone me. They did call, a few days later, with the incorrect guess that an accelerator card had made the print function fail. They promised to call again with another answer, but I'm still waiting.

Next-to-the-Last Word

CommWorks version 1.06 is an adequate program that promises to combine power with ease of use. Consider the current edition, despite its flaws, if you find one of its special features essential. Otherwise, I suggest you wait for PBI to repair the program's deficiencies. I hope it will have the last word with a truly efficient, upgraded CommWorks.■

Tom Sherman
Swarthmore, PA

Editor's note: According to PBI's Eric Wong, reviewer Sherman was prophetic. CommWorks version 1.2, shipping at presstime, fixes many of the above complaints: It can look for logon characters including multiple hyphens and @ symbols, saves XModem downloads as text as well as binary files, warns of a full or unsaved text buffer, and supports virtually all parallel interface cards. Wong also blames Sherman's accelerator card for the failure of the timing-sensitive disk-transfer feature.

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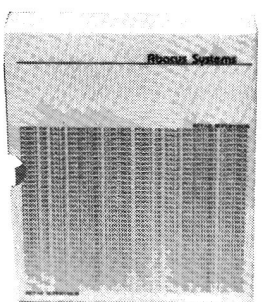

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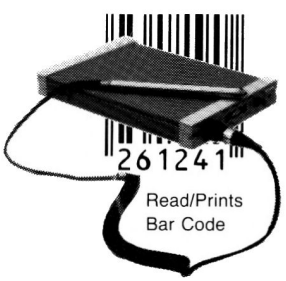

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The Retail Supervisor is available for the Enhanced Apple IIe and Apple IIc.

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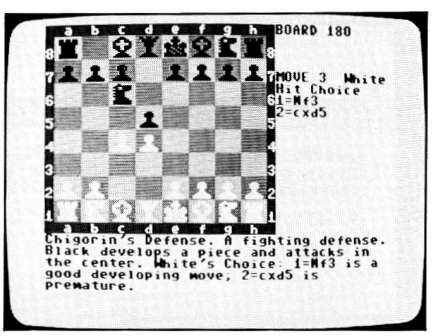


Your Move

PAUL WHITEHEAD TEACHES CHESS

Enlightenment, 1240 Sanchez Street, San Francisco, CA 94114

Chess tutorial and chess-playing program; any 64K Apple II
$49.95

Ease of learning	■■■■
Ease of use	■■■
Documentation	■■
Support	■■■
Overall	■■

Paul Whitehead Teaches Chess is a software product with ambitious goals: to teach beginners the game of chess, and to help them achieve a respectable level of skill. While it succeeds in the former, the program

When you really want to see how Apple works...

AutoWorks *by Alan Bird*

(AUTOmatic AppleWORKS)

AutoWorks adds to AppleWorks several important time-saving features including mail merge, file organizing, macros, new AppleWorks commands and mouse control.

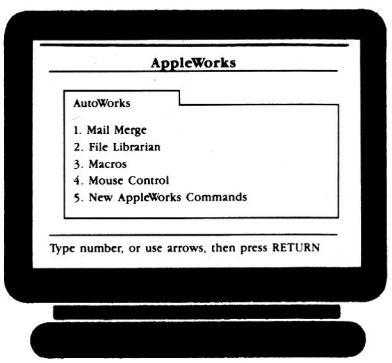
MAIL MERGE allows you to automatically print form letters and fill out forms from your Apple Works data base files. Form letters are reformatted to accommodate varying lengths of names, addresses, etc. Since AutoWorks is built-in, there is never any need to leave AppleWorks to do a mail merge.

AutoWorks allows you to use your MOUSE to make menu selections and to quickly scroll through and position the cursor in your document, data base file or spreadsheet. This feature alone is worth the price of AutoWorks.

With AutoWorks' powerful MACROS, you can automatically enter hundreds of keys including AppleWorks commands with a single keystroke. You can, for example, print out one or several reports by entering one key. The macros are easily updated instantly using the AppleWorks word processor. New AppleWorks commands are also included with macros such as forward delete, word delete, jump to beginning or end of line, etc. With macros you can even create your own AppleWorks commands.

The Disk Librarian helps you keep track of all your disk files. It reads ProDOS file information directly from your disks into an AppleWorks data base file where you may search for certain files and disks, sort on various file characteristics, find disks with free space, etc.

AutoWorks is compatible with AppleWorks versions 1.1, 1.2, and 1.3.



AutoWorks
$39.95

FontWorks *by Mark Simonsen*

Good-looking Printing for AppleWorks

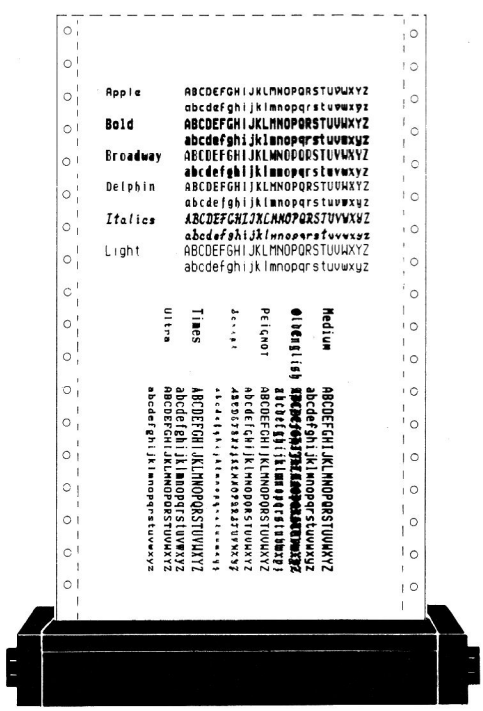
Now you can print your AppleWorks files in a variety of typestyles. FontWorks reads your Appleworks files directly (no need to save them in a different format) and prints them with the typefaces you choose. You can even print your files sideways — great for those wide spreadsheets.

There are no complicated commands to learn. FontWorks incorporates the same easy-to-use menu style as AppleWorks.

Choose from 15 typefaces of various styles and sizes, including Broadway, Delphin, Old English, Peignot, Script, Times, and many more. You can use up to 4 of these typefaces at one time when printing your AppleWorks files. And FontWorks comes with its own Font Editor, allowing you to customize our typefaces or create your own.

FontWorks works with any Apple IIe or IIc and is compatible with most popular dot-matrix printers, including ImageWriter, Epson, and Okidata.

Note: Owners of previous versions of FontWorks may upgrade for FREE by returning their original FontWorks (disk only) to The Software Touch.



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doesn't provide enough depth to turn beginners into middle-level players.

The program consists of two parts: a chess tutorial (three disk sides) and the Coffeehouse Chess Monster, a chess-playing program. The basic tutorial teaches you how to move and capture and explains the object of the game. This section is the best part of the program. Instead of static diagrams in a book, you get to see the way the pieces move—and exactly what *check* and *checkmate* mean. The latter concept is often especially difficult for beginners.

Moving around the tutorial is easy. Using a series of menus, you choose the topics you want to study. After typing in your selection, you advance in a particular subject area by pressing the right-arrow key; the left-arrow key lets you back up. When you reach the end of each part of the tutorial, pressing the right-arrow key takes you to the next section or the next menu.

You can also jump around within the tutorial. A road map identifying the board number at the beginning of each section accompanies the program; you can skip to any section by typing the corresponding board number.

My only complaint regarding the introductory areas of the tutorial is that they often use chess jargon, such as *hole* and *passed pawn*, before defining these terms.

Beyond Beginner

After going through the introductory tutorial a few times, anyone who can read should be able to play a game of chess—albeit poorly. Subsequent tutorials cover strategy, tactics, and the three phases of any game: the opening, middle game, and endgame.

The program goes astray here because it tries to do too much. For example, it gives you only a cursory look at all the major opening systems (there are dozens) without imparting an understanding of what you should be trying to accomplish in the opening.

The tutorial also doesn't present the elements of chess—material, time, space, and position—in enough depth. (All other things being equal, an advantage in one element should be enough to win a game.) The tutorial covers the material element in detail—the number and types of pieces you have left—but fails to do the same for the other three. For beginners, of course, the material element is the easiest to understand (if I have two rooks and you have one, I'll probably beat you), but before advancing to middle levels of play, a beginner must have a better understanding of time, space, and position than the tutorial provides.

The Coffeehouse Chess Monster exhibits the same strengths and weaknesses as the tutorial. It expertly calculates combinations and exchanges, but bases most of its decisions on material considerations. For example, playing black against my Queen's Gambit, it invariably accepted the gambit and tried to hold onto the extra pawn; just as invariably I was able to recapture the pawn with material and positional advantages.

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- 16 single ended channels (single ended means that your signals are measured against the Apple's GND.) or 8 differential channels. Most all the signals you will measure are single ended.
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- Very fast conversion (25 micro seconds).
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- The user connector has +12 and -12 volts on it so you can power your sensors.
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- The entire system is on one standard size plug in card that fits neatly inside the Apple.
- System includes sample programs on disk.

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A/D & D/A

A/D & D/A Features:

- Single PC card
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- 8 channels D/A
- Superfast conversion time
- Very easy programming
- Many analog ranges
- Manual contains sample applications

A/D SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- Fast conversion (.078 MS per channel)
- A/D process totally transparent to Apple (looks like memory)
- 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.

The signal conditioner's outputs are on a high quality 16 pin gold I.C. socket that matches the one on the A/D's so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to ½ mile away from the A/D.
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- Large bread board area.
- Full detailed schematic included.

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- The I/O 32 is your best choice for any control application

The I/O manual includes many programs for inputs and outputs.

Some applications include:
Burglar alarm, direction sensing, use with relays to turn on lights, sound buzzers, start motors, control tape recorders and printers, use with digital joystick.

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Please see our other full page ad in this magazine for information on Applied Engineering's Timemaster Clock Card and other products for the Apple.
Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products compatible with Apple II and //e.

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The program made the same mistake on all levels of play. The Coffeehouse Chess Monster is a good tactical program—just what beginners need—but it isn't a well-rounded opponent.

The tutorial and the Coffeehouse Chess Monster occupy both sides of two copy-protected disks. With the package you also get the road map, a four-page instruction sheet, a warranty sheet, and a certificate that lets you purchase a second copy of the program for $25. You can replace damaged disks for $5. Prominently displayed on the warranty sheet is a notice that unauthorized copying is illegal and immoral. I resent this heavy-handedness, especially since the sheet doesn't mention that you're permitted by the U.S. Congress to make a back-up copy of any software you own (see section 117 of the Copyright Act of 1976, as amended, 1980).

Paul Whitehead Teaches Chess *will* teach you how to play chess. It will also provide you with a competent opponent while you're learning. You'll have to complement it, though, with some basic reading of the ideas behind the game before you can progress beyond the beginner level.■

Robert M. Ryan
Sharon, NH

Editor's note: Martin Marshall of Enlightenment contends that "the reviewer criticizes the tutorial for not containing information [it] does indeed contain." To excerpt his primary complaints, Marshall says that the program includes three boards focusing on time or tempo, many examples of positional play, and enough advanced moves to teach U.S. Chess Federation middle-level players. Jargon or terms introduced on "parent" boards are later defined on "dependent" boards.

While Marshall describes the tutorial as "the world's greatest beginner's chess book," it "does indeed give only a cursory look at all the major openings," albeit, he says, a complete overview of opening principals. "To do a complete job on the openings," says Marshall, "would require five Apple disk sides," available in Enlightenment's "Jeremy Silman's Complete Guide to Chess Openings" ($49.95).

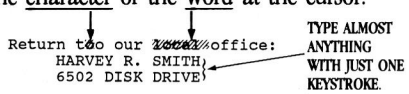
As for copy protection, while Marshall suggests inCider*'s view to be "Raise the Jolly Roger and screw the developers!", we feel computer users should have the right to a back-up copy of each program they own, given the lack of perfect hardware and crashproof disks. We do not condone piracy or stealing from developers.*

Editor's note: A review of the //e-compatible Laser 128 computer, scheduled for this month, has been postponed. Look for a comparison of the Laser and the new Franklin Ace 500 in an upcoming issue.

MacroWorks™ makes AppleWorks™ work the way it should have in the first place.

New Word Processing Power

MacroWorks streamlines AppleWorks word processing with a multitude of new features. For example, one quick keystroke now deletes the character or the word at the cursor.



Use one keystroke to jump to the start or end of a text line. Another keystroke will erase an entire line. Change your mind? Apple-U will instantly "Undo" your last delete command!

AppleWorks Macros

MacroWorks will convert any series of keystrokes into a new one-keystroke solid-Apple command (original open-Apple commands stay intact). Use our built-in macros, or define your own. For example, make Apple-N type your name and address. Or let Apple-X save or print *all* of your Desktop files, nonstop.

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Be creative! Set up macros to execute *any* often-repeated function. You can even skip unwanted questions like "How many copies?".

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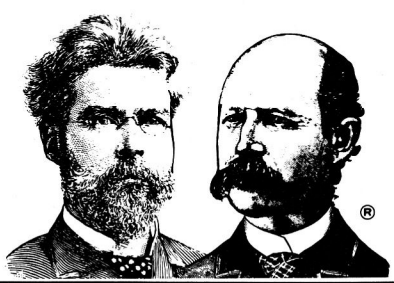
After updating your AppleWorks disk once, just boot normally. Now you can use your mouse to control AppleWorks. And you can define over 4,000 keystrokes-worth of custom macros.

MacroWorks is compatible with the Checkmate™and Applied Engineering (RamWorks™or Z-Ram™) Desktop Expanders.



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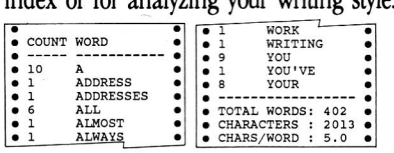
Multi-Column Printouts!

MacroWorks' Galley program prints your AppleWorks Word Processing files in side-by-side columns (two or three-wide) for faster and easier newsletter layouts.

Analyze Your Files

MacroWorks' File Analyzer program prints a sorted list of every word it finds, and reports the number of occurrences of each word and the average word-length. Great for making an index or for analyzing your writing style.



COUNT	WORD
10	A
1	ADDRESS
1	ADDRESSES
6	ALL
1	ALMOST
1	ALWAYS

1	WORK
1	WRITING
9	YOU
1	YOU'VE
8	YOUR

TOTAL WORDS: 402
CHARACTERS : 2013
CHARS/WORD : 5.0

Alphabetize Your Catalogs

MacroWorks' Alpha-Cat program prints a sorted two-column list of all the file names on a disk. Perfect for disk I.D. labels!

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MacroWorks works with all versions of AppleWorks on any Apple IIc or 128K IIe. And you can make disk backups without hassle.

(AppleWorks is a trademark of Apple Computer, Inc.)

AD #MW3

NEW PRODUCTS

edited by Lafe Low

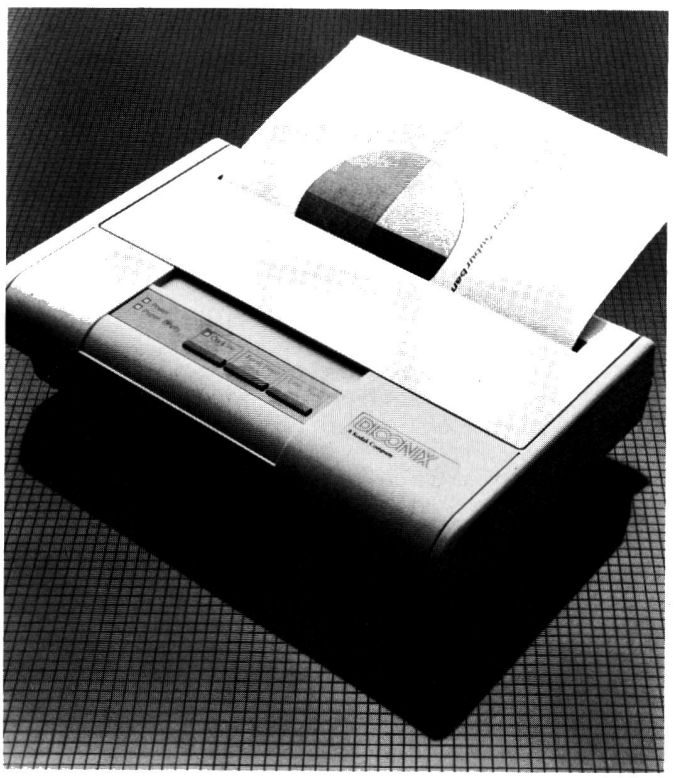
Hardware

The Lighter Side

For people who pack a **portable printer** when they travel, the new battery-powered Diconix 150 weighs less than four pounds. It prints on single letterhead sheets or continuous-feed paper at a speed of 150 cps in draft mode and 50 cps in near-letter-quality. The 150 can emulate the Epson FX and is compatible with major word processors. This portable printer retails for $479, from Diconix, 3100 Research Boulevard, Dayton, OH 45420, (513) 259-3100. Circle Reader Service number 358 for more information.

Locked Up

Keep unauthorized people from using your Apple II, II Plus, or //e. The Greeting Card II **programmable board** stores a security program in its 2K nonvolatile memory, and only those who know the password can use your computer. The Greeting Card also lets you leave short messages for other operators. The Greeting Card II retails for $89.95 (software for security coding and messages included), from Birchem Computer Products, 4813 Cameron Ranch Drive, Sacramento, CA 95841, (916) 489-7181, or circle Reader Service number 360 for more information.



The Diconix 150 portable printer weighs in at less than four pounds.

Mass Storage and More

AST's newest storage device is a 20-megabyte **3½-inch hard disk** with a 20-megabyte backup. This is the first mass-storage unit to combine SCSI (small computer systems interface) port, 3½-inch-disk technology, and built-in tape backup to allow high-performance data transfer between computer and disk drive. The AST-2000 retails for $2795, from AST Research, 2121 Alton Avenue, Irvine, CA 92714, (714) 863-1333. Circle Reader Service number 363 for more information.

A Dash of Color

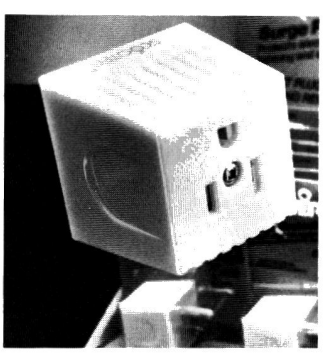
The Kaleidoscope II **RGB color board** features compact size, universal RGB-monitor compatibility, gold-edge connector contacts, and a two-page-memory operating system for programming foreground and background colors. Each text page, each individual line of text, and the background can be programmed independently for any of eight available colors. The Kaleidoscope II retails for $199, from Telemax, 780 Lorraine Drive, Box 339, Warrington, PA 18976, (215) 343-3000. Circle Reader Service number 362 for more information.

Hi-Res Display

Add multiple levels of **graphics** to your monochrome monitor. The Grafex hi-res card will display 640 horizontal pixels and 400 vertical pixels in its basic 32K configuration. This can be upgraded to 640 by 1600 pixels, enough memory for four pages of graphics. Grafex-Dimensions, an assembly-language driver, is also available. The Grafex card is $195, and the Dimensions Software is $45, from Ray Dahlby Electronics, Department 255, Box C 34069, Seattle, WA 98124, (604) 732-1080. For more information, circle Reader Service number 359.

Even Electricity

Protect your computer with the Scooter SP100 Guard-It single-outlet **surge protector**. Plug this 125-volt, 15-amp line protector into any three-prong wall socket, and you'll have an even flow of current. The Scooter sells for $9.95, from Ohm/Electronics, 746 Vermont Street, Palatine, IL 60067, (800) 323-2727, (312) 359-6040 within Illinois. Circle Reader Service number 361 for more information.



Prevent unstable electric currents with Curtis' Scooter surge protector.

Software

Perfect Pictures

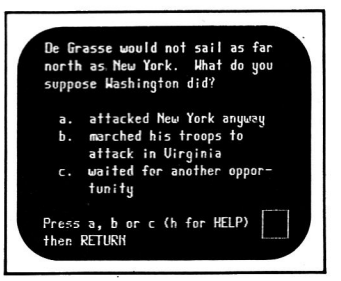
The Electric Crayon series—ABCs, Fun on the Farm, and This Land is Your Land—contain about **30 detailed pictures** each for your child to color. Moving a "crayon" cursor around the screen with a joystick, mouse, or KoalaPad, children aged four and up can choose from a palette of 16 double hi-res colors. Finished work can be printed in color on an Apple Scribe or ImageWriter II. Electric Crayon "coloring books" are available for $19.95 each, from Brian A. Rice, P.O. Box 1088, Westmont, IL 60559, (312) 789-8800, or circle Reader Service number 354 for more information.

Playing the Numbers

Combine **football action and whole-number or decimal drills**. One or two players can play Math Football, with a choice of four skill levels: high school (addition and subtraction), college (multiplication), pro (division), or Super Bowl (mixed operations). Answering the math problems correctly gets you yardage gains, first downs, touchdowns, and extra points after a touchdown. Each series (whole numbers or decimal drills) sells for $39.95, from Gamco Industries, Box 1911, Big Spring, TX 79721, (800) 351-1404, (915) 267-6327 within Texas. For more information, circle Reader Service number 357.

Our Founding Father

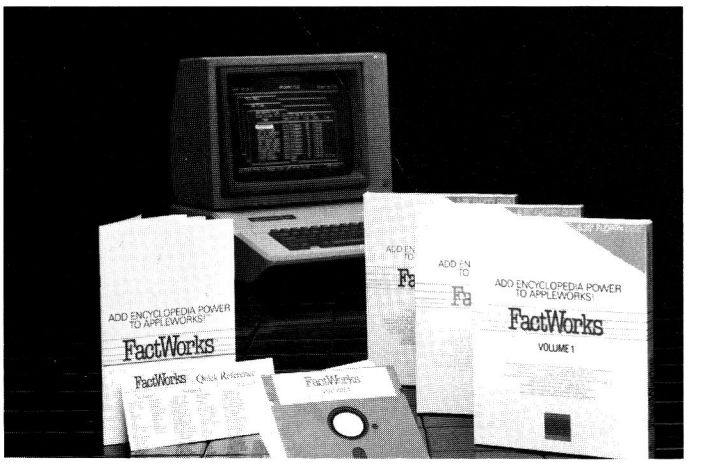
Students take an active role in shaping **18th-century historical events** in Washington's Decisions. This interactive program challenges students to match George Washington's decisions as it leads them through key events in Washington's life. Junior-high and high-school students will develop a greater understanding of Washington's roles in the Revolutionary War and as our first President. Washington's Decisions sells for $63, from Educational Activities, 1937 Grand Avenue, Baldwin, NY 11510, (516) 223-4666. Circle Reader Service number 355 for further information.



Washington's Decisions helps students understand early-American history.

Mouse Filing

Use your mouse to run MouseFiler, a new **file- and directory-manager** program that uses a desktop, windows, and pull-down menus. File operations include creating and displaying directories, copying, pasting, deleting, sorting, and comparing files. You can select single or multiple files individually or by file type. MouseFiler retails for $39.95, from Harbor Software, P.O. Box 872, Acton, MA 01720, (617) 263-1870. Circle Reader Service number 350 for more information.



FactWorks: three encyclopedia volumes for your AppleWorks data base.

Let the Games Begin

IntelliCreations has added **four new games** to its line. In 221B Baker Street, the life of famous detective **Sherlock Holmes** is re-created. Solve more than 30 different cases, with more available on supplementary disks. Crosscheck, a new concept in **crossword puzzles**, accommodates up to four players, who build a "chain" of words from the center of the board to their home base. **Fantasy** gamers can play The Never Ending Story, based on the book and film of the same name: You're cast as the hero, Atreyu, in the land of Fantasia. In Mind Pursuit, you can test your intelligence and knowledge of **trivia** as you answer true/false, multiple-choice, and fill-in-the-blank questions. The four games retail for $29.95 each, from IntelliCreations, 19808 Nordhoff Place, Chatsworth, CA 91311, (818) 886-5922. For more information, circle Reader Service number 352.

That's a Fact

With FactWorks, you can add quantities of **encyclopedia information** to your AppleWorks data base. FactWorks comes in three separate volumes with topics ranging from Countries, Continents, Cats, and Dogs, to Dinosaurs, Mythology, Mountains, and Measures. Look up Volcanoes and Reptiles, or plot a loan for your home or car. If you use AppleWorks, using FactWorks is just a matter of inserting a data disk (and you can add to or modify each disk). Suggested retail price for FactWorks is $32.95 per volume, from ImagiMedia Software, 16640 Roscoe Place, Sepulveda, CA 91343, (818) 891-3707. Circle Reader Service number 351 for more information.

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On File

The Filing System for Apple Writer can **store any type of text file** created with your Apple Writer word processor. This WPL program is user-modifiable and is fully listed and explained in the documentation. The package also includes the *Minute Manual for WPL*, a user guide to WPL programming. You can install Apple Writer and the Filing System on one 3½-inch disk and still have room for more than 500,000 bytes of data. The Filing System for Apple Writer sells for $99.95 (ProDOS or DOS 3.3), from MinuteWare Publishing, P.O. Box 2392, Columbia, MD 21045, (301) 995-1166. Circle Reader Service number 353 for more information.

Resources

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Apple Art

Learn to use your Apple for creating graphics: *Hi-Res/Double Hi-Res Graphics for the Apple //c and Apple // Family*, by William H. Dewitt, covers the use of programming to create images, including how to convert hi-res graphics to double hi-res. The second part of the book discusses available software and various input devices, as well as utility programs to customize off-the-shelf packages. *Hi-Res/Double Hi-Res Graphics* is $16.95 in paperback, from John Wiley & Sons, 605 Third Avenue, New York, NY 10158, (212) 850-6000. For more information, circle Reader Service number 365.

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Product Updates

● Applied Scientific has added two new entries to its line of business templates for AppleWorks. **Accounts Receivable** and **Accounts Payable** ($29.95 each) have joined Accountant, Payroll, Financial Calculator, and Investment Portfolio. Contact Applied Scientific at 416 Arnold, Bozeman, MT 59715, (406) 586-1157.

● Activision's latest game can win you and a friend a trip down the Mississippi. **Murder on the Mississippi** is a 19th-century murder mystery set on a riverboat, the Delta Princess. You guide the famous British sleuth, Sir Charles Foxworth, and his constant companion, Regis Phelps, through their investigations to solve the murder. Details explaining the national drawing are packed inside every box. Murder on the Mississippi retails for $39.95, from Activision, 2350 Bayshore Frontage Road, Mountain View, CA 94043, (415) 960-0410.

● Broderbund has some new developments for its **Science Toolkit**: Two modules explore the physics of speed and motion and the phenomenon of earthquakes ($39.95 each). In addition, a school version of Science Toolkit will soon be available for $89.95. (Teachers who have the original edition can order the teacher's guide for $20.) All from the laboratories of Broderbund, 17 Paul Drive, San Rafael, CA 94903, (415) 479-1170.

● See what the **Covox Voice Master** can do with its new demo disk. The disk retails for $5 directly from Covox, and contains programs and digitally encoded vocabulary demonstrating the audio capabilities of the Voice Master speech and music processor. Send the Covox people $5 and they'll send you the demo disk. Contact them at 675-D Conger Street, Eugene, OR 97402, (503) 342-1271.

● The Telemet **Radio Exchange/Personal Gains** broadcast area for business news and stock quotes (New Products, June 1986, p. 110) is apparently somewhat limited. If you're near a major city, though, don't worry. Telemet broadcasts from 13 cities around the U.S., including New York, Los Angeles, Chicago, Dallas, and Atlanta. Get in touch with Telemet America at 515 Wythe Street, Alexandria, VA 22314, (800) 368-2078.

● PM Software has integrated its ProFiler utility program into the new **ProFiler 2.1** data manager/report generator. The combination offers easy transfer of data between ProFiler and AppleWorks, as the utility permits direct reading and writing of AppleWorks data-base files. ProFiler 2.1, complete with the utility, sells for $99.95, from PM Software, P.O. Box 1788, Huntington Beach, CA 92647, (714) 963-2221.

● Digital Vision now offers **Gray-Scale Compatibility** software to enhance the performance of **ComputerEyes**, its digital video-acquisition system. With the new software control, you can display high-contrast images or images with dot-density gray-scale, in up to eight shades of true gray. Contact Digital Vision at 14 Oak Street, Suite 2, Needham, MA 02192, (617) 444-9040, and add a little gray to your life.

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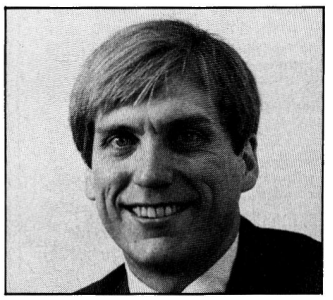

Marketing

"A company that limits itself to making what sells today shuts the door on tomorrow's market."

by Paul Statt, *inCider* staff

Apple Computer, Inc., has proudly proclaimed itself a "market-driven" company. "Whatever it is you're looking for in a microcomputer," a smiling Guy Kawasaki, Apple's head of software development, told West Coast Computer Faire attendees last January, "Apple is working on it."

That's the ideal of a "market-driven" industry. In every machine, the "market"—you, the customer—would get all the features it needs. You could bring home MS-DOS files from work and transfer them to your Apple, your kids could play with all that Apple II educational software from school, you could enjoy Amiga games—you could do anything.

The reality is that market-driven companies sometimes fall into a trap: They see a product that sells, so they all start pounding out copies. The fallacy lies in assuming that what people buy is exactly what they want.

It's a necessary fallacy, of course. Until Big Brother goes into market research and asks every single consumer just what he or she wants, your only vote is your dollar. And where you spend your dollar is where the industry will spend its millions.

But sometimes you want more than you can say. The summer Henry Ford began selling every teenager a car, kids weren't yet wondering how to get to the drive-in.

A company that limits itself to making what sells today shuts the door on tomorrow's market. Take AppleWorks. Software developers who reason that AppleWorks is a big market—"So let's add a clock and a calendar, macros, notepads, telephones, and a blender, and get rich"—won't. That company thinks small and innovates nothing: That's the danger a market-driven company faces.

Take modems. Modem manufacturers who pile baud upon baud—300, 1200, 2400, 4800, 9600, and up—because customers ask for faster telecommunication are missing the point. Customers don't know how to ask for telecommunications software that works without two phone calls before turning on the computer and another to hang up. So market-driven modem makers, observing that 300-baud modems sell, but people complain they want "faster" telecommunication, do what they can—speed up the modem—but not what needs to be done: eliminate the time-consuming hassle.

Those are just two examples among many. Laser printers, hard-disk drives, grammar checkers, shape-recognition games—the makers of this stuff aren't asking, "Does the customer need this?" but "Do products like these sell?"

The alternative to being driven by the market is to drive the market with technology: to come up with something radical nobody ever asked for, but everybody secretly wants. Henry Ford did. Woz and Jobs did.

A market-driven Apple Computer would reason this way: "We made millions with a technologically nifty machine, the Apple II. People like it because writing software for it is easy, and the machine is expandable. Let's build all our new machines that way." Is the Apple Computer that will bring you a new Apple II this fall market-driven or technology-driven?

I hope Apple brings to its new machine a little wisdom from both sides. I hope the //x has all the features we asked for. It needs (at least) a 16-bit coprocessor and a megabyte of RAM to make big programs reasonable, separate sound and graphics chips to make its presentation beautiful, a Small Computer System Interface to share peripherals with other machines (MS-DOS computers as well as Macs), an accepted, widely used operating system like ProDOS to make it credible, and BASIC in ROM.

That's what the market wants. But I also hope that some technological wizard at Apple Computer has created a machine that can do tricks I never dreamt of. I hope Apple thinks ahead and lets its technology lead. ■

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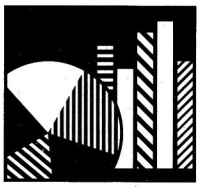

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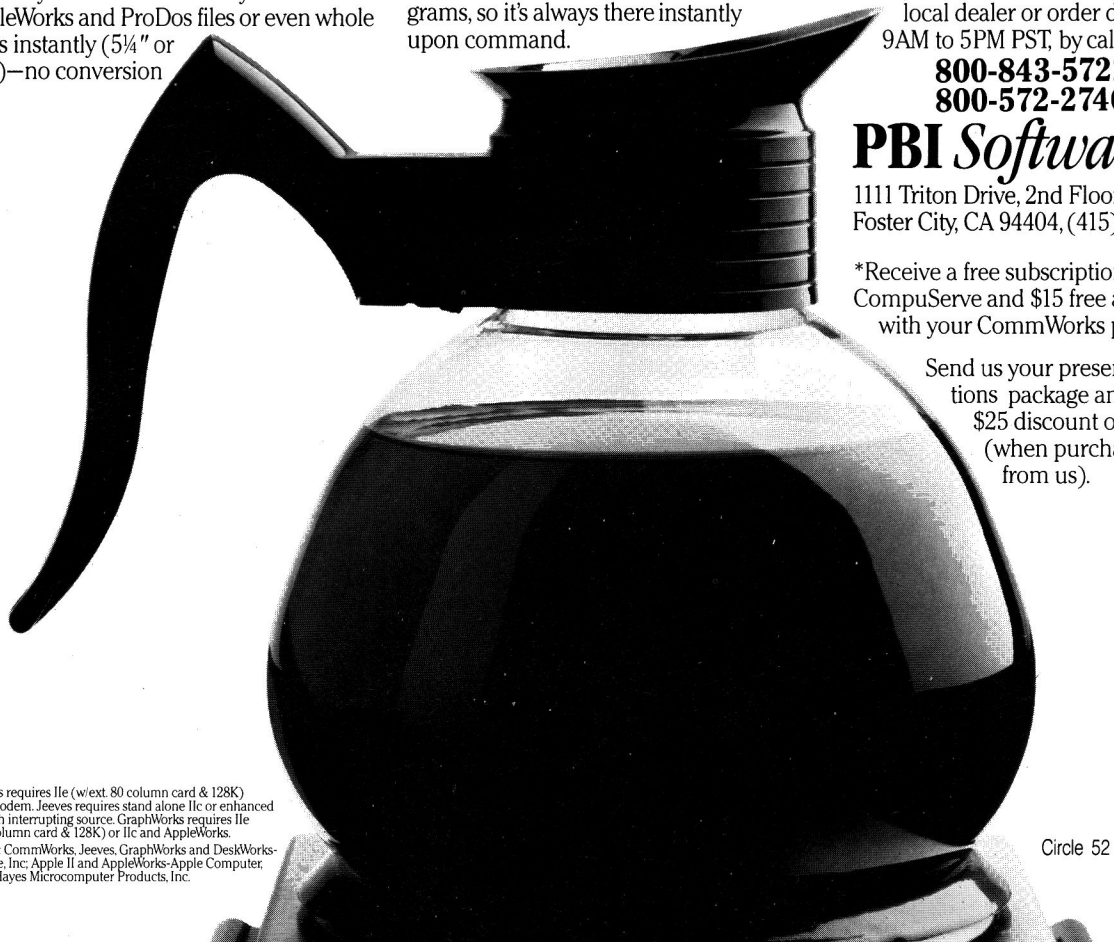

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Reader Service		Page
54	Abacus Systems	102
*	Applied Engineering	2, 3, 31, 62, 63, 66, 68, 100, 104, 125
222	AST Research	65
229	Beagle Bros	76
179	Beagle Bros	105
151	Big Red Apple Club	108
71	Borg Industries	122
102	Briston Press	121
*	Business Computers of Peterborough	40, 41
233	Cauzin Systems	78, 79
62	Central Point Software	23
63	Central Point Software	87
60	Central Point Software	22
*	Cheatsheet Products	88
227	Checkmate Technology	83
18	C.H.I.C.	122
*	CH Products	17
	Classified Ads	123
103	Clayton & Associates	85
168	Clipcapture	109
257	CMC Computer Systems	90
79	Coit Valley Computers	77
124	Compuserve	CV2
183	Computer Network	79
20	Computer Supply	122
76	Computist	92
163	Core Concepts	33
*	Covox	69
19	Davidson	93
144	Davka	73
6	Dealer Network Systems	122
184	Digital Vision	101
108	Diversified Software	120
275	Dresselhaus	85
17	Dynamic Micro Systems	122
170	Electric Transit	4
11	Fastfind	122
259	First Line Software	49
146	Golem Computers	124
66	H&E Computronics	1
254	H&M Disk Drives	97
58	Human Systems Dynamics	26
	inCider Magazine	
	AppleWorks Newsletter	64
	Sub Ad	48
	hotCider	80
*	Information Appliance	112
253	Interlude (Recreational Tech.)	7

Reader Service		Page
157	Int'l Apple Core	55
91	Kyan	54
290	Lance Huffner Games	98
28	Legend Industries.	34
118	Marathon Software	96
6	MasterMedia Supply	122
263	Megahaus	CV3
251	M.G.R. Software	59
274	Micro Systems Research	24
126	Mindscape	9
55	Nat'l Appleworks User Group	101
100	Nibble Notch	114
110	Northeastern Software	18, 19
37	OKS	127
42	Origin Systems	25
52	PBI Software	111
276	Pinpoint Publishing	115
277	Pinpoint Publishing	116, 117
291	Practical Peripherals	36
29	Precision Data Products	73
10	ProAPP	13
49	Professor Jones	109
128	Programs Plus	28, 29
32	Pro-Tech-Tronics	67
69	PSI/Proj Software	27
16	Quinsept	112
41	Quorum	91
214	Rocky Mtn. Medical	32
165	Roger Coats	12
242	Sensible Software	84
84	Sensible Software	94
143	Silicon Express	53
292	Softdisk	37
47	Software Simplified	59
217	Software Touch	103
*	Southern California Research Group	95
115	Stat Soft	108
67	Stellation Two	124
73	Street Electronics	CV4
239	Styleware	47
156	Sublogic	21
252	Telemax	122
*	Telestar/Zoom modems	35
15	Uptime	13
264	Utilico	99
34	VIP Technology	39
113	Visiflex Subs	114
7	Votrax	38

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4	9	14	19	24	154	159	164	169	174	304	309	314	319	324
5	10	15	20	25	155	160	165	170	175	305	310	315	320	325
26	31	36	41	46	176	181	186	191	196	326	331	336	341	346
27	32	37	42	47	177	182	187	192	197	327	332	337	342	347
28	33	38	43	48	178	183	188	193	198	328	333	338	343	348
29	34	39	44	49	179	184	189	194	199	329	334	339	344	349
30	35	40	45	50	180	185	190	195	200	330	335	340	345	350
51	56	61	66	71	201	206	211	216	221	351	356	361	366	371
52	57	62	67	72	202	207	212	217	222	352	357	362	367	372
53	58	63	68	73	203	208	213	218	223	353	358	363	368	373
54	59	64	69	74	204	209	214	219	224	354	359	364	369	374
55	60	65	70	75	205	210	215	220	225	355	360	365	370	375
76	81	86	91	96	226	231	236	241	246	376	381	386	391	396
77	82	87	92	97	227	232	237	242	247	377	382	387	392	397
78	83	88	93	98	228	233	238	243	248	378	383	388	393	398
79	84	89	94	99	229	234	239	244	249	379	384	389	394	399
80	85	90	95	100	230	235	240	245	250	380	385	390	395	400
101	106	111	116	121	251	256	261	266	271
102	107	112	117	122	252	257	262	267	272
103	108	113	118	123	253	258	263	268	273
104	109	114	119	124	254	259	264	269	274
105	110	115	120	125	255	260	265	270	275
126	131	136	141	146	276	281	286	291	296
127	132	137	142	147	277	282	287	292	297
128	133	138	143	148	278	283	288	293	298
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4	9	14	19	24	154	159	164	169	174	304	309	314	319	324
5	10	15	20	25	155	160	165	170	175	305	310	315	320	325
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27	32	37	42	47	177	182	187	192	197	327	332	337	342	347
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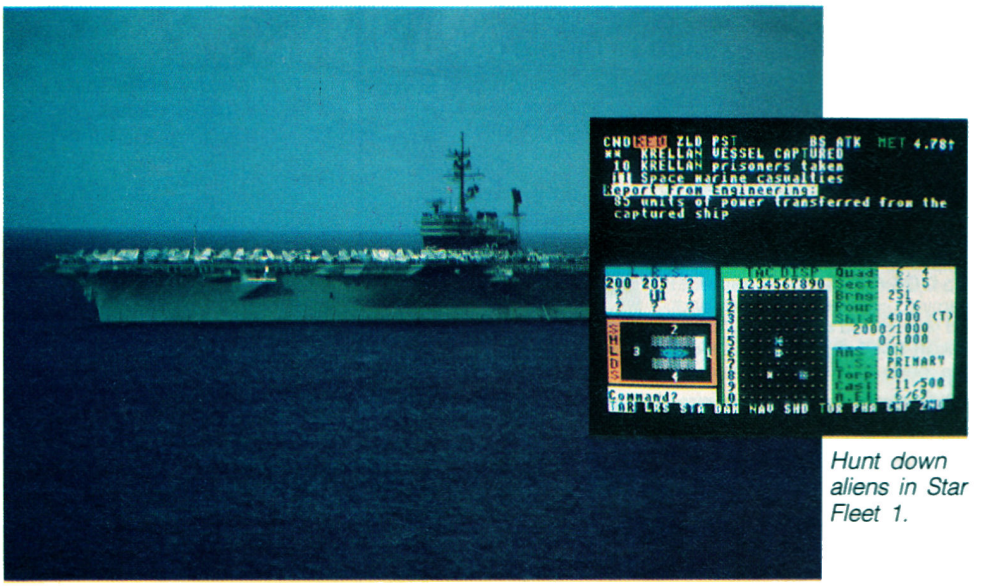
THE APPLE II MAGAZINE

GAME ROOM

by Brian J. Murphy

In Game Room, Brian Murphy tells us what's new in the world of Apple games. Look here for inCider's *scoop on the latest fun.*



Hunt down aliens in Star Fleet 1.

Carriers at War lets you command the Pacific fleet.

Taking command isn't easy. It means making tough decisions that will inevitably lead to the loss of men, ships, and perhaps the war itself. The drama of command decisions is the theme that energizes all war games, whether they're re-creations of World War II battles or hypothetical conflicts in space, centuries in the future.

Star Fleet 1: The War Begins

★★★★

Cygnus
P.O. Box 57825
Webster, TX 77598
Science-fiction war game
Any 64K Apple II, Applesoft, one disk drive
$49.95

Star Fleet is a game of future war, but its origins go back to the dawn of computer gaming. I first played a game very similar to Star Fleet when I was in college. It was 1969, the game was called Star Trek, and the computer was an NCR mainframe, using a printer instead of a monitor (video output was rather exotic in those days). Star Trek initially propelled me down the road to ruin as a computer-game fanatic.

It was a great game then, and it's a great game now. Star Fleet has a streamlined, simplified game system, color graphics, and excellent (although lengthy) documentation. Even without those advantages, Star Fleet would still get high ratings simply for play value. It's ideal for anyone who enjoys an addicting space game.

As a starship commander, you have a simple objective: to kill a certain number of alien vessels within a limited number of days. Each completed mission brings you closer to promotion—provided, of course, you kill efficiently. The less time you take to meet your quota, the higher your efficiency rating. You can also improve your rating by capturing alien vessels and dropping them off at a starbase.

An array of weapons, sensors, and computer aids on your starship perform these tasks. Your supply of torpedoes, phasers, and shields is limited, though. If you use the phasers, you reduce your power to navigate and renew shields. Beefing up shields robs your phasers of energy. To succeed at this game, you must learn to resolve many of these difficult trade-offs.

To help you in combat, automatic routines can aim and "lock on" lasers, plot the trajectory of your torpedoes, and tell you how much damage you or your enemies have sustained. Other systems help you navigate through galaxies. Your ships' sensors can look into adjoining sectors for starbases or enemies, and sensor probes can scan distant sectors. The rest is up to you.

Now for some tips on strategy. Fight your battles from the edge of the sector. If your back is to one wall, you can concentrate shield power on the remaining three sides.

Conserve energy by plotting the shortest routes to enemy sectors, and use your torpedoes to destroy enemy ships. Phasers use too much energy, especially at long distances. Use them only when you want to disable and capture a ship. Don't wait until your energy is drained to break off a battle or go to a starbase for replenishment: Spent energy reduces your efficiency rating.

Reach for the Stars

★★★

Strategic Studies Group
1747 Orleans Court
Walnut Creek, CA 94598
Science-fiction war game
Any 64K Apple II, Applesoft, one disk drive
$45

Stellar conquest and colonization are imperative when you assume command of a star empire in **Reach for the Stars**. It's hardly an original concept, but unlike Carriers at War, this variation is exciting.

You and each of up to three other human or computer opponents start with a single planet on a single star. Your goal is to colonize and develop as many stars in the galaxy as you

inCider's Ratings

★★★★	Excellent
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★★	Good enough
★	Not up to standards
☆	The empty set

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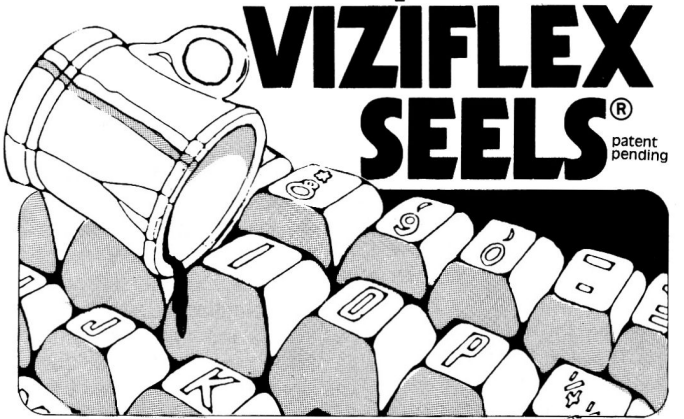

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GAME ROOM

can (during a set period of time), while defending your colonies against the other star emperors. You get additional points for massacring enemy populations, destroying industries, eliminating spaceships, and conquering territory. It's hardly a game for confirmed pacifists.

By controlling the planetary environment and investing in industrial expansion, you can develop your home world and colonies so that they produce star cruisers, transports, and exploration vessels. These vessels, in turn, become the means by which you can colonize or conquer new planets and expand your empire. You can also use these resources to bolster planetary defenses. When enemy star cruisers drop by to destroy your home world, you'll be glad you made the investment.

It's unromantic to say that much of the rest of the game is a matter of juggling numbers, but that's the truth. How you allocate the resources of your home world and colonies will determine whether or not you're able to populate your empire, establish industry, expand into space, and defend your holdings. With a little logic, you should be able to find the right formula.

While you convert your resources into cruisers and transports, you must be careful to use those assets to maintain your initiative, keeping the other three players off balance. At the same time, don't grab too many planets too soon. You'll risk overextending yourself: procuring more territory than your ships can defend or your colonists support.

Carriers at War

★★

Strategic Studies Group
War game
Any 64K Apple II, Applesoft, one disk drive
$50

Roger Keating and Ian Trout have a good game in Reach for the Stars, but in **Carriers at War** the system is so difficult to master, it takes much of the joy out of playing it.

On the plus side, the Carriers game system is very flexible. It encompasses six major battle scenarios from the war in the Pacific (Pearl Harbor, Coral Sea, Midway, Eastern Solomons, Santa Cruz, and Philippine Sea), the historical conditions of which you can alter. In fact, you can build a whole game scenario from scratch, putting the Japanese and U.S. navies in any hypothetical or historical battle situation you like.

But Carriers' big drawback is its complexity. Twenty-eight game menus—not including disk utilities—make for confusion. It seems as if you'll never reach the point at which the game system becomes second nature, letting you concentrate on the problems of command. You can eventually get there, but it's a long, hard trek.

Frankly, I prefer Gary Grigsby's SSI naval games, such as Guadalcanal Campaign, North Atlantic '86, Bomb Alley, and Carrier Force. Admittedly, they're less flexible, but they're just as detailed and much more playable. ■

Brian Murphy is anxious to learn what you think of the current state of computer games. Write him at inCider, *Elm Street, Peterborough, NH 03458, and let him know your opinion.*

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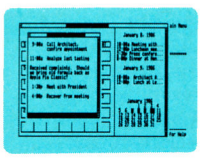

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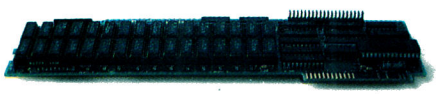

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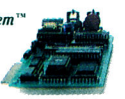

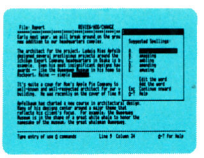

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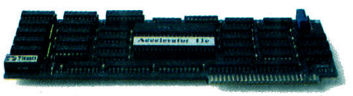

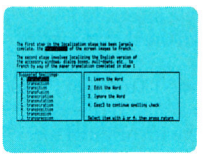

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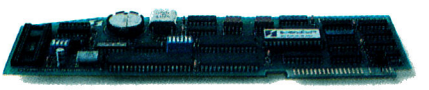

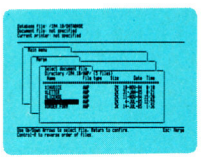

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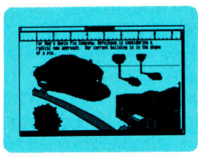

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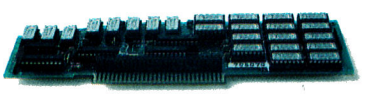

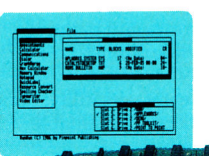

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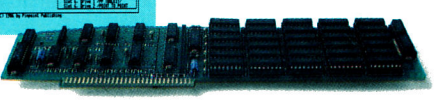

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Apple users know that there's always *an easier way to get the job done. A shortcut here, an elegant twist there. That's what Hints/Techniques is all about. It's an information swap for readers who want to share their programming pointers, DOS tips, hardware secrets, AppleWorks applications, WPL enhancements, and all those other insights that make you go "Aha!" in the night. So read on and see if you don't find just the solution you've been looking for.*

Enhanced INPUT

by Brian S. Lovejoy

If you've ever tried to enter a numerical expression into your computer when prompted for numeric input, you probably know that Applesoft's INPUT command won't evaluate it. If you enter 2 + 2 in response to the statement

```
INPUT "Numerical value: ";A
```

the computer assigns a value of 2 (the first value it encounters) to the variable A, and ignores the rest of the expression. You might think the solution to this is simple, but look at the program below:

```
10 HOME
20 INPUT "Numerical expression: ";A$
30 A = VAL(A$)
40 PRINT A
50 END
```

This program seems to be a logical answer, but the computer still assigns the first value it encounters to the variable A. Adding the &INPUT command to Applesoft BASIC lets you enter numerical expressions easily.

If you use &INPUT with a numeric variable, you can enter any valid numerical expression in a numerical assignment (LET) statement. &INPUT evaluates the expression and stores the result.

For example, you can enter an expression such as SQR(PI) + COS(2*PI) + PEEK(8192) - TAN (PI/2)) in response to the prompt in line 30 of the program below:

```
10 HOME
20 PI = 3.1415924
30 &INPUT "Numerical expression: ";A
40 PRINT "Its value is: ";A
50 END
```

The PRINT statement in line 40 displays the value of the expression and stores it in A.

Unlike INPUT, &INPUT interprets a null expression (a return key press) as the value zero. &INPUT knows where an expression ends and a comment begins. For example, if you enter 23 SALES, the &INPUT command accepts the 23, but ignores the SALES comment. INPUT, though, gives you a REENTER message.

You can also use &INPUT with string variables. Your string can contain commas, colons, quotes, or leading spaces. The INPUT command, though, is somewhat picky when it comes to these characters, and won't accept leading spaces.

&INPUT treats most escape and control characters the same way INPUT does, but treats control-C differently. If you enter control-C, &INPUT gives you a break message, like INPUT, but you can change the values of your program's variables and resume program execution with the CONT command.

One feature &INPUT lacks is the multiple-variable function available with INPUT. For example, a statement such as

```
10 &INPUT "Enter reading A,
   reading B: ";A,B
```

won't work.

Listing 1. Enhanced INPUT.

```
0300- A0 02 B9 0C 03 99 F5 03
0308- 88 10 F7 60 4C 0F 03 C9
0310- 84 F0 05 A2 10 4C 12 D4
0318- 20 B1 00 C9 22 F0 06 20
0320- 5A DB 4C 30 03 20 81 DE
0328- A9 3B 20 C0 DE 20 3D DB
0330- 20 E3 DF 85 85 84 86 24
0338- 11 70 42 A5 B8 A4 B9 8D
0340- AE 03 8C AF 03 20 2C D5
0348- AD 00 02 D0 0C A9 30 8D
0350- 00 02 A9 00 8D 01 02 F0
0358- 0E C9 03 D0 03 4C 63 D8
0360- A9 00 85 B8 20 59 D5 A9
0368- 00 85 B8 A9 02 85 B9 20
0370- 52 DA AD AE 03 AC AF 03
0378- 85 B8 84 B9 60 20 2C D5
0380- AD 00 02 C9 03 D0 03 4C
0388- 63 D8 E8 BD 00 02 D0 FA
0390- 8E AD 03 8A 20 52 E4 A0
0398- 00 91 83 C8 A5 71 91 83
03A0- C8 A5 72 91 83 A2 00 AD
03A8- AD 03 4C E2 E5 00 00 00
```

Listing 1 gives you the &INPUT function. To enter it, first enter the Apple machine-language Monitor by typing CALL -151 and pressing return. Then type in the hex dump as it appears in the listing. To exit the Monitor press control-C and then return. Now save the program by typing BSAVE ENHANCED.INPUT,A$300, L$B0 and pressing return. To execute the program, simply type BRUN ENHANCED.INPUT and press return.■

Write to Brian Lovejoy at P.O. Box 6, Bancroft, WV 25011.

Inverting Hi-Res Graphics

by Brian S. Lovejoy

If you've ever wanted to invert a hi-res graphics picture from Applesoft, you know it can take quite a bit of time. Running the BASIC program INVERT.CREATE (**Listing 2**) produces a machine-language subroutine that inverts and displays a hi-res picture on graphics page 1 (HGR) or 2 (HGR2) in virtually no time at all.

Each hi-res graphics page consists of 8192 bytes of memory. Each byte is made up of 8 bits (pixels). A full byte (with all bits turned on) has the value 255, while a blank byte (with all bits turned off) has the value zero. Graphics page 1 (HGR) consists of bytes 8192 ($2000) to 16375 ($3FF7); graphics page 2 (HGR2) consists of bytes 16384 ($4000) to 23543 ($5BF7).

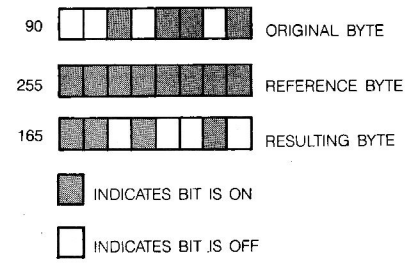
To invert the byte at location 8192 in BASIC, use a statement such as POKE 8192,255 - PEEK(8192). To flip the entire graphics page, you could use the statement:

```
FOR I = SA TO EA : POKE I,255 -
      PEEK(I) : NEXT I
```

where SA and EA are the starting and ending addresses, respectively, for the graphics page. The paragraph above lists the values for each page. The computer calculates the inverted byte by the EXCLUSIVE-OR method, illustrated in **Figure 1**.

The original byte is logically EXCLUSIVE-ORed with a full reference byte. The computer calculates the bits

Figure 1. Calculating an inverted byte with a value of 90.



of the resulting inverted byte in the following way:

Original bit condition: ON
Reference bit condition: ON
Resulting bit condition: OFF

Original bit condition: OFF
Reference bit condition: ON
Resulting bit condition: ON

(Note: The reference bit condition is always ON.)

After running the BASIC program, save the machine-language subroutine by typing BSAVE INVERT.OBJ,A$C00, L495. Now each time you want to invert a picture, simply type CALL 3072 after loading the subroutine with BLOAD INVERT.OBJ. Note, however, you must load the picture into the graphics page before you CALL 3072.

Listing 3 illustrates the method used to invert the bytes. This machine-language program inverts the byte at location $2000 (8192 decimal), the first byte of graphics page 1.

Changes for Page 2

To use the subroutine for page 2, you need to make a few modifications in the accompanying BASIC program. **Listing 2**, as shown, creates a subroutine for graphics page 1. For graphics page 2, make the following changes to the BASIC listing. Change line 20 to:

```
20 V = 16384:A = 3086
```

Change line 10000 to:

```
10000 DATA 3074,49232,3077,49234,
      3080,49237,3083,49239
```

It's a good idea to save two different machine-language subroutines to disk for each page—for example, BSAVE INVERT.OBJ.1,A$C00,L495 (for page 1) and BSAVE INVERT.OBJ.2, A$C00,L495 (for page 2).■

Write to Brian Lovejoy at P.O. Box 6, Bancroft, WV 25011.

Listing 2. INVERT.CREATE.

```
10  HOME : POKE 3072,169: POKE 3073,0: FOR I = 1 TO 4: READ B
    ,V: POKE B,141: POKE B + 1,V -  INT (V / 256) * 256: POKE
    B + 2, INT (V / 256): NEXT I
20 V = 8192:A = 3086
30  FOR I = 1 TO 32: POKE A,160: POKE A + 1,00: POKE A + 2,16
    9: POKE A + 3,255: POKE A + 4,89: POKE A + 5,V -  INT (V
     / 256) * 256: POKE A + 6, INT (V / 256): POKE A + 7,153
    : POKE A + 8,V -  INT (V / 256) * 256: POKE A + 9, INT (
    V / 256)
40  POKE A + 10,200: POKE A + 11,192: POKE A + 12,255: POKE A
     + 13,208: POKE A + 14,243:V = V + 256:A = A + 15: NEXT
    I: POKE A,96: HOME : END
10000  DATA  3074,49232,3077,49234,3080,49236,3083,49239
```

Listing 3. Machine-language program illustrating inversion of bytes.

```
0C00:  A0 00      LDY  #$00     - load Y register with 0
0C02:  A9 FF      LDA  #$FF     - load A register with 255
0C04:  59 00 20   EOR  $2000    - EXCLUSIVE-OR register A
                                  with the value address
                                  $2000 (8192) and store the
                                  result in register A
0C07:  99 00 20   STA  $2000    - Store register A to address
                                  $2000 (8192)
0C0A:  C8         INY           - Increment the Y register
                                  by one
0C0B:  C0 FF      CPY  #$FF     - Compare Y register with 255
0C0D:  D0 F3      BNE  $0C02    - Branch if not equal to
                                  address $0C02
0C0F:  60         RTS           - Return to Applesoft BASIC
```

Running AppleWorks from Your RAM Disk

by Ken Kashmarek

The RAM wars are now in full swing, with more vendors than ever marketing memory upgrades for the Apple II. The primary advantage they offer is additional memory for expanded AppleWorks desktop space. If you only occasionally need a larger desktop, though, the most desirable feature a RAM card provides may be your ability to run AppleWorks directly from memory. (Most vendors supply a software modification that loads the AppleWorks program into RAM along with the expanded desktop.)

Each time you use AppleWorks this way, though, your computer has to reload the modules into memory. This process takes up to one minute when booting AppleWorks, and if you then switch into and out of AppleWorks quite often, the delay is annoying. The technique described below puts AppleWorks into your memory card's RAM disk (volume /RAM) to bypass reloading the modules. You're restricted to the smaller desktop, but I've found that for most of my work it's sufficient.

Copying to /RAM

The technique discussed here requires a RAM-expansion card with at least 256K (mine is a 256K Applied Engineering RamWorks II). RamWorks' software includes two versions of the /RAM driver: PRODRIVE.ALL uses all the card's memory as a RAM disk, while PRODRIVE leaves the original auxiliary memory bank free.

Enter the command BRUN PRODRIVE. CATALOG /RAM then brings up the screen shown in **Figure 2**. With the auxiliary bank free, you can access the 55K AppleWorks desktop in RAM, while the RAM disk is still available for other uses—mainly, to hold AppleWorks' programs.

The EXEC file shown in **Figure 3** loads all the AppleWorks modules into /RAM. Note that you must first change the volume names of your

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Figure 2. Catalog of RamWorks' RAM disk after BRUNning ProDrive.

```
/RAM/

 NAME          TYPE    BLOCKS MODIFIED    CREATED       ENDFILE

BLOCKS FREE: 363      BLOCKS USED: 21   TOTAL BLOCKS: 384
```

Figure 3. EXEC file that loads AppleWorks into your RAM disk.

```
/APPLEWORKS.1/

 NAME           TYPE  BLOCKS  MODIFIED         CREATED          ENDFILE

 PRODOS          SYS      30  18-SEP-84  0:00  21-SEP-84  9:34    14848

 SEG.00          SYS       9  31-AUG-84 13:00  21-SEP-84  9:36     4093

 APLWORKS.SYSTEM SYS      14  14-SEP-84  1:02  21-SEP-84  9:37     6519

BLOCKS FREE:  220     BLOCKS USED:   60     TOTAL BLOCKS:  280

/APPLEWORKS.2/

 NAME           TYPE  BLOCKS  MODIFIED         CREATED          ENDFILE

 SEG.PR          SYS       9  19-DEC-84 10:21  28-SEP-84 13:31     3670

*SEG.M0          $00      46  28-SEP-84 14:35  28-SEP-84 14:34    22819

*SEG.M1          $00     219  28-SEP-84 14:37  28-SEP-84 14:35   111254

BLOCKS FREE:    2     BLOCKS USED:  278     TOTAL BLOCKS:  280
```

AppleWorks disks with the RENAME command (as delivered, both disks are named /APPLEWORKS). Call the start-up disk /APPLEWORKS.1 and the program disk /APPLEWORKS.2. **Figure 4** shows the catalogs of these disks.

Alternatively, you can break up the EXEC file into two files that will load the appropriate sections from the start-up and program disks without renaming. Or you can write an Applesoft program that issues these commands and prompts you to insert the proper AppleWorks disk. (When using Applesoft, be certain your program is small and that dynamic string memory doesn't overlie any of the 32K of memory between $1000 and $8FFF.)

The EXEC file in **Figure 3** applies to the programs on AppleWorks 1.2 disks. If you have an earlier version, you must change lengths and filenames accordingly. *Don't* use this technique with a modified AppleWorks—it works only with the standard edition.

Note that moving the main AppleWorks module, SEG.M1, takes four sequences of BLOAD and BSAVE. These commands use the B operand (byte offset) to copy the file into /RAM.

After EXEC copies the AppleWorks files, CATALOG /RAM produces the screen shown in **Figure 5**.

You can now execute AppleWorks with -/RAM/APLWORKS.SYSTEM. After you exit AppleWorks (with option 6, QUIT), the files stay in /RAM and can be reused. Gone is the delay associated with the RamWorks desktop-expander modification.

A word of caution: Don't reboot ProDOS—booting ProDOS clears /RAM. You can reload BASIC.SYSTEM without affecting the RAM disk, though. Also, modified versions of AppleWorks will overwrite the /RAM volume PRODRIVE sets up.

Note that the copy of the SEG.PR module in /RAM will now reflect any changes you make in your printer definitions or the standard location for loading data.

The EXEC file also works with AppleWorks 1.3, which supports the new peripheral-slot Apple II Memory Expansion card. If you have both types of cards installed, you can use this EXEC file to load AppleWorks 1.2 into the RAM-disk area of the Apple card (/RAMx, where x is the slot number of the card), and use the RamWorks software modifications to access the expanded desktop of that auxiliary-slot card at the same time.

In addition, this technique can load the ProDOS Toolkit Assembler and Editor into /RAM. Switching between

 Circle 108 on Reader Service Card.

Figure 4. Catalogs of AppleWorks start-up and program disks (renamed 1 and 2).

```
NEW
PREFIX /APPLEWORKS.2
CREATE /RAM/SEG.M1,T$00
BLOAD       SEG.M1,T$00,A$1000,L$8000
BSAVE  /RAM/SEG.M1,T$00,A$1000,L$8000
BLOAD       SEG.M1,T$00,A$1000,L$8000,B$08000
BSAVE  /RAM/SEG.M1,T$00,A$1000,L$8000,B$08000
BLOAD       SEG.M1,T$00,A$1000,L$8000,B$10000
BSAVE  /RAM/SEG.M1,T$00,A$1000,L$8000,B$10000
BLOAD       SEG.M1,T$00,A$1000,L$3296,B$18000
BSAVE  /RAM/SEG.M1,T$00,A$1000,L$3296,B$18000
CREATE /RAM/SEG.M0,T$00
BLOAD       SEG.M0,T$00,A$1000,L22819
BSAVE  /RAM/SEG.M0,T$00,A$1000,L22819
CREATE /RAM/SEG.PR,TSYS
BLOAD       SEG.PR,TSYS,A$1000,L3670
BSAVE  /RAM/SEG.PR,TSYS,A$1000,L3670
PREFIX /APPLEWORKS.1
CREATE /RAM/SEG.00,TSYS
BLOAD       SEG.00,TSYS,A$1000,L4093
BSAVE  /RAM/SEG.00,TSYS,A$1000,L4093
CREATE /RAM/APLWORKS.SYSTEM,TSYS
BLOAD       APLWORKS.SYSTEM,TSYS,A$1000,L6519
BSAVE  /RAM/APLWORKS.SYSTEM,TSYS,A$1000,L6519
```

Figure 5. Catalog of /RAM after loading AppleWorks program into your RAM disk.

```
/RAM/

 NAME            TYPE  BLOCKS  MODIFIED         CREATED          ENDFILE
 SEG.M1           $00     219  21-JAN-86 18:35  21-JAN-86 18:35   111254
 SEG.M0           $00      46  21-JAN-86 18:35  21-JAN-86 18:35    22819
 SEG.PR           SYS       9  21-JAN-86 18:36  21-JAN-86 18:35     3670
 SEG.00           SYS       9  21-JAN-86 18:35  21-JAN-86 18:35     4093
 APLWORKS.SYSTEM  SYS      14  21-JAN-86 18:35  21-JAN-86 18:35     6519
BLOCKS FREE:   66     BLOCKS USED:  318     TOTAL BLOCKS:  384
```

editor and assembler modules from /RAM is very rapid.

Many critics of RAM-disk use complain that Apple Computer didn't supply a convenient method of loading programs and files from disk into /RAM. BLOAD and BSAVE, using the B operand, work just fine from an EXEC file: The tool has been there all along.■

Write to Ken Kashmarek at 6 Cherokee Court, Eldridge, IA 52748.

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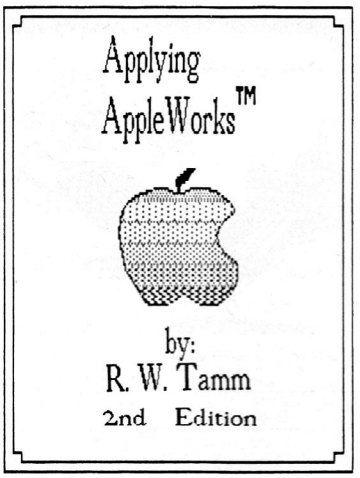

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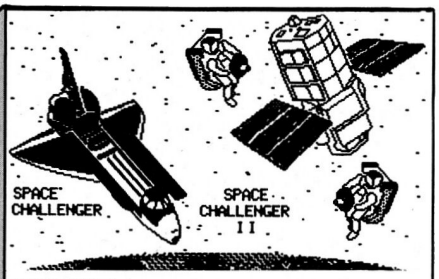

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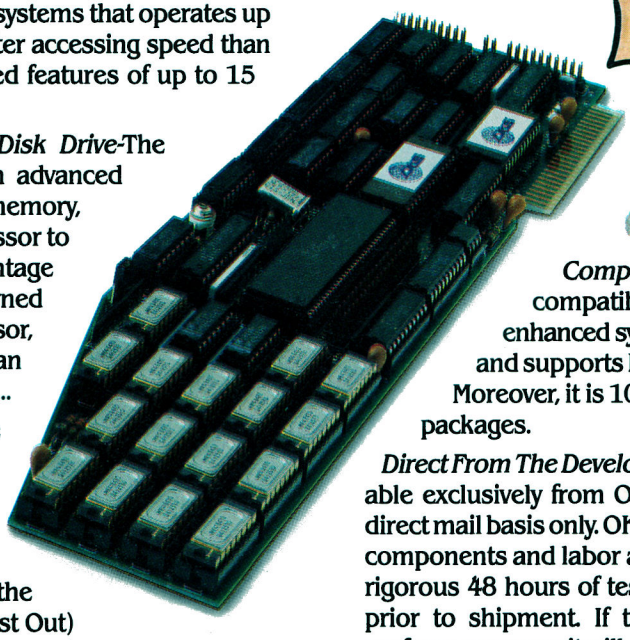

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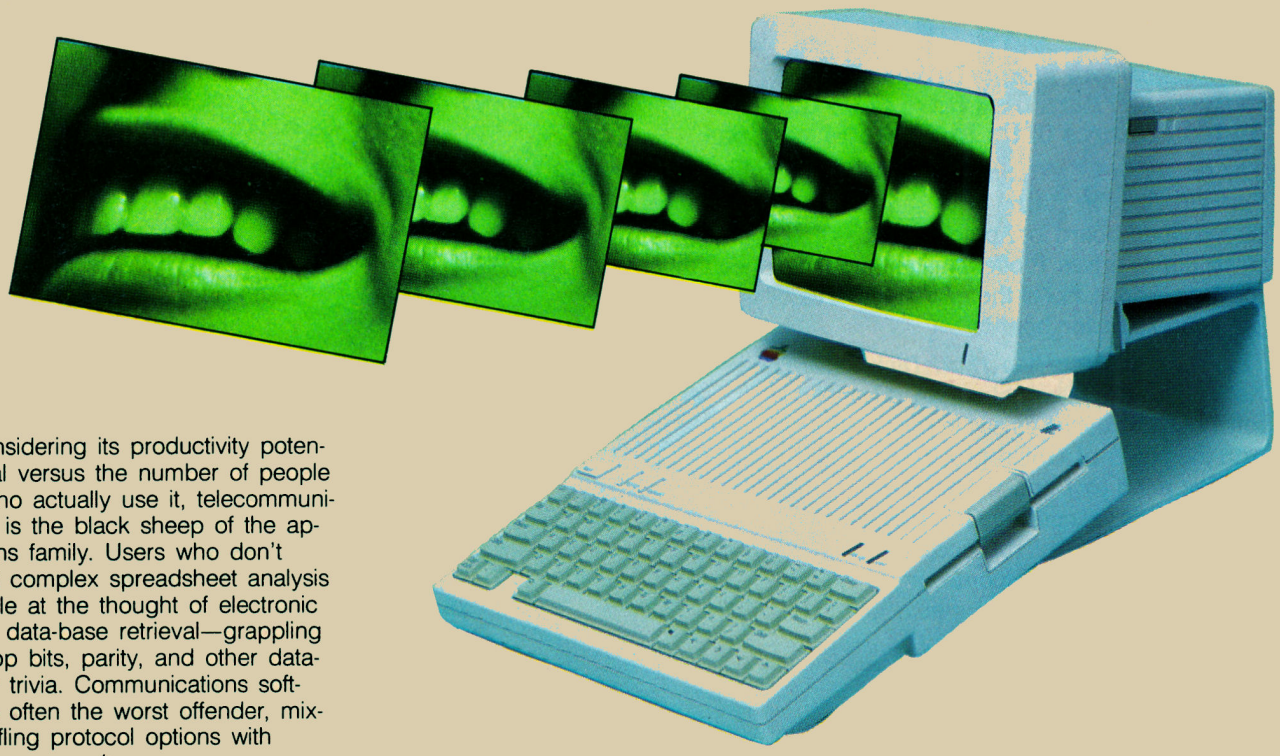
EDITORS' CHOICE

Talk Back: Telecommunications Made Tolerable



Considering its productivity potential versus the number of people who actually use it, telecommunications is the black sheep of the applications family. Users who don't blink at complex spreadsheet analysis turn pale at the thought of electronic mail or data-base retrieval—grappling with stop bits, parity, and other data-transfer trivia. Communications software is often the worst offender, mixing baffling protocol options with cryptic commands.

Russ Systems is dedicated to overcoming on-line anxiety. The firm's Let's Talk turns a //e or //c into an easy-to-use bulletin board or information stand (see *inCider*'s review, May 1986, p. 34). Now Russ has turned to the other end of the phone line, with a communications program suitable for calling Let's Talk, CompuServe, or the computer next door. It's called **Talk Back**, and earns a backhanded compliment: It's the least threatening terminal program around.

The hardest thing to learn about Talk Back is when to type a single letter and when to type the open-apple key and a letter (depending on whether your keystrokes are "live" to the screen, as when you're actually on line or preparing text in the editor). Otherwise, there are rarely more than half a dozen commands from which to choose on its simple, attractive menus, whether you're calling your mom or using Xmodem to send an AppleWorks data base. Changing communication parameters is as easy as pressing the arrow keys.

In a tidy (if somewhat disk-hungry) feature, Talk Back keeps each service or number you call in a different ProDOS directory, so your downloaded Dow Jones report can't overwrite the SourceMail you read this morning. Capture of incoming text is automatic, and easily toggled on or off (as is printing). Power users can record automatic log-on sequences, macros to send frequently used text, or tasks—series of macros for hands-off handling of multiple transmissions or receptions.

There's a utility menu for checking directories and disk files, plus a built-in ASCII text editor—a far cry from a word processor for creating files, but handy for reviewing the transcript of your latest session (and smart enough to offer that transcript, the most recently saved text, as the default file when you enter the editor). Our only complaint is that Talk Back is much better at placing calls than receiving them. A makeshift auto-answer mode makes you type your modem's standby code (such as ATS0 = 1) as a phone number and "call" it, quite a change from other functions' friendly menu choices.

Review Editor Eric Grevstad says, "Remarkable—a new Apple II program that isn't named 'Works' and doesn't draw file folders on the screen. In fact, Talk Back is the cleanest-looking communications program I've seen. Future versions should improve on the edition [1.2] we saw—right now, for instance, Talk Back shows a list of filenames, but makes you type one instead of picking it with the arrow keys. But it's still a simple, practical package; if it cost a bit less than $79 I'd like it even better."

According to Managing Editor Dan Muse, "To me, the phrase 'easy-to-use telecommunications software' is a contradiction in terms, but Talk Back at least makes the process bearable. I don't understand why Russ Systems didn't make the answer mode consistent with the rest of the program, but in general I enjoyed using Talk Back, which is something I can't say about many telecommunications packages."

Talk Back requires a 128K Apple //e or //c, one disk drive, and a Hayes Smartmodem (not Micromodem) or compatible. It's available from Russ Systems, 320 Dufour Street, Santa Cruz, CA 95060, (408) 458-5080. ■

Every month, hardware and software manufacturers release dozens of new products into the Apple II market. Editors' Choice singles out one product each month that the inCider *editors feel is a significant addition to the Apple II family of products. Products evaluated in Editors' Choice are among the most recent releases and may not be available yet for retail distribution.*

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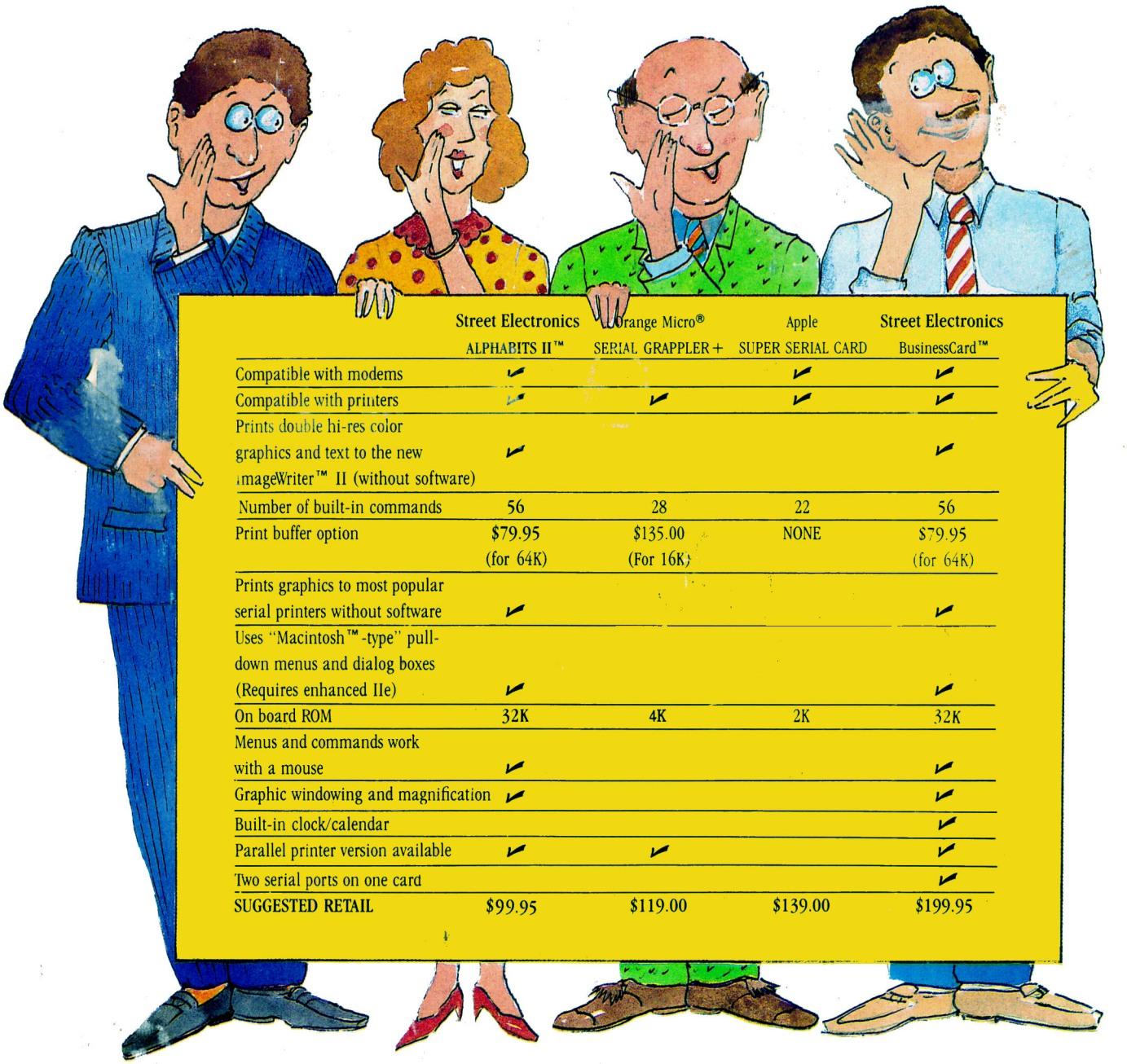

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