VOTED BEST COMPUTER MAGAZINE BY THE COMPUTER PRESS ASSOCIATION

JUNE 1987
$2.95 US
$3.95 CANADA, FOREIGN

A+

The #1 Apple II Magazine



Creating the IIGS Sales Demo

Apple IIe

How To Make MONEY With Your Apple II

RIBBONS
How to Get New Life from Old Printer Ribbons

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

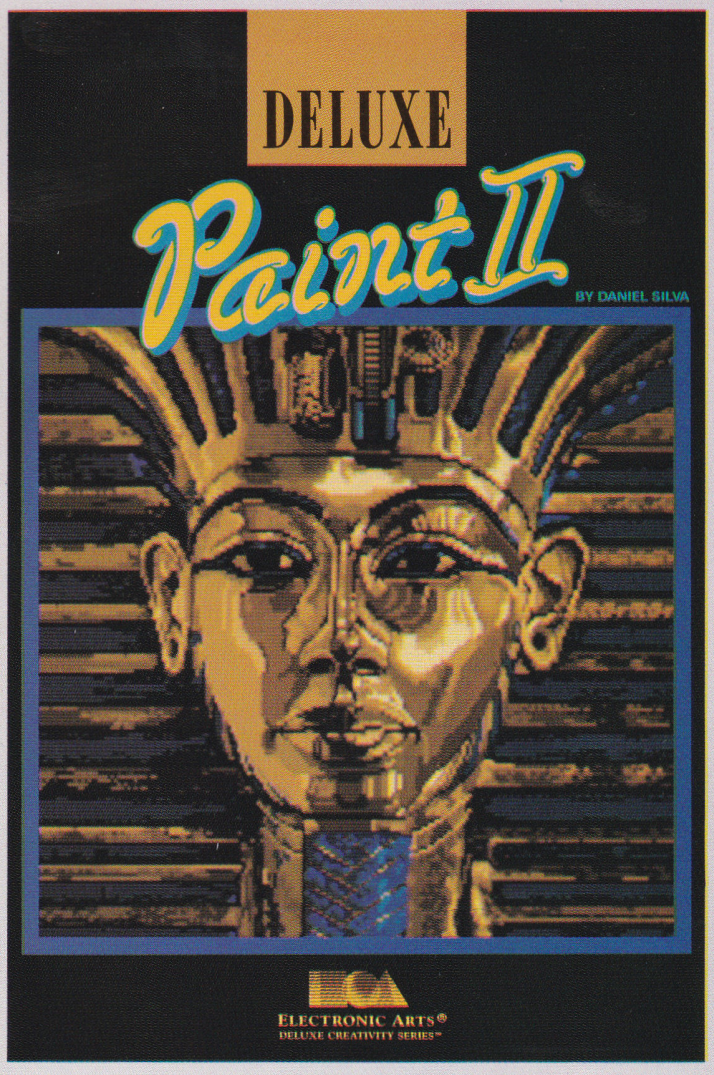
SECRET RAMDISK
Where to Find a Bonus RAMDisk in ProDOS

TEACHERS' TOOLBOX
History and Geography

0 71486 02401 06

Downloaded from www.Apple2Online.com

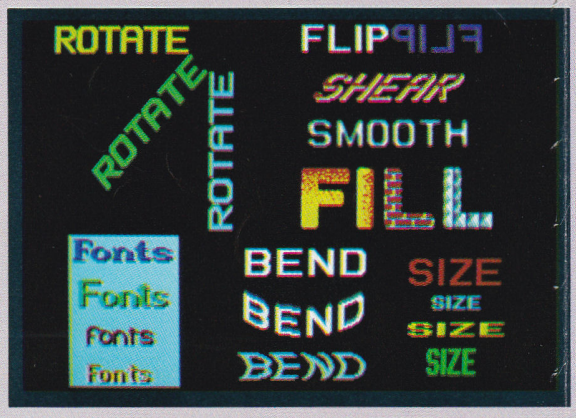

INTRODUCING DELUXEPAINT™ II
FOR THE APPLE II GS...



...THE ONLY PAINT



Fill any area with a custom pattern or gradient color blend. Create tile or textile designs in seconds!



Alter fonts a dozen ways: flip, shear, blend, rotate, fill or resize any text. Design your own logos!

INTRODUCING DELUXEPAINT II. The images above were all produced with the most advanced paint program ever created for a personal computer. The only paint program that lets you zoom in to see your painting in four levels of detail, create custom gradient color ranges from a 4,096-color palette, freeze an image and paint over it, and do dozens of other things you never knew a personal computer could do. The program is DeluxePaint II. The result is more than just a pretty face.

GREAT GRAPHICS...the best reason to buy an Apple IIGS. And the best reason to buy DeluxePaint II. With DeluxePaint II you can master the third dimension with the exclusive 3-D perspective tool. Soften jagged edges and color transitions with the smoothing tool. And give life to static pictures by cycling through a range of colors. Computer graphics have never been so easy. Or so powerful.

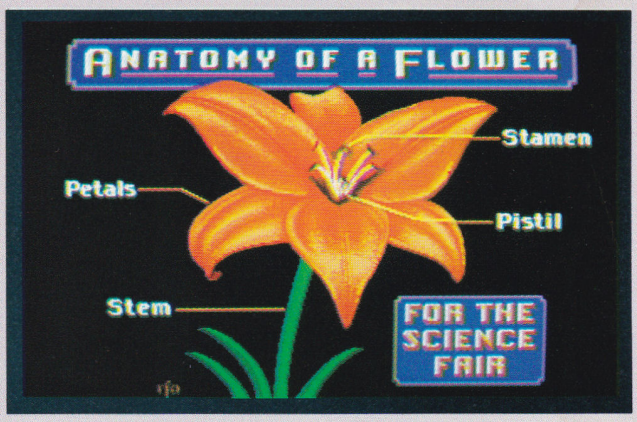
"THE BEST GRAPHICS PRODUCT OF THE YEAR." We didn't say it. The Software Publishers' Association did—and gave us the award to prove it.

DELUXEPAINT II. MORE THAN JUST A PRETTY FACE.

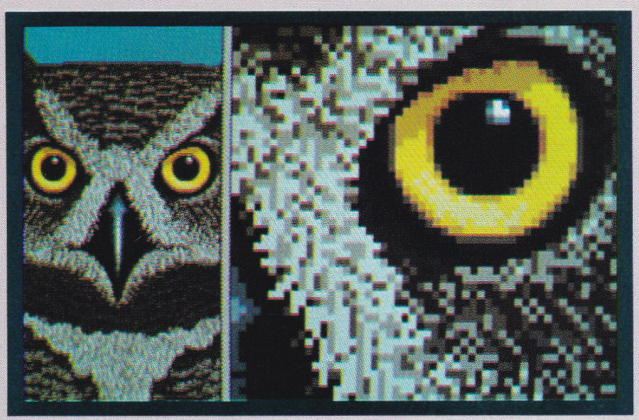
PROGRAM THAT CAN DO ALL THIS!



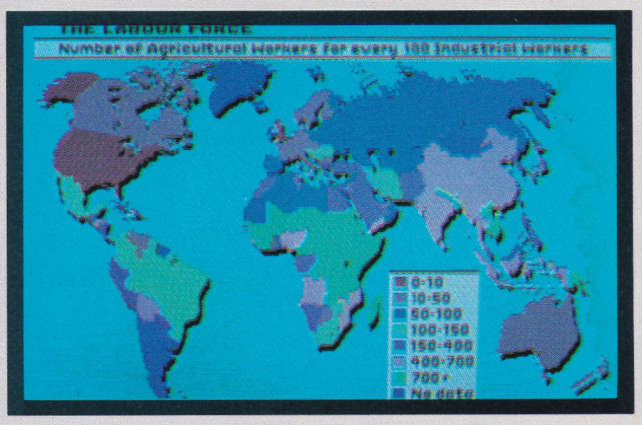
Enter the third dimension. Turn 2-D into 3-D with a click and get a new perspective!



Combine text and graphics for educational presentations. It's easy enough for kids of all ages.



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



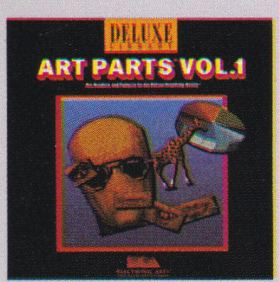
Create colorful presentation graphics like the pros. It's a whole new world for business presentations.

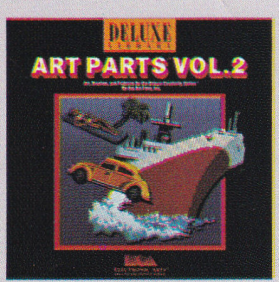
$50 Offer! Upgrade any Apple IIGS paint program to DeluxePaint II

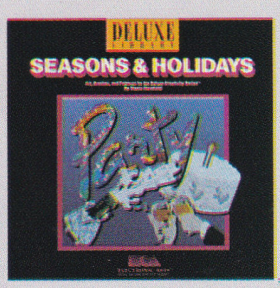
If you jumped the gun and bought Paintworks Plus™—or any other Apple IIGS paint program—here's your chance to get the best for HALF PRICE! Just send us $49.95 and the front manual cover from your current program before July 31, 1987, and we'll send you DeluxePaint II. (You save $50!) We'll even give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

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

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





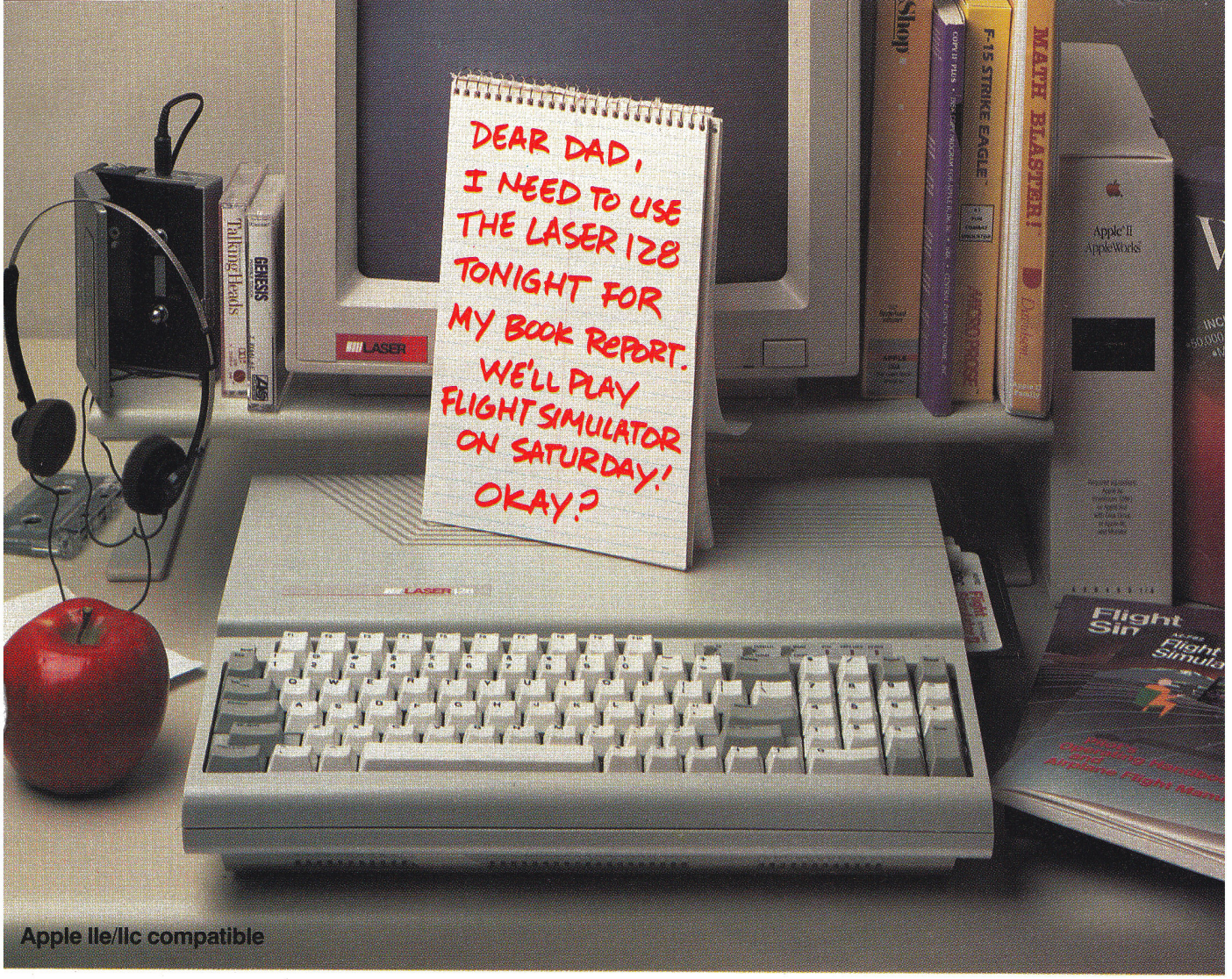


Look for the Deluxe Library of color clip-art disks, with over 350 images you can use to enhance your work!

ELECTRONIC ARTS®

DELUXE CREATIVITY SERIES™

CIRCLE 168 ON READER SERVICE CARD



Apple IIe/IIc compatible

Now your kids can afford to do their homework

More and more students are learning with computers. However most parents haven't been able to work a computer into their budget. The Laser 128 Apple-compatible computer will let you do all those things that you and your family want to or have to do – homework, write reports, even play games for a fraction of the cost of an Apple. With a Laser you can work out your budget on a computer, instead of breaking it with one. The Laser lets you take advantage of the largest software library available, so your child can learn more at home with the same programs they learn on in school. And, you can do your work at home on the Laser, too.

The Laser 128 with all its features: built-in disk drive; 128K RAM (expandable to 1 megabyte); serial, parallel, modem and mouse interfaces; 80 column text mode; numeric keypad; and an expansion slot; makes for a pretty educated buy. When you do your homework on which computer to buy, you'll find the Laser 128 at the head of the class with value. For more information on the Laser 128 and the name of your nearest dealer, contact Video Technology Computers, Inc., 400 Anthony Trail, Northbrook, IL 60062, or call (312) 272-6760.



LASER 128

Apple, Apple IIe and Apple IIc are registered trademarks of Apple Computer, Inc.

Manufactured by
VIDEO TECHNOLOGY COMPUTERS, INC.

MAKING COMPUTERS AFFORDABLE

CIRCLE 115 ON READER SERVICE CARD

AST® Introduces



The graphics possibilities are infinite and infinitely simple.

Plug in. Turn on. Digitize. That's all it takes to transfer "live" video images into your Apple® IIGS.™ Just plug in the AST-VisionPlus™ card. Turn on your video camera or VCR to find the perfect picture. And digitize it with a click of the mouse. Now keep your eyes on the screen.



The video image that goes in your IIGS prints out on the Image-Writer II™ and LaserWriter® in fine detail.

The image that materializes is unbelievably sharp and realistic. No matter what video signal you send... black and white, color, graphics or text. With the ability to choose 16 colors from a palette of 4,096, every vision becomes a masterpiece.

Once you've got all the images you need, you can turn out the lights or turn out more ideas. With AST-VisionEffects,™ IIGS paint or page layout programs you can explore new dimensions in video publishing. Invert your image. Stretch it. Scrunch it. Change the coloration. Rearrange the composition. The only limits are drawn by your imagination.

Show off your talents in a school report, flyer, T-shirt, newsletter, party invitation, catalog and much, much more. With the Apple IIGS and the AST-VisionPlus, you've got the power to make visions a reality.



You can use any standard (NTSC) video device, such as a video camera, VCR or tuner, to collect a library of images.

More Products for the IIGS. Give your Apple IIGS room

Enter AST's Hawaiian Sweepstakes. Details in this ad.

Video Publishing.



to grow. AST offers two new expansion solutions. RamStakPlus™ is the only RAM expansion card with ROM expandability. And our AST-2000™ is a unique 20 Mbyte SCSI hard disk with unlimited storage on the integrated tape backup. It is designed to work with future AppleTalk™ networking applications.

Spectacular Hawaiian Sweepstakes. Check out of your daily routine and check into an all-expense paid vacation for two in Hawaii. AST picks up the tab when your name is drawn in our Spectacular Hawaiian Sweepstakes. Simply receive a live demonstration of one of AST's Apple IIGS enhancement products between **March 15 and June 30, 1987,** and you become eligible to enter the Sweepstakes!



Claim all the creative space you need with AST's unique memory and storage products.

You'll also get a chance to win three $1000 gift certificates (redeemable at the store you receive the demonstration), and over 400 exciting computer-related products from AST, A+, Activision, Inc., DataPak, Diversions, Inc., Electronic Arts, Styleware, Pinpoint, United Software Industries, ISD Marketing and more!



Once an image is captured, it can end up almost anywhere.

With so many prizes, you may be a lucky winner. So, head on down to your nearest AST-authorized Apple Dealer for a live demonstration and details today!!

AST Research, Inc., Apple Enhancement Products Group, 2121 Alton Ave., Irvine, CA 92714-4992,
(714) 553-0340,
BBS: (714) 660-9175,
FAX: (714) 660-8063.

AST RESEARCH INC.

We Make Apples Grow!

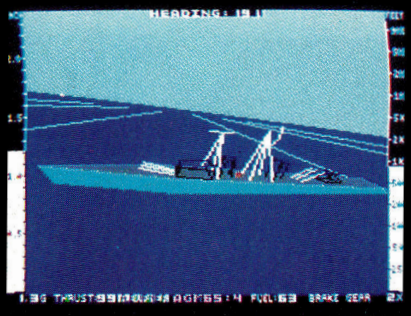
All of the graphics that appear in this ad were created with AST-VisionPlus and the Apple IIGS. Flower graphics were enhanced using PaintWorksPlus from Activision, Inc.
AST registered and AST-VisionPlus, AST-VisionEffects, AST-2000 and RamStakPlus trademarks AST Research, Inc. Apple registered and IIGS, AppleTalk ImageWriter II and LaserWriter trademarks Apple Computer, Inc. Copyright 1986 AST Research, Inc. All rights reserved.

F L I G H T !

From the sophisticated realism, detail, and intellectual stimulation of Flight Simulator...



...to the brute-force fun, thrills and excitement of Jet...



..with new adventures in Scenery Disks...



...SubLOGIC. The State of the Art in Flight.

See Your Dealer. For additional product ordering information or the name of the dealer nearest you, call (800) 637- 4983.



CIRCLE 110 ON READER SERVICE CARD

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

ORDER LINE: (800) 637-4983
(except in Illinois, Alaska and Hawaii)
Open 7 AM to 9 PM Central Time

A+

The #1 Apple II Magazine

PUBLISHER MARTIN MAZNER
EDITOR IN CHIEF FREDERIC E. DAVIS
TECHNICAL EDITOR CHIP CARMAN
SENIOR EDITOR LISA RALEIGH
SENIOR COPY EDITOR EVA LANGFELDT
MANAGING EDITOR LESLIE STEERE
ASSOCIATE EDITOR CAROL PERSON
EDITORIAL ADMINISTRATOR MARJORIE GAE BRANDON
EDITORIAL ASSISTANT MARY BOHANNON

ART DIRECTOR PETER A. TUCKER
ASSOCIATE ART DIRECTOR FABIAN COOPERMAN
MECHANICAL ARTISTS STEVE CAMPBELL
NANCY BROWN SAHNTA PANNUTTI

CONTRIBUTING EDITORS RUSS LOCKWOOD
RUSS BLEDSOE CHARLES RUBIN
MICHAEL CALLERY ROBERTA SCHWARTZ
MICHAEL FISCHER RHODA SIMMONS
BOB LINDSTROM DAVID THORNBURG
GARY LITTLE MICHAEL WIESENBERG

EDITORIAL OFFICE 11 DAVIS DRIVE
(415) 598-2290 BELMONT, CA 94002
ADVERTISING/BUSINESS OFFICE ZIFF-DAVIS PUBLISHING CO.
A DIVISION OF ZIFF ONE PARK AVENUE
COMMUNICATIONS CO. NEW YORK, NY 10016
(212) 503-5209
SUBSCRIPTION INQUIRIES A+, P.O. BOX 2965
(303) 447-9330 BOULDER, CO 80322

ADVERTISING DIRECTOR SUZANNE M. ZELLNER
NORTHEAST MANAGER THOMAS E. RICHARDSON
SOUTHEAST MANAGER PETER STANGEL
MIDWEST MANAGER THOMAS J. LUTZKE
NORTHWEST MANAGER DAVID J. EZEQUELLE
SOUTHWEST MANAGER CHRIS M. TICE
ADVERTISING COORDINATOR MICHAEL CROUCH
ASSISTANT TO PUBLISHER HELEN KEMPISTY
SINGLE-COPY SALES DIRECTOR ROBERT WOLTERSDORF
SINGLE-COPY RETAIL SALES CAROL BENEDETTO
CIRCULATION MANAGER CHARLES MAST
CLASSIFIED ADVERTISING KATHRYN CUMBERLANDER
ADVERTISING PRODUCTION MANAGER LISA FRANEY
EDITORIAL PRODUCTION COORDINATOR EVE HINDERER

ZIFF-DAVIS PUBLISHING COMPANY
A DIVISION OF ZIFF COMMUNICATIONS COMPANY
PRESIDENT KENNETH H. KOPPEL
SENIOR VICE PRESIDENT, MARKETING PAUL CHOOK
VICE PRESIDENT, OPERATIONS BAIRD DAVIS
VICE PRESIDENT, CONTROLLER JOHN VLACHOS
VICE PRESIDENT, CREATIVE SERVICES HERBERT STERN
VICE PRESIDENT, CIRCULATION ALICIA MARIE IVANS
VICE PRESIDENT, CIRCULATION SERVICES JAMES RAMALEY
VICE PRESIDENT, MARKETING SERVICES ANN POLLAK ADELMAN
VICE PRESIDENT, DEVELOPMENT SETH ALPERT
VICE PRESIDENT HUGH TIETJEN
BUSINESS MANAGER GARY A. GUSTAFSON
PRODUCTION DIRECTOR WALTER J. TERLECKI

ZIFF COMMUNICATIONS COMPANY
CHAIRMAN PHILIP B. KORSANT
PRESIDENT KENNETH H. KOPPEL
SENIOR VICE PRESIDENT PHILIP SINE
VICE PRESIDENT LAURENCE USDIN
VICE PRESIDENT WILLIAM PHILLIPS
VICE PRESIDENT J. MALCOLM MORRIS
VICE PRESIDENT STEVEN C. FEINMAN
TREASURER SELWYN I. TAUBMAN
SECRETARY BERTRAM A. ABRAMS

A+ The #1 Apple II Magazine ISSN (#0740-1590) is published monthly for $24.97 one year, $43.97 two years, and $57.97 three years. Additional postage $5 for Canada, $5 other foreign by Ziff-Davis Publishing Co., a division of Ziff Communications Company, One Park Ave., New York, NY 10016. Second-Class Postage paid at New York, NY 10016 and at additional mailing offices. **POSTMASTER:** Send address changes to A+, P.O. Box 56493, Boulder, CO 80321-6493.
A+ is an independent journal, not affiliated in any way with Apple Computer, Inc. Apple is a registered trademark of Apple Computer, Inc.

Entire contents Copyright © 1986 Ziff-Davis Publishing Co., a division of Ziff Communications Company. All rights reserved; reproduction in whole or in part without permission is prohibited. The following are trademarks of Ziff-Davis Publishing Co., a division of Ziff Communications Company: A+, A+: The #1 Apple II Magazine, MacTips, Rescue Squad, That's Entertainment, Teachers' Toolbox, Tips and Techniques, GamePort, Learning Curve. **PERMISSIONS:** Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to the Licensing Manager, Jean Lamensdorf, Ziff-Davis Publishing Company, a division of Ziff Communications Company, 1 Park Ave., New York, NY 10016.

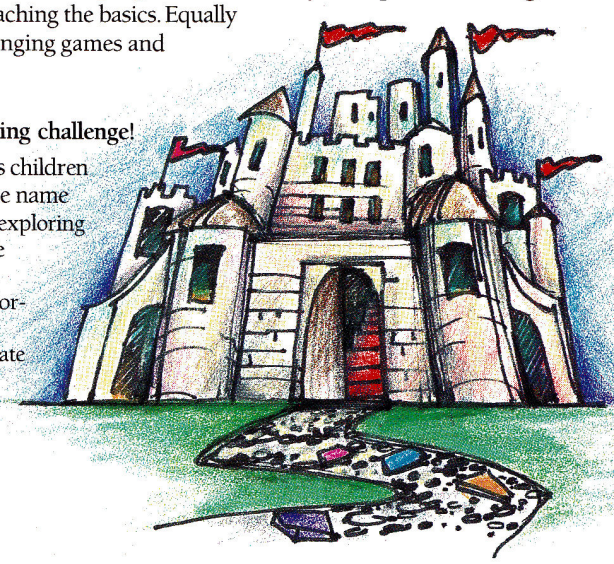
BPA

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

Many of you already know our critically acclaimed educational software programs including *Reader Rabbit, Rocky's Boots* and the recently released *Writer Rabbit* and *Math Rabbit.* Teachers and parents have championed these programs because they build problem-solving and creative thinking skills while teaching the basics. Equally important, children love the challenging games and animated graphics.

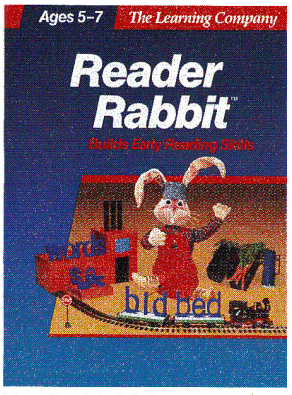
Think Quick! An exciting new learning challenge!

Now, The Learning Company invites children to explore a new program where the name of the game is to *Think Quick!* While exploring the many rooms of a castle, players are challenged to overcome a variety of obstacles. The program develops important thinking skills as children solve mysteries and race through six intricate game levels.

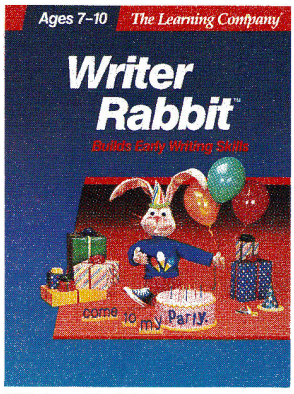


Think Quick! (Ages 7-12)
Apple II Family $39.95

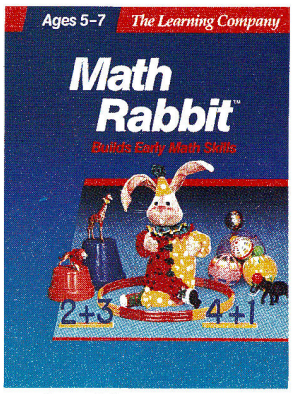
...And don't miss our Three Rabbits. They develop thinking skills and make learning "The Three R's" fun!



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



Writer Rabbit (Ages 7-10)
"Writer Rabbit is a perfect example of high-quality educational software."
—Apple Education Newsletter
Apple II Family $39.95



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

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

Go to your Authorized Dealer today and see what's new from The Learning Company. Or call us for more information: (800) 852-2255; In CA: (800) 852-2256.

The Learning Company®

CIRCLE 158 ON READER SERVICE CARD

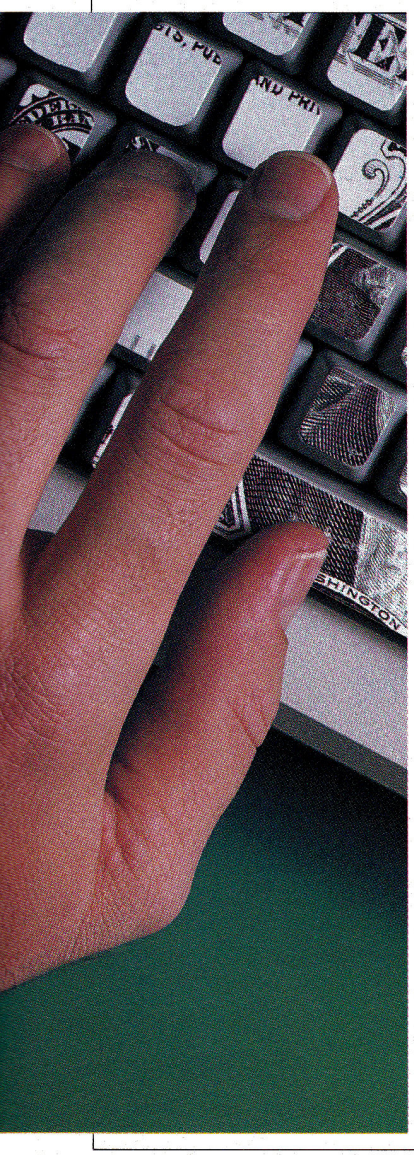
A+ CON

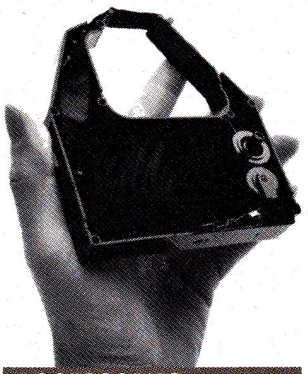
VOTED **BEST COMPUTER MAGAZINE** BY THE COMPUTER PRESS ASSOCIATION

JUNE 1987/VOLUME 5/ISSUE 6

COVER STORY

26
HOW TO MAKE MONEY WITH YOUR APPLE II
BY DAN GUTMAN
With a little ingenuity and the right products, you too can make big bucks and spare change with your Apple II system.





ACCESSORIES

58
NEW LIFE FOR OLD RIBBONS
BY SCOTT BRAINARD
If you think you're spending too much on expensive printer ribbons, check out these ribbon-rejuvenation methods.

PROGRAMMING

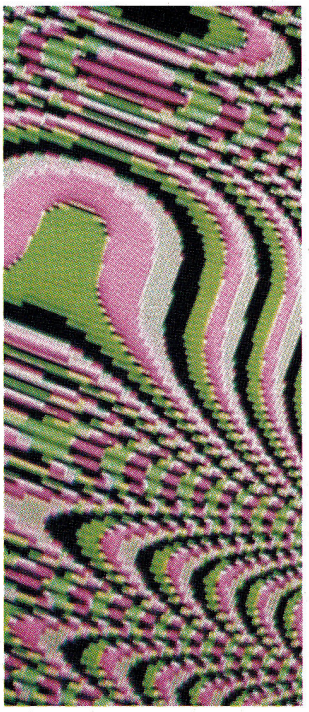
61
SECRET RAMDISK IN PRODOS
BY GARY WEST
ProDOS users, take note. If you have an Apple IIc, or a IIe with 128K, you have access to a second disk drive that many users never take advantage of.



COLUMNS

9
EDITOR'S PAGE

75
THE LEARNING CURVE
BY DAVID D. THORNBURG
Droves of readers wrote in with creative refinements to a program we featured in last December's "Learning Curve." This month, Thornburg shares some of those reader responses.



83
TELECOMMUNICATIONS
BY RUSS LOCKWOOD
Lockwood looks at an upcoming communications standard that may lead to a modemless future.



89
SPEAKING OF GRAPHICS
BY ROBERTA SCHWARTZ AND MICHAEL CALLERY
How can the BASIC programming language help you learn more about the IIGS? The shadow knows. Schwartz and Callery also discuss a few bugs in Paintworks Plus.

97
GAMEPORT
BY BOB LINDSTROM
Our entertainment columnist sounds a fanfare for the common man and interviews the authors of Shanghai and Police Quest. Lindstrom also takes a look at three new Wizardry scenarios.

DEPARTMENTS

15
LETTERS

21
NEWSPLUS
BY LISA RALEIGH
News and views of the personal-computer industry

Downloaded from www.Apple2Online.com

COVER BY CARTER DOW PHOTOGRAPHY

T E N T S

CONTEST

119 "HOW I USE THE II TO TEACH" CONTEST
Win a complete IIGS system by telling us how to use your Apple II in the learning environment.



38 PRODUCT SPOTLIGHT
BY DENISE CARUSO
A compendium of interesting products for the Apple II family

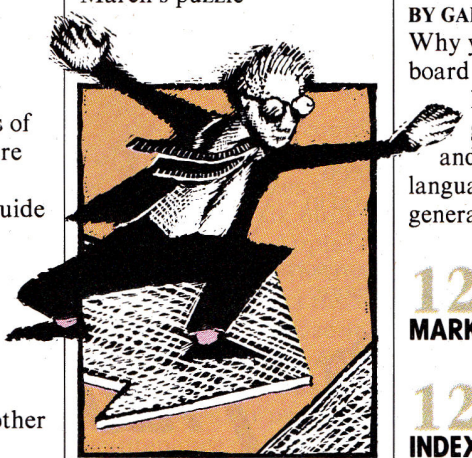
65 A+ APPLEWORKS REPORT
Using AppleWorks as a job-search tool, making use of a special patch, finding blank cells, and logging onto Bob Lissner's AppleWorks bulletin board

81 A+ TEACHERS' TOOLBOX
Which of the thousands of educational programs are worth your time and money? This month's guide features history and geography software.

91 GRAPHICS GALLERY
The last cigarette and other moods

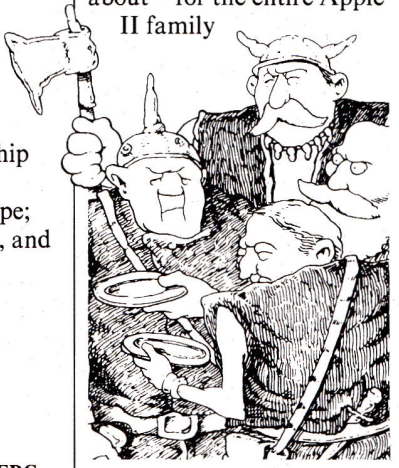
102 ENTERTAINMENT
Following "GamePort" are reviews of Championship Wrestling by Epyx; Infiltrator by Mindscape; Moonmist by Infocom, and Battle of Antietam by Strategic Simulations.

110 COMPUTER CALISTHENICS
BY MICHAEL WIESENBERG
A multiplication mind-bender and the solution to March's puzzle



113 TIPS AND TECHNIQUES
Useful tips from *A+* readers, including hints, tricks, and techniques for getting more out of your Apple II

114 PIPELINE
BY CAROL PERSON AND RHODA SIMMONS
Products you want to know about—for the entire Apple II family



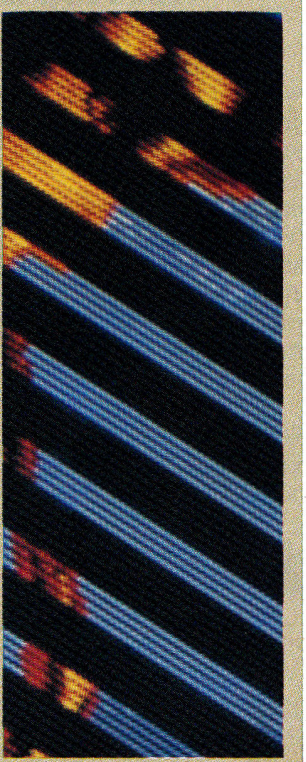
121 RESCUE SQUAD
BY GARY B. LITTLE
Why you can't use a 65816 board with IIGS software, how to print special graphics characters, and an assembly-language random-number generator

122 MARKETPLACE

128 INDEX TO ADVERTISERS

IIGS UPDATE

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



THIS AD CONTAINS GRAPHIC LANGUAGE SUITABLE FOR THE APPLE® II FAMILY.



INTRODUCING THUNDERSCAN® FOR APPLE II.

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



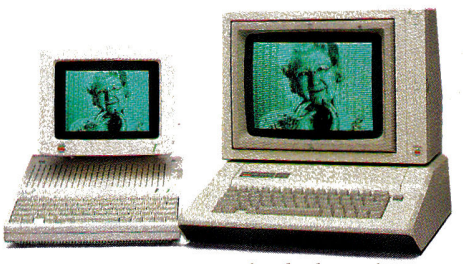
Just roll in your image and ThunderScan does the rest.

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

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



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



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

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



ThunderScan simply replaces ImageWriter's ribbon cartridge.

ThunderScan, Thunderware, and Thunderware logo are registered trademarks of Thunderware, Inc. Apple is a registered trademark of Apple Computer Inc. Macintosh is a trademark licensed to Apple Computer, Inc. ImageWriter, AppleWorks and MousePaint are trademarks of Apple Computer, Inc. Pinpoint GraphMerge is a trademark of Pinpoint Publishing. Dazzle Draw is a trademark of Broderbund Software, Inc.

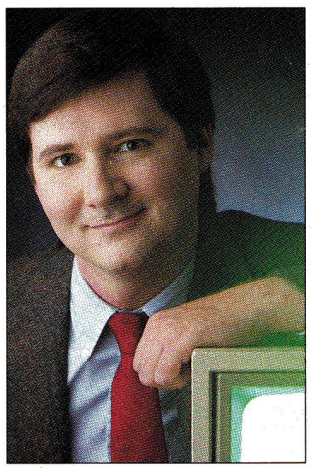
© 1987 Thunderware, Inc.

CIRCLE 114 ON READER SERVICE CARD

Thunderware®

ThunderScan® FOR APPLE II®

21 Orinda Way, Orinda, CA 94563 (415) 254-6581



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

THE OFFICE APPLIANCE

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

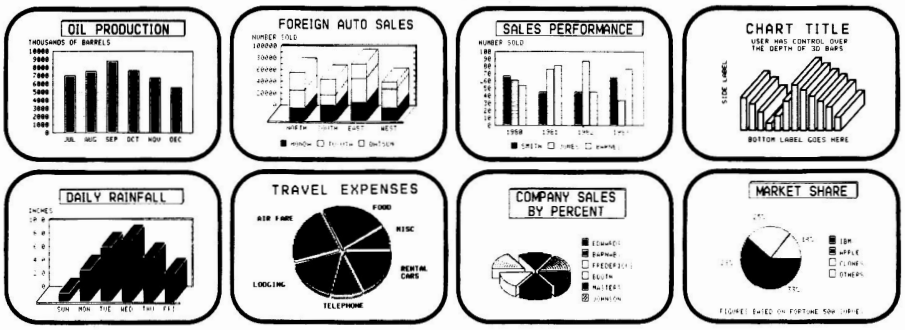
A good electric typewriter costs more than $1000, and all it can do is type. For about the same money, you can get an Apple IIe system, and it can type, correct spelling, create complex form letters, calculate, store information, and lots more. Information typed on a typewriter is stored only on the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

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

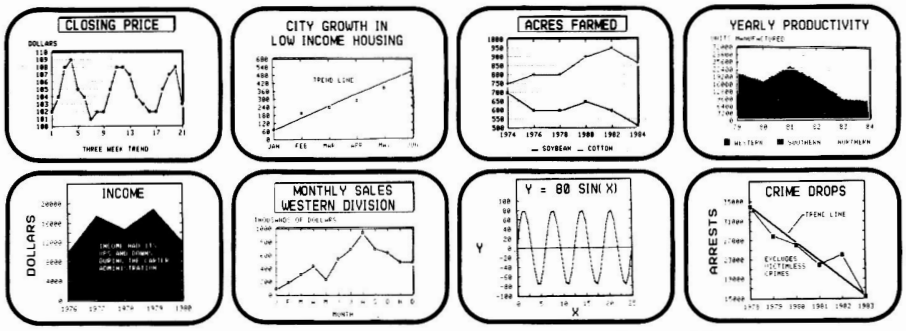
Right now many businesses are buying IBM PC clones because they want an inexpensive yet reliable business-computing setup. Even though the price of a clone may seem low, however, once you add monitors, add-in boards, software, and so on, the price of a PC clone becomes much higher than that of a genuine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

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

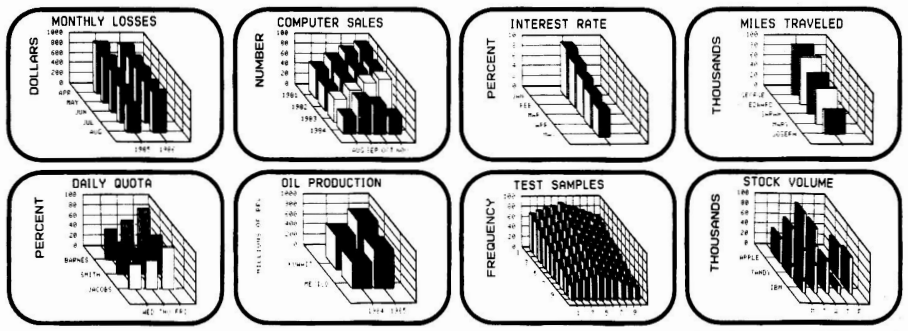
ChartPower! ● For all Apple computers ● Prints on almost any printer ● Convert keyboard data to charts in seconds



AlphaChart. 2D/3D bar and pie charts. Extras include powerful draw, type, and slide show programs. 26 chart styles. **$29.95.**



CurvePlotter. Line, area, trend, and math function charts. Up to three curves per chart, 100 points per curve. 12 chart styles. **$29.95.**



3DChart. Nothing else like it! 3D bars plotted versus two variables on a 3D grid. Up to 144 bars. 14 chart styles. **$29.95.**

TYPE ON CHARTS SIGNS & POSTERS
AWARD CERTIFICATES NEWSLETTERS
ORGANIZATIONAL CHARTS INVITATIONS
ADVERTISEMENTS REPORT COVERS SIGNS

TEXT-ART. Gives your charts an individualized, artistic flair. Type anywhere on any graphic in 24 type styles. Only **$29.95.** Fonts by Beagle Bros.

- Buy any two disks for $39.90.
- Choose three disks for $49.85.
- Check/VISA/MasterCard/COD.
- 3 months money-back guarantee.
- Get all four disks for $59.75.
- Or send $3.00 for a really great demo disk.
- Requires Apple II and a dot-matrix printer.



800-826-2989 (Nationwide)
800-231-7316 (California)
(209) 473-2862 for tech. info.

SPECTRAL GRAPHICS SOFTWARE
6333 Pacific Avenue
Suite 2560
Stockton, CA 95207

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

Hooray for Us!

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

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

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

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

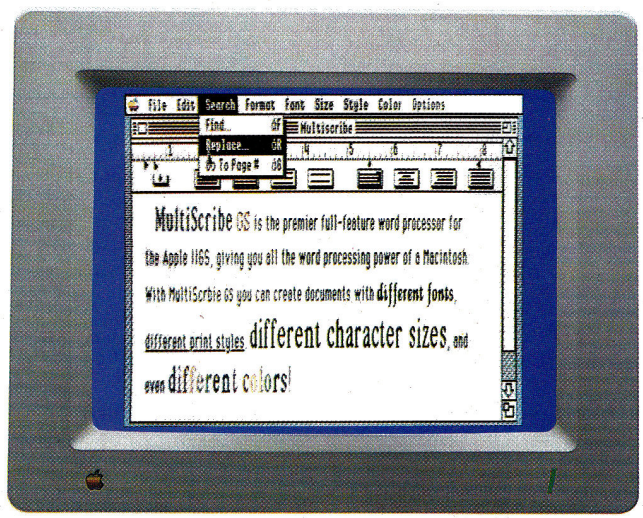


FREDERIC E. DAVIS/**EDITOR IN CHIEF**

Spectacular Vernacular.

MultiScribe GS™

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



The hand is almost as quick as the eye!

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

From the screen to the page – without surprises!

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

Powerfully Professional.

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

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

Illustration Sensation.



TopDraw™

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

The shape of things to come!

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

The color of creativity!

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

Get serious.

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

Seeing is believing!

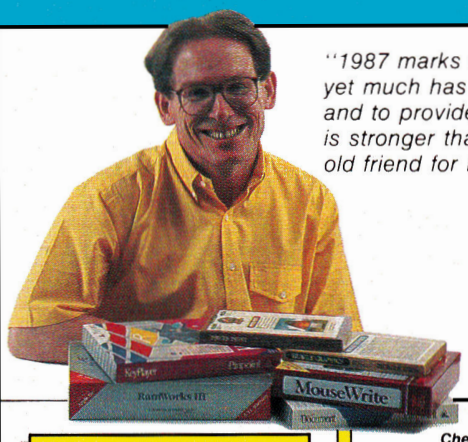
See **TopDraw**, **MultiScribe** GS, and all the other creative StyleWare products at your authorized StyleWare dealer.

StyleWare, Inc.

5250 Gulfton, Suite 2E, Houston, Texas 77081
713/668-0743 (in Texas)
800/233-4088

CIRCLE 155 ON READER SERVICE CARD

MultiScribe GS and TopDraw are trademarks of StyleWare, Inc.. Apple is a registered trademark of Apple Computer, Inc.. Apple IIGS, AppleWorks, ImageWriter II and LaserWriter are trademarks of Apple Computer, Inc.. Macintosh is a trademark of MacIntosh Laboratory, Inc. and is used by Apple Computer Inc. with express permission of its owner. Deluxe Paint is a trademark of Electronic Arts, Inc.



"1987 marks the 7th year of doing business. There have been changes, yet much has remained the same. Our commitment to quality products and to provide 100% satisfaction in all customer contacts and dealings is stronger than ever. We hope you will continue to regard BCP as an old friend for many years to come."

William F. Gollan
Shyster

BCP

PC SAFETY

COMPUTERS

Central Point

Laser 128	389.95
Laser GS (New)	CALL
Disk Drive 5¼"	138.95
Disk Drive 3½" 800k	179.95
Disk Drive 3½" 800k w/Cont.	278.95
Expansion Box	68.95

PERIPHERALS

Disks & Ribbons

Disks 5¼" SS/DD 10 Pac's	
Maxell	10.95
Fuji	10.95
Disks 3½" DS/DD 10 Pac's	
Maxell	23.95
Fuji	23.95
Ribbons All Colors 6 Pac's	
Apple Imagewriter & Scribe	
I or II (Black)	24.95
I or II (Color)	28.95
II Rainbow (Color)	69.95
Scribe (Black)	37.95
Brother	
HR 15 & 35 (Black)	29.95
Citizen & Epson	
FX, MSP 10" (Black)	25.95
FX, MSP 15" (Black)	34.95
LX 80, 90 (Black)	28.95
LQ 800 10" (Black)	34.95
LQ 1000 15" (Black)	49.95
Okidata	
ML 82A, 92, 93 (Black)	14.95
ML 192, 193 (Black)	34.95

Hard Disk Drives

First Class	
Sider 10mb System	539.95
Sider 20mb System	719.95

Mice—Pads—Joysticks

Apple	
Mouse II E w/Int.	118.95
Mouse II C w/Cbl.	88.95
Hayes Joysticks	
Mach 3's IIE, IIC, IIGS	34.95
Mach 4's IIE, IIC	59.95
Kraft	
Premium 3 Button	31.95
Quick Stick	48.95
Koala Tech	
Koala Pad + w/Soft.	78.95

Memory Boards

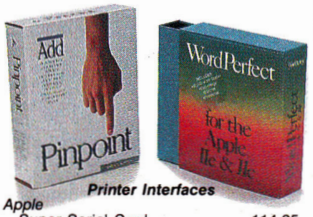
Applied Engineering	
gs Ram	
w/512k	168.95
w/1mb	238.95
w/1.5mb	288.95



Ramfactor II+, IIE	
512k	224.95
1mb	284.95
Ramworks III IIE	
256k	164.95
512k	194.95
1mb	264.95
ZRam Ultra I	
512k	194.95
ZRam Ultra II	
512k	244.95
1mb	294.95
ZRam Ultra III	
512k	289.95
1mb	344.95
Transwarp	229.95

Checkmate Multiram

IIE	
320k	158.95
320k & RGB	188.95
576k	188.95
576k & RGB	218.95
832k & RGB	248.95
1mb & RGB	268.95
CX	
512k	174.95
1mb	369.95
Grappler IIc	78.95



Printer Interfaces

Apple	
Super Serial Card	114.95
Orange Micro	
Grappler + w/16k	118.95
Grappler + w/64k	139.95
Grappler + RS232	74.95
Hot Link IIC	48.95
ImageBuffer II w/64k	68.95
Prograppler GS, IIe	74.95
RamPak 4gs w/512k	188.95
RamPak 4gs w/1mb	258.94
RamPak 4gs w/1.5mb	328.95
Textprint	
Print-It	119.95
Thirdware	
Fingerprint +	88.95
Fingerprint G+	64.95

Surge Protectors

Curtis	
Diamond	29.95
Emerald	35.95
Ruby	53.95
Kensington	
System Saver	63.95

PRINTERS

Apple*

Imagewriter II 10"	499.95

Citizen

MSP 120D (120 cps) 10"	194.95
MSP 10 (160 cps) 10"	294.95
MSP 20 (200 cps) 10"	339.95
MSP 15 (160 cps) 15"	394.95
MSP 25 (200 cps) 15"	494.95
MSP 35 Daisywheel (35cps) 15"	499.95

Okidata

ML 192[s] (200 cps) 10"	359.95
ML 193[s] (200 cps) 15"	529.95

Star

NX 10 (120 cps) 10"	259.95
NX 15 (120 cps) 15"	359.95
NP 10 (100 cps, 10")	209.95

BUSINESS

ALS

Spellworks	30.95
The Handlers	54.95

Apple

Appleworks	198.95

BPI

AR, GL, PR, AP, IC (ea)	138.95

Broderund/Bankstreet

Bank St. Filer	44.95
Bank St. Writer Plus	49.95
On Balance	61.95

Intuit

Quicken	34.95

Meca

Managing your $ V 2.0	98.95

Megahaus/Works Series

Mega,Report,Think (ea)	64.95

Microsoft

Multiplan	64.95

Monogram

Dollars & Cents IIc,II+ (ea)	71.95
Forcast 128k	39.95

PBI

Graphworks	44.95

Quark

Catalyst, Word Juggler 3.0 (ea)	58.95

Roger Wagner

Mouse Write V 2.6	88.95
Write Choice	41.95

Sensible Software

Bookends—Ext.	81.95
Sensible Grammar	55.95
Sensible Writer	55.95
Speller IV	68.95

Sierra On Line

Homeword +, Filer (ea)	44.95
Smart Money	51.95

Simon & Schuster

Websters Speller Ck.	37.95

Software Publishing

PFS:WR, GR RP, PL (ea)	75.95
PFS:File/Report	75.95
PFS:Workmates	148.95

Sorcim/IUS

SuperCalc IIIA	124.95

Styleware

Desk Accessories GS	26.95
Multiscribe	45.95
Multiscribe GS	64.95
Multiscribe Spellchecker GS	26.95
Picture Manager GS	26.95

Word Perfect

WordPerfect V 1.1	84.95
WordPerfect V 1.1 GS	84.95

GRAPHICS/UTILITIES

Activision

Game Maker: Sports, Science (ea)	17.95
Game Maker: Kitchens	31.95
Greeting Card Maker	26.95
Music Studio (GS)	CALL
Paintworks Plus (GS)	51.95

Baudville

816 Paint (GS, IIE, IIC)	45.95
Award Maker Plus GS	23.95

Beagle Brothers

Alpha Plot, D-Code, Extra-K, Triple Dump (ea)	20.95
Apple Mech., Bag, Diskquick, Flex-Text, Font Mech., Frame-Up, IO Silver, Pronto Dos, Util. City (ea)	16.95
Basic, Big U., Dbl. Take, Fat Cat, Macro Works, Probyter, Screens (ea)	18.95
Compiler	41.95
DOS Boss, Silicon Salad (ea)	13.95
Graphics	30.95
GPLE, SuperMacroWorks (ea)	25.95
Mini Pix –1, 2, 3 (ea)	15.95
Shape Mech., Power Print (ea)	20.95
Tip Disk –1	12.95
Typefaces	15.95

Borland International

Turbo Pascal 3.0 (Reg. cpm)	44.95
Turbo Tutor	21.95

Broderbund

Animat	43.95
Dazzle Draw	37.95
Drawing Table (GS)	58.95
Fantavision	31.95
Fantavision (GS)	38.95
Newsmaker (GS)	58.95
Print Shop Companion	24.95
Print Shop Enh.	31.95
Print Shop GL 1,2,3 (ea)	15.95
Print Shop Refill Paper	11.95
Print Shop (GS)	43.95
Toy Shop	38.95
Toy Shop Refill	17.95

Central Point

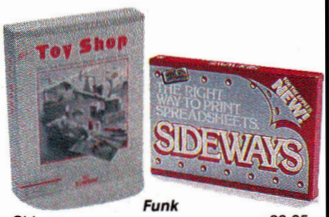
Copy II +	19.95

Data Transforms

Fontrix	59.95
Font Set(s) (ea)	13.95

Electronic

Cut & Paste	11.95
Deluxe Paint	69.95
Movie Maker	26.95
Music Const. GS	35.95



Funk

Sideways	38.95

Pinpoint

Document Checker	44.95
Document & Spellchecker	60.95
Infomerge	48.95
Keyplayer	30.95
Pinpoint Starter Kit GS	104.95
Pinpoint	48.95
Pinpoint Ram Exp.	24.95
Pinpoint Spellchecker	44.95
Pinpoint Toolkit	30.95
ProFiler V2.2	51.95
RunRun	30.95

Roger Wagner

Merlin Assembler	41.95
Merlin Combo	68.95
Merlin Pro	64.95

Spinnaker

T-Shirt Shop	31.95
T-Shirt Shop Graphics	15.95

Springboard

Certificate Maker	29.95
Certificate Maker Lib –1	20.95
Newsroom	34.95
Newsroom Clip Art V1, V3 (ea)	17.95
Newsroom Clip Art V2	24.95
Newsroom Graphic Exp V1	24.95
Publisher	CALL

Styleware

Topdraw GS	64.95

EDUCATIONAL/PERSONAL

Barrons

Computer SAT	32.95

Better W./Spinnaker

Homework Math/Word	31.95
Homework Writing	31.95
Typing Made Easy	31.95

Broderbund

Science Tool Kit Mast.	44.95
Science Tool Kit:	
Earthquake Lab	25.95
Speed in Motion	25.95
Type	28.95
Variable Feast	33.95
Where in World is Carmen San Diego?	25.95
Where in the USA is Carmen San Diego?	28.95

CBS

Mastering SAT	59.95

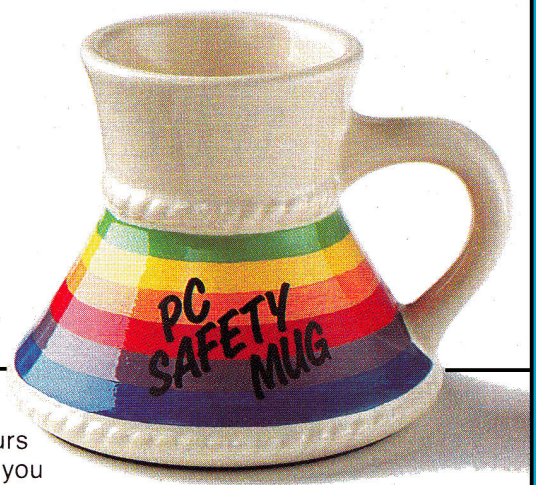
ORDERS ONLY
"NO ORDER TOO SMALL"

CALL TODAY

BUSINESS COMPUTERS OF PETERBOROUGH, INC.

UPPER UNION ST. • PO BOX 94 • W. PETERBOROUGH, NH 03468-0094

MUG FREE



PC Safety Mug is yours free when you purchase any 1200 or 2400 baud modem and a communications software package.

Davidson Associates

AlgeBlaster, Classmate, Mathblaster, Spell-It, Work Attack (ea)	28.95
Grammar Gremlin	28.95
Homeworker	51.95
Speed Reader II	38.95

Designware

States & Traits, Gram. Exam. (ea)	28.95
Remember	48.95
Spellcopter, Spellakazam (ea)	24.95

Fisher Price

Up & Add-Em	16.95
Man-on-Moon, Jungle Reading, Peter R.-Reading, Peter W. Music (ea)	25.95

Harcourt-Brace

SAT	25.95

Hayden

SAT Math, Verbal (ea)	41.95

Learning Company

Reader Rabbit	24.95
Gertrudes Puzzle, Secret (ea)	28.95
Math or Reader Rabbit (ea)	24.95
Number Stumper	24.95
Robot Odessey I, Rocky's Boot (ea)	31.95

Mindscape

Bank St. Story B.	26.95
Perfect Score SAT	44.95

Pinpoint

Micro Cookbook	27.95

Scarborough

Mastertype New, Filer (ea)	26.95

Simon & Schuster

Great Paper Air'P.	24.95
LoveJoy's SAT	39.95
Typing Tutor III	31.95

Spinnaker

Kidwriter	24.95
Facemaker: Golden Edition	15.95
Fraction Fever	16.95
Kindercomp	18.95

Springboard

Early Games	20.95
Easy ABC, Mask Parade (ea)	23.95
Fraction Factory	18.95
Piece Cake Math	20.95
Puzzle Master	20.95

Weekly Reader

Sticky Bear Series (ea)	22.95

GAMES SOFTWARE

Accolade

DamBusters, Fight N., Hard Ball, Laws of West (ea)	20.95

Activision

Borrowed Time, Ghostbuster's Hacker, Road Race, (ea)	24.95
Hacker II, Shanghai (Ea)	24.95
Hacker II (GS)	30.95
Rocky Horror, Labyrinth, Murder on Miss.	24.95
Shanghai (GS)	30.95
Tass Times (GS)	30.95

Avalon Hill

Under Fire	37.95

Broderbund

Airheart	22.95
Art of War, Serpents Star (ea)	28.95
Breakers	28.95
Capt. Goodnight, Champ. Lode R., Karateka (ea)	22.95
Welcome Home Muppets	27.95

Datasoft

Alternate Reality "City"	22.95
Gunslinger	18.95

Electronic Art

Age of Adv., Super B. Dash, 1 on 1, Music Const. Set, Pinball Const. Set, 7 Cities Gold, Archon (ea)	10.95
Adv. Const. Set, Carriers At War, Wilderness Europe Ablaze, Bards Tale II, Starfleet, (ea)	33.95
Amnesia, Robot Rascals, Bards Tale, Reach For Stars (ea)	30.95
Artic Fox, Ring Quest, Battlefront, Make Your Murder, Chess 2000, Lords Conquest, Archon II, Skyfox (ea)	27.95
Pegasus, Battlefront (ea)	27.95
Tim Leary, Marble Mad (ea)	23.95

Epyx

Baseball, BallBlazer, Champ. Wrestling, Destroyer, Football, Mission Impossible, Summer Games 1,2, Winter Games (ea)	24.95
Karate	24.95
World Games, Movie Monster (ea)	24.95

Hayden

Sargon III	31.95

Infocom

All Products	CALL

Micro Lge. Sports

Baseball	24.95

Microprose

F-15, Silent Serv., Solo Flight (ea)	22.95
Conflict Viet., Crusade Europe, Decision Desert (ea)	24.95
Silent Service (GS)	28.95

Mindscape

American Challenger, Rambo Part II (ea)	24.95
Balance of Power	31.95
Defender of Crown (GS)	31.95
Uninvited	CALL

One Step

Golf's Best St. Andrew's Old	18.95

Origin

Autoduel	33.95
Moebius	40.95
Orge	29.95
Ultima 3 & 4 (ea)	40.95

Sierra On Line

Black Caldron	24.95
Kings Quest 1,2,3 (ea)	31.95

Simon & Schuster

Star Trek 1,2 (ea)	25.95

Sir Tech

Wizardry 1	31.95
Wizardry 2	25.95
Wizardry 3,4 (ea)	28.95

Spectrum

Gato	22.95

Strategic Simulations

Baltic 85'	29.95
Battle Cruiser	38.95
Battle for Normandy	25.95
Battle Group	38.95
Battle of Antietam	31.95
Broadsides	25.95
Carrier Force	38.95
Computer Ambush	37.95
50 Mission Crush	25.95
Gettysburg	38.95
Kampfgruppe	38.95
Mech Brigade	38.95
Nam	25.95
N. Atlantic 86'	38.95
Panzeir Grenadier	25.95
Phantasie 1,2,3 (ea)	25.95
Pro Tour Golf	25.95
Questron	30.95
Realm of Darkness	25.95
Rings of Zilfin	25.95
Road War 2000	25.95
Shard of Spring	25.95
USAAF	38.95
War in Russia	50.95
War in South Africa	38.95
Warship	38.95
Wizards Crown	25.95

Sublogic

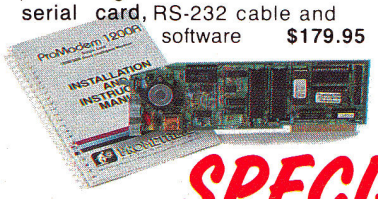
Baseball	34.95
Flight Simulator II	34.95
Jet	29.95

SPECIAL #1

BCP . . . 2 Year Warranty

The PG-1200A is the most popular Apple modem we sell!

Save hundreds of dollars compared to purchasing an external modem. serial card, RS-232 cable and software **$179.95**



- 1200/300 baud card modem
- Plugs into Apple II, II+, or IIe
- Hayes compatible
- Auto answer/auto dial
- Built-in speaker
- ProCom-A Disk based Communications and Word Processing

Sale Price

PG 1200 External **$169.95**
JG 2400 External **$249.95**

SPECIAL #2

Prometheus . . . 1 Year Warranty

An exclusive feature of ProModem 1200 is the optional printer buffer expandable to 512K. It buffers up to 500 pages of text.

Advanced features at affordable prices!



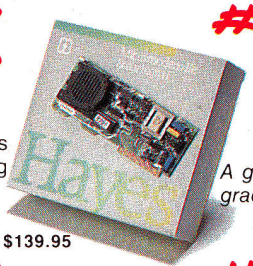
ProModem 1200 External	**$269.95**
ProModem 1200A Internal	**$195.95**
ProModem 300 IIc w/Cable	**$89.95**

SPECIAL #3

Hayes . . . 1 Year Warranty

The MicroModem IIe contains a complete telecommunicating system designed specifically for the Apple II+ and IIe.

MicroModem IIe with Software **$139.95**



A great gift for graduation!

SPECIAL #4

Communications Links

Compuserve Subscription Kit	**$26.95**
United Ascii Express	**$74.95**
Ascii Express Mousetalk	**$94.95**
PinPoint Point to Point	**CALL**



OUR TERMS *Customer Service (603) 924-9406*

Payment: MC/Visa with no surcharge. Your card is not charged until shipment is made. Personal checks require clearing period. Money orders, bank checks, and certified checks are processed same day.

Sales Tax: None
Freight: Software, $3.00 min.; Hardware, please call.
Misc.: Prices & availability subject to change. 1 mug per order, while supply lasts.

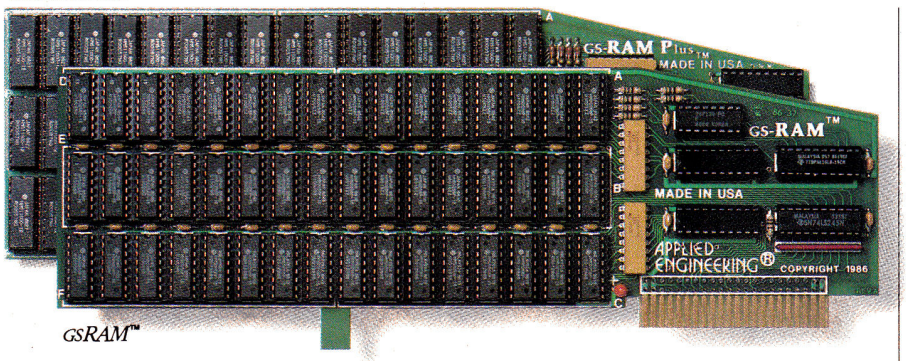
1-800-845-3003

MasterCard VISA

Insist on GSRAM™ When You Buy Your IIGS™

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

GSRAM Plus™



GSRAM™

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

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

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

GSRAM for More AppleWorks Power

Only GSRAM and GSRAM Plus eliminate AppleWorks internal memory limits, increasing the maximum number of records available from 6,000 to over 25,000 and only GSRAM and GSRAM Plus increase the number of lines permitted in the word processing mode from 6,000 to over 15,000. And only GSRAM and GSRAM Plus offer a built-in printer buffer so you can continue using Appleworks while your printer is printing. GSRAM and GSRAM Plus even expand the number of lines in the clipboard from 255 to 2047 and will auto segment large files so they can be saved on two or more disks. You can even have Pinpoint or Macroworks and your favorite spelling checker in RAM for instant response. GSRAM and GSRAM Plus will even display the time and date right on the AppleWorks screen. Nothing comes close to enhancing AppleWorks so much.

Turn Your IIGS into a Giant

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

Grow by Bytes or Megabytes

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

GSRAM—for Normal Memory Requirements

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



"In quality, performance, compatibility, expandability and support, Applied Engineering's GSRAM and GSRAM Plus are number one."

Steve Wozniak, the creator of Apple Computer

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

GSRAM Plus—for Growing by Leaps and Bounds

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

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

Easy Expansion

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

Quality and Support of the Industry Leader

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

GSRAM with 256K	$169
GSRAM with 512K	$219
GSRAM with 1 MEG	$299
GSRAM with 1.5 MEG	$379
GSRAM with 2-8 MEG	CALL
GSRAM PLUS with 1 MEG	$459
GSRAM PLUS with 2 MEG	$759
GSRAM PLUS with 3-8 MEG	CALL

Order today!

See your dealer or call Applied Engineering today, 9 a.m. to 11 p.m. 7 days. Or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 6¼% sales tax. Add $10.00 outside U.S.A.

APPLIED ENGINEERING™

The Apple enhancement experts.

(214) 241-6060

P.O. Box 798, Carrollton, TX 75006

CP/M is a registered trademark of Digital Research, Inc.

Letters

We invite your comments.

GUARD THAT MANUAL

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

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

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

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

H. Gail Eilebrecht
Elephant Butte, NM

UPGRADE FOR A WORKHORSE

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

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

Danial L. Hocson
Tacoma, WA

THE IIc: A REAL COMPUTER

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

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

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

John C. Brown
Reno, NV

NON-APPLE DISK DRIVES

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

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

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

speed during the write process clobbered sectoring and the catalog.

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

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

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

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

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

Cheryl Berthelsen
Ontario, CA

WORD-PROCESSING BARGAIN

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

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

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

Karl R. Beach
Shoreview, MN

The C-VUE is now Laser 128 compatible with adapter for $338!

Upgrade Your System With The Quality Products of
ÆAPPLIED ENGINEERING
and our Complete Line of Peripherals



Apple //c is a registered trademark of Apple Computer Inc.

APPLIED ENGINEERING
(additional AE items in stock)

GS-RAM, 1.5 Meg	$289.00
GS-RAM Plus, 1 Meg	399.00
Z-RAM Ultra 2, 1 Meg	299.00
Z-RAM Ultra 3, 1 Meg	349.00
RamFactor, 1 Meg	279.00
RamWorks III, 1 Meg	259.00
VIP for //e or //c*	169.00
VIP for II GS*	199.00

**$10 discount with purchase of any Applied Engineering Board*

PORTABLE SYSTEM

C-VUE LCD Flat Monitor	$299.00
Prairie Power System Battery Pack/UPS & Carrying Case	139.00
//c Power Cigarette Lighter Adapter	24.95
//c Power Extension Cable	16.95
//c Power Y Adapter	18.95

SOFTWARE

SwyftWare (card or software)	$ 69.95
Appleworks 1.3	179.00
Locksmith 6.0 (Reduced!)	59.00
Copy II Plus	37.95
EDD 4	49.95

APPLE UPGRADES

Enhancement Kit	$ 62.00
//c Detachable Keypad	125.00

TELECOMMUNICATIONS

Promodem 300C	$119.00
Apple Personal Modem	349.00
Mastec 1200 (1 yr guar.)	129.00

MEDIA STORAGE

Apple 3.5 Drive (Platinum)	$359.00
Apple 5.25 Drive (Platinum)	269.00
GS 30 Meg SCSI Hard Drive Logic Array (1 yr. warr.)	870.00

SUPPLIES

5.25 DSDD with order	$ 8.99
3.5 DSDD with order	21.99
Top Notch Disk Notcher	12.95
C-VUE Travel Kit (protective cover, lens cleaner, lubricator)	14.95

• If you don't see it, CALL US!
• Next-day delivery available
MasterCard and VISA accepted
Prices subject to change without notice

Roger Coats
P.O. Box 171466
San Diego, CA 92117

TOLL FREE ORDERLINE: 1-800-438-2883
(7 days, 8 am-5 pm PST) (AK, HI, & outside CA)
All Prices FOB San Diego
CALL (619) 274-1253 (within CA & outside U.S.) for FREE • Technical Support • Appleworks Support and • Price Quotes on all Apple Products

CIRCLE 109 ON READER SERVICE CARD

SILICON EXPRESS DISKS SS/DD 6.95 DS/DD 7.95

VERBATIM OR MAXELL SS/DD 13.95 DS/DD 16.95

ELEPHANT SS/DD 7.95 DS/DD 8.95

DATACASE 7.95

INSIDE OHIO 1-800-225-0755

YOUR TOLL FREE ACCESS OUTSIDE OHIO

1-800-228-0755

CALL...FOR THE BEST PRICES...
BEST DELIVERY...
We have hundreds of other programs in stock at Fantastic savings.

SILICON EXPRESS

LASER 128—APPLE COMPATIBLE COMPUTER $389.00

ACT (Harcourt)	59.89
Adventure Const.	33.89
Airheart	22.89
Algeblaster	27.89
Algebra I thru IV	ea. 26.89
Algebra V & VI	34.89
Alphabet Zoo	20.89
Alpha Plot	20.89
Alter Ego	31.89
American Challenge	24.89
A Mind Forever Voy.	27.89
Animate	43.89
Archon II	27.89
ASC II Express	74.89
Assembly Lines Bk.	13.89
Auto Duel	33.89
Auto Works	25.89
Award Maker	23.89
Bag of Tricks #2	31.89
Ball Blazer	24.89
Ballyhoo	24.89
Bank Street Filer	42.89
Bank Street Mailer	42.89
Bank St. Writer Plus	51.89
Bank Street Speller	42.89
Bard's Tale	30.89
Baron	31.89
Beagle Bag	16.89
Beagle Basic	18.89
Beagle Compiler	41.89
Beagle Graphics	30.89
Beagle Screens	18.89
Beneath Apple DOS	12.89
Big U	18.49
Black's Law Dict.	27.89
Blazing paddles	28.89
Bookends	66.89
Bookends Extended	81.89
Bop & Wrestle	18.89
Borrowed Time	24.89
Breakers	28.89
Cad Apple	69.89
Carmen Sandiego USA	28.89
Carmen Sandiego World	25.89
Captain Goodnight	22.89
Cat Graphics	13.89
Certificate Maker	29.89
Library Vol. 1	19.89
Chshp. Load Runner	22.89
Chart 'n Graph Tlbx.	23.89
Chessmaster 2000	29.95
Clan Accountant	54.89
Classmates	27.89
Clip Art Vol. 1 or 3	17.89
Clip Art Vol. 2	24.89
Commworks	64.89
Complete Graphics	25.89
Compuserve Starter	24.89
Conflict in Vietnam	24.89
Copy II +	19.89
Crimson Crown	13.89
Crossword Magic	31.89
Crusade in Europe	24.89
Cutthroats	24.89
D Code	20.89
Database Toolbox	23.89
Dazzle Draw	37.89
Decision in Desert	24.89
DiskQuick	15.89
Document Checker	44.89
Dollars & Sense	71.89
DOS Boss	12.89
Double-Take	18.49
Dragonworld	22.75
Early Games	20.89
Easy as ABC	23.89
Eidolon	24.89
816 Paint	45.89
Enchanter	24.89
Essential Data Dup 4	20.89
Europe Ablaze	33.89
Extra K	20.89
F-15 Strike Eagle	21.89
Facemaker	27.89
Factory	31.89
Family Roots	149.89
Fantavision	31.89
Farenheit 451	22.75
Fat Cat	18.49
Financial Cookbook	29.89
Fingertips	27.89
Flex Type	15.49
Fleet System III	51.89
Flight Sim. II	34.89
Flight Scenery	14.89
Fontrix	58.89
Fntpaks 1 thru 13	ea. 13.89
Forecast	37.89
Fontworks	33.89
Fraction Factory	19.89
Fraction Fever	19.89
Frame-Up	15.49
Game Maker	31.89
Gato	21.89
Gertrude's Puzzles	27.89
Gertrude's Secrets	27.89
Goren Bridge	51.89
Ghostbusters	24.89
GI Joe	24.89
Grafix Pro	19.89
Grammar Gremlins	27.89
Graphics Department	68.89
Graphics Expander	24.89
Graphics Magician	25.89
Graphics Scrapbook	16.89
Graphworks	44.89
Greeting Card Maker	26.89
GPLE	25.89
Gunship	22.89
Hacker or Hacker II	24.89
Handlers Package	58.89
High Stakes	24.89
Hitchhiker's Guide	24.89
Home Connection	19.89
Home Data Manager	19.89
Homeword +	44.89
Homeword Filer	44.89
Homeworker	51.89
Impossible Mission	24.89
Infomerge	48.89
Infiltrator	18.89
I.O. Silver	15.89
Jeeves	28.89
Jet	28.89
Karateka	22.89
Key Player	30.89
Kid Writer	24.89
Kinder Comp	18.89
Knight of Diamonds	21.89
King's Quest I, II or III	31.89
Koronis Rift	24.89
Leather Goddess	24.89
Legacy of Llylgamyn	24.89
List Handler	36.89
Little Comp. People	24.89
Locksmith	38.89
Lode Runner	22.89
Macroworks	18.89
Magic Spells	25.89
Man. Your Money	98.89
Master Type	26.89
Math Blaster	27.89
Math Rabbit	27.89
Medical Dictionary	27.89
Megaworks	CALL
Merlin	41.89
Merlin 816	89.89
Merlin Pro	64.89
Merlin Combo	68.89
Micro Cookbook	27.89
Micro Lg. Baseball	24.89
Micro Lg. Manager	24.89
Micro Lg. Team Disk	13.89
Micro Lg. Stats	17.89
Millionaire	31.89
Minipix 1, 2 or 3	15.49
Missing Links	31.89
Moebius	40.89
Monty Plays Scrabble	32.89
Moon Mist	24.89
Mouse Talk	69.89
MouseWrite	88.89
Multiplan DOS 3.3	65.89
Multiscribe	45.89
Multiscribe GS	64.95
Multiscribe Fonts	14.89
Munch-A-Bug	23.89
Murder on Mississippi	24.89
Music Construction	10.89
Nam	23.89
NATO Commander	22.89
Newsroom	34.89
On Balance	61.89
One-On-One	10.89
Paper Graphics	13.89
PFS: File & Report	75.89
PFS: Graph	75.89
PFS: Write	75.89
PFS: Workmates	148.89
Piece of Cake Math	23.89
Picture Builder	22.89
Pinball Construction	10.89
Pinpoint	48.89
Pinpoint Spell Chker.	44.89
Pinpoint Toolkit	30.89
Pitstop II	24.89
Pixit	31.89
Planetfall	24.89
Point-to-Point	78.89
Pond	31.89
Power Print	20.89
Prince	48.89
Printographer	25.89
Printmaster	24.89
Print Quick	34.89
Print Shop	31.89
Print Shop Holiday	14.89
Pr. Shp. Gr. #1,2 or 3	15.89
Print Shp. Companion	24.89
Print Shop Refill	12.89
Probyter	18.49
Profiler 2.1	69.89
Program Writer	33.89
Pronto DOS	15.49
Quicken	34.89
Reach for the Stars	30.89
Reader Rabbit	24.89
Report Card	32.89
Report Works	CALL
Rescue on Fractalus	24.89
Rescue Raiders	21.89
Road Race	24.89
Rocky Horror Show	24.89
Robot Odyssey I	31.89
Rocky's Boots	31.89
Run Run	27.89
Sargon III	31.89
Sat (Harcort Brace)	25.89
Science Tool Kit	44.89
Sensible Grammar	55.89
Sensible Speller	68.89
Sensible Writer	58.89
Shanghai	24.89
Shadowkeep	22.75
Shape Mechanic	20.89
Sideways Pro Dos	38.89
Silent Service	21.89
Silicon Salad	12.89
Skyfox	27.89
Soft Switch	34.89
Solo Flight	21.89
Sorcerer	27.89
Speed Reader II	38.89
Spell Breaker	30.89
Spellicopter	24.89
Spell It	27.89
Spellworks	29.89
Spin Dizzy	24.89
Springboard Publisher	94.89
Squire	31.89
Starcross	30.89
Star Fleet I (Flight)	33.89
Star Trek I or II	24.89
Sticky Bear ABC	22.89
Basic	22.89
Basket Bounce	22.89
BOP	22.89
Car Builder	22.89
Drawing	22.89
Math Word Problems	22.89
Music	22.89
Math 1 or 2	22.89
Numbers	22.89
Opposites	22.89
Printer	22.89
Reading	22.89
Rd. Comprehension	22.89
Shapes	22.89
Spellgrabber	22.89
Town Builder	22.89
Typing	22.89
Word Problems	22.89
Story Maker	24.89
Sub Mission	24.89
Sum. Games I or II	24.89
Super Huey	20.89
Super Macroworks	32.89
Suspect	27.89
Take 1	33.89
Tass Times	24.89
Technical Dictionary	27.89
Temple of Apshai Tri.	24.89
Terrapin Logo	63.89
Terrapin Utilities	13.89
Think Tank	79.89
Thinkworks	CALL
Tip Disk #1	10.89
T-Shirt Shop	26.89
Toy Shop	38.89
Transylvania	13.89
Trinity	24.89
Triple-Dump	20.89
Turbo Pascal 3.0	44.89
Turbo Database Tlbx	44.89
Turbo Tutor	21.89
Tycoon	31.89
Type!	28.89
Typing Tutor III	31.89
Ultima III or IV	40.89
Understanding IIE	17.89
Utility City	15.49
Variable Feasts	33.89
Video Toolbox	23.89
V.I.P. Professional	164.89
Visable 6502	31.75
Webster Spell Chker.	37.89
Wilderness	34.89
Will Writer	28.89
Winter Games	24.89
Wishbringer	24.89
Witness	24.89
Wizardry	31.89
Wizard's Toolbox	23.89
Wizprint	16.89
Word Attack	27.89
Word Handler	36.89
Word Perfect	84.89
Word Spinner	20.50
World Karate Champ	24.89
World's Great. Bball	24.89
World's Great. Fball	24.89
Writer Rabbit	27.89
Write Choice	41.89
Zork I	24.89
Zork II or III	27.89
Zork Trilogy	46.89

HARDWARE	
80 Col. 64K Card (II E)	49.89
Apple Cat II	184.89
Apple Cat 212	349.89
Datacase	7.89
Disk Notcher	4.89
Disk Drive Con. Card	47.00
Disk Drive American	144.89
Disk Drive Hi-Tech	119.89
Essential Data Dup 4 -	CALL
Flip-n-File	10.89
Grappler Buf. (16K)	118.89
Grappler +	74.89
Grappler (serial)	74.89
Grappler C	74.89
Hotlink	48.89
Koala Pad +	78.89
Kraft Joystick	CALL
Laser 128	389.00
Lemon	27.89
Mach II II - Joystick	28.89
Mach II IIE Joystick	28.89
Mach III II+ Joystick	34.89
Mach III IIE Joystick	34.89
Mach IV Joystick	59.89
Micromodem IIE	138.89
Mockingboard A or B	64.89
Mockingboard C	114.89
Multiram CX 512K	174.00
Multiram IIEX (16 bit)	154.00
Mltrm CX 512K (16 bit)	299.89
Multiram RGB 64K	154.00
Multiram RGB 512K	218.00
Multiram RGB 1024K	268.00
Multiram IIE 80/64K	119.00
Multiram IIE 80/512K	188.00
Paddlesticks	26.50
Parallel Printer Card	44.89
Print-It	129.89
Ram Factor 256K	184.89
Ram Factor 512K	219.89
Ram Factor 1 Meg	289.89
Ramworks 64K	139.89
Ramworks 256K	164.89
Ramworks 512K	199.89
Ramworks 1 Meg	269.89
Super Serial Card	89.89
System Saver Fan	58.89
Thunder Clock	109.89
Wildcard II	69.89
ZEE 80A Checkmate	54.89
Zoom IIE	102.89

PRINTERS	
Citizen 120D	174.89
Star LV-1210	189.89
Star NX-10	249.89
Okidata 182P	229.89
Okimate 20	209.89
Printer Stand	16.89
Printer Ribbons	CALL
Imagewriter Black	4.49
Imagewriter Color	4.99
Imagewriter II Color	11.99
Color Paper Pack	12.89

MONITORS	
Magnavox Monitors	CALL

SILICON EXPRESS

5955 E. Main St. Columbus, Ohio 43213

1-614-868-6868

SILICON EXPRESS

5955 E. Main St. Columbus, Ohio 43213

Name _____

Address _____

City _____ State _____ Zip _____

Charge # _____ Exp. Date _____

QTY.	DESCRIPTION	PRICE

Computer Type _____ SHIPPING

Phone No. _____ TOTAL

Add $3.00 min. U.S. shipping, C.O.D. $5.00 extra. Hawaii and Alaska $4.95 min. Orders outside U.S. are not insured. Canada & Mexico 10% min $10.00. All other countries 25% min. $30.00. MasterCard, Visa and school purchase orders accepted. Personal checks allow 3 weeks. 5.5% sales tax for Ohio residents. Defective replaced within 20 days. 20% restocking fee if not replaced with same item. Compatibility not guaranteed. Prices subject to change without notice.

DOUBLE SIDED MAC DRIVE $249.95

C. ITOH RITEMAN II PRINTER

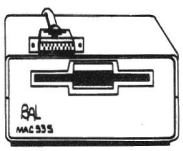
160 CPS DRAFT, 32 CPS NLQ

- 80 COLUMN
- 9 x 9 DOT MATRIX
- 8K CHARACTER BUFFER
- DOWNLOADABLE CHARACTERS
- ITALICS, UNDERLINE, PROPORTIONAL SPACING & MORE!
- VARIABLE LINE SPACING AND PITCH
- CENTRONICS PARALLEL INTERFACE
- SUPPORTS EPSON GRAPHICS
- FRICTION AND PIN FEEDS

ONLY $219.95

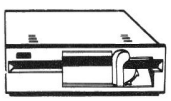
DISK DRIVES

DOUBLE SIDED



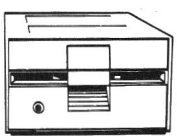
MAC 535 $249.95

- 3.5" ADD-ON DISK DRIVE
- 100% MACINTOSH COMPATIBLE
- DOUBLE SIDED, 800K BYTES STORAGE
- HIGH RELIABILITY DRIVE HAS AUTO-EJECT
- FULL 1 YEAR WARRANTY



BAL-500 $129.95

- TEAC MECHANISM-DIRECT DRIVE
- 100% APPLE COMPATIBLE
- FULL 1 YEAR WARRANTY



AP-135 $129.95

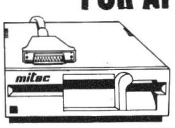
- FULL HT. SHUGART MECHANISM
- DIRECT REPLACEMENT FOR APPLE DISK II
- SIX MONTH WARRANTY



AP-150 $99.95

- ½ HEIGHT, DIRECT DRIVE
- 100% APPLE COMPATIBLE
- SIX MONTH WARRANTY

FOR APPLE IIc



MITAC AD-3C $139.95

- 100% APPLE IIc COMPATIBLE, READY TO PLUG IN W/ SHIELDED CABLE & MOLDED 19 PIN CONNECTOR
- FAST, RELIABLE SLIMLINE DIRECT DRIVE
- SIX MONTH WARRANTY

DISK DRIVE ACCESSORIES

DISK CONTROLLER CARD	$49.95
APPLE IIc ADAPTOR CABLE	$19.95

ADAPTS STANDARD APPLE DRIVES FOR USE WITH APPLE IIc

PRINTER SWITCH BOXES

2 WAY SWITCH BOX $39.95

- PARALLEL OR SERIAL (PLEASE SPECIFY WHICH)
- SWITCH 2 DEVICES TO 1 COMPUTER OR 1 DEVICE TO 2 COMPUTERS
- ALL PINS CONNECTED

3 WAY SWITCH BOX $99.95

- PARALLEL OR SERIAL (PLEASE SPECIFY WHICH)
- GOLD CONTACTS, ALL LINES SWITCHED
- SWITCH 3 DEVICES TO 1 COMPUTER OR 1 DEVICE TO 3 COMPUTERS

PRINTER BUFFERS

64K EXPANDABLE TO 256K

SP120P PARALLEL $139.95

- LED INDICATOR SHOWS VOLUME OF DATA IN BUFFER

SP120S RS232 SERIAL $159.95

- 6 SELECTABLE BAUD RATES, FROM 600B TO 19,200B

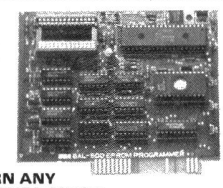
PARALLEL SWITCH/BUFFER CABLE

- 6' CENTRONICS MALE TO MALE
- ALL PINS CONNECTED

$14.95

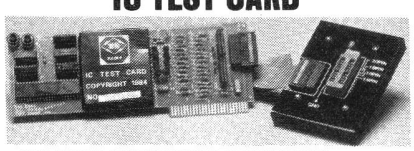
EPROM PROGRAMMER MODEL RP525

$59.95



- DUPLICATE OR BURN ANY STANDARD 27xx SERIES EPROM
- EASY TO USE MENU-DRIVEN SOFTWARE INCLUDED
- MENU SELECTION FOR 2716, 2732, 2732A, 2764 & 27128
- HIGH SPEED WRITE ALGORITHM
- LED INDICATORS FOR ACTIVITY
- NO EXTERNAL POWER SUPPLY REQUIRED

IC TEST CARD



- QUICKLY TESTS MANY COMMON ICs
- DISPLAYS PASS OR FAIL
- ONE YEAR WARRANTY
- TESTS: 4000 SERIES CMOS, 74HC SERIES CMOS, 7400; 74LS,74L, 74S, SOME PROMS AND RAMS

$99.95

16K RAM CARD $39.95

FOR APPLE II+

- 2 YEAR WARRANTY
- EXPAND YOUR 48K APPLE TO 64K
- USE IN PLACE OF APPLE LANGUAGE CARD

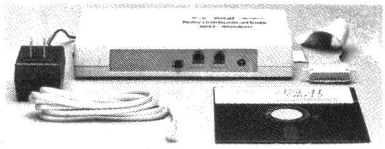
BARE PC CARD AND INSTRUCTIONS $9.95

300 BAUD MODEM

INCLUDES ASCII PRO-EZ MENU DRIVEN SOFTWARE

- FCC APPROVED
- BELL SYSTEM 103 COMPATIBLE
- AUTO-DIAL
- DIRECT CONNECT
- INCLUDES AC ADAPTOR

$49.95



CABLE FOR APPLE IIc $14.95

MODEM ADAPTOR CARD $49.95

FOR APPLE II, II+ & IIe USE WITH OUR 300B MODEM FOR A COMPLETE SYSTEM—UNDER $100!

CASE WITH KEYBOARD

FOR APPLE TYPE MOTHERBOARD

- USER DEFINED FUNCTION KEYS
- NUMERIC KEYPAD WITH CURSOR CONTROL
- CAPS LOCK & AUTO REPEAT

MODEL KB-1000 $79.95

KEYBOARD ONLY $49.95

- REPLACEMENT FOR APPLE II+
- CAPS LOCK, AUTO REAPEAT
- ONE KEY ENTRY OF BASIC OR CP/M COMMANDS

MONITOR STAND $12.95

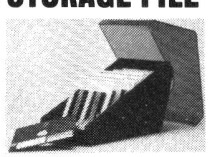
TILTS AND SWIVELS TO PROVIDE OPTIMUM VIEWING ANGLE, REDUCES OPERATOR FATIGUE



DISKETTE STORAGE FILE

$8.95

HOLDS 70 5¼" DISKETTES WITH ROOM TO SPARE



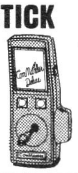
DS/DD NASHUA DISKETTES

$9.90 BOX OF10 **69¢ea** BULK QTY 50

JOYSTICK

CR401 $7.95

WITH APPLE ADAPTOR CABLE



PS-A $49.95

- +5V @ 5A, +12V @ 2.5A
- -5V @ .5A, -12V @ .5A



Visit our retail store located at 1256 S. Bascom Ave. in San Jose, (408) 947-8881

JDR Microdevices

110 Knowles Drive, Los Gatos, CA 95030

Toll Free 800-538-5000 • (408) 866-6200

FAX (408) 378-8927 • Telex 171-110

NEW ADDRESS!

PLEASE USE YOUR CUSTOMER NUMBER WHEN ORDERING

TERMS: Minimum order $10.00. For shipping and handling include $2.50 for UPS Ground and $3.50 for UPS Air. Orders over 1 lb. and foreign orders may require additional shipping charges - please contact our sales department for the amount. CA. residents must include applicable sales tax. All merchandise is warranted for 90 days unless otherwise stated. Prices are subject to change without notice. We are not responsible for typographical errors. We reserve the right to limit quantities and to substitute manufacturer. All merchandise subject to prior sale.

© COPYRIGHT 1986 JDR MICRODEVICES

THE JDR MICRODEVICES LOGO IS A REGISTERED TRADEMARK OF JDR MICRODEVICES. JDR INSTRUMENTS AND JDR MICRODEVICES ARE TRADEMARKS OF JDR MICRODEVICES.

APPLE IS A TRADEMARK OF APPLE COMPUTER.

CIRCLE 167 ON READER SERVICE CARD

TIMELY INFORMATION

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

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

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

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

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

Arthur M. Kent
Federal Way, WA

17 Meg IIe/1 Meg IIc

Want the best & **easiest-to-use RAM card on the market** — at the best price & with the most support? Buy Checkmate Technology's State-Of-The-Art MULTIRAM RGB RAM CARD™ from us w/**BATTERY BACKED-UP RAM options that save programs like AppleWorks for years!** 100% compatible w/all 3rd party software/hardware, 65C816 option ($147), sharp 80 columns/Double Hi-Res, & FREE RGB! Direct substitute for Apple's 80 column card or Ramworks I-III™ (we think it's better). **FREE APPLEWORKS EXPANDER SOFTWARE W/ EVERY CARD, 5 YR WARRANTY. 15 DAY MONEY BACK GUARANTEE & FREE AUTOMATIC SOFTWARE UPDATES ONLY FROM US!**

	MultiRam RGB Card	MultiRam IIe Card
64k MultiRam	159.	129.
320k MultiRam	189.	157.
576k MultiRam	219.	187.
832k MultiRam	244.	212.
1024k MultiRam	269.	⬅ ⬅ ⬅

MultiRam-PLUS Piggyback		
256k MultiRam Plus	219.	*NEW*
512k MultiRam Plus	269.	*NEW*
768k MultiRam Plus	316.	*NEW*
1024k MultiRam Plus	359.	*NEW*
2-17 meg MultiRam Plus	Call	*NEW*
Battery/AC Kit (for Plus)	36.	*NEW*

Checkmate Technology's MultiRam CX card easily expands your IIc to 640k and has a CX+ Piggyback to add another 512k (1152k total)! It's 100% compatible with all IIc software/hardware & upgradable with a 65C816 kit ($85) —all at about 50% less power than Z-RAM™. **SAME FREE SOFTWARE/UPDATES & 5 YR WARRANTY AS IIe CARDS.**

512k MultiRam CX	184.
512k MultiRam CX+ (req CX)	209.
1024k MultiRam CX/CX+ Combo	349.
1200 Baud IIc Modem (add $20 for cable)	129.
Clip-on IIc Rechargable Battery	115.
IIc Flat Panel Display (w/ 512k > Mram)	287.
IIc System Clock	69.

Cermetek 1200 internal modem IIe/II+/IIgs ***148.***
(+ **FREE** Source subscription/ VT 100 Shareware/ASCII Express & ProTERM™ Setup Instructions)

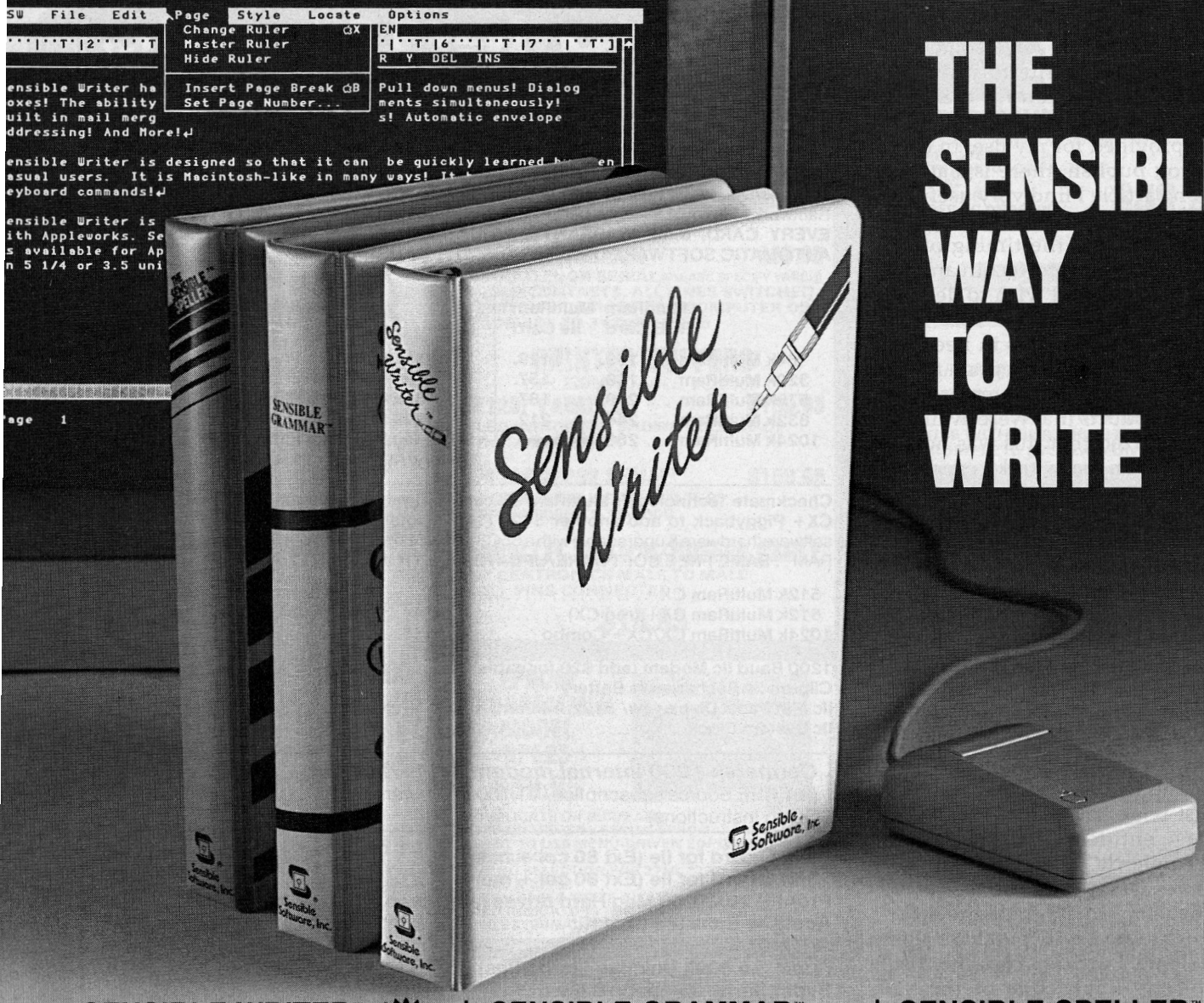
64k Q card for IIe (Ext 80 col + more)	84.
256k Q card for IIe (Ext 80 col + more)	99.
ProAPP 20/30/40 Meg Hard drives (any comp)	Call
Apple IIe Enhancement Kit	62.
Apple IIgs	Call
Apple 3.5 800k Unidrive (IIe/IIc/IIgs)	319.
Super Serial Compatible Card	87.
RamPak 512k gs RAM card	196.
Apple Compatible Drive IIe/II+ (IIgs/IIc + $19)	132.
Clockworks Clock (Thunder/Time HO™ compat)	84.
13" RGB Monitor & cables (req RGB)	327.
Heavy Duty Power Supply II/II+/IIe	69.
Mappler Compat Apple-IBM RGB converter	39.
Slot 1-7 Ram Card for II+, IIe, Laser	Call
System Saver Fan (II/II+/IIe)	65.
Foundation (AW features + more)	229.
AutoWorks (Best AW Macro + more)	35.
FontWorks (Best AW sideways/Fonts & more)	35.
Pinpoint Program	55.
Pinpoint Document Checker (Best Speller)	45.
Copy II Plus 7.3 (Best ProDOS Utility)	29.
ProTERM Modem Software	84.
ASCII Express Pro Modem Software	84.
VIP Professional (Lotus Clone. Specify Comp)	169.

Terms: Add $4-Ground or $6-Air shipping & phone # to each U.S. MultiRam card order (foreign orders/FPO/APO extra). Add 3% for MasterCard/Visa/Amex (include expir date) & P.O.'s. For fast delivery send Cashier's/Certified check/Money Order. C.O.D. (add $5) & personal checks accepted (allow 16 days). Tex res add 7 ¼% tax.
Ordering: CALL or PRINT Name & address, Res & Bus phone, credit card name/number/expir date where appropriate, qty/ description/price/shipping charges if known. Call for questions.

Autoworks, Ramworks III/Timemaster II H.O./Z-ram, respective trademarks of Software Touch, Applied Engineering. Prices subject to change. Software non-returnable.

COIT VALLEY COMPUTERS 14055 Waterfall Way
(214) 234-5047 MCI 2969684 Telex 6502969684 MCI UW Dallas, Texas 75240

THE SENSIBLE WAY TO WRITE



SENSIBLE WRITER™ *Word Processor*

New

Sensible Writer,
for all its sophistication, is easy to learn. It is Macintosh-like and even a casual user can quickly pick it up. You can use a mouse, keyboard, or both. More than that, **Sensible Writer** has all the features you want! Pull down menus! Dialog boxes! The ability to handle two large documents simultaneously! Built-in mail merge! Rulers to format your documents! Automatic envelope addressing! And more!

Sensible Writer
reads and writes Appleworks files directly. You'll like the way it automatically uses extended memory cards and utilizes up to 512K from them. You'll appreciate the convenience of a program which loads completely into memory and installs easily on hard disks.

Sensible Writer
is designed especially for you, the serious word processor user who demands effective professional documents. It's fast, powerful, and full-featured. Compatible with **Sensible Grammar** and **Sensible Speller**, it is available for Apple IIGS, //c or enhanced 128K //e computers on 5¼ and 3.5 UniDisk for $99.95.

SENSIBLE GRAMMAR™ *Proofreading Program*

This comprehensive program saves you embarrassment by checking your papers for grammatical and other writing errors. Featuring a Macintosh-style user interface, it is easy for you to use because it is AppleMouse compatible and also has keyboard commands for speed.

Sensible Grammar
does more than check your writing style. It also checks capitalization, punctuation, and abbreviations too. It searches out inconcise, vague, wordy, repetitive, faulty, informal, pompous and sexist phrases. It also points out cliches and slang.

Sensible Grammar
always keeps you in the driver's seat. It never overrides your judgment. It merely singles out possible mistakes or improper usage and suggests corrections. But you are free to accept or reject them.

Sensible Grammar
is compatible with Appleworks and most ProDOS word processors and is available for Apple IIGS, //c and 128K //e computers on 5¼ and 3.5 UniDisk for $99.95.

SENSIBLE SPELLER™ *Spelling Checker*

ProDOS **Sensible Speller** supports the Apple II Memory Expansion Card and has a huge vocabulary of 81,000 words derived from the official Random House Dictionary®. Used in conjunction with an expansion card, it runs up to three times faster than before. You can also load everything–program and dictionaries–onto a hard disk drive.

Sensible Speller
is easy to use. It shows you misspellings in context, suggests the correct spelling, and allows immediate replacement of misspelled words with correct ones.

Sensible Speller
is compatible with Appleworks and most ProDOS word processors. Supplied on UniDisk 3.5 as well as 5¼" disk, it is available for Apple II computers including IIGS. A non-ProDOS version is also available. Each is $125.

Stedman's Medical Dictionary, Sensible Technical Dictionary™ and **Black's Law Dictionary™** are available separately on diskette for use with the **Sensible Speller.** Each is $39.95. Sensible Speller ProDOS now allows you to merge the dictionaries together.

*Sensible Writer, Sensible Grammar and Sensible Speller ProDOS work with the following programs, AppleWorks (Apple Computer, Inc.); Catalyst (Quark Inc.); Mouse Desk (International Solutions). Sensible Grammar and Sensible Speller ProDOS also work with the following word processors, AppleWriter-ProDOS version (Apple Computer, Inc.); Format II Enhanced-ProDOS (Kensington Microware); MouseWord (International Solutions); Mouse Write-text files (Roger Wagner Publishing); PFS:Write-ProDOS (Software Publishing, Inc.); Sensible Writer (Sensible Software Inc.); Word Juggler (Quark Inc.); Word Perfect (SSI Software); Zardax-ProDOS (Computer Solutions) and others. Sensible Speller ProDOS also works with HomeWord-ProDOS (Sierra On-Line); MultiScribe (StyleWare, Inc.); Word-Talk (Computer Aids) and WritingWizard (Scarborough Systems). Owners of trademarks indicated in parentheses. Black's Law Dictionary (West Publishing, Inc.).

Sensible Software®, Inc.

210 S. Woodward, Suite 229, Birmingham, Michigan 48011 • (313) 258-5566

CIRCLE 165 ON READER SERVICE CARD

BY LISA RALEIGH

NewsPlus

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

THE TALK OF THE TOWN

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





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

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

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

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

APPLE IN THE WINGS

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

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

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

MAKE MINE A MITSUBISHI (OR A IIGS)

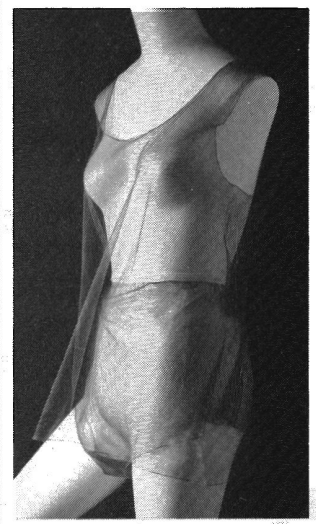
Mitsubishi Motors is touring the country with a half dozen Apple IIc computers in tow. At the end of this jaunt, the Japanese car manufacturer plans to hold a sweepstakes that will award Apple IIGS computers as first and second prizes. (The grand prize, as you might expect, is a Mitsubishi automobile.)

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



PROTECT YOURSELF

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



A disk each month delivered to you...
packed with ten programs for your Apple.

DISCOVER UPTIME. You deserve the best from your Apple. Have the best and save the most with UPTIME.

We make it easy and inexpensive — a disk each month. You deserve value. At UPTIME we believe in value. That's why each month 30,000 people like you enjoy a disk packed full of programs and information.

Make your life easier & get more from your computer. Organize your life and be more productive with **home management** and **finance** programs. Have fun learning with our **educational** programs and fun relaxing with **games** and **adventures.** You'll find **business, graphics, utilities** & more!



Ten programs and more on every disk. What's the opposite of "downtime"? It's UPTIME, of course. Just imagine...a disk each and every month, delivered right to your door and packed with programs for your Apple.

Subscribe now, with our introductory offer! Satisfaction guaranteed — or your money back. Make the very next disk yours! Fill in the coupon and return it to us, or simply call. We'll start your subscription immediately, in addition to sending you...

17 FREE PROGRAMS

Put work gloves on your Apple with UTILITY TIME — 17 programs including *Banner Maker, Musical Keys* and *Graphix Fun.* For **immediate service,** call toll-free: **1-800-437-0033** anytime, day or night.

QUALITY PROGRAMS LESS THAN 60¢ EACH

NOW FOR ALL APPLE II COMPUTERS

FROM **Volume 12, No. 4**

Fun Time ■ Crossword IV ■ Computer Trivia ■ Name Your Number ■ Bongo Bash ■ Disk Map ■ Calendar ■ Language Arts I ■ Puzzle Time ■ Starship

CIRCLE 219 ON READER SERVICE CARD

I'LL BYTE!!! I'm an Apple enthusiast who wants more. Please start my subscription to **UPTIME** immediately.

SAVE 60% → **12** **Disk** Issues $69.95 ☐
6 **Disk** Issues $49.95 ☐
3 **Disk** Issues $29.95 ☐
1 **Trial** Issue $11.95 ☐

(Add $2 per issue in foreign countries, except Canada and APO)

Name _____
Address _____
City _____ State _____ Zip _____
Type of Computer _____
☐ Please send my **FREE Utility Time** disk ($18.45 value)
☐ Payment enclosed. (Make checks payable to **UPTIME.**)
Bill my: ☐ Visa ☐ MC Exp. Date _____
Signature _____
Account No. _____

Send to:
UPTIME · PO Box 299
Newport, RI 02840
(401) 849-4925
A6

Your Choice Only $995!

Macintosh™ 512K
w/ ext. 400K floppy *



LOOK...
1Mb RAM & HD
for under
$1000

Lisa 1Mb w/ 5Mb ProFile HD *

Runs Macintosh™ Software

Do It For Less With a Lisa.

RAM	DRIVE	PRICE
512K*	400K Internal	799.00
1Mb*	5 Mb ProFile	995.00
1Mb*	10Mb Internal	1495.00
1Mb	20Mb Internal	1995.00

*Reconditioned - 90 day warranty

The Lisa Professional. A powerful computer that's as easy to run as any Macintosh™ yet a whole lot easier to afford! It comes standard with a larger 12" screen, detatched keyboard with numeric keypad and available in several affordable configurations.

More than 95% of available Macinitosh software runs on the Lisa. Call today for our free Lisa Fact Book and see how the Lisa can handle the application you have in mind for much less than you would spend on a newer Mac and hard drive.

BPI Accounting Software

For Apple II, Apple IIe, Apple /// Lisa

YOUR CHOICE: Gen. Ledger,Gen. Accnt., Acct. Payable, Acct. Receivable, Payroll, Job Cost, Inventory Control
Call for Details -
all modules not avilable for all models.

$79 per module

• Apple II • Apple /// • Macintosh™

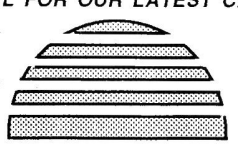
Hard Disk Drives



Quark QC-10	$795
Quark QC-20	$895
ProFile 5Mb	$595

ORDERLINE
1-800-821-3221
For a complete listing of products
CALL FOR OUR LATEST CATALOG

We specialize in obsolete and remarketed Apple products.



PHONE 801 752-7631 Questions Service

Sun Remarketing

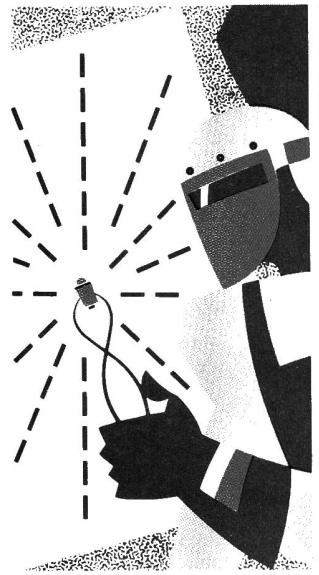
P.O. Box 4059, Logan, Utah 84321

VISA MasterCard

Apple and Macintosh are registered trademarks of Apple Computer, Inc.

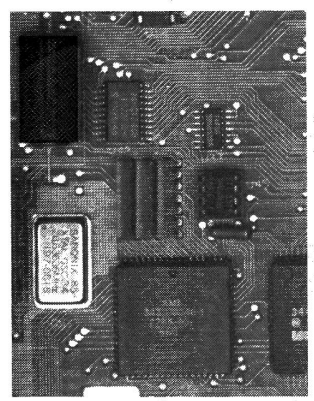
CIRCLE 103 ON READER SERVICE CARD

NewsPlus



A WORD TO THE WISE

You probably won't have occasion to remove the battery from the motherboard of your Apple IIGS, but just in case you must—be careful. This is no run-of-the-mill battery, but a lithium thionyl chloride battery that could explode if improperly handled. One of the battery's active ingredients, lithium, reacts violently if it comes in contact with water. Apple is cautioning its dealers about the correct procedure for disposing of these explosive little bundles when they "die"—namely to treat them as hazardous waste. Apple asks its dealers to remove dead batteries, clip the lead wires off, and send them back to Apple in their original, zip-locked packaging. Apple will then dispose of the batteries according to Environmental Protection Agency guidelines.



THE IIGS BATTERY REQUIRES CAREFUL HANDLING.

LAWSUIT SETTLEMENT

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

ILLUSTRATION BY ROBERT PIZZO

NewsPlus

UPGRADE UPDATE

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

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

APPLEWORKS CONTEST

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

BY DEDINI

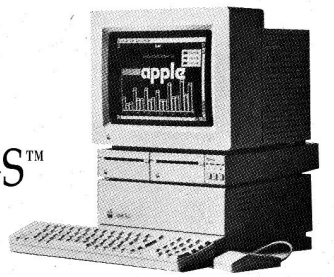
LAUGHTRACK



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

From A MUCH, MUCH BETTER WORLD. Reprinted by Permission of Microsoft Press © 1985 by Eldon Dedini. All Rights Reserved.

Five Stars for your Apple IIGS™



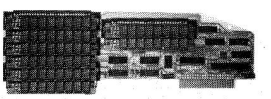
Conserver™
Cooling Fan, Surge Suppression, and More... $129.95

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

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

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

OctoRam 2 meg.



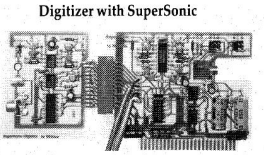
OctoRam ESP™
"Zero to AppleWorks in 1.5 Seconds!" $179.95

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

SuperSonic™
IIGS Stereo Card $59.95

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

Digitizer with SuperSonic



SuperSonic Digitizer™
Sound Input Card for SuperSonic $39.95

Add a SuperSonic Digitizer and you now have a professional music studio. Input instruments, music, voices, sounds, anything you want into the IIGS's powerful Ensoniq sound chip. Our advanced circuitry provides clean distortion free samples. Edit, record, playback, and save audio you've digitized. Utilize the IIGS's sound capabilities to the fullest extent.

MDIdeas, Inc.

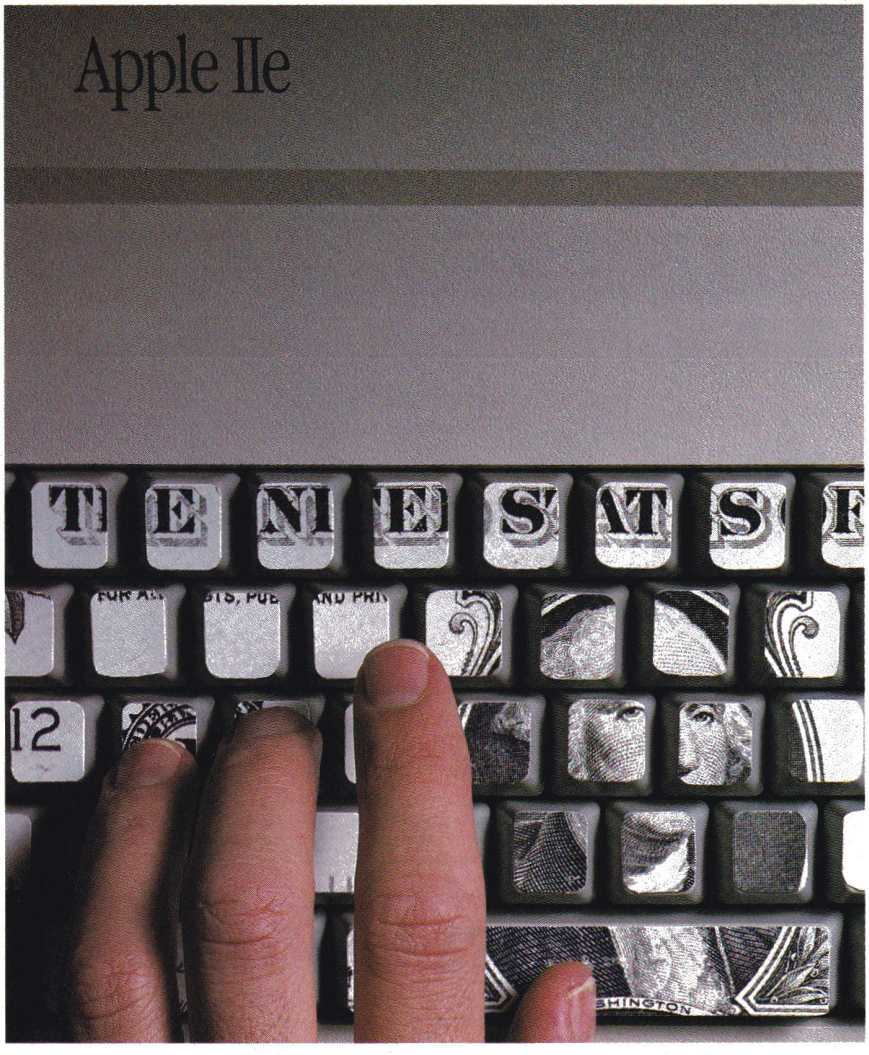
1163 Triton Drive, Foster City, California 94404

Available Now. Order Today!!! Contact your dealer or call us toll free at (800) 843-5722, in CA (800) 572-2746. For information call (415) 573-0580.

CIRCLE 241 ON READER SERVICE CARD

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

How to make



CARTER DOW PHOTOGRAPHY

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

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

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

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

MONEY

with your Apple II

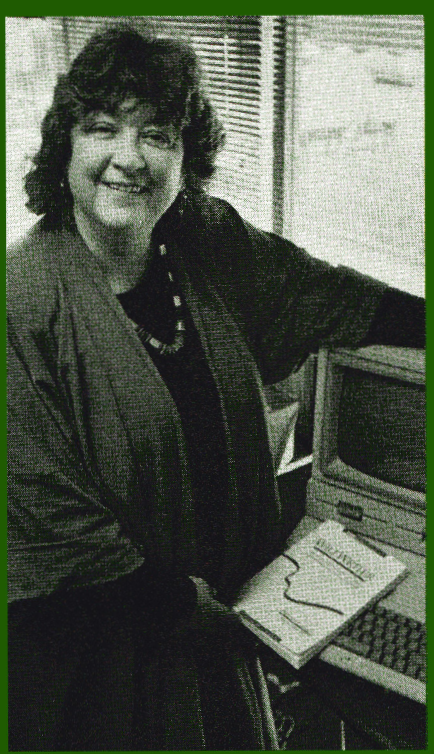
many small businesses have been slow to computerize. The noncomputing world still has no idea how easy it is to accomplish tasks with a computer. An overwhelming job for a noncomputer person may take you five minutes on your Apple II, and you'll find that noncomputer people pay good money to avoid doing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

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

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

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

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



REGINALD PEARMAN

Consulting: Where There's a Will

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

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

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

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

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

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

Power Play.

In personal computer performance, power makes the difference. When you increase your computer power, you improve your performance. It's that simple.

WordPerfect 1.1 for the Apple IIe/IIc and the new Apple IIGS* works on that perfectly simple premise. And works beautifully. WordPerfect 1.1 is the word processor designed to get the most out of your Apple IIe/IIc or IIGS. The most power. The most efficiency. The most functions. And the most for your money.

Power to the Core.

WordPerfect 1.1 will give your Apple the power to process your words, thoughts and ideas like never before. With scores of useful and unique functions, WordPerfect will do almost any word processing task you can imagine.

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

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

WordPerfect 1.1 features include:

- 50,000-word spelling dictionary (115,000 on Apple IIGS)
- Align on any character
- Automatic formatting on screen
- Automatic page numbering
- Block features (bold, delete, move, save, underline, etc.)
- Bold and underline text
- Center text
- Chaining of macros
- Comprehensive file management
- Date set/format/insertion
- Extensive printer/font definition
- Flush right
- Footnotes
- Headers and footers
- Hyphenation, automatic prompting
- Indent left and left/right
- Macros
- Mail merge
- Overstrike
- Right justification
- Search and replace
- Super/subscripts
- Text file create/edit/invoke
- Widow/orphan protection
- Word look-up and count
- And more.

Easy as Pie.

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

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

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

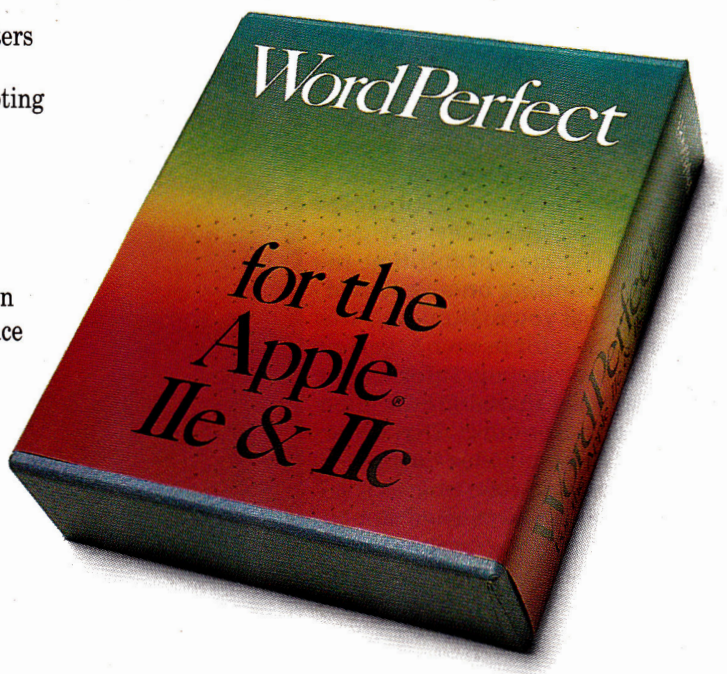
Harvest the Power.

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

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

*Runs under ProDOS-16.

WordPerfect CORPORATION



CIRCLE 118 ON READER SERVICE CARD

Terry Spencer tutors groups of adults and children.



SCOTT PIPER

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

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

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

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

Word Processing: Typing for $$

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

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

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

Desktop Publishing: 1980s Gold

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

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

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

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

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

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

and earn good money too.

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

Desktop Creativity: Blank Slate

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

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

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

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

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

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

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

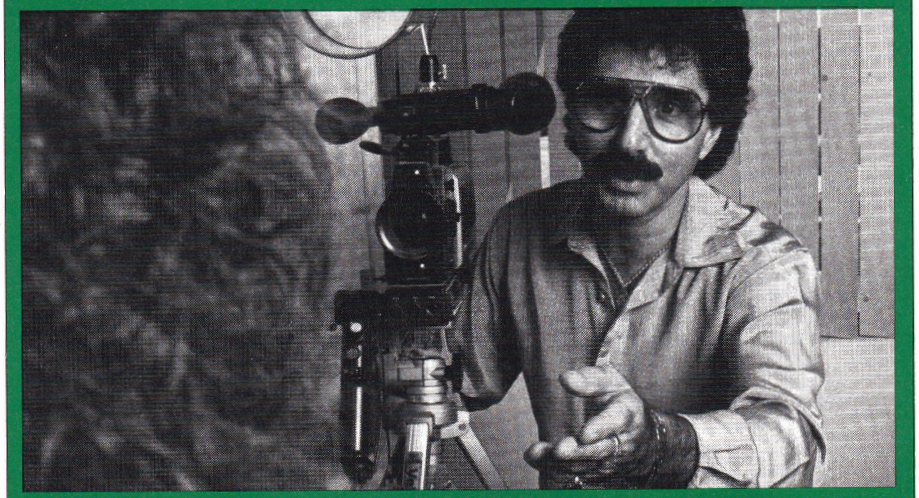
With a little imagination, you can make up dummy baseball cards or magazine covers with people's faces on them. If you have a digitizer hooked up to your Apple, you can sell digitized portraits of people at a flea market or fair.

Financial Services: Manage Money

When multiple sclerosis forced Joe Conelly out of work and into a wheelchair two years ago, he got interested in computers. One day a businessman neighbor came to him and said, "Joe, I used to be able to keep track of everything in my head. Now I can't." Conelly took the man's business records and put them on his Apple IIe. Now, each month he delivers complete spreadsheets, projections, and records showing how the company is progressing.

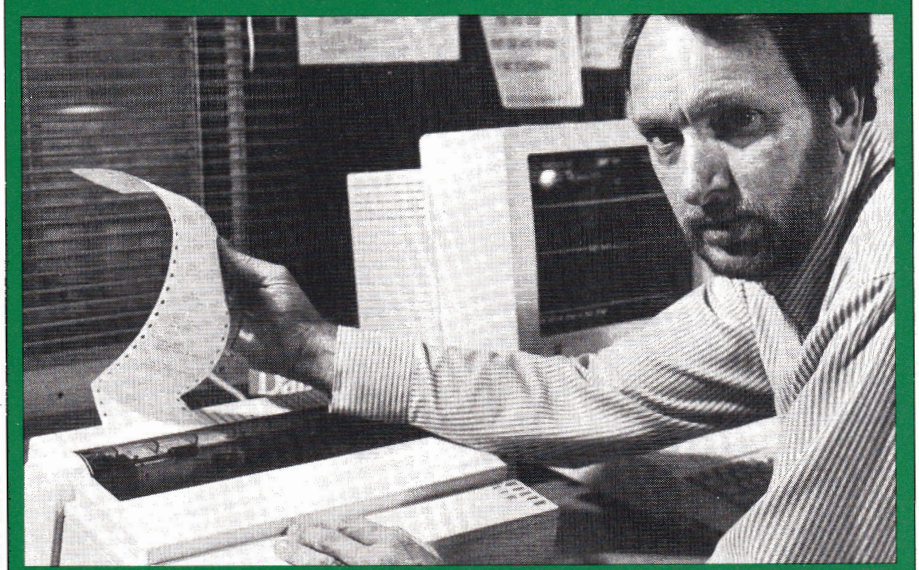
"I don't make big bucks from it, but I just started doing it for fun," Conelly says. He recently added a

Before he cuts your hair, Vito digitizes your face.



RICH MAHAN

Jim Smith gets 10 cents per typed mailing label.



GALEN QUIGEY

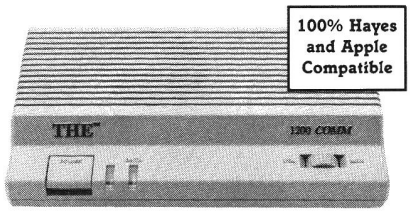
The #1 Source for Apple IIe/IIc

PC NETWORK

BUY HARDWARE AND SOFTWARE AT WHOLESALE +8% AND GET 14 TO 30 DAY SOFTWARE RENTALS.†..

CALL FOR EXCITING PRICES ON APPLE IIE/IIC

MODEMS



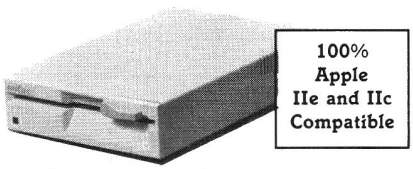
THE™ 1200 COM

1200 BPS External Modem w/auto answer, dial, re-dial and built-in speaker.

$119.00*

Anchor *Lightning 2400*	$309.00*
Hayes *Smartmodem 1200A Internal*	282.00*
Hayes *Micromodem IIe w/Smartcom*	125.00*
Hayes *Smartmodem 2400 w/ V.22 Commands*	525.00*
Prometheus *Promodem 1200*	247.00*
THE™ 2400 COMM *External Modem*	220.00*
U.S. Robotics *Courier 2400 BPS*	345.00*

DISK DRIVES



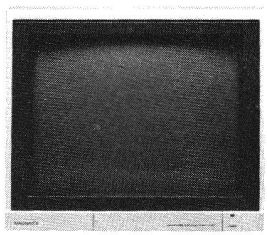
PC Network 140K Drive

IIc or IIe External **$95.00***

Apple *IIc 140K External Disk Drive*	$220.00*
Apple *20MB SCSI Hard Disk for the IIe or IIGS or Mac*	950.00*
Apple *Unidisk 3.5" w/Utilities*	319.00*
Apple *SCSI Card for the IIe*	88.50*

MONITORS

Magnavox Color 13" RGB Monitor

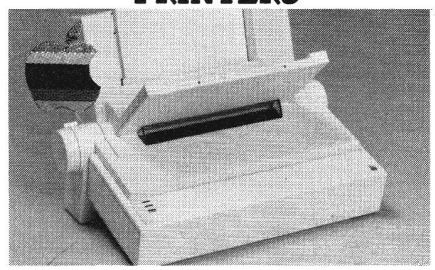


$275.00*

Amdek *Color 600*	$365.00*
Amdek *Video 300A Composite*	120.00*
Amdek *Video 300G Composite*	110.00*
Apple *Color IIe or IIc Monitor*	293.00*
Princeton *HX-9 9" RGB Color Monitor*	365.00*
Princeton *HX-12E 12" RGB Hi Res Color Monitor w/IBM™ EGA*	445.00*
Taxan *720-U High Res Color*	359.00*

Members Get The Network Advantage...

PRINTERS



Imagewriter II

10" Carriage 250CPS/80COL NLQ
Color Capable

$435.00*

Apple *Imagewriter II Cut Sheet Feeder*	$149.00*
Apple *Laserwriter*	3,650.00*
Apple *15" Imagewriter for Mac*	475.00*
Epson *EX-800 300/60CPS 80COL Parallel/Serial*	410.00*
Epson *EX-1000 300/60CPS 132COL Parallel/Serial*	535.00*
Epson *FX-85 160/35CPS 10" Parallel*	345.00*
Epson *FX-286E 200/40CPS 15" Parallel*	479.00*
Epson *LX-86 120/16CPS 8.5" Parallel*	195.00*

SOFTWARE

GAMES AND EDUCATIONAL SOFTWARE

Activision *Paintworks Plus*	$42.50*
Barron *Study Program for SAT*	31.00*
Bluechip *Baron, Millionaire or Tycoon*	27.00*
Broderbund *Airheart, Capt. Goodnight...*	19.50*
Broderbund *The Print Shop*	26.50*
Broderbund *The Toy Shop, Fantavision*	31.75*
Broderbund *Bank Street Writer, Filer or Speller*	35.25*
▶**Davidson & Associates** *Math Blaster!/Word Attack!*	24.00*
Epyx *Winter Games/Summer Games II/Karonis Rift*	21.00*
Hayden *Sargon III*	26.00*
Infocom *Fooblitzky, Leather Goddesses..., Trinity*	20.00*
Infocom *Hollywood Hijinx, Moonmist*	21.25*
▶**Infocom** *Zork Trilogy*	39.95*
Microprose *Solo Flight/F-15 Strike Eagle/Silent Serv.*	18.50*
Mindscape *Bop'N Wrestle, Color Me*	16.00*
Mindscape *Balance of Power/Crossword Magic*	26.50*
Mindscape *Shadowgate/Bank St. Music Writer*	26.50*
Sierra On Line *Black Cauldron*	21.25*
Simon & Schuster *Typing Tutor III*	28.25*
Springboard *Early Games, A Piece of Cake*	18.50*
Springboard *Certificate Maker*	24.75*
Springboard *The Newsroom*	31.75*
Sublogic *Flight Simulator II*	27.50*
Strategic Simul. *Roadwar 2000/Shard of Spring*	23.97*
▶**Weekly Reader** *Sticky Bear Series (ea.)*	21.95*



$21.25* each

BUSINESS SOFTWARE

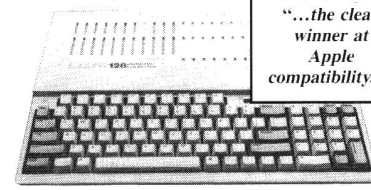
Apple *Appleworks*	$165.00*
▶**Beagle Bros.** *MacroWorks*	16.50*
Borland *Turbo Pascal*	38.00*
BPI *General Accounting (ProDos)*	189.00*
Broderbund *On Balance*	54.00*
Central Point *Copy II +*	20.00*
Funk Software *Sideways for (ProDos)*	32.00*
▶**Intuit** *Quicken*	30.00*
▶**Meca** *Managing Your Money*	85.00*
▶**Megahaus** *MegaWorks, ThinkWorks or ReportWorks*	53.00*
Microstuf *Crosstalk XVI*	89.00*
▶**Monogram** *Dollars and Sense*	63.50*
Peachtree *Back To Basics (GL, AR, AP)*	107.25*
Satellite Software *WordPerfect*	72.00*

†**RENT BEFORE YOU BUY**—Members are eligible to join the NETWORK's Business and Game Software Rental Libraries and evaluate products for a full 14 days (Regular Membership) or 30 days (VIP Membership) to see if they meet their needs. And the Network's rental charges are far less than other software rental services—Just 20% of the Member Wholesale Price. **Rental titles are available in IBM, Apple and Mac Formats.**

*All Prices in this Ad are Wholesale. Members Pay 8% Over Wholesale Plus Shipping. All Items are Subject to Availability. Prices Subject to Change Without Notice. ▶ Denotes recent price change.

SYSTEMS

A+ *"...the clear winner at Apple compatibility..."*



Laser 128

128K RAM, 140K Drive
Apple IIe/IIc Compatible
w/Parallel and Serial Ports

$355.00*

DISKETTES

Guaranteed For Life!

Brand Name Diskettes Available in Boxes of 10 or in Bulk Packs of 50

5.25" SS/DD

Box of 50 **.44* ea.**

Box of 10 **$7.95***

CALL TOLL FREE

(800) 621-SAVE

(Orders—Membership and Advice!)
In Illinois Call (312) 280-0002
Your Membership Validation Number M567

You can validate your membership number and, if you wish, place your first money-saving order over the phone by using your VISA, MASTERCARD or AMERICAN EXPRESS.
Our knowledgeable sales consultants are on duty Mon.-Fri. 8:00 AM to 7:00 PM Sat. 9:00 AM to 5:00 PM CST.

PERSONAL COMPUTER NETWORK
320 West Ohio Street
Chicago, Illinois 60610-9934
Customer Service and Order Status (312) 280-1567

PC NETWORK MEMBERSHIP APPLICATION

YES! Please enroll me as a member in the PC NETWORK™ and send my catalog featuring thousands of computer products, all at just 8% above DEALER WHOLESALE PRICES. I will also receive "THE PRINTOUT", a special periodic update on merchandise at prices BELOW even those in my wholesale catalog and all the other exclusive, money-saving services available to Members. I am under no obligation to buy anything. My complete satisfaction is guaranteed.

Please (✓) all boxes that apply: **567**

	1 Year	2 Year
•**Basic Membership**		
With 14 Days Rental	$8 ☐	$15 ☐
Business Software Rental Library	$25 ☐ add'l. per year	
Games Software Rental Library	$10 ☐ add'l. per year	
•**Special V.I.P. Membership**	1 Year	2 Year
With 30 Days Rental	$15 ☐	$25 ☐
BOTH Business and Game Software Rental Libraries	$30 ☐ add'l. per year	

☐Bill My Credit Card: ☐VISA ☐MasterCard ☐American Express
Account Number:

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Exp. Date: mon. _____ yr. _____
☐Check or Money Order Enclosed for $ _____
Name _____
Address _____ Apt. No. _____
City _____ State _____ Zip _____
Telephone: ( ) _____
My Computer(s) is: ☐IBM ☐IBM XT ☐IBM AT ☐Apple II ☐Macintosh Other _____
Signature _____
(Signature required to validate membership)

Copyright© 1986, PC NETWORK, INC.

CATALOG • NEWSLETTERS • 10 DAY RETURNS • BULLETIN BOARD • SOFTWARE RENTAL

(30,000 Items Listed) (Catalog Price Updates and Reviews) (No Questions Asked—If You Don't Like It, Return It—Hardware Only) (10,000 Free Programs to Download) (Over 1,000 Titles in our Library)

CIRCLE 315 ON READER SERVICE CARD

ORDERS ONLY
TOLL FREE
800-526-5313

In NJ call
201-728-8080

Mailorder Worldwide

CDA COMPUTER SALES

VISA MasterCard AMERICAN EXPRESS

★ Complete Ready-To-Run Packages.....

Apple IIe Entry System

System Includes:

- **Apple IIe** 128K Computer with Numeric Keypad
- Two **Apple** 5.25 Drives with Controller
- **Thompson** 12" Green Monochome Monitor
- **Epson** LX-86 Printer with Adjustable Tractor
- **Epson** Adjustable Tractor Feed Option
- Fingerprint G+ Printer Interface
- Box of 10 **Maxell** Diskettes
- Dust Covers for **IIe & Epson** Printer
- Starter Package of Computer Paper

Suggested List Price $2199.00

Now Only $1519.00

- When Ordering specify package # 8718

Apple IIGS 512K Color System

- **Apple IIGS** 256K CPU with Mouse
- **Apple** Color RGB Analog Monitor
- **Apple** 3.5 Platinum Disk Drive
- **Apple** 5.25 Platinum Disk Drive
- **Apple** Imagewriter II Printer
- **Imagewriter** and Monitor Cables
- Applied GS-RAM 256K*
- Color **Imagewriter** Ribbon
- Box of 10 **Maxell** 3.5 Diskettes
- Box of 10 **Maxell** 5.25 Diskettes
- Dust Covers for **IIGS & Imagewriter II**
- Starter Package of Paper

Suggested List Price $3083.00

Now Only $2399.00

- When Ordering specify package # 8717

Includes 512K of RAM required by most IIGS Software!

Macintosh SE Super System

System Includes:

- **Macintosh SE** 1 Megabyte
- **Macintosh** Keyboard
- **Macintosh** Mouse
- **Imagewriter II** with cable
- Box of 10 **Maxell** Diskettes
- **Mac Write** Word Processor
- Deluxe Dust Cover
- Head Cleaning Kit

NEW!

Suggested List Price $3740.00

Now Only $2899.00

- When ordering specify package # 8714

Includes 2 Built In Disk Drives !!!

Complete Ready-To-Run System!

....Don't stop now, there's so much more you can do!

IIGS SOFTWARE

	LIST	NOW
Activision		
Paintworks Plus	$ 79.95	$ 55.00
Hackers II	$ 44.95	$ 29.95
ClipArt	$ 29.95	$ 23.00
Shanghai	$ 44.95	$ 29.95
Tass Time	$ 44.95	$ 29.95
Writers Choice	$ 99.95	$ 65.00
Music Studio	$ 79.95	$ 55.00
Apple		
Appleworks 2.0	$249.00	$199.00
Baudville		
816 Paint	$ 75.00	$ 54.00
Data Pak		
GraphicWriter	$149.95	$108.00
Notes-N-Files	$ 99.00	$ 70.00
Electronic Arts		
Music Constuct.	$ 49.95	$ 39.00
Deluxe Paint	$ 99.00	$ 70.00
Art Part 1 or 2	$ 30.00	$ 24.00
Bards Tale	$ 50.00	$ 39.00
Great Wave		
Kids Time II	$ 39.95	$ 29.95
PBI Software		
Visulizer	$ 99.95	$ 70.00
Roger Wagner		
MouseWrite	$149.95	$108.00
Softswitch	$ 49.95	$ 39.00
VIP Technology		
VIP Professional	$269.00	$219.00
Word Perfect		
Word Perfect GS	$179.00	$109.00

Communications Software

Apple Access II	$59
PBI CommWorks	$72
Pinpoint	$49
USI Mousetalk	$69

(All of the above are GS compatible)

Cables

IIe Modem Cable	$19
IIc Modem Cable	$19
IIGS Modem Cable	$19

IIGS HARDWARE

APPLE BRAND	
IIGS CPU w/mouse	$849
5.25 Drive Platinum	$229
3.5 Drive Platinum	$329
Analog RGB Monitor	$399
SCSI Card	$109
APPLIED ENGINEERING	
GS RAM 256K	$139
GS RAM 512K	$169
GS RAM 1 MEG	$229
GS RAM 1.5 MEG	$289
GS RAM Plus 1 MEG	$359
GS RAM Plus 2 MEG	$499
AST RESEARCH	
Vision Plus	$229
AST RamStack	$ 99
BOSE	
Roommate II	$199
MD IDEAS	
Conservor	$ 99
Supersonic	$ 49
Didgitizer	$ 33
Octoram 256K	$119
ORANGE MICRO	
Rampak 512K	$209
Rampak 1 MEG	$299
Rampak 2 MEG	$449
Pro Grappler	$ 82

COMMUNICATIONS

Apple Super Serial Card	$ 99
Apple Personel Modem-External	$319
Hayes Smartmodem 1200	$419
Hayes Smartmodem 2400-External	$599
Hayes Smartmodem 1200A-Internal	$299
Prometheus 300C (IIc)	$ 89
Prometheus 1200 Expandable	$249
Prometheus 1200 Non-Expandable	$179
Prometheus 2400 Expandable	$349
Prometheus 2400 Non-Expandable	$289
Prometheus 1200A Internal	$209

All external modems include interface cable to your choice IIe, IIc, IIGS, or Macintosh!

APPLE IIc HARDWARE

Apple IIc Computer	$649
Apple IIc Color Monitor	$299
Apple IIc Monitor Stand	$ 25
Apple 5.25 Drive	$229
Unidisk 3.5 w/Catalyst	$319
AE Z-RAM Ultra 2 256K	$209
AE Z-RAM Ultra 2 1 MEG	$309
AE Z-RAM Ultra 3 256K	$259
AE Z-RAM Ultra 3 1 MEG	$359

Floppy & Hard Drives

American Mitak IIe	$ 129
American Mitak IIc	$ 135
Video Technology IIc	$ 149
PROAPP 20 MEG SCSI Hard	$ 749
PROAPP 40 MEG SCSI Hard	$1499

APPLE IIe HARDWARE

Apple IIe 64K CPU	$599
Apple IIe 128 K CPU	$649
Unidisk 3.5 w/Catalyst	$319
3.5 Drive Controller	$ 59
Apple 5.25 Drive	$229
Apple Color Monitor IIe	$299
Apple IIe Mouse	$119
AE RamWorks III 256K	$179
AE RamWorks III 512K	$209
AE RamWorks III 1 MEG	$279
AE RGB Option	$105
AE RamFactor 256K	$189
AE RamFactor 512K	$229
AE RamFactor 1 MEG	$289
RamCharger Bat Back-Up	$149
AE Heavy Duty Power Sup	$ 59
Kensington System Saver	$ 69
Orange Buf Grappler 16K	$114
Orange Buf Grappler 64K	$129

NO-RISK 30-DAY SATISFACTION GUARANTEE If you're not 100% satisfied with any Hardware or Accessories purchased from CDA Computer Sales, we will refund your purchase price 100% no questions asked!

FREE TECHNICAL SUPPORT HOTLINE We support our customers with knowledgable technicians on all products we sell. A Technical Support Hotline is provided for all our customers.

ORDER VIA MAIL - Write: CDA Computer Sales, 31 Marshall Hill Road, West Milford, New Jersey 07480. Please include full name, address, and phone number.

ORDER VIA TELEPHONE - 1-800-526-5313

ORDER VIA COMPUSERVE'S ELECTRONIC MALL - 24 hours a day! GO WOC

FREIGHT - UPS GROUND SHIPPING - Add 2% ($3.50 minimum). UPS BLUE LABEL SHIPPING - Add 5% (two-day delivery, $5.50 minimum). APO/FPO SHIPPING - Add 4% ($4.50 minimum). ALASKA, HAWAII, PUERTO RICO -Add 6% ($6.50 minimum). FOREIGN ORDERS - Please call.

MAJOR CREDIT CARDS ACCEPTED - No additional charge! Cashiers Checks, Money Orders, Personal and Company checks accepted. NO COD's please!

In N.J. 201-728-8080
Mon.-Fri. 9-9 EST Sat. 10-4 EST

Inquiries & Customer Service 201-728-8082.

31 Marshall Hill Rd., West Milford, NJ 07480

ORDERS ONLY
TOLL FREE
800-526-5313

CIRCLE 235 ON READER SERVICE CARD

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



GEORGE GRYZENIA

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

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

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

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

Telecommunications: Dialing for $$

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

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

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

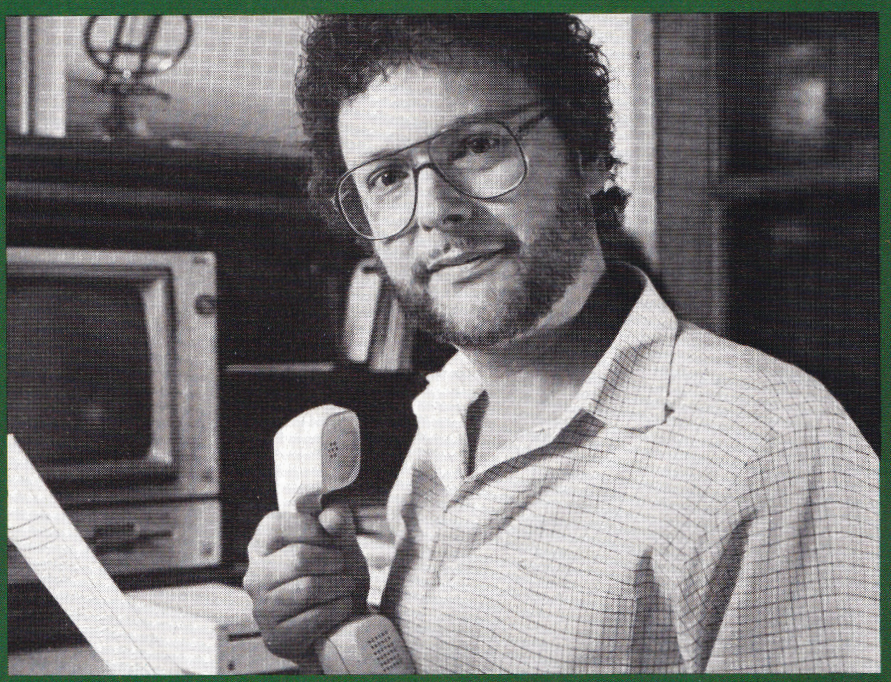
"Having a computer and modem is the easiest way to tap into the mass market," says Badeaux.

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

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

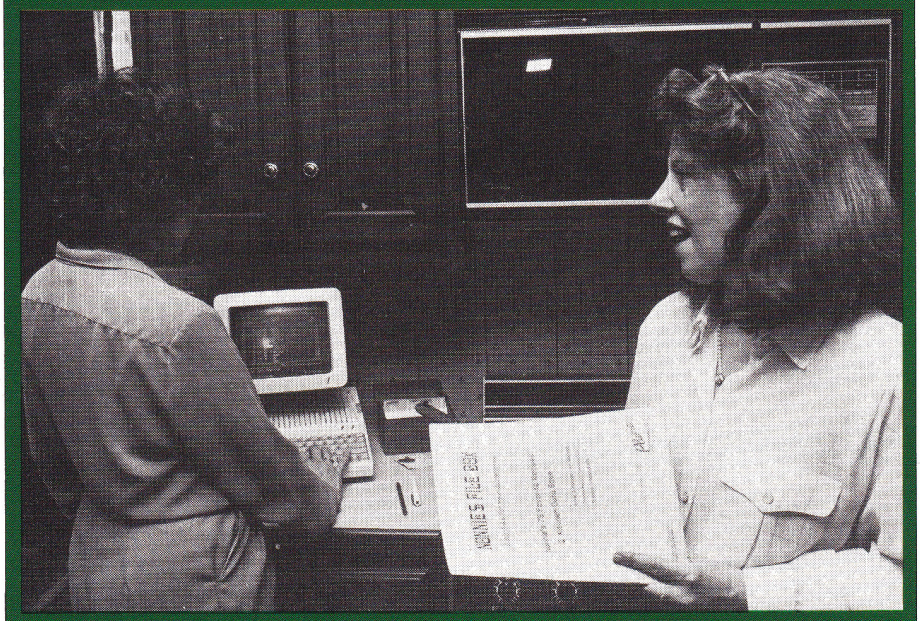
An easier way to make money through telecommunications is by setting yourself up as an "information broker." That is, you can charge people and businesses to do library research for them. Instead of going

Jon Badeaux started his 'databoard' two years ago.



ANDRE MILLER

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



MOMENTS PHOTOGRAPHY

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

Build Your Own Empire

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

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

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

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

For Love or Money

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

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

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

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

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

BOOKS ON MAKING BUCKS

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

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

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

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

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

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

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

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

PRODUCT INFORMATION

WillWriter
Nolo Press
950 Parker Street
Berkeley, CA 94710
(415) 549-1976
List Price: $39.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM
CIRCLE 365 ON READER SERVICE CARD

PartyWare
Hi Tech Expressions/
Thoughtware
2699 South Bayshore Drive
Suite 1000A
Coconut Grove, FL 33133
(305) 854-2318
List Price: $14.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM
CIRCLE 366 ON READER SERVICE CARD

The Newsroom and **Certificate Maker**
Springboard Software
7808 Creekridge Circle
Minneapolis, MN 55435
(612) 944-3915
List Price: The Newsroom, $59.95; Certificate Maker, $49.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM
CIRCLE 367 ON READER SERVICE CARD

The Print Shop and **The Toy Shop**
Brøderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1700
List Price: The Print Shop, $49.95; The Toy Shop, $59.95
Requires: Apple II Plus, IIe, IIc, or IIGS; 64K RAM

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

CIRCLE 368 ON READER SERVICE CARD

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

CIRCLE 369 ON READER SERVICE CARD

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

CIRCLE 370 ON READER SERVICE CARD

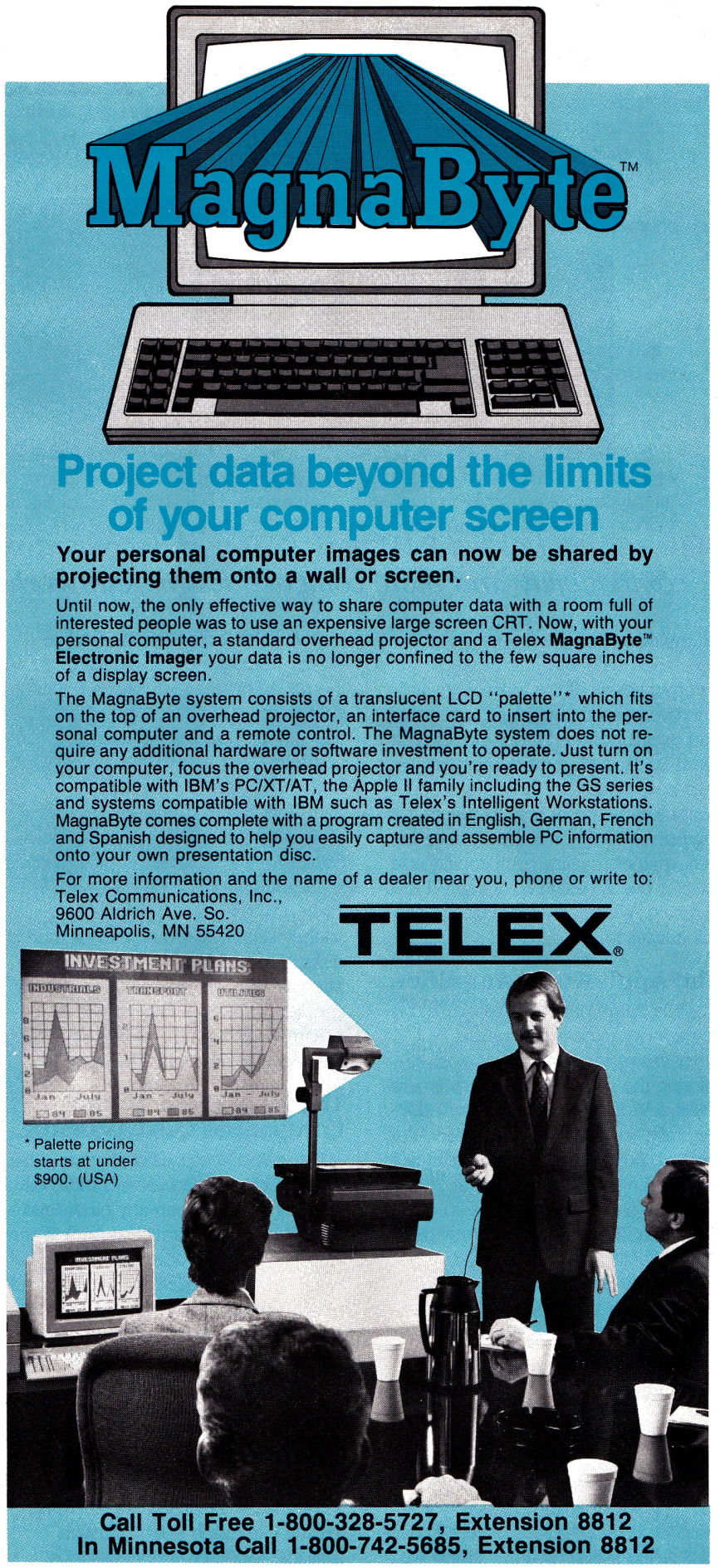
AST-VisionPlus
AST Research
2121 Alton Avenue
Irvine, CA 92714
(714) 553-0340
List Price: $295
Requires: Apple IIGS; 512K RAM; 3.5-inch disk drive; video camera (color optional), VCR, or any other NTSC-compatible device

CIRCLE 371 ON READER SERVICE CARD

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

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

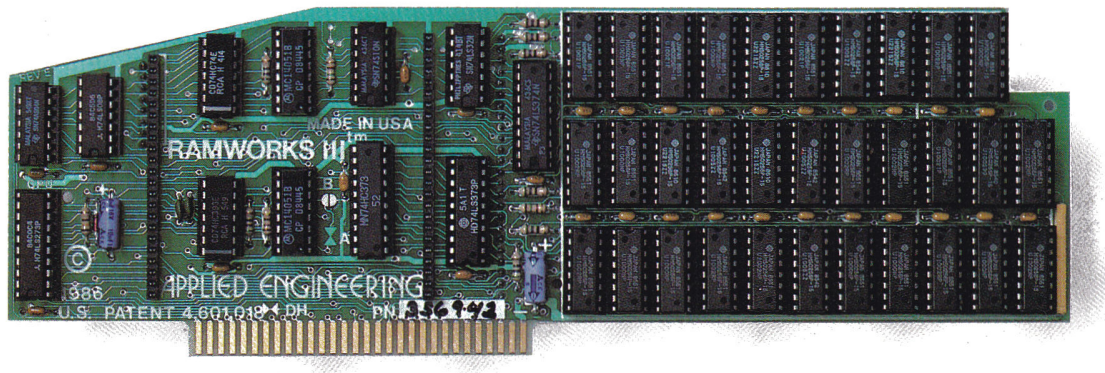
CIRCLE 372 ON READER SERVICE CARD



CIRCLE 117 ON READER SERVICE CARD

RamWorks® III

Patented Performance from the Recognized Leader



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

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

The AppleWorks Amplifier.

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

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

RamWorks, nothing comes close to enhancing AppleWorks so much.

The Most Friendly, Most Compatible Card Available.

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

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

Highest Memory Expansion.

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

It Even Corrects Mistakes.

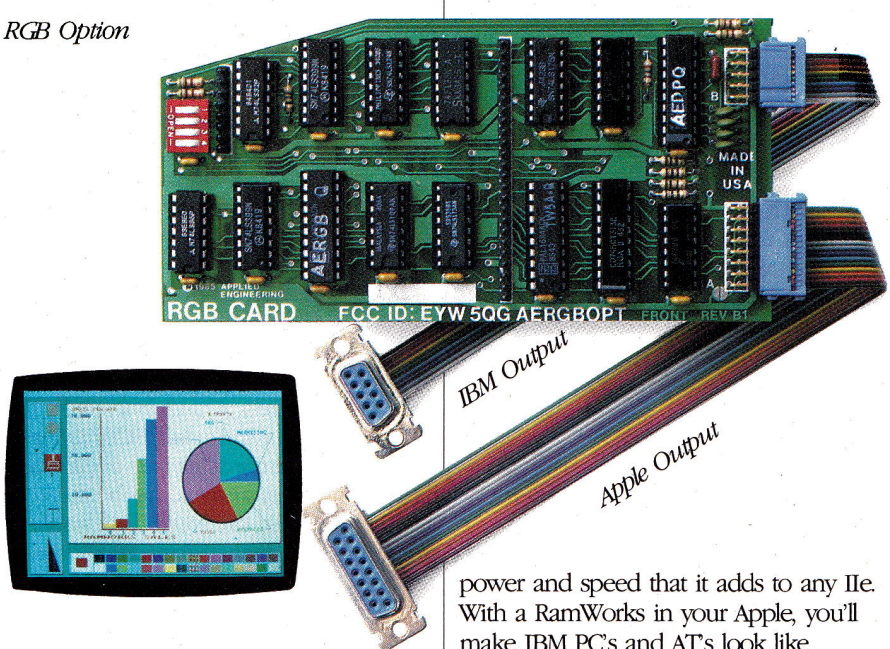
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

The Ultimate in RGB Color.

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

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

RGB Option

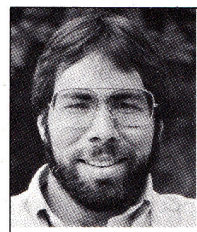


True 65C816 16 Bit Power.

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

Endorsed by the Experts.

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



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

Steve Wozniak, the creator of Apple Computer

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

Quality and Support of the Industry Leader

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

It's Got It All

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

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

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

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

Applied Engineering™

P.O. Box 798, Carrollton, TX 75006

(214) 241-6060

PICK OF THE CROP *BY DENISE CARUSO*

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

PRODUCT SPOTLIGHT

UTILITY PLAYER

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

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

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

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

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

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

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

PROSEL
Glen E. Bredon
521 State Road
Princeton, NJ 08540
(609) 924-5976
CIRCLE READER SERVICE NO. **400**





SCSI DRIVE

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

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

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

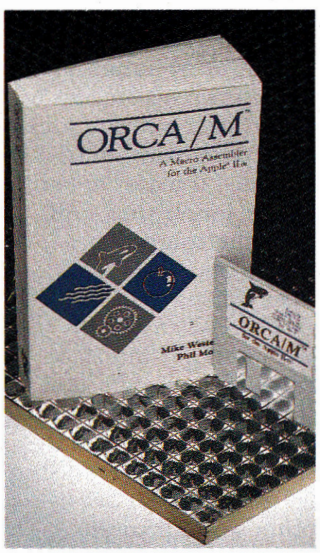


(List Price: hard-disk drive, $1795; interface cards, $129 each)
Requires: Apple IIe or IIGS with SCSI interface card
S40 SCSI hard-disk subsystem
CMS Enhancements, Inc.
1372 Valencia Avenue
Tustin, CA 92680
(714) 259-9555
CIRCLE READER SERVICE NO. **401**

RIGHT OF ASSEMBLY

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

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



A CLEAN SWEEP

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

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



AND THE ANSWER IS . . .

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

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

The main program disk comes with 40 cur-



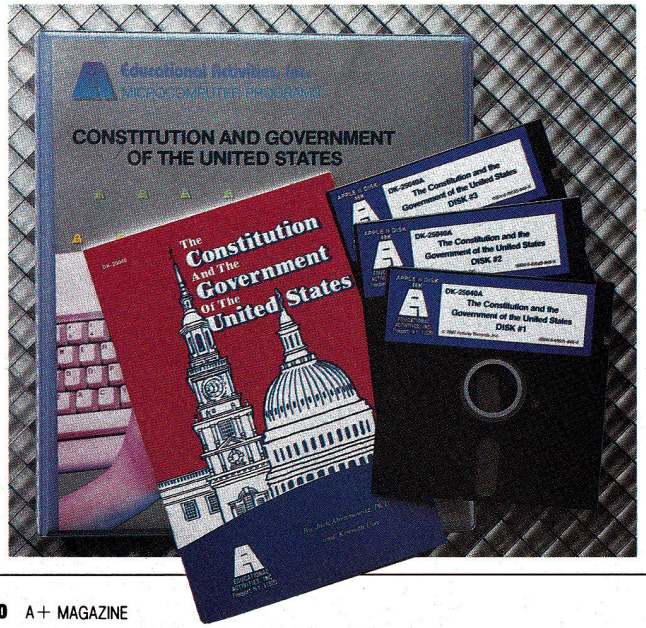
riculum topics on math, science, language/vocabulary, and social studies for grades 3–8. Extra LearningWare subject diskettes are available too. *(List Price: $39.95; LearningWare diskettes, $19.95 each. Upgrades to The New Game Show are available for $15—which includes tax and postage—plus original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

RUGGED CONSTITUTION

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

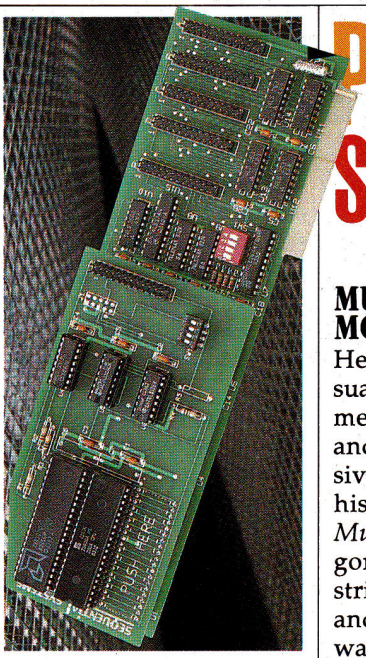
What better time for junior-high and high-school students to get a chance to explore the Constitution with a program called The Constitution and the Government of the United States?

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



QUEUING UP FOR THE PRINTER

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



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

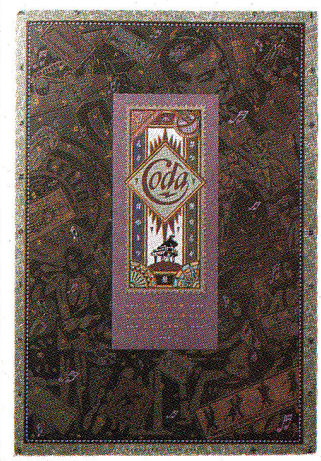
The Q-Card works with parallel-interface cards and printers, and the company also provides parallel-to-serial converters if you're using an ImageWriter or another serial printer.

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

PRODUCT SPOTLIGHT

MUSIC FOR MODERNS

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



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

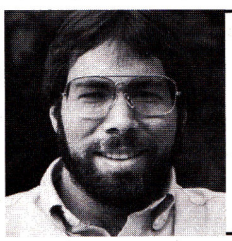


With the TransWarp™ accelerator, your IIe™ or II+™ is 40% faster than the IIGS!

Computing at warp speed!

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

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



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

Steve Wozniak, the creator of Apple Computer

An important difference.

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

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

A cinch to use.

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

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

Speed = Productivity

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

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

Satisfaction guaranteed!

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

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

For fast response:

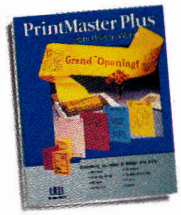
Call Applied Engineering, 9 a.m. to 11 p.m., 7 days at (214) 241-6060. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 if outside U.S.A. *Or mail* check or money order to Applied Engineering, P.O. Box 798, Carrollton, TX 75006.

Applied Engineering

The Apple enhancement experts.

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

PrintMaster Plu advance in freed



Spread the word.

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

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

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



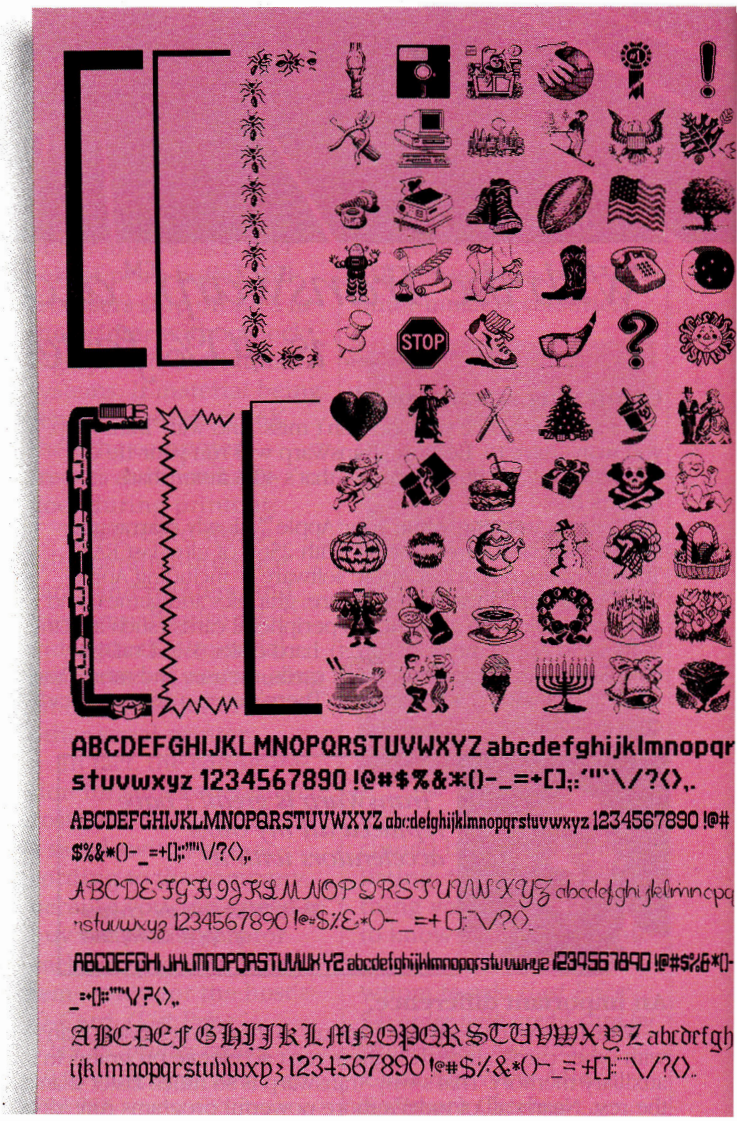
With PrintMaster Plus one program does it all — cards, banners, posters, stationery, even calendars.

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

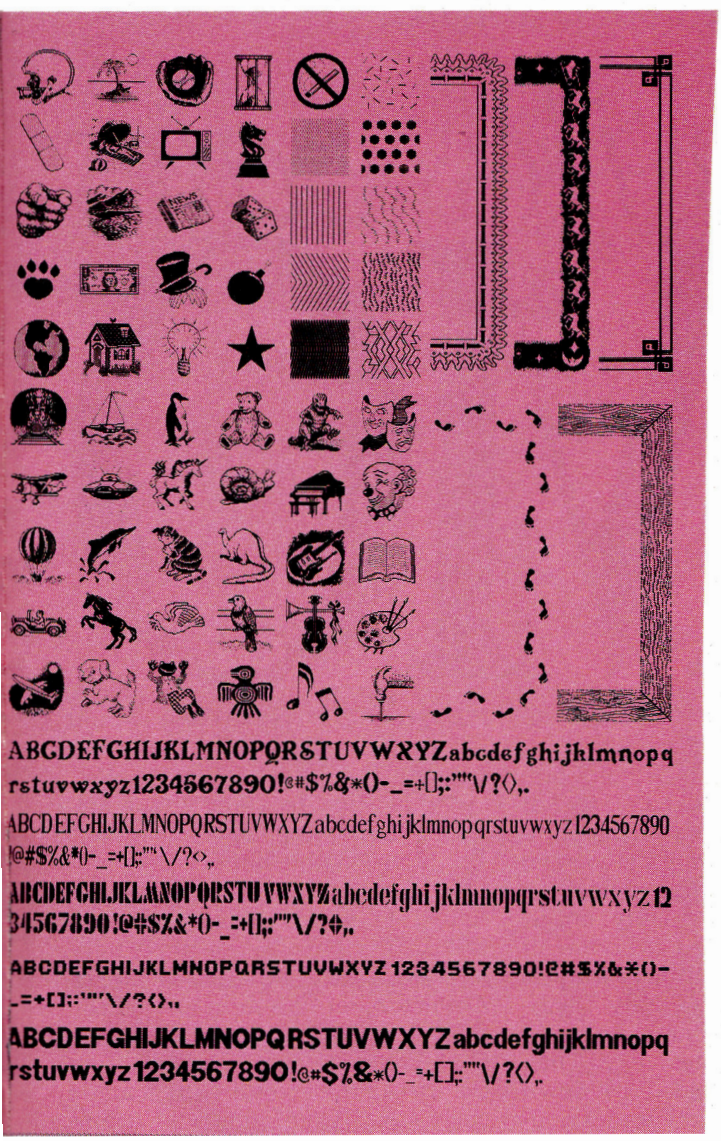


PrintMaster Plus lets you create, preview, and make changes at any step.

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



s.™ An incredible om of expression.



PrintMaster Plus is available for Apple® IIc, IIe, II+ with 128K and many other computers. For the name of the PrintMaster Plus dealer nearest you or for more information, call Unison World at 415-848-6666.

Aa

PrintMaster Plus gives you both capital and lower case letters to work with, while other programs may limit you to all caps.

Special offer: Trade in and save two-thirds off the $49.95 retail price. Just send us $15 plus the disk or label from your current program that creates cards, banners and posters and we'll rush you a copy of PrintMaster Plus.

Express yourself more, for even less.

Clip and mail to Unison World, Box 3056, Berkeley, California 94703

_____YES! I'm enclosing $15 plus the disk or label from my current program that creates cards, banners and posters. Please rush me a copy of PrintMaster Plus for my Apple IIc, IIe, or II+ computer with 128K.

NAME

STREET ADDRESS APT.

CITY STATE ZIP

_____CHECK _____MONEY ORDER _____VISA/MASTERCARD

CARD NO. EXP. DATE

SIGNATURE

Unison World

2150 Shattuck Ave., Suite 902, Berkeley, CA 94704

CIRCLE 113 ON READER SERVICE CARD

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

Making the IIGS Sales DEMO

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

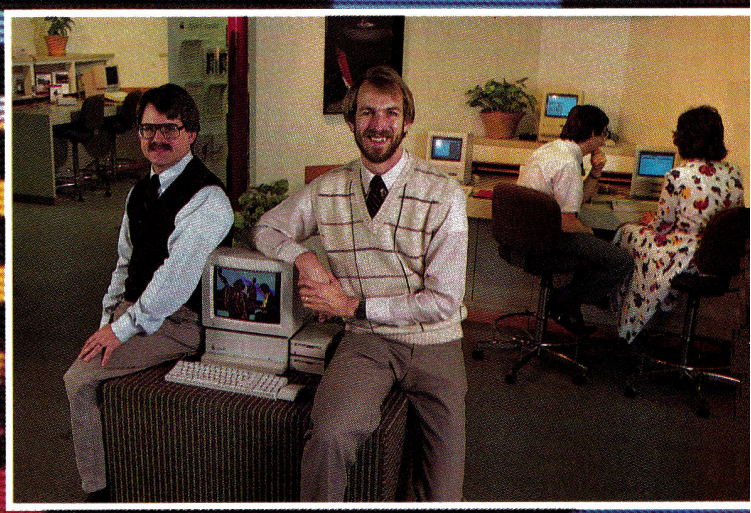
The two programmers involved in the project, Ron Lichty and Tom Crosley, wrote and tested nearly 40,000 bytes of assembly code during the following four months. This is their exclusive report on the techniques they used to create Apple's IIGS demo program.

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

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

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

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



PHOTOGRAPHY BY JIM DAVIS

Behind the Scenes

FIGURE 1.

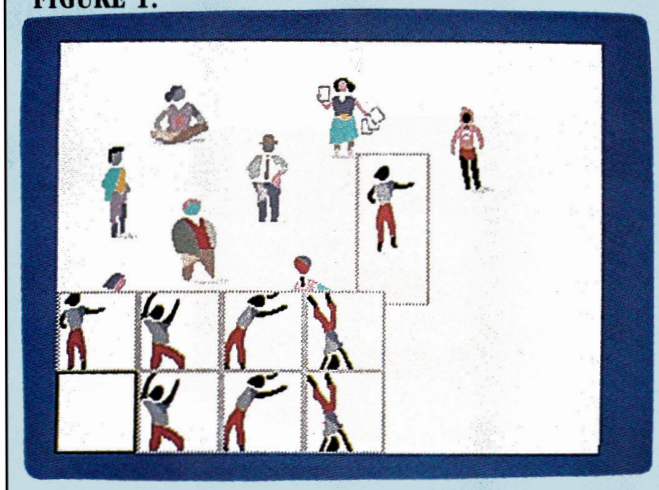


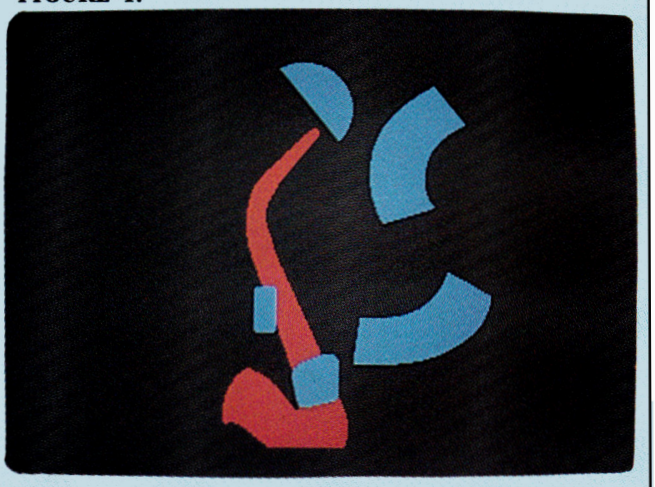
FIGURE 2.

```
FRAME   1   2   3   4   5   6   7   8    OPTS SPD
-------------------------------------------------
  73:   --  A6  B2  --  A7  C5  A1  --          8
  74:   --  A6  B3  --  A7  C5  A1  --          8
  75:   --  A6  B3  --  A7  C5  A1  --          8
  76:   --  A6  B3  TD  A7  C5  A1  C1          8
  77:   TE  A6  B3  TD  A7  C5  A1  C1          8
  78:   TE  A6  B4  TD  A7  C5  A2  C1          8
  79:   A3  A6  B4  TD  A7  C5  --  C1          8
  80:   A3  A6  B4  TD  A7  C5  A2  --          8
  81:   A3  A6  B5  TD  A7  C5  A2  --          8
  82:   A3  A6  B5  TD  A7  C5  A2  --          8
  83:   --  A6  B5  TD  A7  C5  A2  --          8
  84:   --  A6  B6  TD  A7  C5  A2  --          8
  85:   --  A6  B6  TD  A7  C5  A2  --          8
  86:   --  A6  B6  --  A7  C5  A2  --          8
  87:   --  A6  B6  --  A7  C5  A2  C1          8
  88:   --  A6  B7  --  A7  C5  A2  C1          8
  89:   --  A6  B7  --  A7  C5  A2  C1          8
  90:   --  A6  B7  --  A7  C5  --  C1          8
  91:   A4  A6  B8  C6  A7  C5  --  --          8
  92:   A4  A6  B8  C6  A7  C5  --  --          8
-------------------------------------------------
File: hand                    X= 39,  Y=131
```

FIGURE 3.



FIGURE 4.



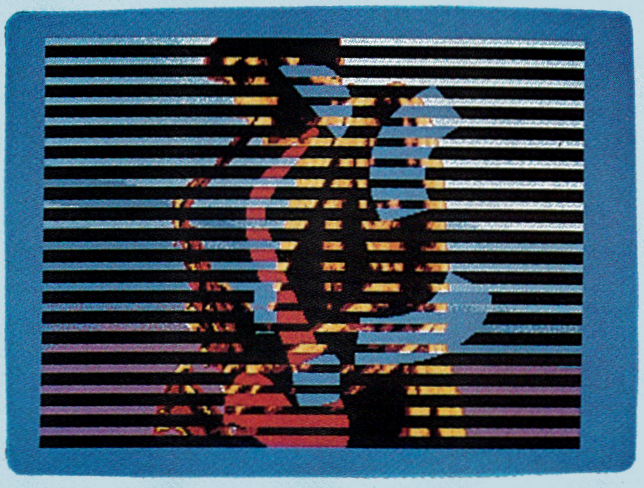




Figure 1 demonstrates the use of the cast cutter tool. Using the mouse to drag the cross hair, the artist could cut up to eight cast members from the full-screen picture to the eight boxes in the lower left corner. The top four of those eight boxes were all that was necessary to make the woman do cartwheels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

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

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

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

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

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

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

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

Memory Limits

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

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

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

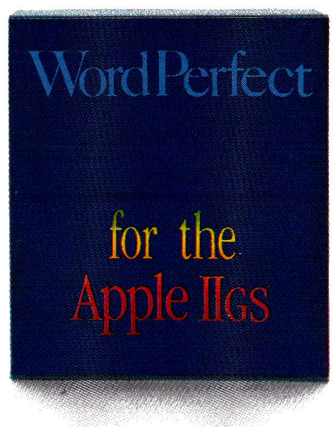
We restricted the number of 32K super-hi-res pictures to just backgrounds, figuring we'd store animated characters as small parts of a screen. We concluded we could fit the program, pictures, and sound onto two 800K disks if we employed file compression. It could be done—and that's what we told Apple.

Designing the Animator

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

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

If you want power from your IIGS, WordPerfect gives it to you in writing.



WordPerfect announces the first power word processor for the Apple IIGS. WordPerfect takes the innate power of the IIGS and plugs it into a feature-rich word processing program designed for power users.

WordPerfect Power.

The result is a word processor that generates detailed footnotes and has a dictionary of 115,000 words. An easy-to-use word processor with features like mail merge, macros, on-screen formatting, automatic page numbering, bold and underline displayed on screen, super/subscript, headers and footers, and even support for hundreds of printers. And the feature list goes on. With WordPerfect, what you really get is a powerful writing tool that lets you flex your word processing muscle.

WordPerfect Flexibility.

In addition to running on the IIGS, WordPerfect is available for the IIe/IIc.* And files from both versions can be interchanged with WordPerfect files generated on other machines, including IBM® PC compatibles and some minicomputers.

No other word processor gives you word power for your IIGS like WordPerfect does. Isn't it time you got plugged in? For more information, including special discount pricing for educators, call or write WordPerfect Corp., 288 West Center St., Orem, Utah 84057 (801) 225-5000.

WordPerfect CORPORATION

*50,000-word dictionary on IIe/IIc.

CIRCLE 120 ON READER SERVICE CARD

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

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

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

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

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

Steps in Creating a Scene

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

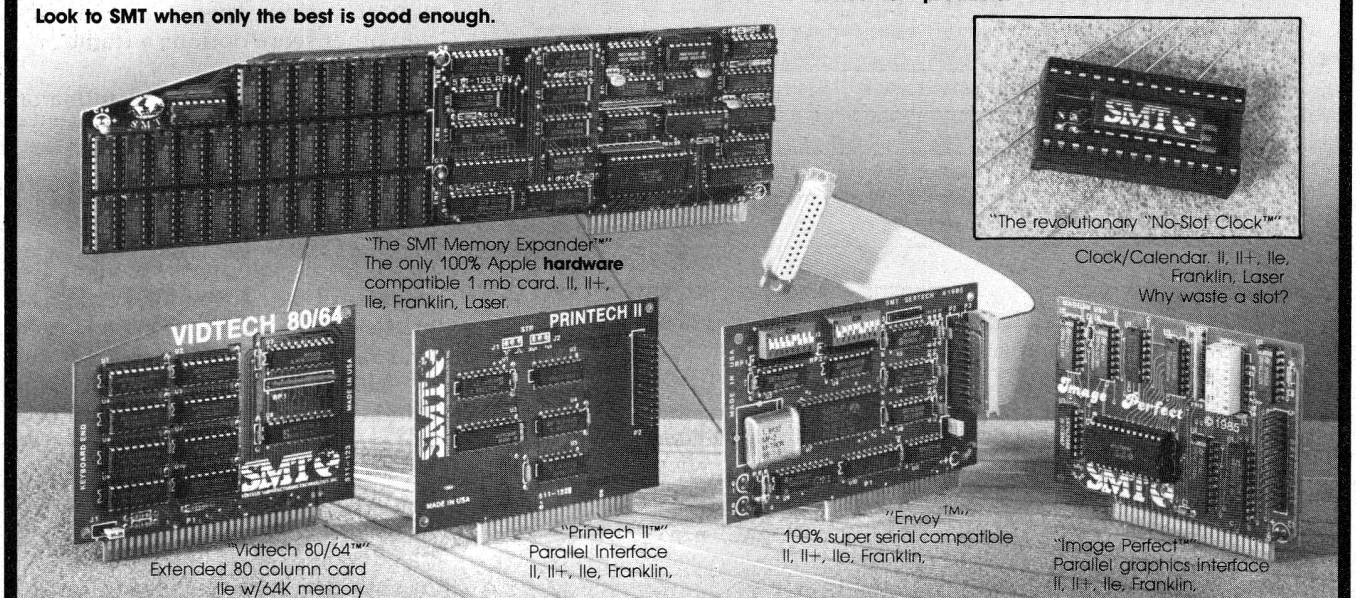
WE'VE BEEN *JUICING* APPLES FOR OVER 3 YEARS

SMT has been designing and manufacturing the highest quality Apple and IBM add-on boards for over 3 years. Our American made products are backed by a 3 year warranty, the same warranty that sent other manufacturers scrambling to meet or beat.

Look to SMT when only the best is good enough.

★ Friendly, helpful, (and available) technical support at no charge to dealers *and* end-users, (619) 744-3599.

★ Quality and reliability built into each product by one of the premier manufacturers of Apple and IBM productivity enhancement products.



"The SMT Memory Expander™" The only 100% Apple **hardware** compatible 1 mb card. II, II+, IIe, Franklin, Laser.

"The revolutionary "No-Slot Clock™" Clock/Calendar. II, II+, IIe, Franklin, Laser Why waste a slot?

"Vidtech 80/64™" Extended 80 column card IIe w/64K memory

"Printech II™" Parallel Interface II, II+, IIe, Franklin,

"Envoy™" 100% super serial compatible II, II+, IIe, Franklin,

"Image Perfect™" Parallel graphics interface II, II+, IIe, Franklin,

SMT SYSTEMS MANUFACTURING TECHNOLOGY, INC.

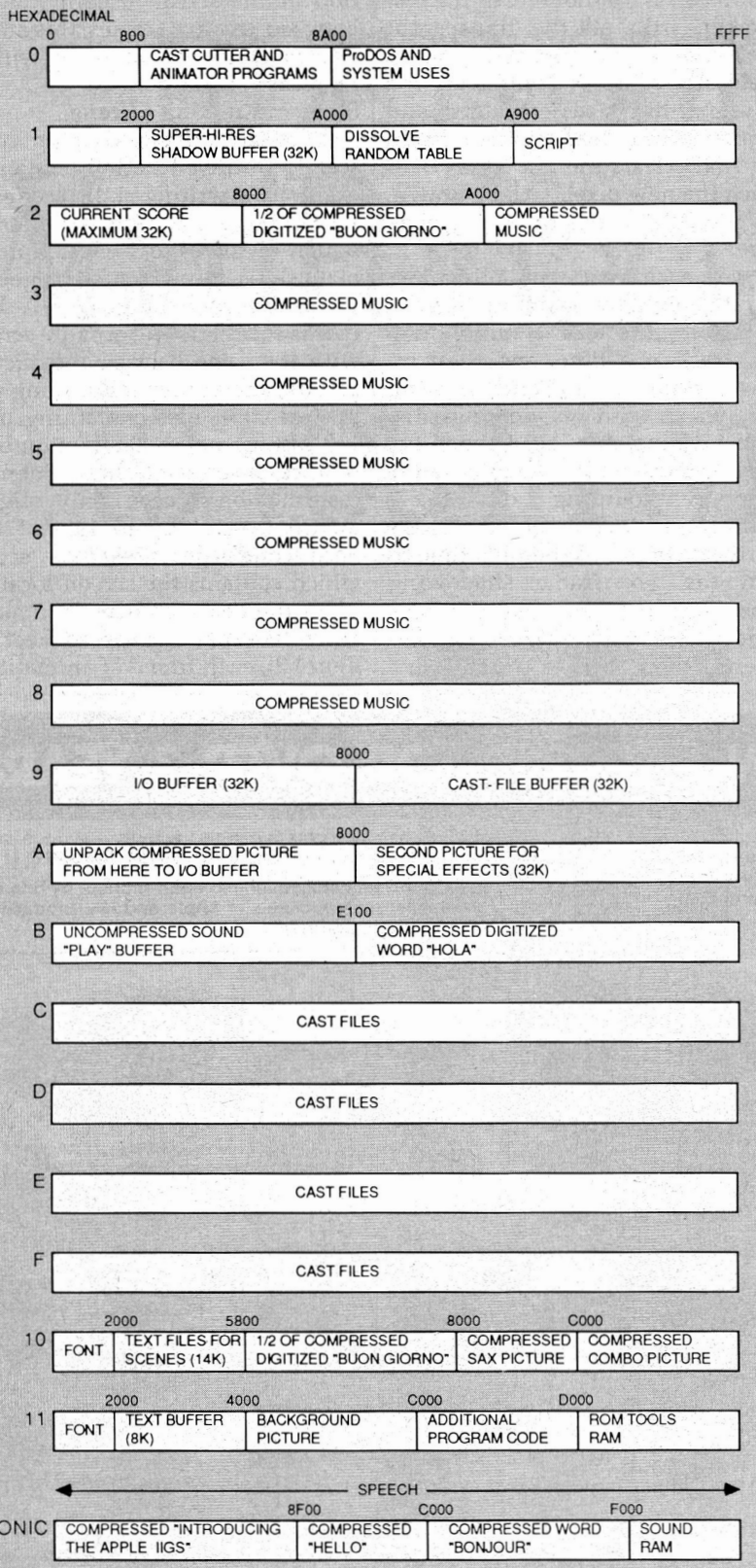
For information and location of your local dealer call:
1145 Linda Vista Drive San Marcos, CA 92069
(800) 648-6262 in California **(619) 744-3590**

Also distributed to dealers by:
• Micro D — Nationally • PC Micro Dealers — MD • Micro Data Products — CO • Jade Computer — CA

CIRCLE 280 ON READER SERVICE CARD

Memory Map

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



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

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

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

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

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

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

Special Effects

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

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

Preferred Computing

ORDER
TOLL FREE
1-800-327-7234

Computer Accessories **When Only the Best Will Do!**

VISA COD MasterCard

We only sell proven products that work. By selling only the industry best, we can assure you of the highest level of reliability and performance. Selling large volumes of a smaller product line allows us to have the lowest discount prices and fast same day shipment.

APPLIED ENGINEERING™

RamWorks III™ *If you have a IIe this card is perfect and if you use AppleWorks, it's an absolute must! Applied Engineering was the first company to expand AppleWorks and they're always 6-12 months ahead of the competition. And you can stay current with our FREE SOFTWARE UPGRADES. Why settle for a partial compatible when you can have a real RamWorks at a discount price.*

RamWorks III 256K **$169**
RamWorks III 512K **$209**
RamWorks III 1 MEG **$269**
RamWorks III 1.5 MEG **$389**

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

RamWorks RGB Option *Even if you bought a RamWorks just to use the RGB option, it would be worth it. Runs both Apple and IBM RGB monitors, and is compatible with Apple's standard for RGB, includes cables.* **$99**
(See our new RGB monitor ar right.)

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

Z-80 Plus™ *Runs all CP/M® software. Includes operating system and manual, a great value.* **$109**

Timemaster H.O.™ *Timemaster H.O. has the most features and is the easiest to use. It comes with more software than any other clock card. It even adds 15 new commands to BASIC!* **$79**

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

SerialPro *A powerful multifunction card with serial ports and clock/calendar* **$129**

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

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

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

Extended 80 Column Card with 64K *For IIe, with documentation.* **$69**

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

GSRAM 256K **$139**
GSRAM 512K **$179**
GSRAM 1 MEG **$249**
GSRAM 1.5 MEG **$319**
GSRAM Plus 1 MEG **$379**
GSRAM Plus 2 MEG **$619**

IIc Clock™ *Clock/Calendar for IIc* **$49**

Z-RAM Ultra *For all IIc's*

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

More Quality Products

Ultra Hi-Res RGB Monitor/TV *This Sony RGB monitor uses a 13" ultra hi-res CRT for super sharp 80 column text and great graphics. Works with the IIe and IIGS. But in addition to being the best RGB monitor available this unit is also a 180 channel cable-ready television set with remote control. Try it. You WILL like it.*
(List $625) *Only* **$499**

IIe RGB Cable **$19 w/Sony** *($29 Sep.)*
IIGS RGB Cable **$29 w/Sony** *($49 Sep.)*

5-1/4" Disk Drive *Super quiet direct drive compatible with all Apple software and Apple controller card. A top quality unit with 1 year warranty. Add $20.00 for IIc/IIGS Cable.* *Only* **$119**

5-1/4" Disk Controller **$49**

16K RAM Card *For Apple II and II+* **$69**

Heavy Duty Apple Power Supply *Over twice the output current of Apple's original power supply for IIe and IIGS.* **$59**

Internal 1200 Baud Modem *Cermetek 1200, for Apple IIe, II+ and IIGS runs at 1200 and 300 baud. Auto-dial, auto-answer with built-in speaker. Hayes compatible, with built-in communications software. Comes complete with phone cable and manual. (List $299)* **$146**

Kensington System Saver *Fan with 2 power outlets and surge protector.* **$69**

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

MacroWorks and Super MacroWorks *". . . the best single AppleWorks add-on available today." A+ Magazine. Add new word processing power, create your own Macros and save lots of keystrokes. Use mouse with AppleWorks. No more pathnames! Just select from a menu. Works with Applied Engineering cards and software. Buy MacroWorks for AppleWorks versions 1.0 - 1.3. Buy Super MacroWorks for AppleWorks version 2.0.*

MacroWorks (List 34.95) **$29.00**
Super MacroWorks (List 49.95) ... **$39.00**

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

VIP Professional *Lotus 1-2-3 Workalike. For IIe & IIc (List $249)* **$169**
For IIGS (List $299) **$199**

RamWorks™ *That's right, RamWorks not RamWorks II. RamWorks is the memory card that started the revolution. RamWorks can expand to 512K on the main board and up to 1 meg with an optional 512K piggyback and can accept Applied Engineering's new RGB option. A 512K RamWorks gives AppleWorks a 360K desktop. Comes with Applied Engineering's newest software.*
With 512K **$139**

Why buy from us?

1. *Toll free 800 numbers for orders.*
2. *We almost always ship from OUR stock. Call us before 3 P.M. and it ships today.*
3. *All memory cards have factory installed and tested RAM chips.*
4. *We're nice guys that want to help. We want our business to grow because of repeat customers and word of mouth.*
5. *We handle only the industry's best. We've tested and used all the products we sell.*
6. *15 day money back satisfaction guarantee on hardware. If you don't like something, we'll give you your money back. No hassles.*
7. *We'll support, service and warranty everything we sell.*
8. *No surcharge is added for charge cards and we won't charge your card until we ship.*
9. *No sales tax is collected on orders outside Texas.*
10. *All shipments are insured by us.*

Order by mail: *Send check or money order to Preferred Computing, P.O. Box 815828, Dallas, TX 75381*
Order by phone: *1-800-327-7234 Visa, MasterCard or COD Texas, Hawaii and Alaska 1-214-484-5464*

Orders only call *1-800-327-7234*
Questions and Customer Service *call 1-214-484-5464*
Texas residents add 6¼% sales tax

Prices subject to change without notice

Scene Control

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

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

:/sd2/act2/sc1/
:mouse1

/sd2/act3/sc1/
chars1

/sd2/act3/sc2/
mail

/sd2/act3/sc3/
money

/sd2/act3/sc4/
file

/sd2/act3/sc5/
cash

/sd2/act3/sc6/
boys

/sd2/act3/sc7/
write

/sd2/act3/sc8/
chase

/sd2/act3/sc9/
math

/sd2/act3/sc10/
solar

/sd2/act3/sc11/
europe

/sd2/act3/sc12/
music

/sd2/act3/sc13/
flower

/sd2/act3/sc1/
chars9

/sd2/act4/sc1/
per0

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

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

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

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

Sound

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

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

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

FURTHER INFORMATION

Books

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

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

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

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

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

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

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

Upcoming Addison-Wesley books:

Apple IIGS Hardware Reference, Apple Computer, Inc., $24.95 (available summer 1987)

Apple IIGS Firmware Reference, Apple Computer, Inc., $24.95 (available summer 1987)

Apple IIGS Toolbox Reference, Apple Computer, Inc., Volume 1 and Volume 2, $26.95 each (available fall 1987)

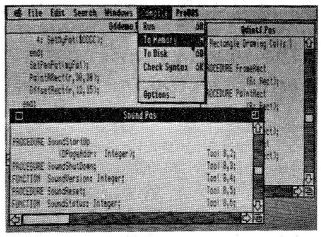
Organizations

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

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

TML Pascal for the Apple IIGS

Fully integrated and super fast!



- ✓ *TML Pascal - winner of the A+ Reader's Choice award is now available for the Apple IIGS!*
- ✓ *Compile up to 6,000 + lines a minute!*
- ✓ *Fully integrated mouse-based, multiple-window editor, and Pascal compiler!*
- ✓ *Create stand-alone ProDOS16 applications and desk accessories.*
- ✓ *Complete Apple IIGS Toolbox support:*
  - *QuickDraw graphics*
  - *Windows*
  - *Menus*
  - *Controls*
  - *Desk Accessories*
  - *Sound*
  - *Note Synthesizer*
  - *Dialogs*
  - *Printing*
  - *and all others ...*
- ✓ *Language features include:*
  - *Separate compilation of Units*
  - *Direct access to Apple IIGS Toolbox*
  - *Pascal strings and string operations*
  - *Byte, Integer and LongInt types*
  - *Type casting*
  - *Bit operations*
  - *Generates native 65816 code*
  - *Random access I/O*
  - *Turtle graphics Units*
  - *4 real types (uses SANE)*
  - *UNIV and STATIC parameters*
  - *Full Code and Data segmentation*
- ✓ *TML Pascal is also available for the Apple Programmer's Workshop (APW), implemented as a language tool.*

TML Source Code Library

- ✓ *Extensive collection of applications and desk accessories with complete TML Pascal source code and documentation!*
- ✓ *Demonstrates how to program the Apple IIGS Toolbox, including graphics, sound, windows, menus, dialogs, etc...*
- ✓ *Use the source code in your applications.*
- ✓ *Will save you months of learning to program the Toolbox!*
- ✓ *The perfect addition to any programmer's set of tools.*

TML Speech Toolkit

Make your Apple IIGS TALK!

NEW PRODUCT

- ✓ *Converts English text to speech!*
- ✓ *Both male and female speech supported!*
- ✓ *TML Speech Toolkit provides full programmer control of speech.*
  - *Speech*
  - *Tone*
  - *Volume*
  - *Pitch*
- ✓ *Dictionary support for customizing word pronunciation.*
- ✓ *Complete documentation.*
- ✓ *Includes TML Pascal source code examples demonstrating the use of speech.*

TML Systems' Development Software

Apple IIGs Products:

TML Pascal	*$125.00*
TML Source Code Library	*$49.00*
TML Speech Toolkit	*$69.00*
TML Pascal, Source Code Libary, and Speech Toolkit Bundle (limited time offer)	*$199.00*
TML Pascal (Macintosh to GS cross compiler)	*$495.00*

Macintosh Products:

TML Pascal	*$99.95*
TML Modula-2	*$99.95*
TML Source Code Library	*$79.95*
TML Database Toolkit	*$89.95*
MacExpress	*$195.00*
MiniEdit	*$19.95*

To order call
1-904-636-8592
MC Visa COD

TML SYSTEMS

4241 Baymeadows Road, Suite 23
Jacksonville, FL 32217
(904) 636-8592

Please enclose $5.00 shipping and handling.
Outside North America, enclose $10.00

CIRCLE 160 ON READER SERVICE CARD

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

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

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

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

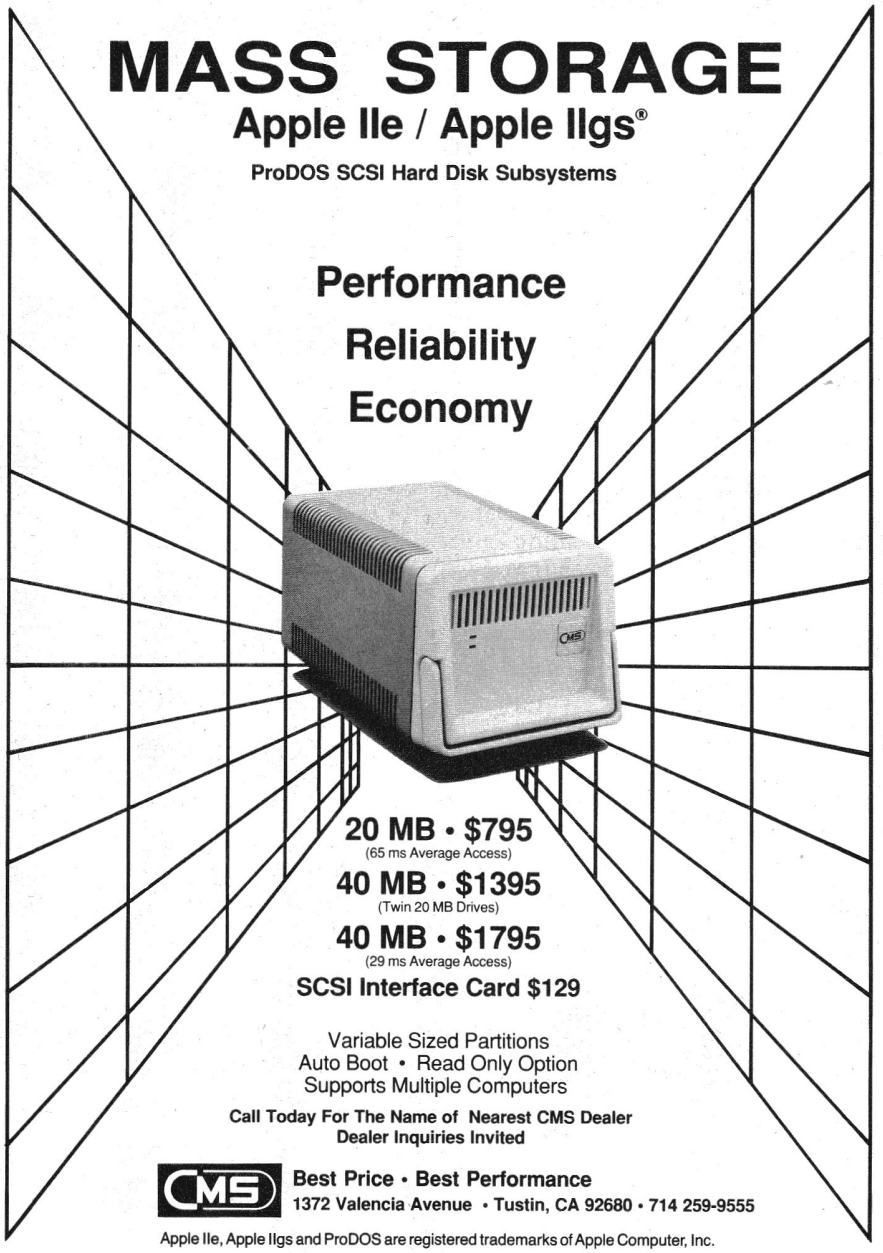
This kind of memory packing isn't good programming practice on a computer such as the IIGS, where every program is supposed to request memory it needs from the memory manager, which determines its location. With the memory manager, multiple IIGS applications and desk accessories can be in memory at the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

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

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

See It Yourself

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



CIRCLE 149 ON READER SERVICE CARD

Mail Order Electronics · Worldwide

Jameco ELECTRONICS ®

• QUALITY COMPUTER PRODUCTS • COMPETITIVE PRICING

• PROMPT DELIVERY • CALL (415) 592-8097

300 Baud Modem $79.95!

128K RAM Card $69.95!

16K RAM Card $39.95!

UNIVERSAL JOYSTICK



for Apple II, II+, *IIe* or *IIc* and IBM PC

UJS-1. . . . . $29.95

COOLING FAN

for Apple II, II+ and *IIe*

APF-1. . . . . $29.95

SWITCHING POWER SUPPLY

for Apple II, II+ and *IIe*

KHP4007. . . . $34.95

PARALLEL PRINTER INTERFACE

for Apple *IIc*

MW-100. . . . . $49.95

NUMERIC AUXILIARY KEYPAD

for Apple *IIe*-VisiCalc Users

JE614. . . . . $49.95

80-COLUMN CARD

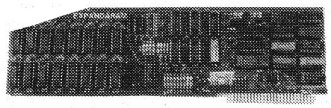
for Apple II, II+ and *IIe*

Smarterm II..$139.95

1 MBYTE RAM CARD

for Apple II, II+ and *IIe*

BIGBOARD-256K $189.95
BIGBOARD-512K $219.95
BIGBOARD-1M $289.95



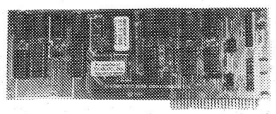
Jameco ELECTRONICS **SALE!**

128K RAM Card* for Apple II, II+ and *IIe*

• Can be utilized with most software as a 128K RAM card • Four key software programs included: utilities, diagnostics, demos, and RAM disk emulators for DOS 3.3, CP/M and Apple PASCAL

Note: Incompatible with software designed to access an extended 80-column card

JE868 (Expand-A-RAM). . . . . ~~$99.95~~ $69.95



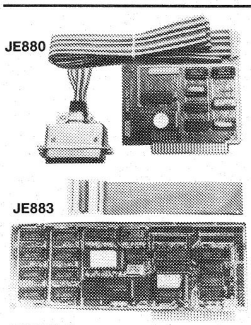
Jameco ELECTRONICS

Applesurance Diagnostic Disk Controller Card for Apple II, II+ and *IIe*

• Serves as a diagnostic tool and a dual disk drive controller • Verifies and checks the RAM, ROM, CPU and disk drives every time you turn on your Apple II, II+ or *IIe* • Diagnostic routines may be cancelled at the touch of a key • Manual included **SALE!**

Note: Incompatible with Enhanced Apple *IIe*

JE877. . . . . ~~$59.95~~ $49.95



Jameco ELECTRONICS **SALE!**

Parallel Printer Card and Parallel/Serial Buffer for Apple II, II+ and *IIe*

JE880 - • Intelligent interface to most of today's dot matrix graphics printers • Centronics standard • Advanced text printing features • Cable & manual incl.

JE883 - 64K of serial/parallel buffered memory • Attaches to JE880 • Parallel card needed for operation • Parallel cable and manual included

JE880 Parallel Printer Card. . . . . **~~$59.95~~ $49.95**
JE883 64K Buffer for JE880. . . . . **~~$69.95~~ $59.95**
JE8803 JE880 and JE883. . . . . **~~$109.95~~ $99.95**

5¼" DISK DRIVE

for Apple II, II+ and *IIe*



• Direct drive • 143K formatted • 35 tracks • Super quiet • Works with Apple Controllers or other compatibles (JE875) below • Complete with connector – just plug into your controller • Size: 5¾"W x 1⅝"H x 8"D • Weight: 4 lbs.

ADD-12. . . . . $99.95

JE875 (Controller Card) **$49.95**

Adapts standard Apple drives for use with *IIc*

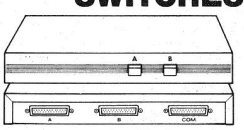
AAC. $14.95

5¼" DISK DRIVE for Apple *IIc*

• Same specs as ADD-12 (above) except no controller necessary.

ADD-IIc. . . . $109.95

DATA SPEC **DATA SWITCHES**



SERIAL 2-WAY
AB-8 (8 pin Mini Din) **$49.95**

SERIAL 2-WAY
AB-25. . . . . $49.95

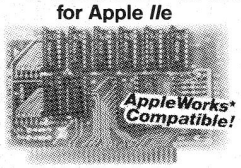
PARALLEL 2-WAY
AB-36. . . . . $66.95

PARALLEL 3-WAY
ABC-36. . . . . $94.95

Jameco ELECTRONICS

EXTENDED 80-COLUMN CARD

for Apple *IIe*



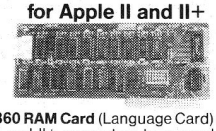
The **JE864** is an extended 80-column/64K RAM Card. This effectively doubles the amount of data that your Apple *IIe* can display as well as its memory capacity • Ideal for word processing • Ultra High Resolution Graphics capability • Complete with instructions

JE864 . . . *SALE!* . . .$59.95

Jameco ELECTRONICS

16K RAM CARD

for Apple II and II+

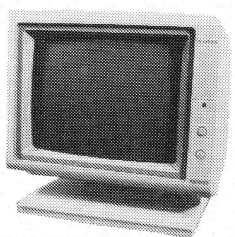


The **JE860 RAM Card** (Language Card) allows the Apple II and II+ computers to expand from 48K to 64K. Complete with instructions.

JE860. . . . . $39.95

C·A·S·P·E·R

12" Monochrome Green Monitor for Apple II, II+, *IIe* and *IIc*



FEATURES:

- Composite video output
- Band width: 20MHz
- Input impedance: 75 Ohm
- Resolution: 900 lines @ ctr.
- Power consumption: 30W
- Complete with tilt/swivel monitor stand, cable and manual

AMON. $99.95

ZOOM

300 BAUD MODEM

for Apple II, II+ and *IIe*



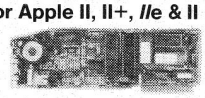
• Auto-dial/Auto-answer • Hayes compatible • Includes call progress monitor, speaker, ZOOM Communications software and manual • Made in U.S.A.

ZM300 ~~89.95~~ $79.95

PROMETHEUS

1200/300 BAUD MODEM

for Apple II, II+, *IIe* & II GS



• **NEW, single card version** • Built-in software in ROM • Comes with ProCom-A disk-based communications software • Hayes compatible • Compatible with ProDOS • Auto-dial/Auto-answer • Auto redial on busy • Built-in speaker and volume control • 2 phase jacks with exclusion switching • 2-year warranty

PM1200A-2 $199.95

$20.00 Minimum Order - U.S. Funds Only
CA Residents Add 6%, 6½% or 7% Sales Tax
Shipping - Add 5% plus $1.50 Insurance
Send S.A.S.E. for Sales Flyer!

Send $1.00 Postage for your *FREE 1987 Jameco Catalog*
Prices Subject to Change

MasterCard

Mail Order Electronics · Worldwide

Jameco ELECTRONICS ®

VISA®

1355 SHOREWAY ROAD • BELMONT, CALIFORNIA 94002
Phone Orders Welcome (415) 592-8097 • Telex #176043

6/87

*When using CP/M the JE868 will only function with Version 2.2 or earlier, PASCAL Version 1.1 or earlier

APPLE, APPLE II, II+, *IIe*, *IIc*, II GS and Macintosh are registered trademarks of APPLE Computers
All "JE" Products are manufactured by JAMECO Electronics

CIRCLE 279 ON READER SERVICE CARD

Programs, Peripherals,

Computers

Central Point Software
Laser 128K Computer 389.00
The Laser 128 includes an Expansion Slot, RGB Video Output, Parallel Printer Port, and a 10 Key Numeric Keypad! Most Apple Compatible Computer Available at Any Price!
Laser 128 2nd Disk Drive *(5¼", ½ height)* 139.00
Laser 128 800K 3.5" Drive w/Controller 279.00
Laser 128 2-Slot Expansion Box 69.00
Laser 128 Cables *(Parallel, Serial, or RGB)* 24.00

Backup Utilities & Boards

Alpha Logic Locksmith 6.0 35.00
Central Point Software Copy II Plus Ver. 6 20.00
Wildcard II 70.00
Computer Applications
Nibbles Away III/NADOL 29.00
Utilico Software
E.D.D. IV 21.00
E.D.D. IV Plus *(II, II+, IIe w/Disk II)* 79.00
E.D.D. IV Plus *(IIe w/DuoDisk or UniDisk 5.25")* 89.00

Entertainment

Accolade Mean 18 *(IIGS)* 25.00
Dam Busters or Fight Night 20.00
Hard Ball or Laws of the West 20.00
SunDog V2.0 23.00
Activision Alter Ego *(Male or Female)* 32.00
Borrowed Time or Space Shuttle 25.00
Rocky Horror Show 15.00
GBA Championship Basketball 26.00
GFL Championship Football 26.00
Hacker or Hacker II 25.00
Mindshadow or Tracer Sanction 25.00
Murder on The Mississippi or Shanghai 24.00
Portal, Hacker II or Shanghai *(for IIGS)* 29.00
Tass Times In Tonetown *(IIGS)* 24.00
Baudville Video Vegas 18.00
Blue Lion Software
Ticket to Paris or Ticket to London 26.00
Broderbund Airheart 23.00
Breakers 29.00
Captain Goodnight & the Islands of Fear 23.00
Championship Lode Runner or Karateka 23.00
Data East
Karate Champ or Kung Fu Master 24.00
DataSoft
Alternate Reality "The City" 23.00
Bruce Lee, The Goonies, or Zorro 14.00
Gunslinger or Conan 19.00
Theatre Europe 21.00
Never Ending Story 19.00
Electronic Arts
Adventure Const. Set or Starfleet I 34.00
Age Of Adventure or One-On-One 11.00
Amnesia or Robot Rascals 31.00
Arctic Fox or Ring Quest 28.00
Bard's Tale or Reach For The Stars 31.00
Bard's Tale II: The Destiny Knight 34.00
Battlefront or Make Your Own Murder Party 28.00
Carriers At War or Europe Ablaze 34.00
ChessMaster 2000 or Ogre 28.00
Lords of Conquest 28.00
Music or Pinball Construction Set 11.00
7 Cities of Gold, Super Boulder Dash, Skyfox 11.00
Archon II or Scrabble 28.00
Software Golden Oldies or Dark Lord 24.00
Marble Madness or PHM Pegasus 24.00
EPYX Championship Wrestling or Destroyer 25.00
Summer Games II or Winter Games 25.00
Temple of Apshai Trilogy or Pistop II 15.00
World Games or The Movie Monster Game 15.00
World's Greatest Baseball Game 15.00
World's Greatest Football Game 15.00
Firebird Licensees, Inc.
Elite 22.00
Colossus Chess IV 25.00
Hayden Software Sargon III 32.00
Infocom Bureaucracy, Hollywood Hyjinx, Ballyhoo, Cutthroats, Enchantor, Fooblitzky, Hitchhiker's Guide, Leather Goddesses Of Phobos, Moon Mist, Planetfall, Seastalker, Trinity, Wishbringer, Witness, or Zork I *(each)* 26.00
A Mind Forever Voyaging, Infidel, Sorceror, Suspect, Zork II or Zork III *(each)* 29.00
Deadline, Starcross, or Spellbreaker *(each)* 32.00
Micro League Sports
Micro League Baseball 25.00
General Manager/Owner Disk 25.00
Microprose
F-15 Strike Eagle or Solo Flight 22.00
Silent Service 22.00
Mindscape
Defender of the Crown *(Apple IIGS)* 32.00
Balance of Power 32.00
Sub Mission 25.00
S.D.I. 32.00
Infiltrator or Bop 'n' Wrestle 19.00
Racter 29.00
The American Challenge Sailing 25.00
One Step Software
Golf's Best Pinehurst 19.00
Golf's Best St. Andrews 19.00
Origin Systems Moebius 41.00
AutoDuel 34.00
Ultima III: Exodus or Ultima IV 41.00
Random House
APBA Major League Baseball 39.00
Old Timer's Stats 14.00
Tournament Bridge 32.00
Sierra On-Line
Championship Boxing 22.00
Kings Quest I, II, or III 32.00
The Black Cauldron 25.00
Simon & Schuster
Star Trek *(Kobayashi Alternative)* 25.00
Star Trek *(The Promethean Prophesy)* 26.00
Sir-Tech Wizardry 32.00
Knight of Diamonds 22.00
Legacy of Llylgamyn 25.00
Spectrum Holobyte Gato 23.00
Strategic Simulations
Battalion Commander or Phantasie III 26.00
Battle Group or Battle Cruiser 38.00
Battle of Antientam 32.00
Gemstone Healer 19.00
Gemstone Warrior, or Wizard's Crown 26.00
Geopolitique 1990 or Rails West 26.00
Imperium Galactum or Broadsides 26.00
Kampfgruppe or War in the South Pacific 38.00
NAM or Professional Tour Golf 26.00
North Atlantic '86 or Warship 38.00
Phantasie II, or Panzer Grenadier 26.00
Ring's of Zilfin, or Colonial Conquest 26.00
Roadwar 2000 or Shard of Spring 26.00
U.S.A.A.F. or Mech Brigade 38.00
War in Russia 51.00
Sublogic Flight Simulator II 35.00
Jet 29.00
Scenery Disks 1-3 *(ea)* 15.00
Windham Classics Alice in Wonderland 26.00
Below The Root or Swiss Family Robinson 26.00
Wizard Of Oz or Treasure Island 26.00

Orders Only 1-800-832-3201

In Connecticut call 378-3662 or 378-8293
Customer Service (203) 378-3662
Monday thru Friday 9 A.M. to 9 P.M.
Saturdays 10 A.M. to 6 P.M. *(Eastern Time)*

Our Policies

- We Accept MASTERCARD and VISA with no added surcharge.
- Your credit card is not charged until we ship.
- If we must ship a partial order the shipment that completes the order is sent freight free.
- If you are ordering by mail, we accept private and company checks. For fast delivery, send cashier's check, certified check, or money order. With MASTERCARD and VISA orders include card number and expiration date. Connecticut residents add 7.5% sales tax.
- UPS Next Day Air & 2nd Day Air Available.
- Sorry, we cannot accept COD orders.

Shipping

- **Software Only:** Continental US: $3.00 minimum charge for Shipping & Insurance. APO/FPO orders shipped 1st class mail, add 3% *($5.00 Min.)* **Hawaii:** Add 10% *($15.00 Min.)* **Alaska:** Add 6% *($10.00 Min.)* **Canada:** Add 12% *($15.00 Min.)* **Foreign Orders:** Add 20% *($35.00 Min.)*
  Hardware Items: Please call for shipping charges.
- All goods are new and are guaranteed by the manufacturer, but we cannot guarantee machine compatibility. Due to software copyright laws, all sales are final. Defective software will be replaced immediately by the same item. Defective hardware will be replaced or repaired at our own discretion. Call customer service at *(203) 378-3662* to obtain a Return Authorization Number before returning goods for replacement. Products purchased in error subject to a 20% restocking fee. All items subject to availability. Prices subject to change without notice.

Utility/Language Software

Apple Computer
Apple II Instant Pascal 115.00
Apple Pascal V1.3 199.00
Beagle Brothers
MacroWorks, Beagle Basic, or Beagle Screens 19.00
Beagle Compiler 42.00
Beagle G.P.L.E. or Super MacroWorks 26.00
Big U, Double Take, or Pro-Byter 18.50
D-Code, Extra K, or Power Print 21.00
DiskQuick or I.O. Silver 16.00
Dos Bos or Silicon Salad 13.00
Fat Cat 18.50
Tip Disk #1 11.00
Pronto Dos or Utility City 15.50
Triple Dump 21.00
Borland Turbo Pascal 3.0 45.00
Turbo Database Tool Box 45.00
Turbo Tutor 22.00
Funk Software
Sideways Prodos & Dos 3.3 45.00
Qualty Software Bag of Tricks II 32.00
Beneath Apple Dos or Beneath Apple ProDos 13.00
Roger Wagner Merlin ProDos 65.00
Merlin Assembler 42.00
Merlin Combo Pack 69.00
The Byte Works ORCA/M 4.1 75.00
ORCA/M GS 49.00
The Software Touch AutoWorks 34.00
FontWorks 34.00
Grafix Pro 20.00
Program Writer 34.00
Zedcor ZBASIC 65.00

Graphics Packages

Activision
Gary Kitchen's Game Maker 32.00
GameMaker "Designer's Library" Sports 18.00
GameMaker "Designer's Library" Sci-Fi 18.00
PaintWorks Plus *(Apple IIGS)* 52.00
Music Studio *(Apple IIGS)* 52.00
Greeting Card Maker 27.00
Bantam Software
Walt Disney Card & Party Shop 26.00
Walt Disney Comic Strip Maker 26.00
Baudville 816/Paint *(IIGS, IIe, & IIc)* 46.00
Award Maker Plus 24.00
Prince *(C.Itoh or Epson)* 52.00
Prince *(ImageWriter II-No Ribbons)* 29.00
Take 1 Deluxe 36.00
Beagle Brothers Alpha Plot 21.00
Apple Mechanic 15.50
Beagle Graphics 31.00
Flex Text or Frame Up 15.50
Font Mechanic, Minipix Disk #1, #2, or #3 *(ea.)* 15.50
Shape Mechanic 21.00
Broderbund Toy Shop 39.00
Toy Shop Refill 18.00
Animate 44.00
Dazzle Draw 38.00
Drawing Table *(Apple IIGS)* 59.00
Print Shop Enhanced or Fantavision 32.00
Print Shop *(Apple IIGS)* 44.00
Fantavision *(Apple IIGS)* 39.00
NewsMaker *(Apple IIGS)* 59.00
Print Shop Companion 25.00
Print Shop Graphics Library I, II, or III or Holiday Ed. 16.00
Print Shop Paper Refill 12.95
DataPak Graphwriter IIGS 99.00
Data Transforms Fontrix 1.5 62.00
Font Paks 1-15 ea. 14.00
Electronic Arts Movie Maker 27.00
PBI Software Visualizer IIGS 65.00
Visualizer IIe 59.00
Penguin Software
New Complete Graphics System 26.00
The Graphics Magician 26.00
Simon & Schuster
Great INTL Paper Airplane Const. Kit 25.00
Springboard Newsroom 35.00
Certificate Maker 30.00
Certificate Maker Library #1 21.00
Newsroom Clip Art Collection Vol. 1 or 3 18.00
Newsroom Clip Art Collection Vol. 2 25.00
Graphics Expander Vol. 1 25.00
Spinnaker T-Shirt Shop 32.00
T-Shirt Shop Graphics 15.00
StyleWare, Inc.
TopDraw *(Apple IIGS)* 65.00
Unison World Printmaster 25.00
Art Gallery I 25.00
Art Gallery II 19.00
Weekly Reader Stickybear Printer 23.00

Communications

Apple Computer
Access *II (IIe, IIc only)* 62.00
Compuserve Compuserve Starter Kit 24.00
PBI Software Commworks *(IIe & IIc)* 65.00
Softronics Softerm 2 149.00
United Software Industries
ASCII: Express Pro: Prodos or Dos 3.3 75.00
ASCII: Express Mousetalk 99.00

Business Software

Activision Writer's Choice Elite *(IIGS)* 52.00
Advanced Logic Systems SpellWorks 31.00
The Handlers *(II+, IIe, IIc)* 59.00
Apple Apple Works V2.0 *(IIe, IIc)* 199.00
Apple Writer *II* 2.0 ProDos *(IIe, IIc)* 119.00
BPI Systems
BPI General Accounting ProDos 139.00
BPI AR/AP/PR or Inv. ProDos (ea.) 139.00
Broderbund On Balance 62.00
Bank Street Writer *Plus* 52.00
Computer Associates SuperCalc 3a 125.00
Dac Software DacEasy Accounting 45.00
Haba/Arrays Home Accountant 47.00
Home Accountant *IIc* 47.00
Intuit Quicken 35.00
Manzanita
BusinessWorks
System Manager *(Required)* 65.00
GL/AR/AP/ or Inventory Control 249.00
Payroll Module 279.00
MECA
Managing Your Money *(Version 2.0)* 99.00
Megahaus MegaWorks 65.00
ReportWorks 65.00
ThinkWorks 65.00
Monogram
Dollars and Sense *(II+, IIe or IIc)* 72.00
Nolo Press Will Writer *(Version 2.0)* 29.00
PBI Software Graphworks 1.3 45.00
Peachtree Back To Basics Accounting System: *GL/AR/AP* 135.00
Pinpoint Publishing
Pinpoint IIGS Starter Kit 82.00
Pinpoint 49.00
PinPoint Spelling Checker 45.00
PinPoint Document Checker 45.00
PinPoint Speller/Document Checker Combo 61.00
PinPoint Toolkit 31.00
Point To Point 79.00
Infomerge 49.00
Key Player 31.00
RunRun 31.00
Pinpoint IIe Upgrade Kit 25.00
PinPoint Ram Enhancement 25.00
PinPoint Modem Enhancement 25.00
ProFILER 2.2 52.00
Quark Catalyst IIe V3.0 59.00
Word Juggler & Lexicheck IIe 59.00
Roger Wagner Publishing
Mouse Write *(ver. 2.6.8) IIe, IIc, IIGS* 89.00
Sensible Software Bookends-ProDos 67.00
Sensible Grammer ProDos *(3.5" & 5.25")* 56.00
Sensible Speller-Dos or ProDos w/3.5 & 5.25" 69.00
Sensible Writer *(3.5" & 5.25")* 56.00
Sierra On-Line Smart Money 52.00
Homeword Plus *(128K) w/Speller* 45.00
Simon & Schuster JK Lasser's Income Tax 45.00
Webster's Spelling Checker *(ProDos)* 38.00
Sir-Tech Software, Inc.
The Clan Practical Accountant 55.00
Software Publishing
All Programs for IIe with 128K or IIc
PFS: Workmates *(File/Report/Plan/Write)* 149.00
PFS: Graph 76.00
PFS: File/Report Bundle 76.00
PFS: Write w/Speller or Plan 76.00
StyleWare, Inc. Multiscribe 2.0 *(128K IIe or IIc)* 46.00
Multicribe GS *(Apple IIGS)* 65.00
Picture Manager 27.00
Desk Accessories 27.00
Multiscribe Spell Checker 27.00
Fontpaks 1-5 *(each)* 15.00
VIP Software VIP Professional *(Apple IIc or Enhanced IIe)* 165.00
Word Perfect Corporation
WordPerfect V1.1 w/Speller *(IIe & IIc)* 85.00
WordPerfect *(Apple IIGS)* 85.00

Educational Software

Barron's Computer SAT Revised Version 32.00
Baudville Guitar Wizard 18.00
Ted Bear Discovers...Rainy Day Games 18.00
Broderbund
Science Tool Kit Master Module 45.00
Science Tool Kit Module I or II 26.00
Type! 29.00
Variable Feasts 34.00
Where in the World is Carmen Sandiego? 26.00
Where in the USA is Carmen Sandiego? 29.00
Davidson & Associates
Alge-Blaster, Classmate or Math Blaster 28.00

Phenomenal Prices...

Grammer Gremlins	28.00
Homeworker	52.00
Speed Reader II	39.00
Spell-It or Word Attack!	28.00
Designware	
European Nations & Locations	29.00
Grammer Examiner	29.00
Remember	49.00
Spellicopter	25.00
States & Traits or Mission Algebra	29.00
The Body Transparent	29.00
DLM	
Create With Garfield! Deluxe Edition	28.00
Decimal Discovery or Fast Track Fractions	32.00
Ted Bear-rels of Fun	28.00
Writing Adventure	42.00
Fisher Price	
First Man on The Moon Math	26.00
Jungle Book Reading	26.00
Peter Rabbit Reading	26.00
Harcourt, Brace, Jovanovich	
Computer SAT	26.00
Intracorp, Inc.	
Interaction with Dr. Joyce Brothers	59.00
The Love Quest	39.00
Intracourse Anal. & Comp. Module	59.00
Learning Company	
Bumble Plot, Games, or Reader Rabbit	25.00
Gertrude's Puzzles or Secrets	29.00
Juggle's Rainbow	19.00
Magic Spells or Word Spinner	22.00
Math Rabbit or Writer Rabbit	25.00
Moptown Hotel, Parade, or Number Stumper	25.00
Robot Odyssey I or Rocky's Boots	32.00
Mindscape Crossword Magic	32.00
Luscher Profile	25.00
Perfect Score SAT	45.00
Peachtree/Eduware Algebra 1, 2, 3, or 4	25.00
Algebra 5 & 6	31.00
Decimals or Fractions	25.00
Compu-Read *(V 3.0)*	18.00
Introduction to Counting	25.00
PSAT or SAT Word Attack Skills	19.00
Spelling Bee w/Reading Primer	25.00
Writing Skills 1, 2, 3, 4 or 5	25.00
Personal Choice Software	
Term Paper Writer	38.00
PinPoint Micro Cookbook *(IIe or IIc)*	28.00
Random House Charlie Brown's ABC's	20.00
Charlie Brown Typing is a Ball	20.00
Garfield Double Dares	20.00
Garfield Eat Your Words	20.00
Snoopy Writer or Fix-It	20.00
Scarborough Systems	
MasterType New & Improved	25.00
Scholastic Wizware	
Agent U.S.A. or Math Shop	25.00
Success with Typing	32.00
Operation: Frog or Logic Builders	25.00
Story Tree or Story Maker	25.00
Simon & Schuster Chem Lab	25.00
Lovejoy's Preparation for SAT	39.00
Typing Tutor III	32.00
Spinnaker Delta Drawing	25.00
Facemaker: Golden Edition	26.00
Fraction Fever or Story Machine	17.00
Kidwriter	25.00
Kindercomp or Kids on Keys	19.00
Megabots	19.00
Snooper Troops Case I or II	21.00
Springboard Early Games or Piece of Cake	21.00
Fraction Factory or Make a Match	18.00
Mask Parade or Easy as ABC	24.00
Rainbow Painter or Puzzle Master	21.00
Terrapin Enhanced Terrapin Logo V3.0	64.00
Weekly Reader *Stickybear Series:* Sticky Bear ABC, Car Builder, Codes & Cyphers, Basic, Basket Bounce, Drawing, Math, Math II, Math Word Problems, Music, Numbers, Opposites, Reading, Reading Comprehension, Shapes, Spellgrabber, Typing, & Townbuilder *(each)*	23.00

Modems

Anchor Automation		**Prometheus**	
Signalman Express 1200	199.00	Pro Modem 1200 *(External)*	239.00
Signalman Lightning 2400	299.00	ProModem 1200G *(Non Expandable)*	169.00
Volksmodem 12	125.00	Pro Modem 2400 *(External)*	309.00
Hayes Hayes Micromodem IIe	139.00	Pro Modem 2400G *(Non Expandable)*	249.00
Hayes Smartmodem 1200A *(Internal)*	299.00	Pro Modem 1200A *(Single Card)*	199.00
Hayes 300 Baud Smartmodem IIc	169.00	Pro Modem 300c	89.00
Hayes 300 Baud Smartmodem	139.00	Communications Buffer *(2K Exp. to 512K)*	105.00
Hayes 1200 Baud Smartmodem	379.00	Alphanumeric Display	69.00
Hayes 2400 Baud Smartmodem	579.00	**U.S. Robotics** U.S. Robotics Courier 1200	229.00
Novation Novation Apple Cat II	199.00	U.S. Robotics Courier 2400	379.00
Novation 212 Apple Cat II	369.00	U.S. Robotics Courier 9600	729.00
Novation 2400 Baud Prof. Modem	469.00		

Accelerators/Ramcards/Z-80/80 Column Cards

Advanced Logic Systems Add-Ram 16	65.00	SprintDisk w/256K	179.00
Add-Ram 80/64	52.00	SprintDisk w/512K	269.00
Apple Computer		**Checkmate Technology**	
Apple IIe Extended 80 Col. Card	89.00	MultiRam CX *(256K)*	139.00
Apple IIe Enhancement Kit	49.00	MultiRam CX *(512K)*	175.00
Applied Engineering		MultiRam CX+ *Piggyback (512K)*	199.00
RamWorks III *(64K to 3 MB)*	Call	MultiRam IIe *(128K)*	129.00
RamWorks Expander 512k or 2M Ver.	Call	MultiRam RGB *(128K)*	169.00
RamFactor *(256K to 1MB)*	Call	MultiRam IIe *(320K)*	159.00
Z-RAM Ultra 1 *(256K or 512K)*	Call	MultiRam RGB *(320K)*	189.00
Z-RAM Ultra 2 or 3 *(256K to 1Meg)*	Call	MultiRam IIe *(576K)*	189.00
GS-RAM *(256K to 1.5Meg)*	Call	MultiRam RGB *(576K)*	219.00
Phasor *(II+, IIe, and IIGS)*	139.00	MultiRam RGB *(832K)*	249.00
TransWarp Accelerator *(II+ and IIe)*	219.00	MultiRam RGB *(1024K)*	269.00
TimeMaster H.O. *(II+ and IIe)*	105.00	Zee-80A	55.00
ViewMaster 80 *(II+)*	119.00	**Micro Sci**	
Z-80 Plus	119.00	Micro Sci 80/64e	52.00
Apricorn Apricorn 64K Extend-It	75.00	**Orange Micro**	
Apricorn 16K Ramcard II+	79.00	Rampak 4GS *(512k Exp. to 4MB w/Utilities)*	189.00
AST Research Ramstack Plus IIGS *(256K)*	105.00		

Multifunction Cards

AST Research Multi I/O Clock/Calendar	99.00	**Street Electronics**	
Multi I/O Clock/Calendar/2 Ser. Ports	129.00	Business Card Parallel *(1-SP/1-PP/CLK/CAL)*	179.00
Quadram Multicore w/0K	149.00	Business Card Serial *(2-SP/CLK/CAL)*	159.00
Multicore w/256K	279.00		

Printer Interface Cards

Apple Apple Super Serial Card	115.00	Buffered Grappler+	119.00
Apricorn Apricord IIc	54.00	Grappler IIc	79.00
Super Serial Card	92.00	Hot Link	49.00
Orange Micro		**TextPrint** Print-It! *(Parallel or Serial)*	132.00
Pro Grappler *(Apple IIe or IIGS)*	75.00	**Thirdware** *Choice of Parallel, Serial (ImageWriter I), or Serial (ImageWriter II)*	
Serial Grappler Plus	75.00	Finger Print Plus II+, IIe, IIc	89.00
Grappler+	75.00		

Clock/Calendar Peripherals

Applied Engineering TimeMaster H.O.	79.00	**Creative Peripherals** IIc System Clock	65.00
BSR Interface	39.00	**SMT** No Slot Clock (II+ & IIe)	69.00
IIc System Clock	65.00	**Street Electronics** Livewire	70.00
Quadram Pro Dos Clock/Calendar Card	62.00	**Thunderware** Thunderclock Plus	109.00

Video Cards

Video 7 Color Enhancer IIe	125.00	Screen Enhancer IIe	89.00
Color Enhancer IIc	89.00	Screen Enhancer IIc	49.00

Accessories

Kensington System Saver	64.00	Kraft Quickstick IIc	49.00
Curtis Diamond	30.00	Kraft Universal 3 Button Joystick *(II+ IIe, IIc)*	32.00
Curtis Emerald	36.00	Koala Pad Plus w/Graphics Exhibitor	79.00
Curtis Ruby	54.00	Echo II Plus	119.00
Curtis Sapphire	47.00	The Cricket IIc	109.00
Apple Mouse IIe	119.00	Rainbow Paper Pak *(300 Sheets)*	14.00
Apple Mouse IIc	89.00	ImageWriter Ribbon-Black	4.50
Pico Universal Joystick II+, IIe, IIc	25.00	ImageWriter Ribbon-Color	5.00
Hayes Mach II Joystick	29.00	ImageWriter II - 4 Color Ribbon	12.00
Hayes Mach III Joystick	35.00	ImageWriter Rainbow Pk. (6 Colors)	27.00

Blank Media

5¼" Blank Diskettes		Bulk *(Sony)* 3½" DS/DD *(box of 10)*	19.00
BASF 5.25" SS/DD *(box of 10)*	8.50	Centech 3½" DS/DD Color Disks *(box of 10)*	23.00
Verbatim 5.25" SS/DD *(box of 10)*	10.00	Sony 3.5" DS/DD *(box of 10)*	23.00
Sony 5.25" SS/DD *(box of 10)*	9.00	Fuji 3.5" DS/DD *(box of 10)*	23.00
Maxell 5.25" SS/DD *(box of 10)*	10.00	Maxell 3.5" DS/DD *(box of 10)*	23.00
Nashua 5.25 SS/DD *(box of 10)*	8.00	Verbatim DS/DD *(box of 10)*	24.00
3M 5.25" SS/DD *(box of 10)*	12.00	3M 3.5" DS/DD *(box of 10)*	25.00
3½" Blank Diskettes		C. Itoh 3.5" DS/DD Color Disks *(box of 10)*	26.00
BASF 3.5" DS/DD *(box of 5)*	12.00		

Printers

Brother M-1109AP *ImageWriter Comp.*	259.00	Microline 192*Plus (200cps Dot Matrix 10")*	359.00
M-1409 *(180cps Dot Matrix NLQ) 10"*	349.00	Microline 193*Plus (200cps Dot Matrix 15")*	529.00
M-1509 *(180cps Dot Matrix NLQ) 15"*	389.00	Microline 292P *(240cps Dot Matrix 10")*	549.00
HR-20 *(20cps)* Daisywheel	349.00	Microline 293P *(240cps Dot Matrix 15")*	689.00
HR-35 *(35cps)* Daisywheel	729.00	**Panasonic** KXP-1080AP *(100 cps) ImageWriter Compatible*	249.00
TwinWriter 5	Call	**Epson** LX-86	Call
FX-86e	Call For	KXP-1080i *(120 cps)* NLQ Mode	219.00
FX-286e	Most	KXP-1091i *(160 cps)* NLQ Mode	269.00
LQ-800/1000	Recent	KXP-1092i *(180 cps)* NLQ Mode	329.00
EX-800/1000	Low! Low!	KXP-1592 *(160 cps)* NLQ Mode	419.00
LQ-2500	Prices	KXP-1595 *(240 cps)* NLQ Mode	499.00
Juki 6100 *(18 cps)* Daisywheel/Par.	429.00	KXP-3131 *(16 cps)* Daisywheel	259.00
6200 *(30 cps)* Daisywheel/Par.	569.00	KXP-3151 *(23 cps)* Daisywheel	409.00
6300 *(40 cps)* Daisywheel/Par.	749.00	**Toshiba**	
Okidata Okimate 20 Color Printer	139.00	P-321 24 Pin *(216cps)* Par./Ser. 10"	499.00
Microline 182P *(120cps Dot Matrix 10")*	249.00	P-341e 24 Pin *(216cps)* Par./Ser. 15"	719.00
		P-351 24 Pin *(288cps)* Par./Ser. 15"	959.00

Disk Drives/Hard Disks

Central Point Software		**Micro Sci**	
Mix and Match 5¼" & 3½" Drives:		A2 Full Height	149.00
Universal Disk Controller	119.00	A5 Slimline IIe	149.00
Universal Disk Controller/800KB Drive Bundle	279.00	A5 Slimline IIc	159.00
First Class Peripherals		Micro Sci C2 Controller	49.00
Sider 10MB Hard Drive	529.00	**Mitac** AD-3C Slimline IIe or IIc	129.00
Sider II 20MB Hard Drive	599.00	**Pico Products**	
B Sider Tape Backup	599.00	Apple Half-Height II+, IIe, IIc	139.00
Hi-Tech Peripherals		**ProAPP**	
Full Height 5¼" Drive for Apple IIe	139.00	ProAPP 20 MB Hard Disk System *(II+, IIe, & IIc)*	Call
Half Height 5¼" Drive for Apple IIe or IIc	145.00	**Video Technology Computers, Inc.**	
Half Height 5¼" Drive Platinum for IIGS	169.00	Laser FD 100c *(Apple IIc)*	139.00
Apple IIc Drive Adaptor	15.00	Laser FD 100 *(Apple II Series)*	139.00

Positively A Plus!

PROGRAMS PLUS

75 Research Drive
Stratford, Conn. 06497

Telephone Hours: Monday-Friday 9-9
Saturday 10-6

Orders Only TOLL-FREE
1-800-832-3201

©Copyright 1987 Programs Plus, Inc. CIRCLE 299 ON READER SERVICE CARD

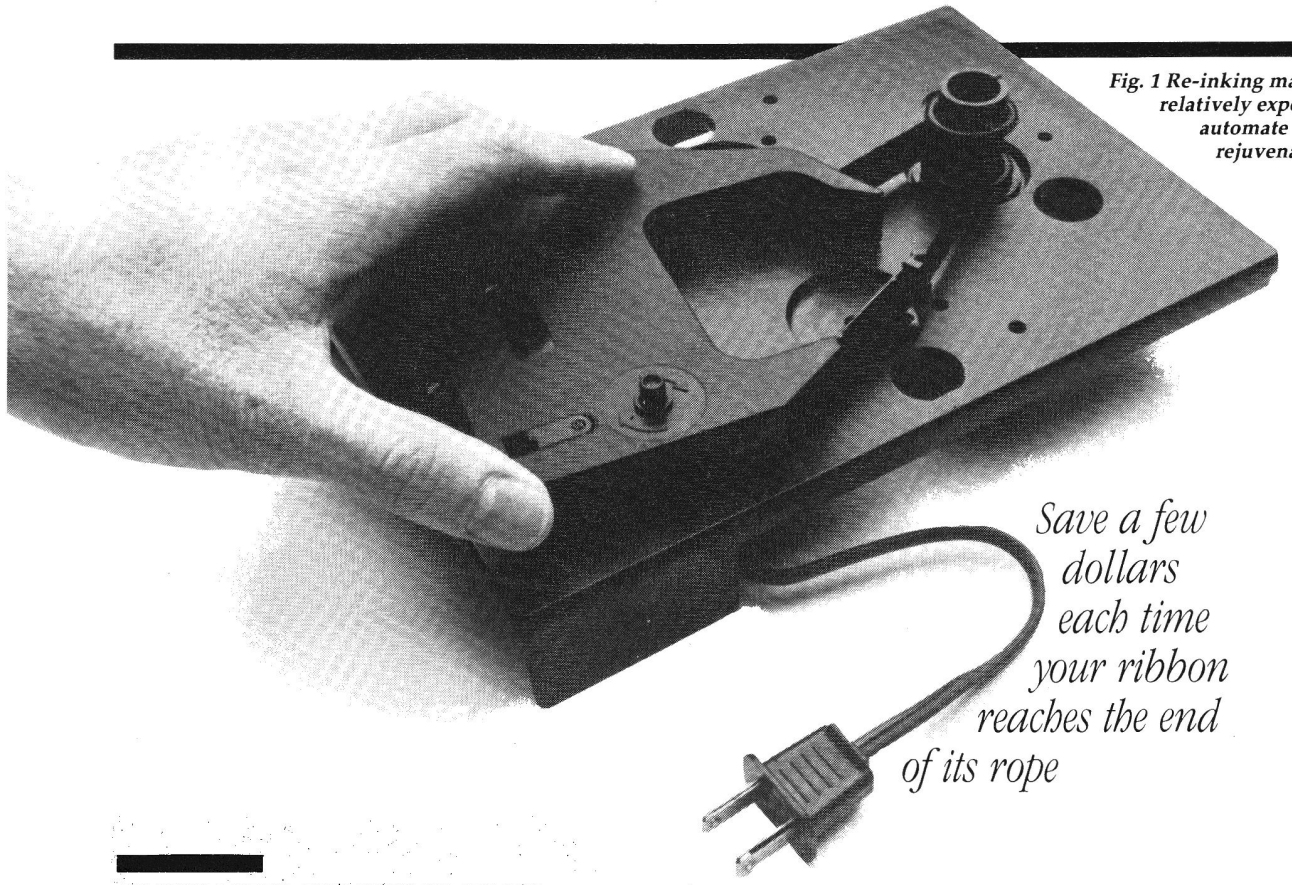


Fig. 1 Re-inking machines are relatively expensive, but automate the task of rejuvenating worn ribbons.

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

ACCESSORIES *BY SCOTT BRAINARD*

NEW LIFE *for* OLD RIBBONS

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

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

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

Do It Yourself

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

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

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

In theory, these ma-

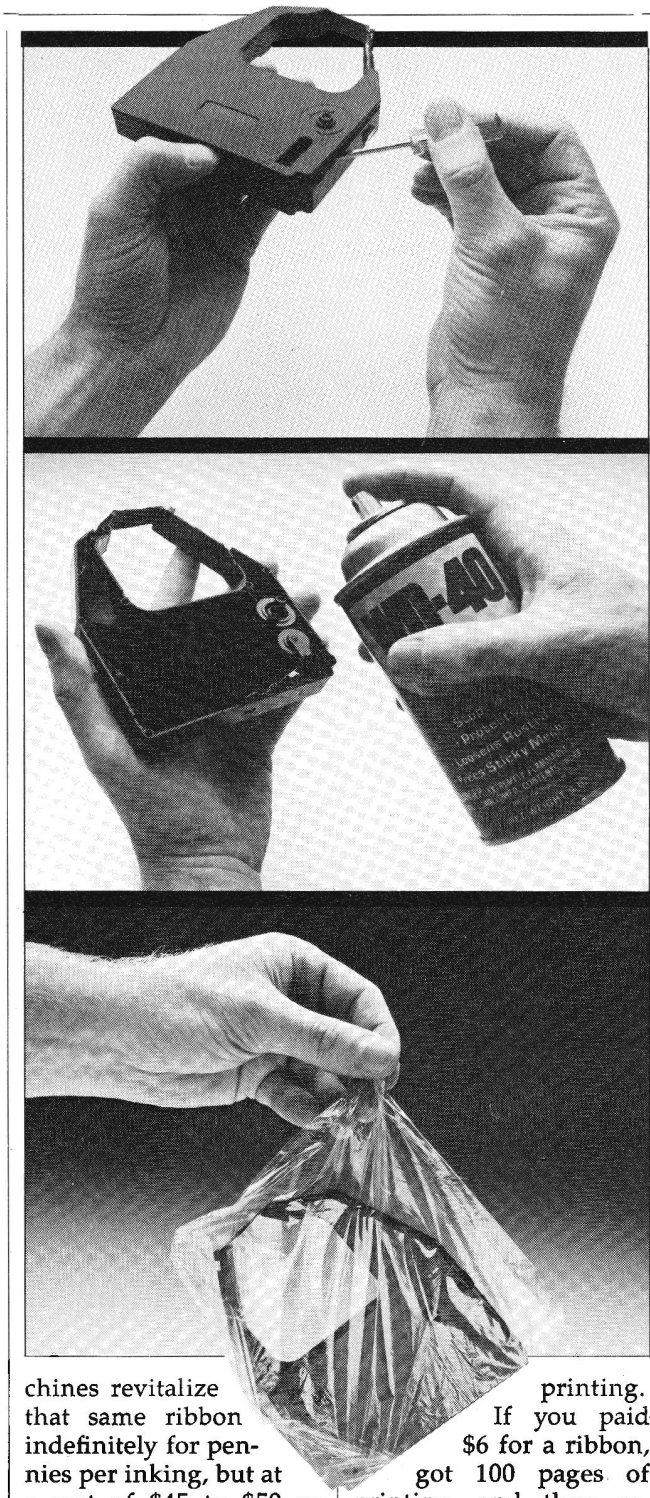


Fig. 2 Solvents can redistribute the ink on a used ribbon. Pry open the cartridge with a screwdriver, spray the ribbon with WD-40 or alcohol, and let it stand in a plastic bag for several days to allow the ink to spread evenly.

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

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

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

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

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

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

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

The Replacement Option

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

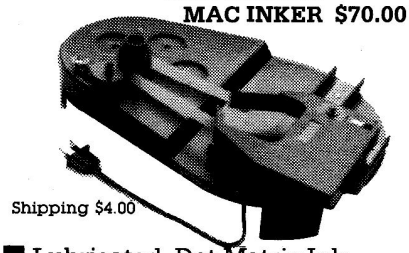


Fig. 3 Using a typewriter ribbon as a replacement reduces the likelihood of fraying, and means a potentially larger selection of colors.

MAC INKER™

Re-ink any Fabric Ribbon **automatically for less than 5 cents.**

MAC INKER IM (Imagewriter I/II) $42.00
Universal Cartridge or Spool MAC INKER (specify) **$68.50**
Multicolored MAC INKER (re-inks 4 color Imagewriter cartridges) $80.00
Heat Transfer MAC INKER $70.00

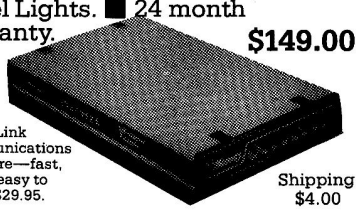


Shipping $4.00

■ Lubricated, Dot Matrix Ink extends print-head life, $3.00/ bottle, available in black, brown, red, green, yellow, blue, purple, orange, gold and silver. ■ > 70,000 sold since 1982 (we are older than the MAC), > 8500 printers supported. ■ Imgwr. Cartridges top quality, life guaranteed, $7.00. Heat Transfer $9.00 (any color).

MERCURY MODEM

Really 100% Hayes* compatible ■ 300/1200 baud. Speaker. Front Panel Lights. ■ 24 month warranty. **$149.00**



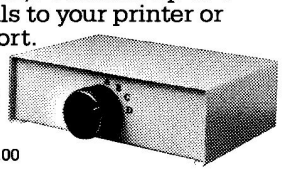
Quick Link Communications Software—fast, quick, easy to learn. $29.95.

Shipping $4.00

*Hayes is a trademark of Hayes Microproducts.

DATA SWITCHES (any type) MACINTOSH MULTIPORT SWITCH (9 pin), (or 8 pin for MacPlus). Connect up to 4 peripherals to your printer or modem port.

$50.00



Shipping $4.00

Order Toll Free.
Call or write for free brochure.
1-800-547-3303
In Oregon 503-626-2291 (24 hour line)

We are and always will be your

Computer Friends®

14250 N.W. Science Park Drive
Portland, Oregon 97229 Telex 4949559
Dealer inquiries welcome.

CIRCLE 195 ON READER SERVICE CARD

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

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

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

An Easier Approach

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

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

Prevention Is Worth . . .

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

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

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

PRODUCT INFORMATION

Ribbon re-inker
Bede Tech
8327 Clinton Road
Cleveland, OH 44144
(800) 772-4536
In OH (216) 631-4214
List Price: $49
CIRCLE 358 ON READER SERVICE CARD

Ribbon re-inker
Icon Review
P.O. Box 2566
Dept. CT046
Monterey, CA 93942
(800) 228-8175
In CA (800) 824-8175
List Price: $44
CIRCLE 359 ON READER SERVICE CARD

Ribbon re-inker
Computer Friends
6415 SW Canyon Court #10
Portland, OR 97221
(800) 547-3303
In OR (503) 297-2321
List Price: $42
CIRCLE 360 ON READER SERVICE CARD

Re-inking service
American Ink Products
527 Howard Street
San Francisco, CA 94105
(415) 982-0161
List Price: $3.25–$3.60 per ribbon
CIRCLE 361 ON READER SERVICE CARD

Secret RAMDISK in ProDOS

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

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

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

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

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

A Problem and an Answer

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

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

Creating the EXEC File

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

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

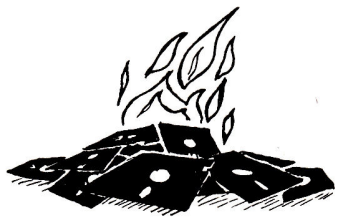
Note that some of the commands in the file in figure 1 contain strings that are enclosed in quotation marks (ASCII character 34). Also note, in the program in figure 2, how those quotation marks are in strings that must be enclosed in other quotation marks.

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

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

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

HOT NEW PROGRAMS!
Public Domain and Shareware



Samples from our Apple II Family

Tutorials
☐ **000** BASIC tutorial $5
Art
☐ **006** Printer Poker: 18 fonts, create your own . . . $5
☐ **023** Make drawings, paint w/colors $5
Astronomy
☐ **030** Planets, forecast weather $5
Word Processing
☐ **037** Freewriter (II+ needs paddles or joystick) . . . $5
Business/Home
☐ **039** General ledger, 15 financial programs, label maker $5
☐ **056** Check balancer w/documentation . . $5
☐ **057** Omnifile database w/doc $5
☐ **402** Sales Portfolio, market value $5
☐ **403** Garden Planner, budget analyzer, etc. $5
☐ **404** Family Finance, accounting $5
☐ **405** Home Mgmnt., financial records . . . $5
CAD
☐ **310/311/312** CAD and graphing pkg $15
Communication
☐ **260/261** Bulletin board system w/doc . . . $10
☐ **262/263** Hayes modem utilities $10
Education
☐ **062** Alphabet, spelling, word games $5
☐ **064** Drills: typing, spelling, states $5
☐ **066** Teaching aids: grader, averager, make and print tests $5
☐ **069** Geography, fractions/decimals $5
☐ **085** Elementary math drills: +,−,×,÷, 23 levels $5
☐ **501** Teacher's Q/A test, word puzzle $5
☐ **502** Flash cards, speed reading, Spanish . $5
Food and Nutrition
☐ **092** Count calories, nutrient values $5
Games
☐ **119** CU★BIT, Cribbage, text advent. . . . $5
☐ **123** Missile Command, Star Trek, Life . . $5
☐ **124** English dice game, space orbit, etc. . $5
Music
☐ **186** Music Maker/text editor w/doc $5
Passion
☐ **190/191** Graphic displays, adults only . . $10
Programming
☐ **370** BASIC algorithms (shareware) $5
Science
☐ **602** Genetics, anatomy, biology $5
☐ **605** Learn about motion, acceleration . . $5
Utilities
☐ **213** Best of Utilities $5
☐ **244** 30 useful disk & programming util. . $5
☐ **247** DOS customizer, printing utilities . . . $5
☐ **248** BASIC editor, adv. program editor . . $5
☐ **1 Yr. Membership: Qtrly bulletins, discounts plus directory** $20

SPECIAL! **Any 6 disks plus Apple directory 1 Yr. Membership**
Only $39.95

Add $4 shipping for disk orders, or $2 if ordering directory only. California orders add sales tax.

Enclosed $_____ by ☐ Check ☐ VISA ☐ MC
Card no. _____ Exp. _____
Name _____
Address _____
City _____ State ____ Zip _____

THE ◆ PUBLIC ◆ DOMAIN EXCHANGE
CALL NOW!
800-331-8125
In California
408-496-0624
2074C Walsh, Ste. 517, Santa Clara, CA 95050


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

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

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

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

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

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

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

Checking the Results

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

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

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

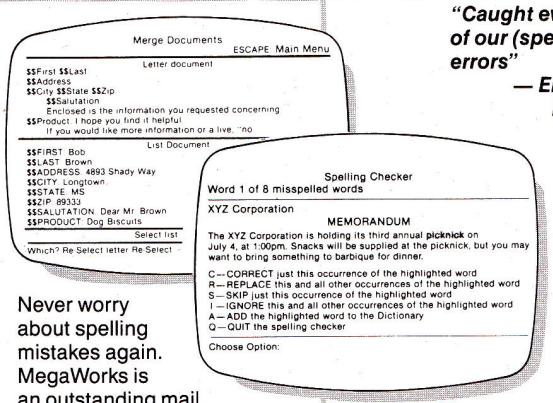
Gary West is the Federal Projects Coordinator for Allendale County, South Carolina, public schools. He also teaches teachers, at the graduate level for the University of South Carolina, how to use computers as instructional tools and as productivity tools for noninstructional tasks.

LIMITED TIME OFFER

Complete AppleWorks at a Price that Works

Over 400,000 Apple Users already know AppleWorks is a powerful program — but you need it to do more! With Megahaus products you can do mail-merging, spelling correction, enhanced report generation, and outline organizing, operating with the same commands and visuals as AppleWorks.

MegaWorks $49.95

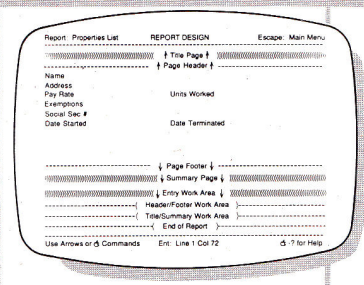


"Caught every one of our (spelling) errors"
— Electronic Learning

Never worry about spelling mistakes again. MegaWorks is an outstanding mail merge and spelling correction program designed exclusively for use with AppleWorks. The merge facility lets you combine database information with word processing documents creating personalized form letters. The 40,000 word dictionary checks your document for misspellings and corrects them as you view them in context.

- ▲ CREATE personalized form letters using lists from your AppleWorks word processor and database files.
- ▲ PRESERVE the original format of the document after merging.
- ▲ CHANGE merged documents with AppleWorks by saving them on disk.
- ▲ ACCESS all AppleWorks printing options.
- ▲ CHECK for misspelled words & add up to 10,000 new words.

ReportWorks $49.95



"ReportWorks is the most important AppleWorks add-on available." ***— A+***

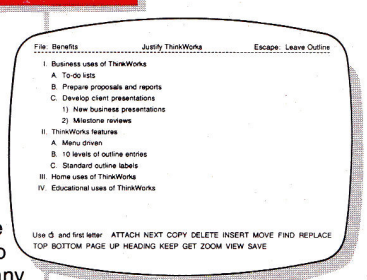
Making decisions is easy with the right information. ReportWorks adds powerful new report generation capabilities to AppleWorks, creating reports, tables, lists and full-page forms from existing AppleWorks database and spreadsheet files. It performs all calculations, such as adding taxes, adjusting discounts, looking up prices and totaling invoices. And, it provides the ability to repeatedly sort, search and select the information to be included in the report.

- ▲ POWERFUL free-form design features for creating reports and forms.
- ▲ INTEGRATION of data from several different files in one report.
- ▲ SORTING of reports (up to 3 levels) after they're created.
- ▲ AUTOMATIC pagination, dating, and running totals.
- ▲ MORE math functions than AppleWorks alone.
- ▲ ADDITION of headers, footers, title & summary pages, etc.

System Requirements: Apple IIe (enhanced), IIc (128K min), IIgs; Two disk drives recommended for ReportWorks and ThinkWorks; Optional: most hard disks, RAM cards, UniDisk 3.5

ThinkWorks $49.95

"A well-made outline processor. . ." ***— A+***



Good planning means success, so ThinkWorks is a must for those reaching for the top. This easy-to-use outlining tool enables you to efficiently organize nearly any type of information — for business, home or school. Outlines can be expanded, rearranged, and merged with familiar AppleWorks commands. Use it by itself or as a powerful add-on tool.

- ▲ ZOOM to view outlines at any level of detail.
- ▲ CREATE outlines with up to 10 levels of detail.
- ▲ AUTOMATICALLY wrap words within paragraphs.
- ▲ MERGE all or part of one outline into another.
- ▲ EXPORT into AppleWorks to create documents.

megahaus
(619) 450-1230

30 Day Money-Back Guarantee!

Order Toll Free • 7 Days a Week

1-800-345-8112

Visa and Master Card only

Order Now. Rush me THE WORKS because I know that within 30 days if I'm not satisfied, I can return them for a complete refund.

MegaWorks . . . . . $49.95 ea. _____
ReportWorks . . . . . $49.95 ea. _____
ThinkWorks . . . . . $49.95 ea. _____
Shipping & Handling $4.00
Buy all three: Shipping & Handling FREE
(CA Res. Add 6%)
Payment Enclosed

☐ Check ☐ Visa ☐ M/C

Card #: _____ Exp: _____
Signature: _____
Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Daytime Phone #: ( ) _____

Send Order To:
6215 Ferris Square
San Diego, CA 92121
Dept. A-49

megahaus
WE MAKE COMPUTERS WORK HARDER easier
(619) 450-1230

CIRCLE 259 ON READER SERVICE CARD

TWO WAYS TO ENHANCE THE POWER OF YOUR

AppleWorks

FontWorks™ **$49.95**
by Mark Simonsen

Versatile printing for your AppleWorks

Wouldn't it be nice if you had both flexibility and style in your printouts? FontWorks is the solution that will make your AppleWorks printouts look better than ever before! FontWorks reads your AppleWorks files directly and prints them in your choice of 15 good looking, attention-getting typestyles. You can even print sideways and customize typefaces.

No complicated commands to learn. Same easy-to-use menu style. Works with any Apple IIe, IIc or II GS. Compatible with most dot-matrix printers including ImageWriter, Epson and Okidata.

FontWorks Font Disk **$29.95**
This package has 25 new fonts including Chicago, Geneva, London, Monaco, New York and Venice.

AutoWorks™ **$49.95**
by Alan Bird

- Automates AppleWorks
- Saves Time
- Increases Productivity

AutoWorks automates AppleWorks by adding time-saving features such as Mail Merge, File Organizing, Macros, new AppleWorks Commands and Mouse Control.

With Mail Merge, you can automatically print form letters, fill out forms from your data base files and you don't have to exit AppleWorks.

Your mouse can now make menu selections and quickly scroll through and position the cursor in your document, data base file or spreadsheet.

With AutoWork's powerful macros, you can automatically enter hundreds of keys with a single keystroke. The Disk Librarian helps you keep track of all your disk files.

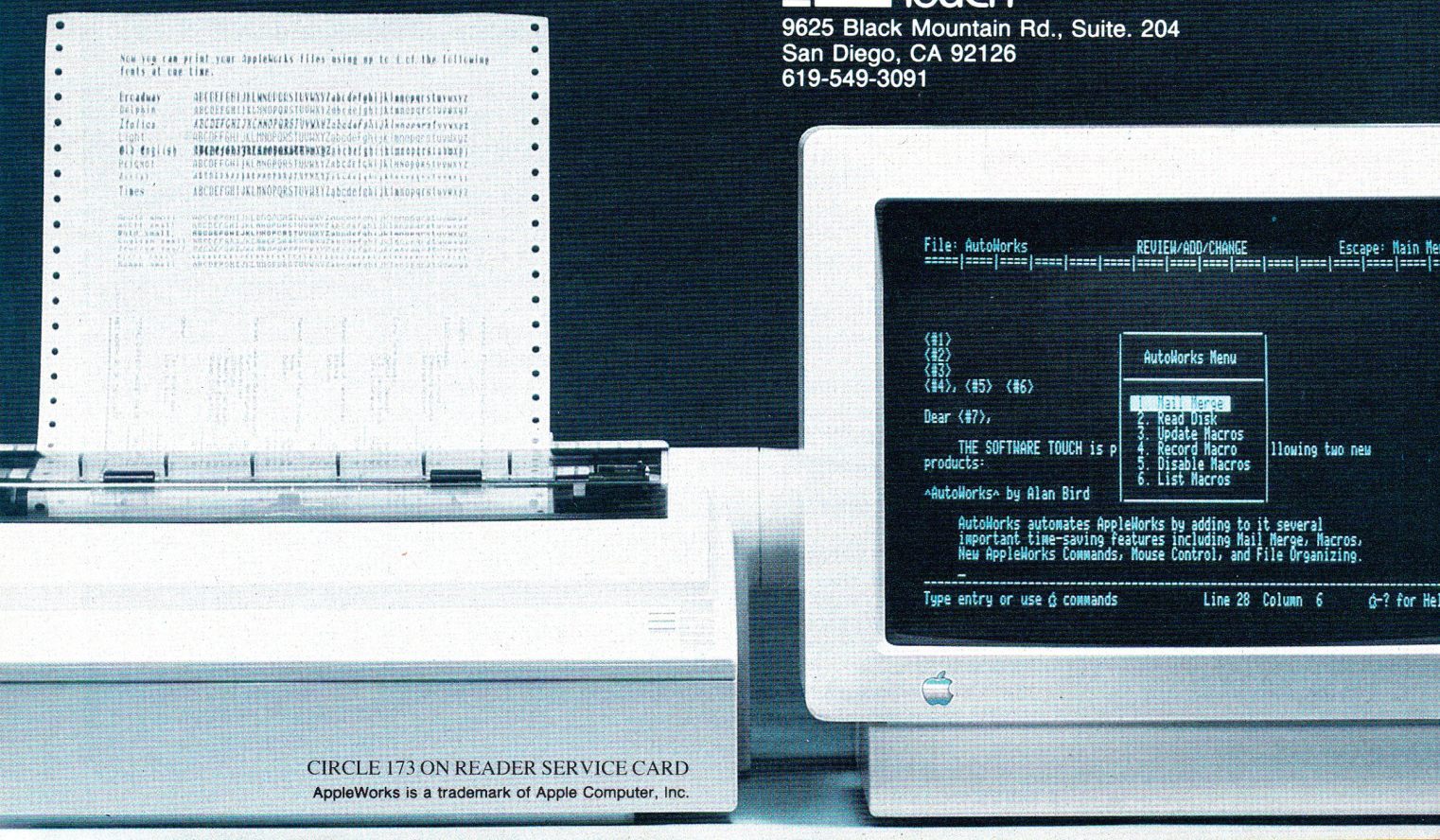
AutoWorks is compatible with AppleWorks versions 1.1, 1.2, 1.3 and 2.0.

Add $3. shipping and handling.
California residents add 6% sales tax.
Outside U.S. and Canada add $5.
Dealer inquiries welcome.

FOR ORDERS ONLY:
800-541-0900 (Outside CA)
800-334-3030 (Inside CA)

VISA MasterCard

Software Touch
9625 Black Mountain Rd., Suite. 204
San Diego, CA 92126
619-549-3091



CIRCLE 173 ON READER SERVICE CARD

AppleWorks is a trademark of Apple Computer, Inc.

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

A+ APPLEWORKS REPORT

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

USER REPORT *BY JIM SOYER*

APPLEWORKS, THE JOB FINDER

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

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

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

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

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

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

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

Data for a Database

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BY CHRISTOPHER VAN BUREN

FINDING BLANK CELLS

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

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

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

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

Now enter this formula into cell B1:

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

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

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

Type entry or use A commands _
```

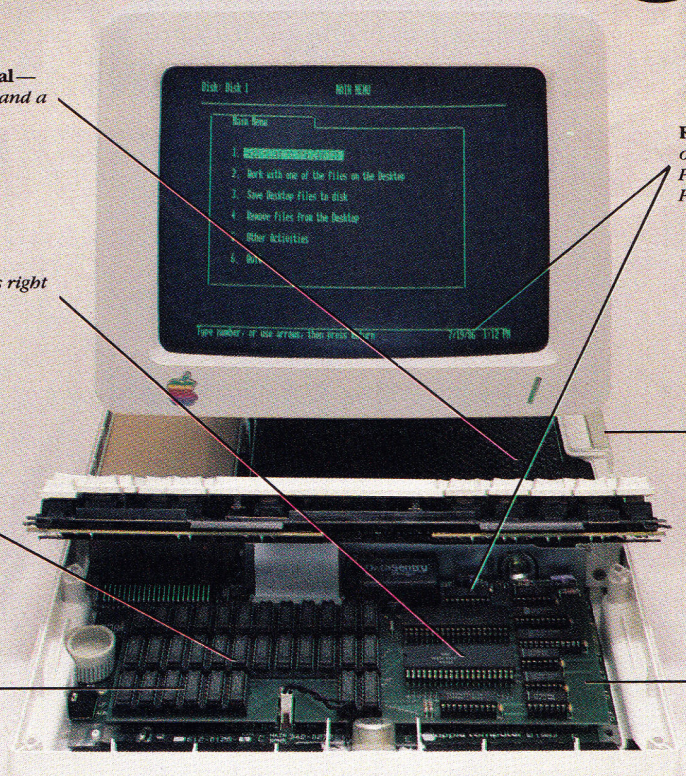
Z-RAM® gave the IIc guts. Now comes the glory.

No jumper wires, clips or drive removal—*so installation takes only a few minutes and a screwdriver.*

Optional 65C816 16-bit processor *plugs right in with no other component changes.*

Up to 1 MEG memory *(you choose how much) lets you store, load and run programs up to 30 times faster.*

Printer buffer *lets you continue working while printing AppleWorks files.*



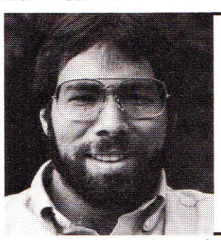
Real-time clock *displays time and date on AppleWorks™ screens and files, and is PRO-DOS compatible for use with other PRO-DOS software.*

Pinpoint's AppleWorks accessories *with RAM enhancement software—together a $118 value—only $79 if ordered with Z-RAM Ultra.*

Run CP/M® programs *with Z-RAM Ultra's built-in Z-80B microprocessor.*

Introducing Z-RAM Ultra.

Your Apple IIc is about to become a computer you never dreamed it could be. Because the most exciting chapter in the Z-RAM history of turbo charged IIc's has just been written. It's called Z-RAM Ultra. And it takes IIc expansion into a whole new realm.



"I recommend Applied Engineering products wholeheartedly." (Of course, Steve's IIc has a Z-RAM installed.)

Steve Wozniak, the creator of Apple Computer

Ultra smart. Ultra speedy.

With any Z-RAM Ultra, your AppleWorks word processor capacity will instantly increase from 2,250 lines to over 15,000 and the maximum number of records from 1,350 to over 25,000. Available desktop memory rockets to over 700K with *all* of AppleWorks loaded into RAM. Z-RAM Ultra even expands the clipboard and autosegments large files so they can be saved on two or more disks. Nothing else comes close to enhancing AppleWorks like this!

Z-RAM Ultra will completely load your programs into RAM, then run them up to 30 times faster. And our included RAM disk is compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M.

That's just the beginning.

Memory and speed are only part of the story. Z-RAM Ultra 3 also has a built-in Z-80B microprocessor that allows it to run CP/M programs (the largest body of software in existence)—including WordStar, dBase II, Turbo PASCAL, Microsoft BASIC and more. A PRO-DOS compatible battery backed-up clock not only displays time and date on the AppleWorks screen, but will time and date stamp any PRO-DOS file. And a printer buffer handles printing of AppleWorks files so you can continue working.

Patented technology and a computer-aided design allow Z-RAM Ultra to run with extremely low power consumption—less than half the power drain of other memory cards. And all the IC chips are in sockets.

Call to order or for more information!

Z-RAM Ultra comes with simple instructions, RAM disk software, Z-80 operating system, CP/M manual, a five-year "hassle-free" warranty, and all the AppleWorks enhancements we're famous for.

If you want to run CP/M software, but don't need more memory, we suggest our Z-80C card, priced at only $159.

CALL 214-241-6060 TO ORDER TODAY 9 a.m. to 11 p.m. seven days, or send check or money order to Applied Engineering. MasterCard, Visa and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.

Prices:

Z-RAM Ultra 3 (With memory, clock and CP/M)
256K—$329.00 512K—$379.00 1 MEG—$459.00

Z-RAM Ultra 2 (With memory and clock)
256K—$269.00 512K—$319.00 1 MEG—$399.00

Z-RAM Ultra 1 (Memory only-expandable to 512K)
256K—$199.00 512K—$249.00

Pinpoint with RAM enhancement software $79.00
(List price $118)

16-bit 65C816 Upgrade $99.00

Applied Engineering

The Apple enhancement experts.

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

CP/M is a registered trademark of Digital Research, Inc.

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

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

ZEPHYR's

Exclusive Software

Good Software! Great Prices!

For YOUR

APPLE II+/IIe/IIc/IIgs IBM PC/XT
Pick the Ones YOU Want:

☐ **FINANCER™**—10 most needed financial calculations in easy to use package. Menu selectable for: amortization schedule, present values, future values, simple & compound interest, installment loan, days between dates, & more. Output to screen or printer. **"FINANCER is best"-G.W.,Montana** **$19.95**

☐ **MUSICMAN™**—Compose music on screen, placing notes, rests, sharps, flats on musical staff. Vary key, pitch, tempo & legato to perfect your music. Save your compositions to disk to replay or revise later. Comes with musical selections. 80 column display. **$29.95**

☐ **ASTROSTELL™**—Learn the constellation using your computer, all 88 included. Four levels star brightness simulate sky on screen. Gives star names, positions of galaxies, nebula, etc., plus lore & observing tips.80 column screen. **"A Perfect Delight"-Prof. M.F.,Minnesota.** **$29.95**

☐ **STATCALC™**—Key statistical functions for student or experienced user. Includes correlation & regression, normal, T, Poisson, binomial, Chi-square, distributions, data handling for sorts, mean, standard deviation, range, median. Save data to disk. Manual explains statistics and program use with examples. **$39.95**

☐ **HOROSCOPICS™**—For your birthdate and time the exact sky conditions are calculated and horoscope chart printed out, with zodiac, sun, moon & all planets. Includes astrological reading, sun & moon sign, ascendant, conjunctions & oppositions. **$24.95**

☐ **BIO-DATA™**—Calculates Biorhythms for any time period you specify and displays on screen or to printer. For your birthdate gives celestial longitude of sun and your astrological sign. Determines Julian Day #, days since birth & day of week for birth. **$19.95**

☐ **VOCABULATOR™**—Improve your vocabulary at selectable skill level, from high school to sequipedalian. Use multiple choice or quick review mode. Add words you want included. **"Recommended: Excellent Program"-Electronic Learning Mag** **$29.95**

☐ **SUPERCAT™**—Professional level cataloging for up to 5,000 books per directory with hard disk or 1000 per floppy (400 for Apple). Multiple subjects & authors, call #, title, publisher, etc., plus fields to customize. Print 3x5 index cards & reports in various formats. Sort and retrieve data by any field. Fast and easy to use. **$49.95**

☐ **CATMAN™**—Catalog your books, records, tapes with ease. Store author, title, and subject for up to 3000 item per floppy(1500 for Apple). Use search options to to get listings on screen or printer. Your choice if full power of Supercat not needed. **$19.95**

☐ **HEADLINER™**—Print banners and signs on any 80 or 132 column printer in letters up to 13" high (smaller sizes, too). Any length headline. Great for parties, kids, offices, stores. Get your message across! **On PC MAG Holiday '85 Wish List.** **$19.95**

FREE Catalog - call or write

ORDER TODAY!

1-800- 533-6666

Orders Only

MEMBER DIRECT MARKETING ASSOCIATION

By phone or mail. Check, M.O., credit card (# & Expir. Date). Add $2 shipping ($4 overseas). PA add 6%. Give COMPUTER TYPE. **JOIN OUR THOUSANDS OF SATISFIED CUSTOMERS** in 50 states and more than 70 countries, including homes, businesses, schools, & governments. Fast shipment!

ZEPHYR SERVICES

1900 Murray Ave. Dept. H
Pittsburgh, PA 15217

For Info or in PA call

☎ **412-422-6600**

ORDER BY PHONE 9-9, MON-SAT
OUR 6th YEAR OF BUSINESS

TIP FOLDER

BY CHRISTOPHER VAN BUREN

SPECIAL PATCH

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

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

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

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

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

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

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

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

```
POKE 13193,44
```

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

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

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

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

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

```
POKE 14468,44
```

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

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

Now save the patch file by typing

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

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

CIRCLE 121 ON READER SERVICE CARD

"Ordinary online services left me flat..."



$10.00+ per hour

"With GEnie™ I discovered vast new horizons."



$5 per hour

There's only so far you can go with most ordinary online information networks. But with GEnie—the General Electric Network for Information Exchange—there's virtually no end to the exciting new interests you can explore. Discover the value of GEnie's vast range of services and explore new territory with guides from our Special Interest Groups.

Join the friendly crew with GEnie's Apple II† ***RoundTable™ Special Interest Group*** for exciting and informative discussions. Benefit from the expertise of experienced individuals. Compare notes on hardware, software, games or any other topic you choose. And, for the simple cost of down-loading, collect thousands of valuable public domain software programs for your personal computer. Over 1000 new programs are added to our libraries every month. And remember, UPLOADS ARE FREE on GEnie!

No extra charge for 1200 Baud.

Make new friends, schedule meetings, gather facts and figures, set up travel plans, get the news, be entertained and even shop online for a fraction of what other information services charge, because GEnie's non-prime rate for 300 or 1200 baud is only $5 an hour. GEnie always comes out ahead of the competition in savings, in some cases by as much as 60%.

You get even more for your money.

In addition to user support groups, you can meet new people with ***GEnie's Live Wire™ CB Simulator.*** Exchange messages with ***electronic mail*** service. Find the best vacation deals and make your reservations with ***American Airlines travel service.*** Shop at home with ***American Express Merchandise Shop.*** Learn the fun way with a subscription to ***Grolier's electronic encyclopedia.*** Play classic and ***multiplayer games.*** Use GEnie's ***Financial Services*** to track stock market quotes, check market indicators and maintain an automatically updated personal portfolio online. All this ***plus*** new services added each and every month!

Map out your own voyage of discovery with GEnie as your guide...enrich your tomorrows by signing on with GEnie today.

Backed in the GE Tradition

GEnie is brought to you by General Electric, whose reputation is built on attention to detail and customer satisfaction. We're continuing that tradition with GEnie.

*Compare & Save**	Services						Pricing			
	Travel & Shopping	*SIGs/User Groups*	*CB & Mail*	*Financial Services*	*News*	*Games*	*Registration Fee*	*Monthly Minimum*	*Non-prime time rates*	
									300 baud	*1200 baud*
The Source	X	X	X	X	X	X	$49.95	$10.00	$8.40	$10.80
CompuServe	X	X	X	X	X	X	$39.95	none	$6.00	$12.50
GEnie†	**X**	**X**	**X**	**X**	**X**	**X**	**$18.00**	**none**	**$5.00**	**$5.00**

**Basic rates and services shown in effect 2/87. †Non-prime time applies Mon.–Fri., 6pm–8am local time, all day Sat., Sun., and nat'l holidays. Subject to service availability. Additional charges apply for 2400 baud and financial services.*

Sign up from your keyboard today.
4 Easy Steps:

1. Have your major credit card or checking account number ready.
2. Set your modem for local echo (half duplex)—300 or 1200 baud.
3. Dial **1-800-638-8369.** When connected, enter HHH
4. At the U# = prompt enter **XJM11885,GEnie** then RETURN.

Need help or more information? No modem yet? We can help. In U.S. or Canada call **1-800-638-9636.**

A+ MAGAZINE NOW ONLINE!

GEnie™

Stay online longer, for less.

GE INFORMATION SERVICES

General Electric Information Services Company, USA

GEnie rates and services subject to change. Uploads are free during non-prime hours at 300 or 1200 baud. Some services offered on Genie may include additional charges.

† Apple and Apple II are registered trademarks of Apple Computer, Inc.

SHORT REPORT

BY CHRISTOPHER VAN BUREN

NEW PROGRAMMERS' SERVICE

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

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

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

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

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

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

Print-it!™

THE *PROVEN* APPLE COMPATIBLE PRINTER INTERFACE

The *ONLY* way to get fast, "snapshot" printouts from ANY screen, at ANY time, with ANY software program then AUTOMATICALLY RESUME OPERATION... at the Touch of a Button

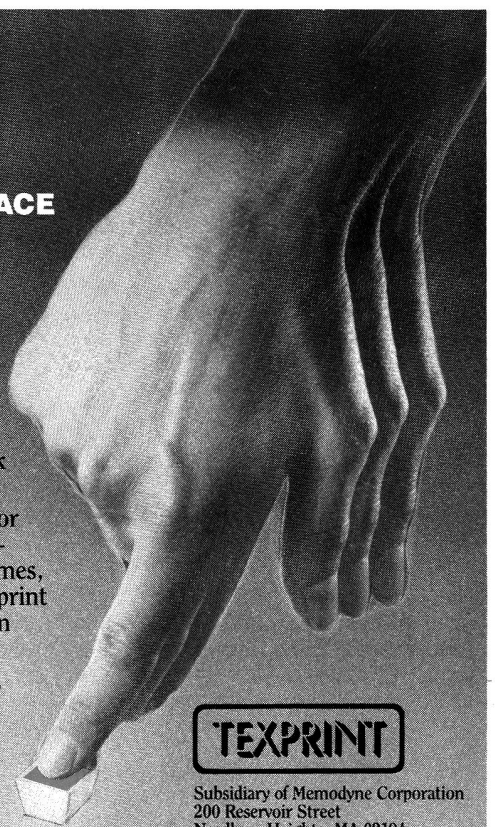
Push the red button. Your program pauses instantly. Touch the return key and whatever is on your screen—text, graphics or both—is printed in color or black & white.

Whether you use your Apple II, II+, IIe or "look-alike" for education, business or recreation, you'll enjoy the ability to pause and take snapshots of your screen displays and then continue from exactly where you paused—in one easy step—games, business data, menus, educational instructions, logo, graphics... **Print-it!** will print your screen display at any time no matter what program you're running and then automatically resume operation exactly where the program left off.

■ Prints all graphics and text displays ■ Supports over 50 printers[1]—b/w, color, serial, parallel ■ Includes 35 built-in print commands ■ Operates as a normal printer interface when its snapshot features are not in use

Print-it! is available from selected mail order companies, through your favorite computer dealer or directly from TEXPRINT[2] and comes complete with serial or parallel cable, push button and instructions. A **Save-it!** disk for transferring screen images to disk for slide shows is available separately.

1 Apple DMP/IMAGEWRITER/IMAGEWRITER II/SCRIBE, C. Itoh, Canon, Epson, NEC, Okidata/Okimate series, Panasonic, Radio Shack, Star Micronics, and many more.
2 Qualified educational and dealer discounts available.
Apple II, II+, and IIe are registered trademarks of Apple Computer, Inc.



TEXPRINT

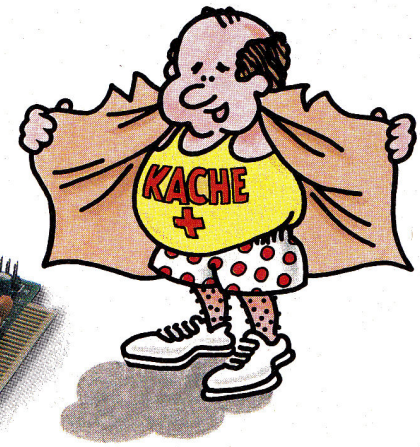
Subsidiary of Memodyne Corporation
200 Reservoir Street
Needham Heights, MA 02194
(617) 449-5808

For Information, call Toll Free
1-800-255-1510

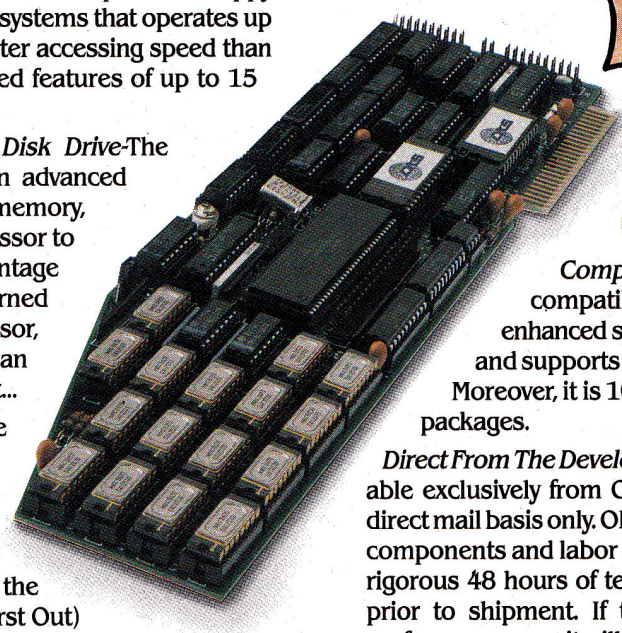
CIRCLE 343 ON READER SERVICE CARD

EXPOSE YOURSELF...
TO THE KACHE PLUS CARD.

Accelerate Your Floppy Drives...To Out Perform Any Hard Disk Drive *PLUS* Gain The Added Features Of Up To 15 Multi-Functions



*The Kache Plus Card...Shocking Speed **PLUS** Expanded Performance*-The Kache Plus Card is a powerful floppy disk adapter board for Apple *II* systems that operates up to six floppy drives. It offers faster accessing speed than hard disk drive ***PLUS*** the added features of up to 15 popular expansion boards.



Faster Accessing Than Hard Disk Drive-The Kache Plus Card combines an advanced form of RAM, known as cache memory, with the power of a microprocessor to achieve a 2.5 to 1 speed advantage over hard disk accessing. Governed by a Hitachi 64180 microprocessor, the Kache Plus Card becomes an intelligent RAM disk card that...

AUTOMATICALLY fills cache memory with up to 512K of your "most frequently accessed data"

AUTOMATICALLY maintains the data content of cache using the "LUFO" method (Least Used First Out)

AUTOMATICALLY anticipates data requests and transfers needed files to your Apple's CPU electronically

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

AUTOMATICALLY time and date stamps files written to disk

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

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

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

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

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

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

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

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

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

For shocking speed ***PLUS*** expanded performance...Expose yourself to Ohio Kache Systems, and its latest product! For more information on the new Kache Plus Card call us toll free at...

1-800-338-0050

or write for our free brochure.

Available soon: The Data Kache Card for IBM and IBM compatible systems.

Ohio Kache Systems Corp.
4166 Little York Road
Dayton, Ohio 45414-2566
513-890-3913

© Ohio Kache Systems is a developer of computer enhancement products.

Ohio Kache System, OKS and Kache Plus Card are registered trademarks of Ohio Kache Systems, Inc.
Apple, Apple *II+, IIe* and *IIe* enhanced are registered trademarks of Apple Computers, Inc.
IBM is a registered trademark of International Business Machines, Inc.
Hitachi is a registered trademark of Hitachi, Inc.

CIRCLE 178 ON READER SERVICE CARD

Ribbon Land

the "BEST" for "LE$$"
ORDER HOTLINE 1-800-221-4892
In PA & Customer Service CALL 215-524-9760

"RIBBON SPECIAL OF THE MONTH"
All Transfer Ribbons — 20% OFF on 4 or more

NYLON Ribbons

Printer Type	Black EA	Black 6+	Color EA	Color 4+	Transfer EA	Transfer 4+
P+ Apple Imagewriter + DMP, C-Itoh Prowriter, Nec 8023	4.50	4.00	5.50	4.50	6.50	6.00
P* Apple Imagewriter II	4.50	4.00	10.00	9.00	18.00	17.00
• Brother HR15/35	5.50	5.00	6.50	6.00	—	—
P• Brother 1009, Commodore MPS 803	5.50	5.00	6.50	6.00	7.00	6.50
Po Canon 1080A/1156, A-40/50/55	6.00	5.50	7.00	6.50	8.00	7.50
o Commodore MPS 801, Comrex 220	5.00	4.50	6.00	5.50	—	—
o Commodore 1525/Gorilla Banana	5.00	4.50	6.00	5.50	—	—
Po Epson AP 80, Seikosha 1000, RS-DMP130	7.00	6.50	8.00	7.50	9.00	8.50
• Epson DX 10/20, Silver Reed EXP 400/550	5.50	5.00	6.50	6.00	—	—
Epson EX 800/1000	Call	Call	—	—	—	—
* Epson JX 80	4.50	4.00	11.00	10.00	—	—
• Epson LQ 800 (HD)	6.00	5.50	7.00	6.50	—	—
Epson LQ 1000 (HD)	7.00	6.50	—	—	—	—
Po Epson LQ 1500	5.50	5.00	6.50	6.00	—	—
Epson LQ 2500	Call	Call	—	—	—	—
P+ Epson LX 80/86/90, Homewriter 10	5.00	4.50	6.00	5.50	7.00	6.50
P+ Epson MX, FX, RX 80/85, Citizen 10/20	4.50	4.00	5.50	5.00	6.50	6.00
Po Epson MX, FX, RX 100/185, Citizen 15/25	6.00	5.50	7.00	6.50	8.00	7.50
Po IBM Proprinter	5.50	5.00	6.50	6.00	7.50	7.00
IBM Proprinter XL	7.50	7.00	—	—	—	—
* IDS Prism	8.00	7.50	11.00	10.00	—	—
Nec P6/P2 (HD)	7.00	6.50	—	—	—	—
Nec P7/P3 (HD)	8.00	7.50	—	—	—	—
Nec P5 (HD)	7.00	6.50	—	—	—	—
P+ Okidata 82/83/92/93, Star SG10, Gemini 10X	2.50	2.25	3.50	3.25	4.50	4.00
Okidata 84	4.00	3.50	—	—	—	—
P• OKI 120/182/192/193	6.00	5.50	7.00	6.50	—	—
OKI 292, 293	Call	Call	—	—	—	—
Po Panasonic 1080,90,91,92	7.00	6.50	8.00	7.50	—	—
Panasonic 1093, RS LP VI+VIII	5.00	4.50	—	—	—	—
• Smith Corona D200/RS DMP 120	6.00	5.50	7.00	6.50	—	—
• Star NX 10	6.00	5.50	7.00	6.50	—	—
o Toshiba 1350/1351/RS DMP 2100	6.00	5.50	7.00	6.50	—	—

• COLORS: Red, Blue, Green, Brown o Plus Yellow & Purple + Plus Orange & Silver
P Print Head Cleaning Kit Available * Multi-Color Ribbon

MULTI-STRIKE Film Ribbons

	EACH	6+
Adler Sattelite, Nakajima	5.00	4.50
Apple LQP, Qume IV	5.00	4.50
Apple Scribe (Thermal)	6.00	5.50
Brother HR-15, Comrex II	5.50	5.00
Coleco Adam	5.00	4.50
Diablo 620	5.00	4.50
Diablo Hi-Type II, Diablo 630	4.00	3.50
Epson DX 10/20, Silver Reed EXP 400/550	6.50	6.00
Juki 6100, IBM Selectric 2/Tech 3	4.00	3.50
Nec 3500 (Flip Cartridge)	11.00	10.00
Nec 3500 (1 Pass)	5.00	4.50
Nec 5500/7700	5.00	4.50
Okimate 10/20 (Thermal) (Color add $1 ea)	5.00	4.50
Qume LetterPro 20	4.00	3.50
Ricoh 1300/1600, RS, DW2	5.00	4.50
* Spirit 80, BMC-BX80, Commodore 802/1526, Legend 808, 880	6.00	5.50

* Also Available in Red, Blue, & Brown. Add $1/Ribbon.

5 1/4" DSDD DISKS
Maxwell (20 Pack)....**59¢ each**

3 1/2" DS DISKS
C-Itoh (20 Pack)....**$1.39 each**

PRINT HEAD CLEANING KITS
Prolongs your Ribbon & Print Head Life.
See Nylon Ribbons for availability.
$8 EACH

PRINT 'n WEAR! Transfer Paper
Computer-design your own iron-ons in **washproof** colors! For use with ANY computer printer using a standard black ribbon. You can color your design with crayons if printer has black ribbon only. 10 Sheets.....**$13.00**

PAYMENT: C.O.D., MC, VISA Orders Accepted.
MINIMUM: Credit Card Order $20.
SCHOOL & BUSINESS PURCHASE ORDERS ACCEPTED.
SALES TAX: PA & NJ add 6%.
S&H: Ribbon Orders over $75 are shipped free. UPS Ground Only, all other orders add $4.
RETURNS: Accepted with proper authorization.
Prices Subject to Change Without Notice.

MAC INKER - Re-Ink Ribbons & SAVE$$$

Imagewriter 1 + 2	$41.95
Epson MX,FX,RX 80/85/100/185/286	$49.95
Universal - for most nylon ribbons	$64.95
INK - All 8 colors above (2 oz.)	$ 4.00
Ink Roller	$ 5.00

COLOR COMPUTER PAPER
BRIGHT (24 lb.) Red, Blue, Green, Gold, Orange and Yellow.
PASTEL (20 lb.) Pink, Blue, Green, Ivory, Lilac and Yellow.
Rainbow Pack includes 100 EACH Color of either Bright or Pastel.
100 Sheets...**$6.00** Rainbow Pack..**$24.00**

COLOR ENVELOPES
BRIGHT (Announcements)
Same Colors as Above.
PASTEL (Announcements)
Same Colors as Above.
Rainbow Assortment includes 50 EACH color Bright or Pastel.
50 Env...**$4.50** Rainbow Assortment..**$19.50**
PASTEL #10 - Same colors as above except Ivory.
50 Envelopes...**$6.00** 500 Envelopes..**$49.50**

COLOR INDEX CARDS
(Pin Feed Cards available in: Cherry, Blue, Yellow, Orange & Green)
Rainbow Deck includes 100 EACH color.
100 Cards...**$2.50** Rainbow Deck..**$10.00**

THERMAL PAPER
250 Sheets...**$8.50** 1000 Sheets..**$29.50**

INK JET PAPER
250 Sheets...**$8.50** 1000 Sheets..**$29.50**

SEND MAIL ORDERS TO: Ribbon Land • P.O. Box 506 • Exton • PA • 19341

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

Wishful Thinking

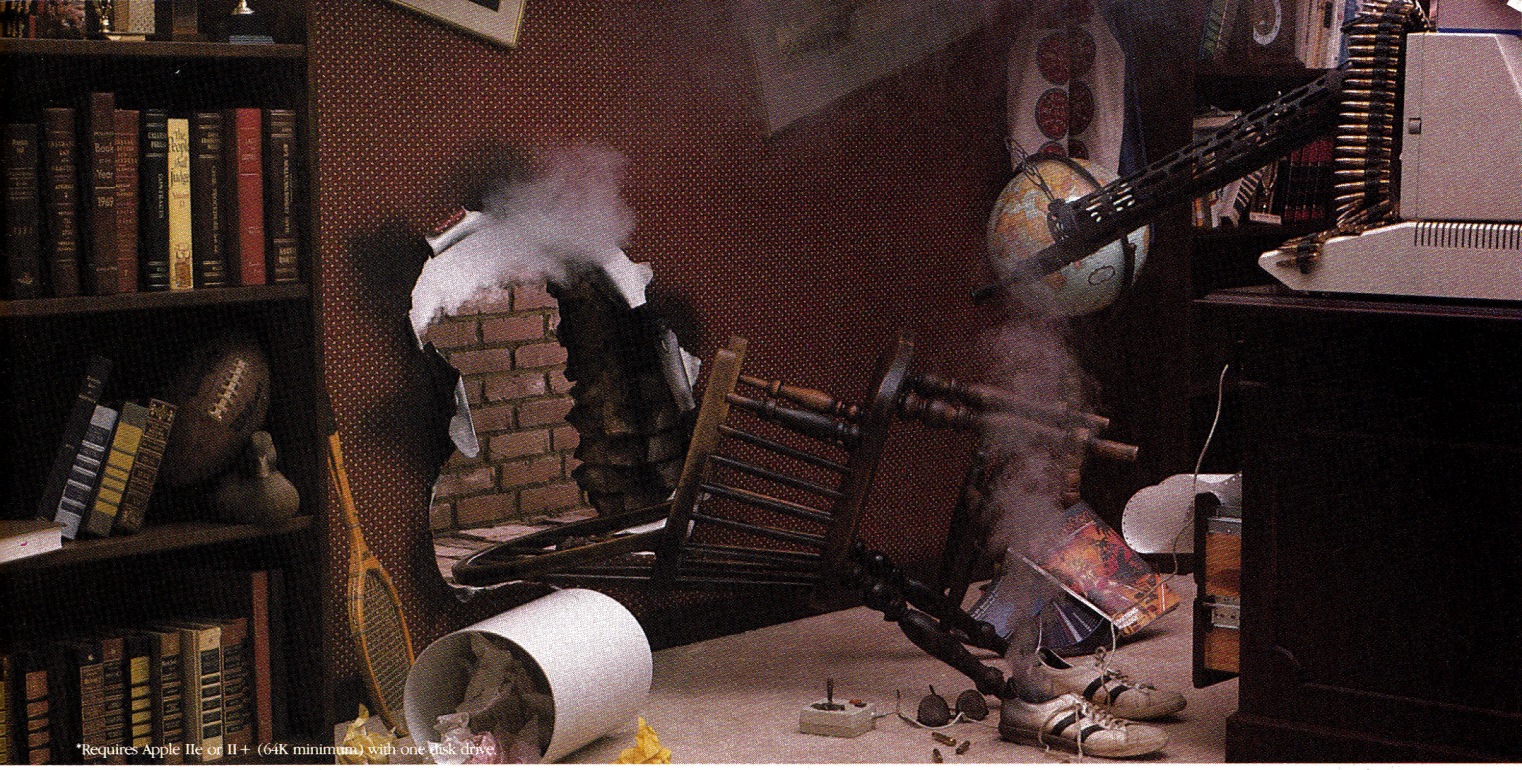
Using this bulletin board to develop patches may not be such a great thing, though. Of course, one of the beauties of AppleWorks is that so much can be added to it, making it a more custom system. AppleWorks add-on developers know another side of the story, however. They know that too many patches in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

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

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

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

CIRCLE 202 ON READER SERVICE CARD



*Requires Apple IIe or II+ (64K minimum) with one disk drive.

Prepare to be blown away by your Apple.™

Phasor produces sound effects, music, and speech so striking, Applied Engineering feels you should be warned.

Have a weak heart? Don't read any further. And by all means, *don't go near* an Apple IIe or II+ equipped with the new Phasor sound synthesizer from Applied Engineering.

But those of you with the right stuff ... prepare yourself. Because the Phasor is like nothing you've heard before. It's a sound effects synthesizer that makes games explode into life. A music synthesizer that will stun you with 4 watts of stereophonic sound. And a speech synthesizer so realistic, it will send shivers up your spine.



"I recommend Applied Engineering products wholeheartedly!"

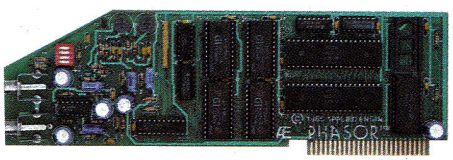
Steve Wozniak, the creator of Apple Computer

What's best, the Phasor works with more off-the-shelf software than any other sound card you can buy. So now all your favorite games — like Skyfox™, Under Fire™, Willy Byte™, Tactical Armor Command™, Maze Craze™, Zaxxon™ and Ultima IV™ — can have shattering sound effects. Educational packages like Music Construction Set™, Guitar Master™ and Music Star™ are also dramatically enhanced.

The Phasor has *four times* the output power and *twice* the accuracy of any other sound card — but of course, you can easily turn down the volume if you need a rest. The Phasor is equipped with 12 simultaneous sound channels, 4 white noise generators, and a voice channel expandable to 2 voices. Programs written for other sound cards, including Mockingboard™, ALF music card™, Synphonix™ and the Super Music Synthesizer™, sound even better with the Phasor. And you can control speech, pitch, volume and more with simple commands.

The Phasor comes with its own easy-to-use software (ProDOS based), including 30 ready-to-run, non-copy protected songs and sound effects along with a Music Editor, Sound Effects Editor and Text to Speech program. And of course, it carries our no-hassle, five-year warranty.

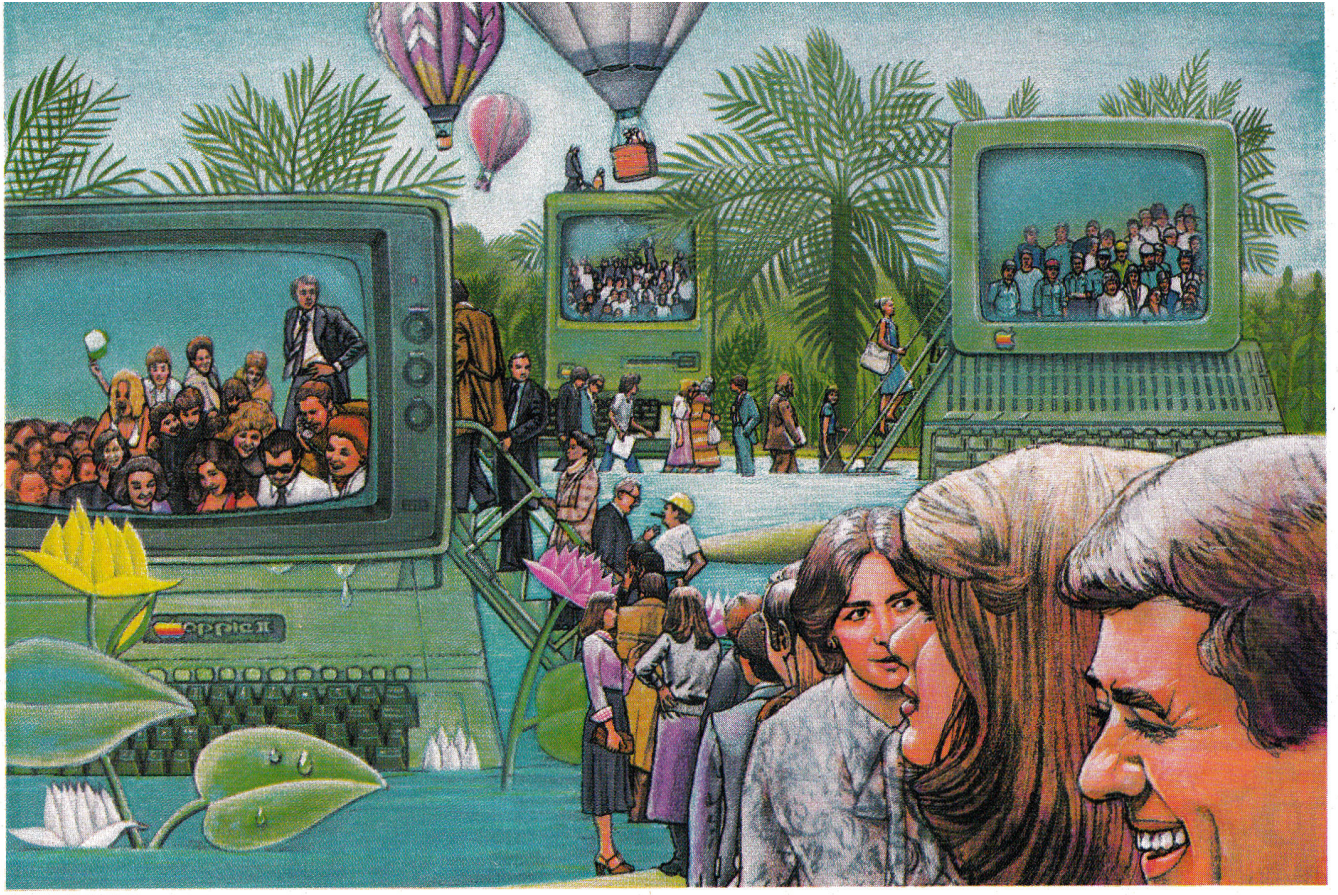
Order a Phasor for your Apple today — and prepare to be blown away! Call (214) 241-6060 to order (9 a.m. to 11 p.m. 7 days). Or send check or money order for $179 to:



Applied Engineering

The Apple enhancement experts.

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



USE THE BRAINS YOUR APPLE WASN'T BORN WITH.

Right at your fingertips in CompuServe's Apple® Forums.

Join the CompuServe **Apple II and III Forum** to swap everything from tall tales to short cuts with other users, and explore thousands of classic programs stockpiled since 1979.

Swap programs and files with fellow Mac owners in our **Macintosh® Users Forum.** Questions? You'll get answers from the experts here!

Visit the **Macintosh Developers Forum.** Get updates to the "Inside Macintosh Software Supplement." Interact with the Mac "team" in Cupertino.

The **Apple User Groups Forum,** supported by Apple Computer, unites officers of Apple user groups—"ambassadors" for hundreds of thousands of Apple-active enthusiasts worldwide.

Easy access to free software.

- *Download First-rate, non-commercial, user-supported software and utility programs.*
- *Take advantage of CompuServe's inexpensive weeknight and weekend rates (when Forums are most active, and standard online charges are just 10¢ a minute).*
- *Go online in most major metropolitan areas with a local phone call.*
- *And receive a* ***$25.00 Introductory Usage Credit*** *with purchase of your CompuServe Subscription Kit.*

Information you simply can't find anywhere else.

Use the Forum *Message Board* to send and receive electronic messages, and pose specific questions to Apple owners.

Join ongoing, real-time discussions in a Forum *Conference*—with Apple luminaries like Bill Atkinson, Doug Clapp, Dan Cochran, Jean-Louis Gassee, Mark Pelczarski, John Sculley and Steve Wozniak.

Search Forum *Data Libraries* for free software, user tips, transcripts of previous CompuServe online conferences and more.

Enjoy other useful services like:

- ***Popular Computer Magazines***—*electronic editions, for your reading pleasure. Including* ***Apples Online,*** *which reprints articles from leading user group newsletters nationwide and other Apple-related publications.*
- ***Other CompuServe Forums***—*supporting Jazz™ and other LOTUS® products. Microsoft®, MicroPro®, Borland International,® Ashton-Tate,® and other software. Also Pascal, Basic, C, Forth, Assembly and other programming languages.*

All you need is your Apple computer and a modem . . . or almost any other personal computer.

To buy your Subscription Kit, see your nearest computer dealer. Suggested retail price is $39.95. To receive our free brochure, or to order direct, call 800-848-8199 (in Ohio, call 614-457-0802). If you're already a CompuServe subscriber, type GO MAUG (Micronetworked Apple Users Group) at any ! prompt to see what you've been missing.

CompuServe®

Information Services, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, Ohio 43220

800-848-8199

In Ohio, Call 614-457-0802
An H&R Block Company

CIRCLE 271 ON READER SERVICE CARD

BY DAVID D. THORNBURG

COMPUTERS AND CREATIVITY REVISITED

Readers experiment with BASIC program to create graphic images.

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

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

Getting Down to BASICs

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

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

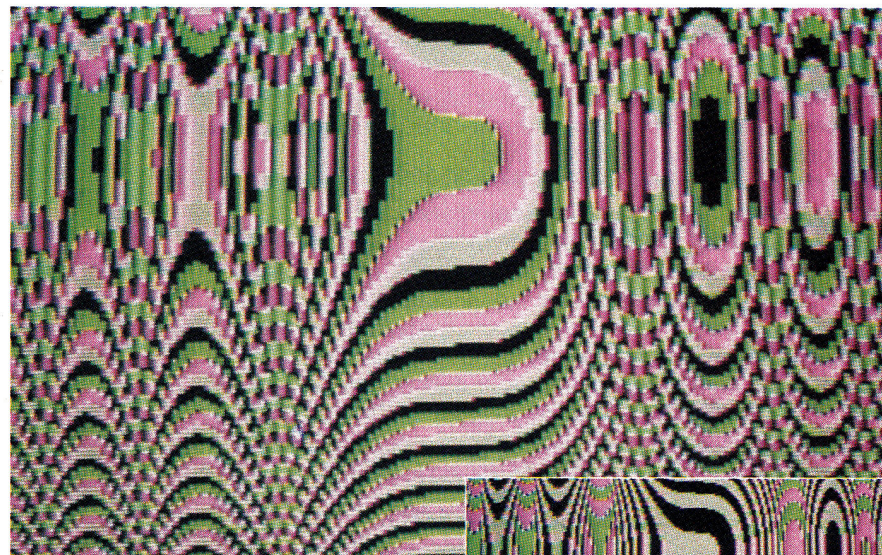


Figure 2: Contour plot for the formula $Z = X^3 + Y^2 + 3*Y$ with A=0, B=0, S=5, and N=4

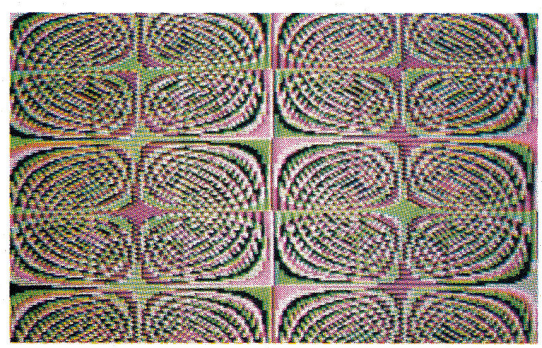


Figure 1: Contour plot for the formula $Z = 4*X*Y + 4*X - 2$ with A=0, B=0, S=9, and N=4

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

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



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

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

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

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

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

A Few of My Favorites

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

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

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

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

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

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

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

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

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

and

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

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

Aliasing and Artifacts

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

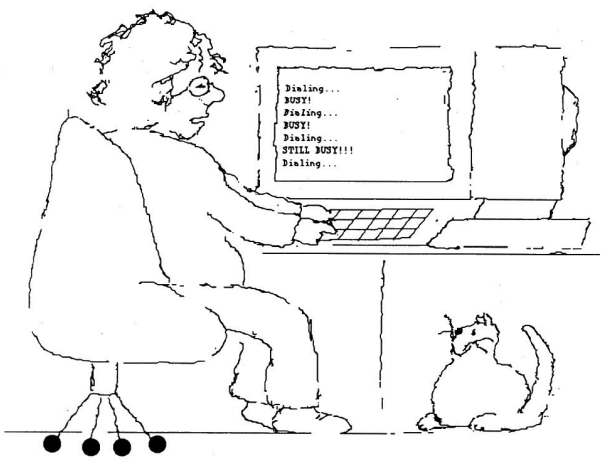
```
160 HCOLOR= 3*(Z - 2*INT(Z/2))
```

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

Speed

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

Wouldn't you rather be running your own BBS instead of trying to get through to someone else's?



• EMS 2.0: ($74.95) a powerful Bulletin Board and Electronic Mail host, customizable prompts, menus and commands; full remote operation and more! DOS 3.3

• EMS 3.0: ($179.95) Customize everything! Powerful message editor, online résumés, individual user options, security levels, auto/manual verification, configurable fast scan. ProDOS.

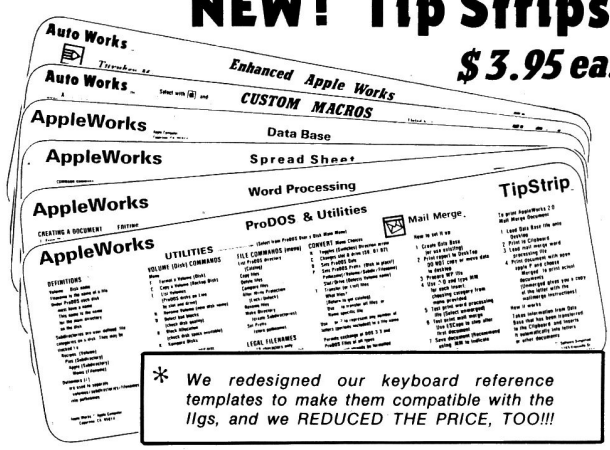
• MMS 1.0: ($279.95) "Matchmaking System"- the BBS with a built-in computer dating service! Try it for yourself by calling (714) 779-7205. ProDOS.

Apple® and ProDOS® are trademarks of Apple Computer, Inc.

SnAPP Systems
toll free (800) 53-SnAPP
in CA (714) 532-6800
Modem (714) 921-2255
1588-1 N. Batavia St. Orange, CA 92667

CIRCLE 122 ON READER SERVICE CARD FOR DEALERS ONLY
CIRCLE 119 ON READER SERVICE CARD FOR END-USERS

NEW! Tip Strips™
$3.95 ea.*



* We redesigned our keyboard reference templates to make them compatible with the IIgs, and we REDUCED THE PRICE, TOO!!!

TIPSTRIPS FOR IIc & IIgs

AppleWorks set (2) (P&H $2. per set)	$7.95
AutoWorks TipStrip (P&H $1. per set)*	$3.95

FLIP TEMPS for IIe ONLY

Flight Simulator II	$4.95
GATO (sub game)	$4.95
AppleWriter IIe	$4.95

(P&H for FlipTemps $1)

* California add 6% Sales Tax

Order from: Software Simplified
1765 Knoxville Street
San Diego, CA 92110-3548 A+6/87

Satisfaction Guaranteed or money back

CIRCLE 265 ON READER SERVICE CARD

EVERY TIME I TRIED T
PRINT A SPREADSHE
IT RAN RIGHT OFF TH

"Then I got new Sideways for the Apple II"

Now, you too can keep wide spreadsheets from meeting an untimely end at the edge of the printer paper. Use new Sideways® for the Apple II.™

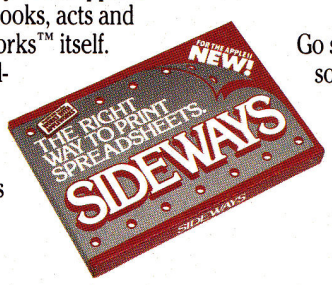
Sideways turns your text on its side as it prints. So no matter how many columns you add to your spreadsheet, they'll all come back out in a single, continuous printout.

For top quality printouts without staples, glue or tape, Sideways has always been the way to go. And our latest version has even wider appeal.

Sideways works wonders with AppleWorks

Broadly speaking, new Sideways is the perfect printing companion to the world's most widely used Apple II spreadsheet program. That's because it looks, acts and feels like a natural extension of AppleWorks™ itself.

Sideways reads AppleWorks spreadsheet files directly. It even displays your spreadsheet right on the screen, and lets you use familiar AppleWorks-style menus and Open-Apple commands to mark off a range and print. It's fast, easy, and looks great.



Give a new twist to all your printouts

With new Sideways, the printing possibilities are nearly endless. Choose from six different type sizes — from tiny to extra-large. Select single or double density printing. Adjust margins, page size, line spacing and character spacing any way you like.

And it works with every spreadsheet and word processor we can think of, whether it runs with ProDOS® or DOS 3.3. Just flip open the manual to find step by step instructions for using Sideways with an extensive number of popular programs.

Order Sideways today!

Go see new Sideways for the Apple II at a software dealer near you. Or to make it even easier on yourself, just stretch out on your sofa and call us toll-free. It's just $69.95 with your check, Visa or MasterCard.

To order call 1-800-822-3865.
(1-617-497-6339 in MA)



© 1986 Funk Software, Inc., 222 Third Street, Cambridge, MA 02142 • 617-497-6339
Sideways is a registered trademark of Funk Software.

CIRCLE 154 ON READER SERVICE CARD

Computer Talk



The Echo IIb speech synthesizer is compatible with the Apple®IIe, II + and the new Apple IIGS. It offers both text-to-speech and natural sounding speech capabilities. Its unique text-to-speech program gives the Apple an unlimited vocabulary. The Echo IIb also features distinctive natural sounding speech in a female voice. This fixed vocabulary of 720 words is supplied on disk and can easily be added to BASIC programs.

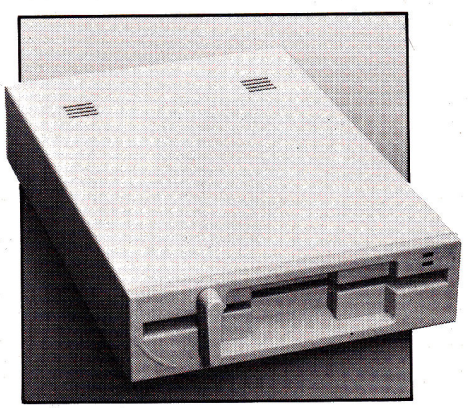
The Echo IIb, like the Echo II, Echo +, and Cricket,™ is compatible with numerous educational and special needs programs from over eighty software manufacturers. Contact Street for a list of companies offering these talking programs.

Street Electronics Corporation
1140 Mark Avenue Carpinteria, California 93013 (805) 684-4593

CIRCLE 188 ON READER SERVICE CARD

5¼" APPLE® II DISK DRIVE

ONLY $77



INTRODUCTORY OFFER

- **Fully Apple® II Series Compatible**
- **164K Formatted Capacity**
- **Brushless Direct Drive Motor**
- **Extreme Quiet Operation**
- **Gate Array IC Design**
- **48 Hrs Factory Burnt-in Tested**
- **Ultra-high Precision Head Positioning and Loading**

Apple® IIc/IIgs Cable installed —$12 extra.
Add $5 shipping per drive.

MEIJI

One Year Warranty

1-800-433-6224
(OUTSIDE CALIFORNIA)
OR
1-800-553-6224
(INSIDE CALIFORNIA)

VISA MasterCard

SEND MONEY ORDER OR CHECK TO:
KINSON PRODUCTS CORP.
260 S. LOS ROBLES, #107, PASADENA, CA91101

Apple is a trademark of Apple Computer

CIRCLE 133 ON READER SERVICE CARD

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

A Disk-overy

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

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

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

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

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

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

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

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

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

Something BASIC

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



THIS MONTH'S FEATURED PRODUCTS

PERFORMANCE PARTNERS
Pinpoint Desktop Accessories and Pinpoint KeyPlayer Macro Keys
$109

AppleWorks™ *Power Tools*

Anything you can do with AppleWorks, you can do faster with KeyPlayer.

That's because KeyPlayer plays back complex, repetitive keystroke sequences at the touch of a key. Everything including AppleWorks' commands, menu selections, whole sentences, whatever. In any combination!

Just select "RECORD A MACRO" and KeyPlayer will remember everything you do. It's that simple.

What's more, KeyPlayer can just as easily be programmed to do more than parrot your keystrokes. You can add new commands, customize AppleWorks functions, or create interactive instructional aids, to name but a few.

Yet KeyPlayer is so easy to learn and use, within minutes you'll be on your way to saving hours every week.

What's more, because KeyPlayer is a desktop accessory it's right at home with Pinpoint's eight other "pop up" programs. So now it's just as easy to automate AppleWorks as it is to schedule an appointment, merge pictures into text, address an envelope, or log on to CompuServe or GEnie. Maybe easier.

Just think of all the time-saving things Pinpoint Desktop Accessories and KeyPlayer could be doing for you. But don't think too long, this special offer won't last forever.*

CIRCLE 239 ON READER SERVICE CARD

Yes! Please rush me the products I've marked.

☐ Visa ☐ MasterCard ☐ American Express ☐ Check ☐ School P.O.

Card No. _____ Expires _____

Signature _____

Name on Card _____

Company _____

Street Address _____

City / State / Zip Code _____

Telephone Number (_____) _____

Send To: PINPOINT DIRECT, 5901 Christie #501, Emeryville, CA 94608

Add $5.00 per order shipping. Express and international orders extra. C.O.D. add $2.50. CA residents add 6.5 percent sales tax. All prices in U.S. dollars. 30 Day Return Guarantee subject to merchandise returned in resellable condition and a 15 percent restocking fee.

TO ORDER CALL 24 HOURS TOLL FREE
800-633-2252 EXT. 654

☐ $109 Pinpoint Desktop Accessories & KeyPlayer macro keys Special Offer. SAVE $29.

- ☐ $89 Pinpoint Desktop Accessories
- ☐ $49 Pinpoint KeyPlayer macro keys
- ☐ $69 Pinpoint Spelling Checker
- ☐ $69 Pinpoint ToolKit
- ☐ $29 RAM Enhancement Kit
- ☐ $29 Apple IIe Upgrade Kit

Pinpoint

* LIMITED TIME OFFER: Offer valid for orders received between May 7, 1987 and July 15, 1987.

REQUIRES: Apple IIc, Enhanced Apple IIe or IIGS with 128K. Unenhanced Apple IIe requires Pinpoint Apple IIe Enhancement Kit and 128K. KeyPlayer, Spelling Checker, and ToolKit require AppleWorks and Pinpoint Desktop Accessories. Pinpoint Desktop Accessories also work with AppleWriter, WordPerfect, BusinessWorks, Point-to-Point, ProFILER and other selected ProDOS applications.

© 1987 Pinpoint Direct. Pinpoint GraphMerge, KeyPlayer and Point-to-Point are trademarks of Pinpoint Publishing. Apple is a registered trademark while Apple IIGS, AppleWorks and ProDOS are trademarks of Apple Computer, Inc.

Computerize Your Mailing Lists. $49.95 Sugg. List



LABEL EXPRESS® BY ROLODEX

Label and List Management Software

Label Express makes it easy to create labels, locate and update mailing lists, address envelopes, print name badges or Rolodex brand Continuous Form Cards. Label Express by Rolodex. It keeps you in touch with people.

Label Express software is available for IBM/PC (LSM-I) and Apple IIe (LSM-A) computers, at $49.95 each. Its powerful features include: ☐ **Creating your own label formats, up to 180 characters on five lines.** ☐ Full-screen editing with popular, word processing commands ☐ Immediate indexing for each new entry ☐ Extensive and time-saving search features ☐ Full combine/merge capability ☐ Customized printing up to 999 copies.

ROLODEX CORPORATION

245 Secaucus Road, Secaucus, N.J. 07094

IBM/PC is a registered trademark of International Business Machines Corporation; Apple IIe is a registered trademark of Apple Computer, Inc.

CIRCLE 182 ON READER SERVICE CARD

A+ TEACHERS' TOOLBOX

The Best in Educational Software

Wondering which of the thousands of educational programs are worth your money and attention? We've created "A+ Teachers' Toolbox" to help educators, parents, and students sort through the vast array of educational software for the Apple II Plus, IIe, IIc, and/or IIGS. Each month A+ will have a group of nationally recognized education experts select some of the best programs in different educational categories. This month, our recommendations come from the 1986 edition of *Only the Best*, an annual directory from Education News Service in Carmichael, California. *Only the Best* draws its listings from reviews by 22 educational organizations across the country. Only the products that receive consistently superior ratings appear in this publication. This month, we feature history and geography.

LINCOLN'S DECISIONS
Grades 7-12

Simulation program in which students assume the role of President Lincoln and try to duplicate his decisions during the Civil War period. Provides students with clues, maps, time lines, and historical information. Includes quiz questions, scoring system, and manual. Approximately 30–45 minutes required to run the program.

List Price: $63. Educational Activities, Inc., P.O. Box 392, Freeport, NY 11520; (800) 645-3739; in NY, AK, HI (516) 223-4666

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

THE PRESIDENT ELECT
Grades 8-14

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

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

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



THE MEDALISTS – BLACK AMERICANS
Grades 5-10

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

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

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

THE MEDALIST – CONTINENTS
Grades 5-10

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

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

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

THE MEDALISTS – STATES
Grades 5-10

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

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

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

REGIONS OF THE UNITED STATES
Grades 5-12

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

YOU PAID FULL PRICE FOR YOUR PRINTER, NOW GET THE FULL VALUE!

IIGS COMPATIBLE! PRINT-QUICK™ Don't Settle For Less

PRINT-QUICK Puts the 5 most needed printer support programs on one disk. Why purchase separate products at great expense when PRINT-QUICK does it ALL and does it BETTER?

QUICK-SETUP: Master your printer with the ability to control ALL print features right at your fingertips.

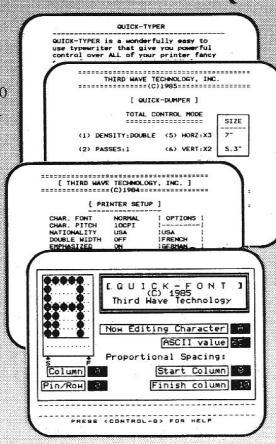
QUICK-TYPER: Turns your printer into a modern electronic typewriter with control over all print features. Text may be sent right to the printer or to a text file.

QUICK-DUMPER: Provides one button Hi-Res screen printing, or Total Control selects your own print style. Includes Hi-Res screen of over 30 handy sign phrases.

QUICK-FONT: Changes the shape and style of your printer's characters as easily as you'd change the printwheel in a typewriter. Four new character sets included on the disk. Use the Special Graphics characters to create custom business forms.

TEXT FILE UTILITIES: Print text files or display them on the screen with all hidden command characters revealed?

DETAILED HELP SCREENS and a QUICK REFERENCE CARD allow immediate use of PRINT-QUICK supporting a fine three-ring bound Owner's Manual.



PRINT-QUICK can be used with word processors (like Appleworks™), data bases, spreadsheets, virtually any program that uses a printer.

PRINT-QUICK runs on the entire Apple II family.

PRINT-QUICK unleashes the full power of the Apple Imagewriter I & II and other printers made by Citizens, C. Itoh, Epson, Okidata, NEC, Star Micronics and their Compatibles.

Available now! FONT DISK I – 15 Exciting new character sets for use with PRINT-QUICK! Two NEW Hi-Res Sign Screens! FREE Program, Super Disk Drive Head Cleaner. Only **$19.95** (plus $1 S&H).

We believe in customer support and guarantee your satisfaction. Ask your local dealer for PRINT-QUICK.

ORDER NOW by calling
1-800-233-WAVE

PRINT-QUICK, only **$49.95** (plus $2 shipping and handling). MC and VISA accepted.

THIRD WAVE TECHNOLOGY INC.™
11934 Lorain Ave • Cleveland OH 44111 • (216)671-8991

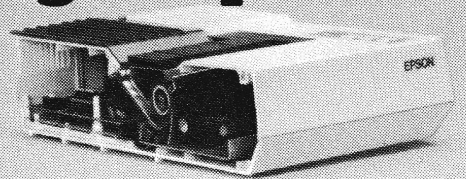
PRINT-QUICK, QUICK-SETUP, QUICK-FONT, QUICK-TYPER, QUICK-DUMPER and THIRD WAVE TECHNOLOGY are trademarks of Third Wave Technology, Inc. Apple and Appleworks are reg. TM of Apple Computer, Inc.

CIRCLE 144 ON READER SERVICE CARD

Attention all FX80, FX100, JX, RX, & MX owners:

You already own half of a great printer

Now Only $79.95



Now for $79.95 you can own the rest. You see, today's new dot matrix printers offer a lot more.

Like an NLQ mode that makes their letters print almost as sharp as a daisy wheel. And mode switching at the touch of a button in over 160 styles. But now, a Dots-Perfect upgrade kit will make your printer work like the new models in minutes— at a fraction of their cost.

And FX, JX and MX models will print the IBM character set, too.

So, call now and use your Visa, MasterCard, or AmerEx. Don't replace your printer, upgrade it!

1-800-368-7737
(Anywhere in the United States or Canada)

Sample of letter with Dots-Perfect

Dots-Perfect™
Dresselhaus

Sample of letter without Dots-Perfect

8560 Vineyard Ave., Ste. 405, Rancho Cucamonga, CA 91730 (714) 945-5600



An upgrade kit for EPSON FX, JX, RX, & MX printers

IBM is a registered trademark of International Business Machines Corp.
Graftrax PLUS is a trademark of Epson America, Inc.
Epson is a registered trademark of Epson America, Inc.

CIRCLE 339 ON READER SERVICE CARD

or small groups of students.

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

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

STATES & TRAITS
Grades 4-14

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

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

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

THE TIME TUNNEL: AMERICAN HISTORY SERIES
Grades 7-12

Three programs in game format in which students identify famous Americans in history from computer-generated clues. The fewer clues needed, the higher the score. Students select from three historical periods: 1760–1860, 1860–1917, and 1917–1970. Each game can be played on two difficulty levels and requires 5–10 minutes. For use by individual students or teams. Home version available.

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

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

AFRICA
Grades 7-14

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

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

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

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

BY RUSS LOCKWOOD

FUTURE SHOCK: A MODEMLESS SOCIETY

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

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

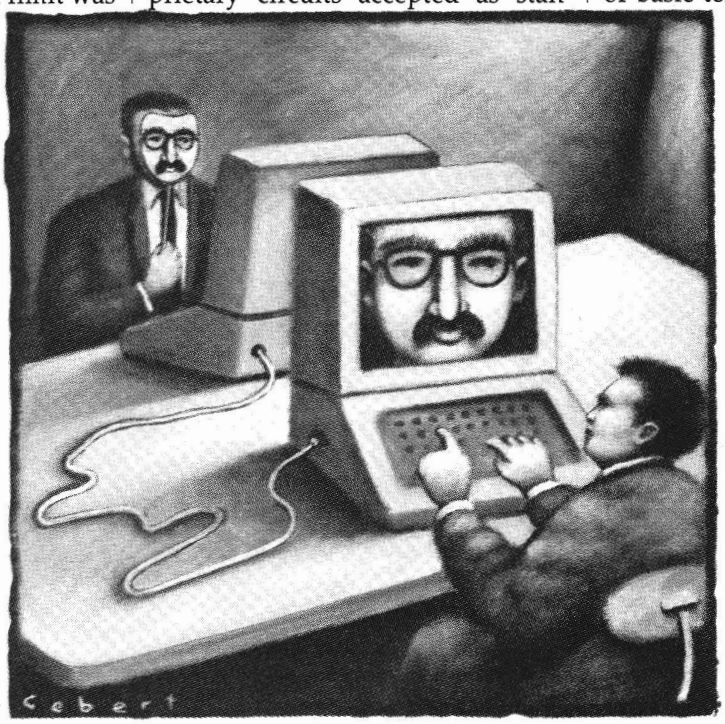
Yesteryear's leading edge of telecommunications technology may now seem quaint. Imagine dialing a phone number by hand (rotary, of course); listening to one ringy-dingy, two ringy-dingy; and then frantically stuffing the handset into the modem cups before the carrier tone disappeared. I made a lot of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

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

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

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

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



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

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

ILLUSTRATION BY WARREN GEBERT

but it is an important advance.

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

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

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

Turning ISDN into GOSIP

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

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

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

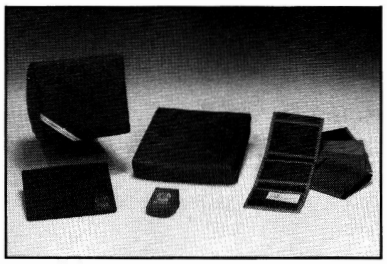
OSI will work with the Macintosh, but whether OSI filters down to the Apple II remains to be seen. Given the II's penetration into the education market and the theoretical plans for an international research system, however, you can probably bet on some sort of Apple II expansion card somewhere down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

Modem Magic-A Disappearing Act

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

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

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



IT ISN'T OVER 'TIL IT'S COVERED

Your computer has become an integral part of your lifestyle, therefore appropriate steps should be taken towards its care and maintenance. When you decide to treat your computer to the finest dust covers money can buy. **COMPUTER COVER COMPANY** can deliver. We design and fit an individual cover for each component in your computer system. Our commitment to quality, superior workmanship and customer satisfaction is evident throughout our entire line of products.

Have you ever tried vinyl, naugahyde or cloth dust covers? If you have, then you can appreciate why our covers are constructed from *400 Denier Rip Stop Nylon*. Our covers are water and static resistant, they **will not tear, crack or create lint problems.**

IIc Cover Sets

Set #		Base Price*
200	Monitor, CPU/Keyboard, Mouse	$20.95*
210	Monitor, CPU/Keyboard, Mouse, External Drive	$23.95*
220	Monitor, CPU/Keyboard, Mouse, Printer	$29.95*
230	Monitor, CPU/Keyboard, Mouse, Printer, External Drive	$31.95*

II GS Cover Sets

Set #		Base Price*
300	Monitor/CPU, Keyboard, Mouse	$29.95*
310	Monitor/CPU, Keyboard, Mouse, External Drive	$31.95*
320	Monitor/CPU, Keyboard, Mouse, Printer	$37.95*
330	Monitor/CPU, Keyboard, Mouse, Printer, External Drive	$39.95*

Macintosh and IIe Cover Sets Available.

Imagewriter Ribbons

	Box of Six	5 or less
Black	$21.95/$3.66 ea.	$4.50 ea.
Solid Color	$26.95/$4.50 ea.	$6.00 ea.
Multicolored I/W II	$52.50/$8.75 ea.	$10.00 ea.

Slip Ups

Our own special mouse pad measures 8" x 9½". Available in three colors: BLUE, GRAY and RED ..... Regulary $6.95

★★★ **FREE — SLIP UP** ★★★

★★★ **With every cover set purchased!** ★★★

PAK UPS

Diskette holders designed for your traveling and storage needs, that will slip into your coat pocket, purse or briefcase with ease. Velcro closure holds your diskettes safe and secure. Available for your 5.25" diskettes and in two sizes for 3.5" diskettes.

	Regularly	Direct Order	2 For
3.5" Small PAK UP holds 1 or 2 diskettes	$5.95	$4.95	$7.95
3.5" Big PAK UP holds up to 8 diskettes	$9.95	$7.95	$12.95
5.25" PAK UP holds up to 9 diskettes	$9.95	$7.95	$12.95

Colors: Bone, Tan, Blue, Platinum, Brown, Red, Black, Smoke and Green.

ORDER FORM:

IMPORTANT: To avoid delays and reshipping charges, read carefully and complete fully. Thank you.

APPLE IIc SET # _____ **BASE PRICE** $ _____

NAC = No Additional Charge *Include any extra charges*

Monitor: ☐ IIc Monochrome [NAC] ☐ IIc Color (add $1.00) $ _____

Keyboard: ☐ IIc CPU/keyboard [NAC] $ NAC

APPLE II GS SET # _____ **BASE PRICE** $ _____

NAC = No Additional Charge *Include any extra charges*

Monitor/CPU: ☐ One piece cover [NAC] ☐ Individual covers ($4.00) $ _____

Keyboard: ☐ Standard IIGS keyboard [NAC] $ NAC

PRINTERS:

☐ Standard Imagewriter [NAC] ☐ Imagewriter II (add $1.00) ☐ 15" Imagewriter (add $2.00) $ _____

☐ Imagewriter II w/sheet feed (add $5.00) ☐ Scribe [NAC] ☐ Laserwriter (add $5.00) $ _____

EXTERNAL DISK DRIVES:

☐ Unidisk 3.5 [NAC] ☐ IIe Disk II [NAC] ☐ IIc 5.25" [NAC] $ _____

☐ Unidisk 5.25 (add $1.00) ☐ Stacked UNI 3.5 (add $1.00) $ _____

☐ Stacked UNI 5.25 (add $2.00) ☐ Stacked UNI 3.5 atop UNI 5.25 (add $2.00) $ _____

Color Choice: ☐ Bone ☐ Tan ☐ Blue ☐ Platinum ☐ Brown

★★★ **FREE Slip Up with each Cover Set Purchased** ★★★ $ [NAC]

Name _____ Subtotal $.

Address _____ CA residents add 6% sales tax $.

Zip _____ U.P.S. Ground (foreign orders/FPO/APO extra) $ 3.00

Daytime Phone (_____) _____ **Total** $.

Payment enclosed ☐ Bill my Visa ☐ M/C ☐

Card # _____ Exp.: ___/___ Signature _____

Mail Orders Directly to COMPUTER COVER COMPANY: P.O. Box 3080, Laguna Hills, CA 92654

Orders Only: CA (800) 237-5376 ★ Outside CA (800) 235-5330 ★ Inquiries: (714) 380-0085

Prices Effective January 1, 1987 - Prices Subject To Change Without Notice AT 87

CIRCLE 136 ON READER SERVICE CARD

LASER 128

"THE LASER 128 IS A FINE MACHINE BY ANY STANDARD... A TERRIFIC DEAL FOR A TERRIFIC MACHINE," - Electronic Learning

Whether you're trying to familiarize children at the grade school level with computer use, or teaching junior high school students programming, the Laser 128 is your best bet. With its Apple // compatibility, you can use virtually all the educational software available, including popular titles from **MECC, DLM, Davidson, Learning Company** and many more!

Peripherals, too

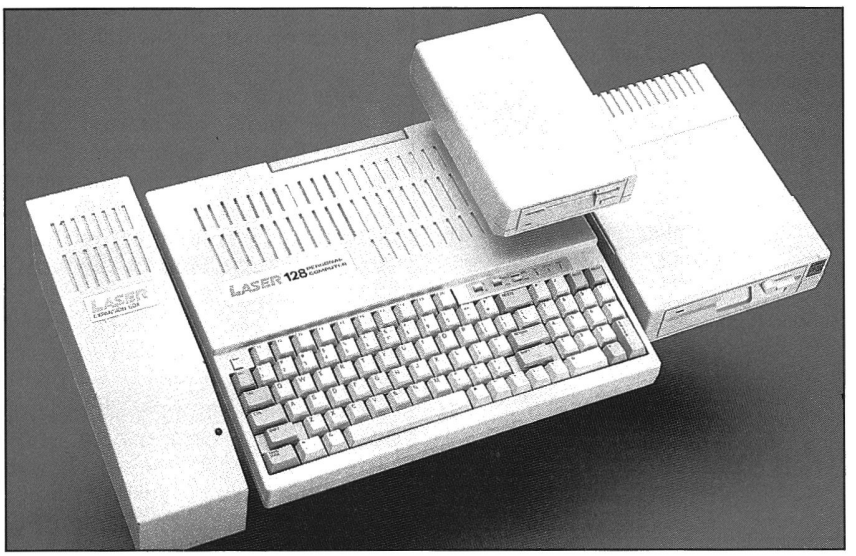
The Laser 128 runs with the best hardware, too. With its optional two-slot Expansion Box, the Laser 128 is the only Apple-compatible that gives you the portability of the //c and the expandability of the //e. The Laser even has its own line of peripherals and works with virtually any monitor (color or black and white) and printer (serial or parallel).

Service worth smiling about

When you purchase a Laser 128 from Central Point Software, you'll get the fastest turnaround possible if your Laser ever needs service. Our complete in-house repair center stocks all repair parts and the average turnaround time is under 48 hours!

We wrote the book

When it comes to people who know the Laser 128 inside and out, you won't find anyone more knowledgeable than Central Point Software. We wrote the Apple-compatible ROM that is the heart of the Laser 128 and have worked with dozens of software publishers to make sure that the Laser 128 will run all their software titles.



The Laser can cut it

The Apple // compatible computer that brings you the best of all worlds: compatible, portable, and expandable, but priced like a Commodore 128! No wonder A+ magazine calls the Laser 128 the "clear winner" of Apple compatibles and inCider Magazine adds: "The Laser 128 is a remarkably compatible competent performer. The Apple market isn't known for hardware bargains, but it has one now."

CIRCLE 107 ON READER SERVICE CARD

Laser 128: Only $395

YES! PLEASE SEND ME:

- ☐ Laser 128 Computer - **$395** & $20 s/h
- ☐ Laser 2-slot Expansion Box - $50 & $6 s/h
- ☐ Laser 5.25" 2nd Disk Drive - $150 & $10 s/h
- ☐ 3.5 800K Drive & Controller Card - $299 & $10 s/h
- ☐ AST Sprint Disk™ 1 meg RAM board/256K installed (Appleworks™ compatible!) - $95 & $10 s/h

Ship them to me at:

_____
Name

_____
Address

_____
City, State, Zip

Daytime phone #(____)_____

To Order By Mail:
Simply send in this order form with a cashier's check (Personal/business checks require more processing.) Or provide your Visa/MC

#_____ _____ _____ _____

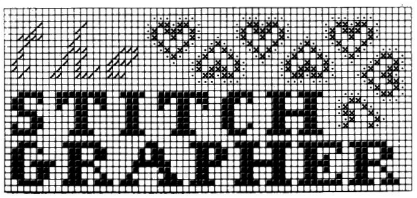
expiration date_____

issuing bank_____

To Order By Phone:
Just call us! **503/244-5782** 8-5 (W. Coast time), M-F, with your MasterCard VISA in hand!

Or see your local computer dealer!

Central Point Software
INCORPORATED
9700 SW Capitol Hwy., #100
Portland, OR 97219 A+



DESIGN NEEDLECRAFT CHARTS

for Counted-Cross-Stitch, Needlepoint, Latch Hook, Knitting, etc. using a revolutionary new computer program--

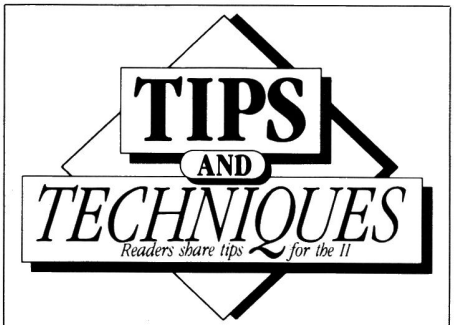
The Stitch Grapher.

Graphs as large as 240 X 400 stitches with up to 30 symbols may be generated and printed with any of 3 grid styles along with a color chart. A unique windowing feature allows the designer to move, copy, rotate, mirror image, save and re-use previous designs.

The Stitch Grapher is compatible with the 64K Apple II series microcomputers. Disk plus 90-page spiral bound manual--$89.95. Dealer inquiries welcome. To place an order, or for complete information contact

COMPUCRAFTS
RFD 2 Box 216, Lincoln, MA 01773
(617) 259-0409

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



Share your tips for the II!
Send us your own
ingenious routines,
practical tips,
insignificant tricks,
and Easter eggs.
If we publish your tips,
you will receive credit
in the magazine,
and we will pay you $25
for each tip we use.
Send your tips to:
A+ magazine
Attn: Tips and Techniques
11 Davis Drive
Belmont, CA 94002

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

TELETIPS

"Speedism"

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

Apple Source

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

On-line Directory Assistance

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

Escape with Hayes

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

BBS with USRobotics

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

Modem Comparison Chart

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

MY LAST LOG-OFF

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

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

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

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

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

FURTHER INFORMATION

The Source
1616 Anderson Road
McLean, VA 22102
(703) 734-7500
CIRCLE 352 ON READER SERVICE CARD

The National E-Mail Registry
3 Neshaminy Interplex
Trevose, PA 19047
(800) 843-6088 (voice)
(800) 622-0505 (modem)
(203) 245-7720 (modem)
CIRCLE 353 ON READER SERVICE CARD

Hayes Microcomputer
P.O. Box 105203
Atlanta, GA 30348
(404) 449-8791
CIRCLE 354 ON READER SERVICE CARD

USRobotics
8100 North McCormick Blvd.
Skokie, IL 60076
(312) 982-5010
CIRCLE 355 ON READER SERVICE CARD

Hire Education
3631 Jenifer Street NW
Washington, DC 20015
(202) 966-1635
CIRCLE 356 ON READER SERVICE CARD

Back to Basics.
Now just $199!

FOR THE BEST SELLING ACCOUNTING SOFTWARE LOOK FOR THE PEACHTREE LABEL

Peachtree Software®

Get Back to Basics™

Peachtree's Back to Basics is the most popular accounting system on the market today. And it's no wonder why.

Back to Basics is simple to install, easy to use, and priced in line with what small businesses can afford.

But don't take our word for it. Software Digest, a leading consumer organization, rated Back to Basics number one in overall usability when compared to products costing as much as $995 and, for the past two years, Back to Basics has won the *A+ Magazine* ***Software of the Year Award*** for business accounting systems thanks to the votes of over 20,000 Apple users.

No Experience Required

Back to Basics assumes you're an expert in only one business—your own.

- Installation of Back to Basics is painless — read only seven pages in the manual and *spend 30 minutes* using our screen menus.
- If you need to brush up on your accounting, use our accounting primer and tutorial, written by Harvard Business School Professor, Robert N. Anthony, plus our business section on how to handle everyday accounting dilemmas.

$199

Back to Basics Accounting System is not only a best seller but an incredible value with all three modules — General Ledger, Accounts Receivable and Accounts Payable — in a complete set for just $199.

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

Proven Power

Peachtree has long been the first name in accounting software and the powerful features we've included in Back to Basics prove we understand what you're looking for.

- Complete integration of General Ledger with Accounts Receivable and Accounts Payable.
- Single transaction entries up to $999,999.99 and year-to-date totals up to $21,000,000.
- Journals and reports updated as each transaction is recorded.
- Void transaction facility automatically creates reversing entry.
- *More than 30 reports* can be viewed on screen or printed.

Ongoing Accolades

Back to Basics Accounting System is designed to take full advantage of the capabilities of your Apple II computer, with customized versions for the Apple II+, IIe, IIc, IIgs and Macintosh.

Peachtree's support, labeled by *InfoWorld* as "the finest in the industry", is available as you need it, at a nominal charge directly from Peachtree or through our network of local authorized support centers.

Money Back Guarantee

When you purchase Back to Basics directly from Peachtree Software you're protected with a 30-day, money back guarantee (an option even the most expensive accounting products don't offer).

If you're not satisfied, simply return the complete product in saleable condition within 30 days and your purchase price will be promptly refunded. For full details, call the toll free telephone number below.

Now Available for the Apple IIgs

A new version of Back to Basics Accounting is now available for the Apple IIgs, designed specifically for use with the PRO-DOS operating system and 3½" disk drives or a hard disk.

Hardware Specifications

- IBM Personal Computer, PC/XT, PC/AT with two floppy disk drives or one floppy disk drive and a hard disk.
- Apple II+, IIe, IIc, IIgs with 128K and two disk drives or hard disk.
- Apple Macintosh 512K or Plus with two disk drives or hard disk.

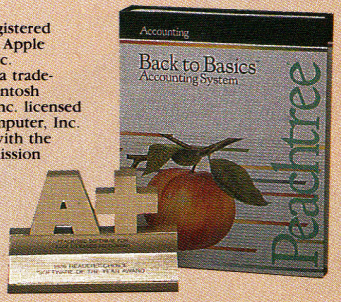
Features That Made Back to Basics A Best Seller

GENERAL LEDGER
- On-line help displays Chart of Accounts.
- MTD and YTD show on income statements.
- Allows automatic Journal entries.
- Check processing and printing capability through Cash Disbursements.
- Optional cost of sales ranges.
- User modifiable Chart of Accounts included.
- Allows up to 3 checking accounts.
- Up to 10 departments with separate income statements.

ACCOUNTS RECEIVABLE
- Calculates receivables on balance forward basis.
- Prints statements and mailing labels.
- Allows automatic posting to General Ledger.
- Accepts partial payments.
- Calculates finance charges.
- Up-to-date customer information can be scrolled for review at any time.
- Customer ID's can be alpha or numeric.
- Verifies customer credit limit.
- Calculates up to 3 sales taxes per entry.

ACCOUNTS PAYABLE
- Up to 10 vendor payment terms.
- Calculates cash discounts.
- Accepts partial payments.
- Automatic posting to General Ledger.
- Prints vendor mailing labels.
- Up-to-date vendor information can be scrolled for review at any time.
- Customer ID's can be alpha or numeric.
- Prints computer checks or processes hand-written checks.
- Invoices automatically or manually selected for payment.

Apple is a registered trademark of Apple Computer, Inc. Macintosh is a trademark of Macintosh Laboratory, Inc. licensed to Apple Computer, Inc. and is used with the express permission of its owner.



To Order, or for a Dealer Near You, **Call**

1-800-247-3224

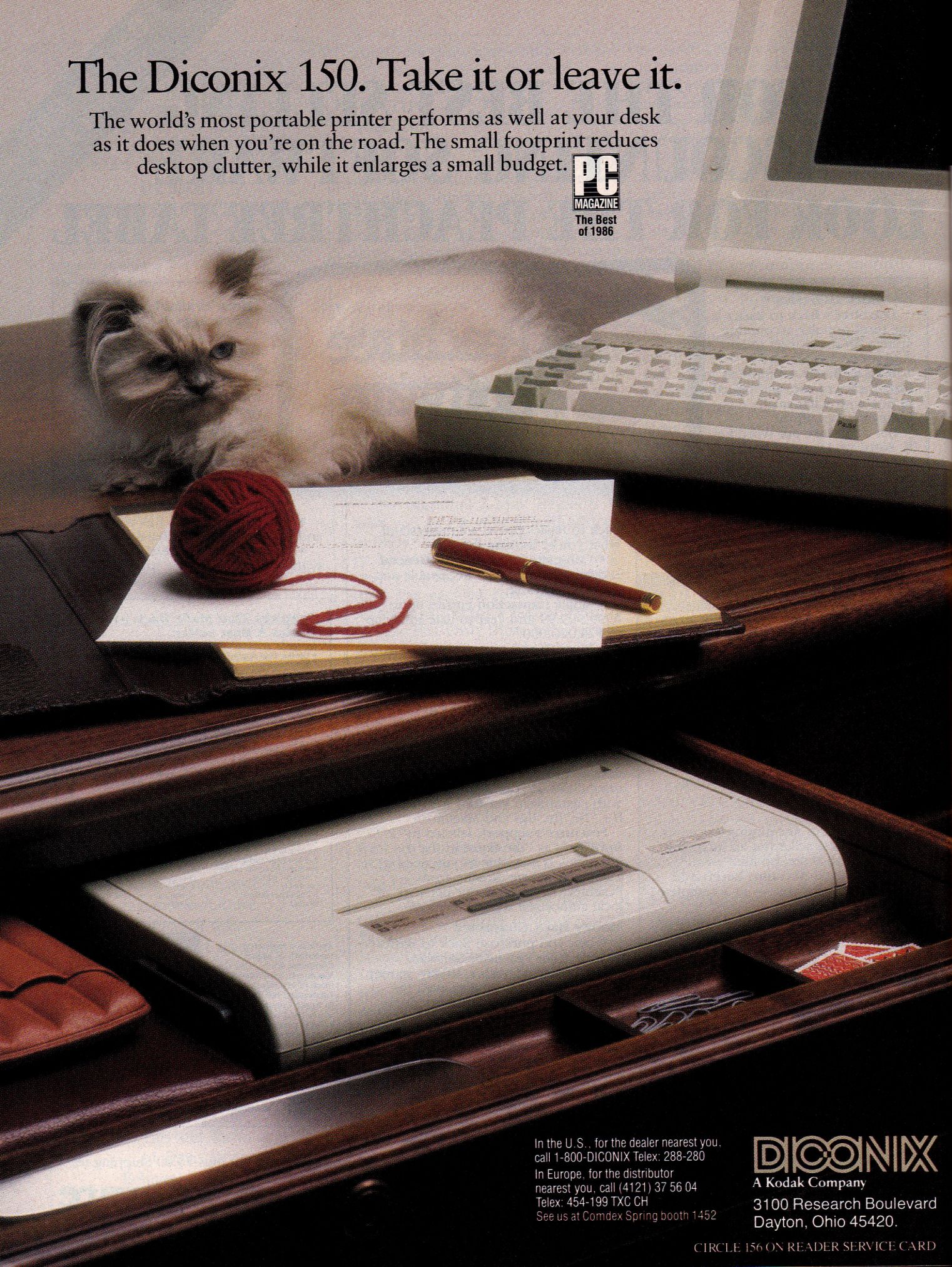
In Georgia, call 1-404-564-5800

To Order by Mail Send $199 plus $5.00 Shipping to:

Peachtree Software

CIRCLE 318 ON READER SERVICE CARD

4355 Shackleford Road, Dept. A+-06, Norcross, GA 30093



CIRCLE 156 ON READER SERVICE CARD

BY ROBERTA SCHWARTZ AND MICHAEL CALLERY

HOW CAN BASIC EDUCATE YOU ABOUT IIGS GRAPHICS?

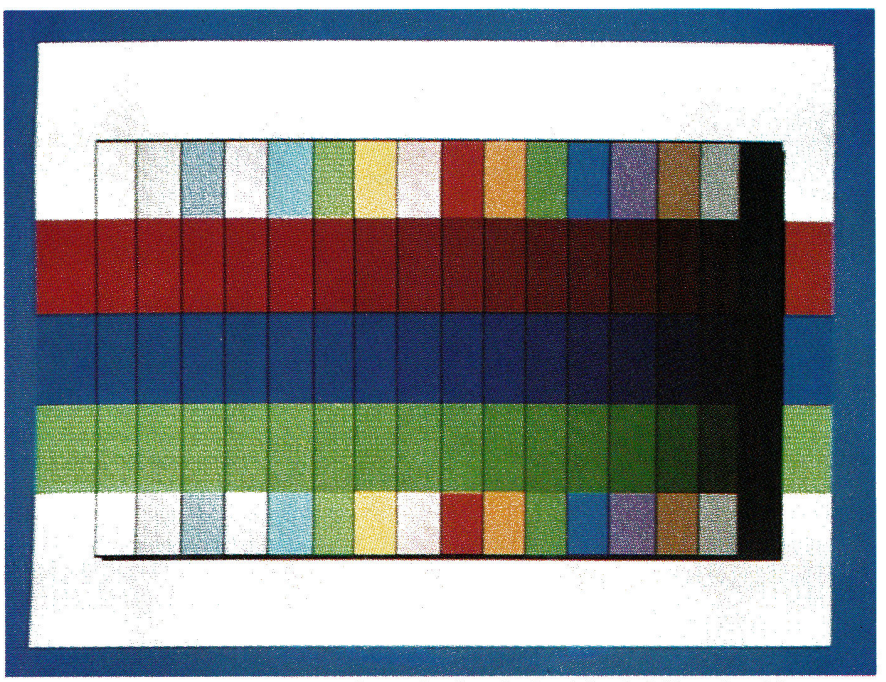
The shadow knows.

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

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

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

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



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

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

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

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

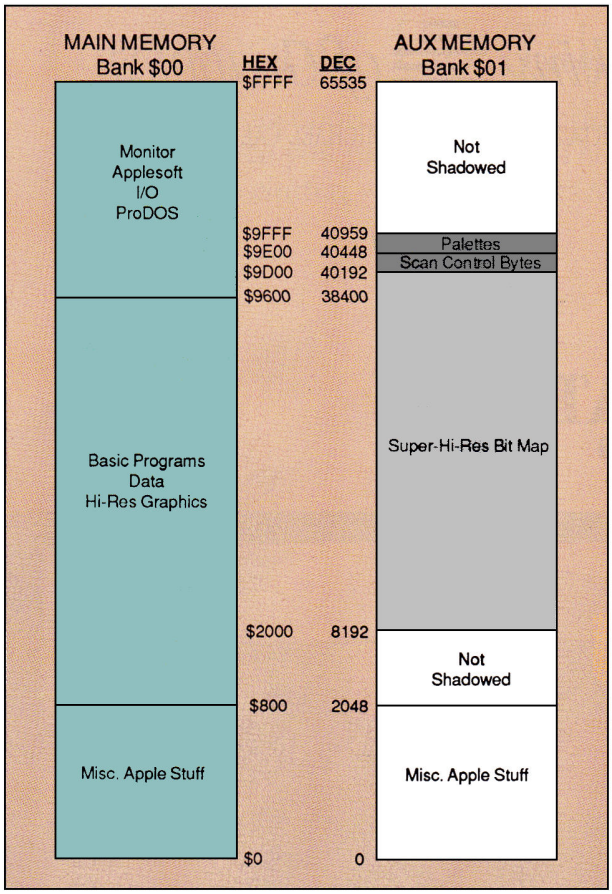


Figure 1: An abbreviated memory map (not drawn proportionately) of the Apple IIGS, showing the shadowed super-hi-res screen and associated data

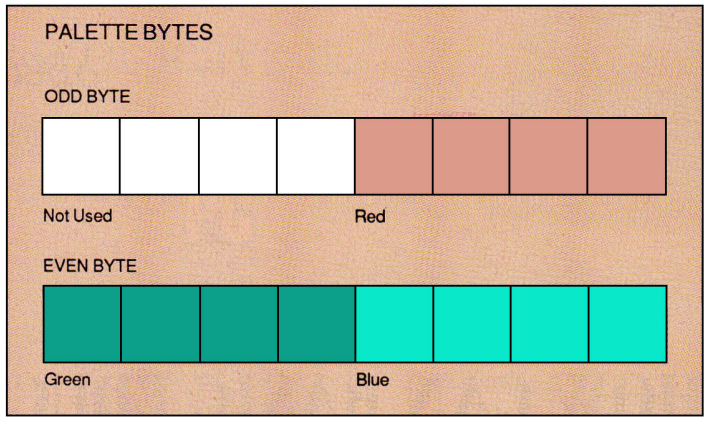


Figure 3: Palette bytes – these bytes define each color in a palette. The unused portion of the odd byte should be set to 0. A half byte (or nibble) per color allows generation of 16 different shades of each color.

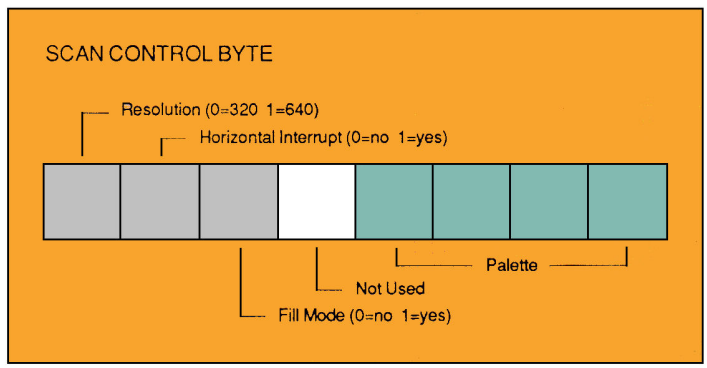


Figure 4: Scan Control Bytes (SCBs) – each scan line has one SCB. Each bit of the byte controls a different screen parameter; four bits control the palette for the line. The Fill mode works only in the 320 mode.

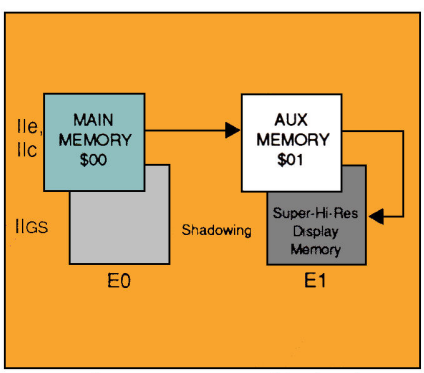


Figure 2: You can move graphic data in Apple IIe/IIc main memory to the IIGS super-hi-res memory location by moving it from main memory to aux memory with shadowing on.

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

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

SCBs and Palettes

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

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

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

Super-Hi-Res Files

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

SPEAKING OF GRAPHICS GALLERY

THE LAST CIGARETTE AND OTHER MOODS

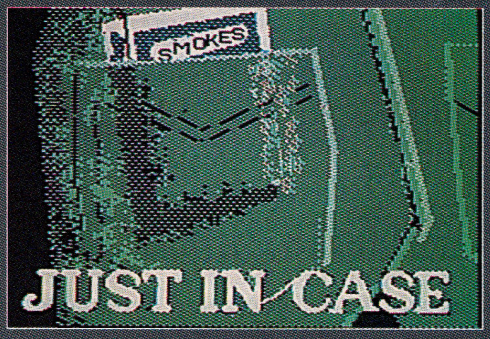
Rebecca August and Vivi Kuhnle, students at Parsons School of Design and the New School Computer Center in New York City, created these images with an Apple IIe computer and the Apple Graphics Tablet. Rebecca used Blazing Paddles and Fontrix to make a graphic statement on "How to Stop Smoking." Vivi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

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

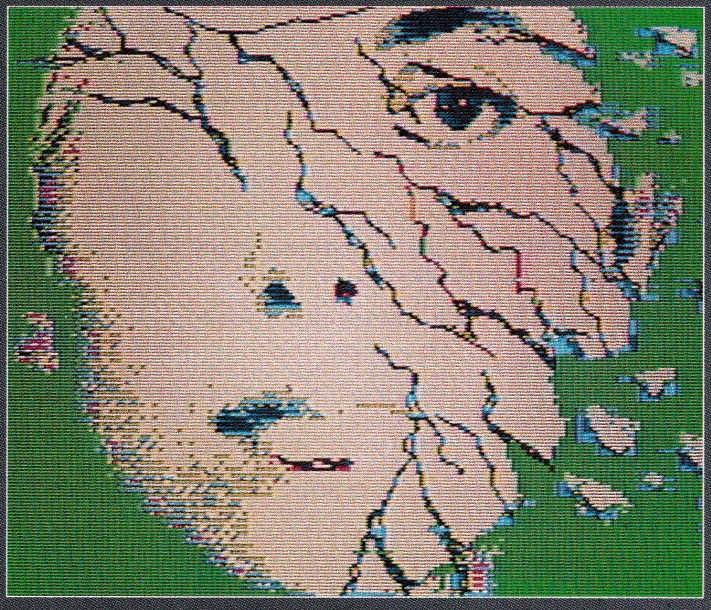
REBECCA AUGUST, *Wynnewood, PA*







VIVI KUHNLE, *New York, NY*





COMPLETE YOUR A+ LIBRARY!

...With product reviews, applications and tutorials for your Apple II with those missing issues of A+ Magazine. For your hands-on collection of A+ Magazine, send the attached coupon, or a clearly written order indicating your desired issues, along with $6 per issue ($7 Canada/Foreign orders, U.S. currency) to:

A+ Magazine
K. Armstrong
One Park Avenue—4th Floor
New York, NY 10016

ORDER YOUR MISSING VOLUMES OF A+ TODAY!



April 87—ON-LINE—A comprehensive guide for Apple II communications including High-Speed Modems. Communications Software, and On-Line Services; Mousefiler; IIGS Sound Magic Program Listing, Super Macroworks, Key-Player, AutoWorks and more.



March 87—TAXES! The Apple II comes to the rescue! Plus, Mail Order Shopping Statistical Analysis software; Personal Finance Made Easy; Tracking Inventory for Taxes, Apple IIGS Music Tutorial; Reader's Choice Winners and more.



February 87—The APPLE IIGS UPGRADE. Is there a better way? Plus Project Planning and Management; Analog RGB Monitors and other options; Review of Uptime; Appleworks annotated bibliography, power print and keyword searching and more.



January 87—THE DRIVE TO SUCCEED! 9 Floppy Disk Drives Reviewed; Point-to-Point; 9 IIGS Graphics Programs; IIGS Sound Listings; Computers & Creativity Part II; Adding RAM to a IIc and more.



December 86—ALTERNATIVES TO APPLEWORKS, Plus IIGS compared to its competition; Exploring the IIGS Mac-like ROM: Turn your II into a print shop; ThinkWorks & ReportWorks and more.



November 86—IIGS SPECIAL REPORT—Introduction: New Products; The IIe to IIGS upgrade; IIGS toolbox: New Apple for the Teacher and more!



October 86—40 WORD PROCESSING PACKAGES COMPARED; IIc WriteProtectors; ProFiler; ProDos Database; AppleWorks Add Ons; Microsoft Works and more.



September 86—A SURVEY OF APPLE II ACCOUNTING PROGRAMS; Sylvia Porter and Andrew Tobias Personal Finance Reviewed; 7 Postscript Output Devices; Math for Kids and more.

August 86—HOW TO INCREASE YOUR II'S PERFORMANCE, Plus Diskette Care, Public Domain Software; AppleWriter Form Letters; Mac Assembly Language and more!

July 86—APPLE II DESKTOP PUBLISHING; 10 Spelling Checkers; Macintosh Accounting; Run IIe Software on Your III; Common Sense Repairs and more.

June 86—APPLE COMPATIBLES; Expanding your IIc; Sales and Marketing Tools; Bard's Tale; The Mist; Build Your Own Cables; Mac Assembly Language; and more.

May 86—HARD DISKS FOR THE II: Guide to DIP Switch Settings: SoundCap & Natural Sound; Interlace and more.

April 86—TELECOMMUNICATIONS; Comprehensive Apple II Software and Hardware Guides; Instant Pascal; Pinpoint; Jeeves; Optical CD Disks and more.

March 86—DESKTOP PUBLISHING WITH THE APPLE II; Comparing Hard Disks for the IIe; Excel in Business; First Look at the Macintosh Plus; 1986 Reader's Choice Awards Winners and more.

February 86—MIDI MUSIC FOR THE IIe and Macintosh; Word perfect; Fantavision; Hyperdrive 20; Hard Disk 20; Business Filevision; Deja Vu; Baron and more.

January 86—THE COMPATIBILITY MAZE Plus SmartCom II, ProCom-M; Telecape in Touch; MacCharlie & Abation Drive 5.25; 10 Flight Simulators; Warranties and more!

December 85—EXPANSION FOR THE LIMITLESS II; Complete Comparison Charts of Memory, Input/Output, Clocks and CoProcessors; How To Program in Assembly Language; OMNIS 3; Scugon III vs PSION; 9 Game Reviews and more.

November 85—8 NEW PRODUCTS FOR YOUR APPLE; Automated Writing; Project Planning; Laser Printers; Moving Data with AppleWorks and more.

October 85—EDUCATION; IIc Monitors; Do-It-Yourself Write Protect Switch; Catalyst IIe; 11 Daisy Wheel Printers Compared; Fortis DH45 Hybrid Printer and more.

September 85—BUSINESS ACCOUNTING FOR THE APPLE II—Double Entry or Spreadsheets; SuperCalc3a A Powerful Spreadsheet; 7 Plotters Evaluated; 5 Digitizers Compared; Newsroom Plus and more.

Order today—Quantities are limited!

Please send me the following issues of A+ Magazine ($6 per issue/$7 per issue in Canada and all foreign countries, U.S. currency):

- ☐ April 87
- ☐ March 87
- ☐ February 87
- ☐ January 87
- ☐ December 86
- ☐ November 86
- ☐ October 86
- ☐ September 86
- ☐ August 86
- ☐ July 86
- ☐ June 86
- ☐ May 86
- ☐ April 86
- ☐ March 86
- ☐ February 86
- ☐ January 86
- ☐ December 85
- ☐ November 85
- ☐ October 85
- ☐ September 85

Other issues available call 1-212-503-5319.

To: A+ Magazine— K. Armstrong—One Park Avenue 4th Floor—New York, NY 10016

Enclosed is a check/money order for $_____.

Name_____

Address_____

City_____

State_____ Zip_____

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

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

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

PROGRAM 1

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

The Whole Picture

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

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

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

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

Take It from Here

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

CompuServe

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

PROGRAM 2

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

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

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

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

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

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

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

Attention!
HORSE RACING FANS...
Here's the game you've been waiting for...

A DAY AT THE RACES
Game 1 - "The Spectator"
- Horse Selection
- Win/Place/Show
- Scratch Sheets

A DAY AT THE RACES
Game 2 - "The Owner"
- Manage a Stable
- Complete Data Sheets
- Various Track Conditions

1 to 4 Players
Ages 10 to Adult

8 Races Daily!

$39.95
Two Games In One!



Available for the Apple IIe and IIc with 64K and 80 column capacity.

TO ORDER: Please send check or money order to:
B/T ENTERPRISES
P.O. BOX 360916
MILPITAS, CA 95035-0916
or call 408-946-6019 with your Visa or MasterCard Number.
DEALER INQUIRIES INVITED
Please allow 2-3 weeks for delivery. Add $2.50 for shipping and handling. California residents add 7% sales tax.

CIRCLE 102 ON READER SERVICE CARD

APPLE COMPATIBLE DISK DRIVES
100% APPLE COMPATIBLE
1 YEAR WARRANTY

II+ & IIe HALF HEIGHT	$99.00
IIc HALF HEIGHT	$99.00

MEMORY BOARDS FOR IIe & IIc

EXTENDED 80 COLUMN Card		$40.00
RAMWORKS III	256K	$175.00
MULTIRAM RGB	256K	$150.00
MULTIRAM C	256K	$150.00
TRANSWARP		$210.00

SUPER SERIAL CARD	$59.00
DISK CONTROLLER CARD	$39.00
16K CARD	$35.00
80 COLUMN CARD FOR II+	$49.00
CPM CARD FOR FOR II+ & IIe	$39.00
128K CARD FOR II+	$85.00

All above have a FIVE YEAR WARRANTY

VISA & MASTERCARD — SCHOOL P.O.
Add $3.00 for Shipping - C.O.D. add $2.00
DEALER PRICING

MEMORY PLUS DISTRIBUTORS
2628 West Baseline Road
Mesa, Arizona 85202
(602) 820-8819

CIRCLE 152 ON READER SERVICE CARD

EVERYTHING YOU WANTED TO KNOW ABOUT APPLEWORKS... BUT DIDN'T KNOW WHAT TO ASK.

Whether you're a dedicated user—or thinking about buying AppleWorks, make sure you read *A+ APPLEWORKS REPORT* every month!

You'll find the most current information devoted exclusively to AppleWorks applications and the many companion products. Discover how to upgrade older AppleWorks versions...uncover new tricks and techniques...find out what questions other users have and the solutions from the experts at A+ Magazine.

Whether you want to know more about Power Print, shortcut routines for database searching, mail merging using InfoMerge or answers to other AppleWorks questions, you'll find the information and problem solving tutorials in *A+ APPLEWORKS REPORT* every month!

COPY II® PLUS

Version 7! Works on II GS

THE BEST, MOST COMPLETE ProDOS-DOS UTILITIES.

- Copy files, disks, even entire subdirectories.
- Undelete ProDOS and DOS files.
- Fast 2-pass disk copy on Apple *IIe, IIc* or Laser 128.
- Tree display for selecting subdirectories—no need to type lengthy "prefixes."
- Alphabetize catalog.
- Convert DOS to ProDOS & vice versa.
- And many more.

BACKUP YOUR PROTECTED SOFTWARE.

With COPY II PLUS' fully automatic bit copier, simply type in the name of the program you want to backup and COPY II PLUS does the rest. (We update COPY II PLUS often to handle new protections; you as a registered owner may update at any time for $15 plus $3 s/h.)

Parameters for hundreds of programs are right on disk. Also includes a track editor, sector editor and HI-RES disk display.

COPY II PLUS is supplied on a standard ProDOS diskette. Runs on Apple II, II+, *IIe, IIc* and Laser 128. Requires at least 64K and one or two disk drives.

Call 503/244-5782, M—F, 8—5 (West Coast time) with your VISA MasterCard in hand. Or send a check for $39.95 U.S. plus $3 s/h, $8 overseas.

$39.95

Central Point Software
INCORPORATED
9700 S.W. Capitol Hwy., #100
Portland, OR 97219

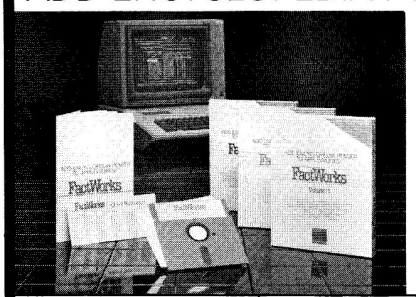
Winner of A+ Readers' Choice Awards!

Backup utilities also available for the IBM, Macintosh, Commodore 64/128 and Atari ST.

CIRCLE 184 ON READER SERVICE CARD

FactWorks™

ADD ENCYCLOPEDIA POWER TO APPLEWORKS!™



USE YOUR IIGs, IIe, OR IIc TO SEARCH, SORT, OR PRINT USING THE POWER OF APPLEWORKS AND THE INFORMATION FROM OVER 90 FACTWORKS FILES.

Three volumes with thousands of interesting and educational facts for home, student, or school reference.

Volume 1

Anniversaries
Birthstones
Capitalization rules
Cats
Continents
Countries
Dogs
Friends filer
Home loan/30 yr
Manned Space Flights
Poker Hands
Reptiles
Roman Numerals
Time Zones
United States
Area codes
Deserts
Dinosaurs
Mammals
Mountains
National Parks
Oceans & Seas
Rivers
Speller
Travel Documents
Volcanoes

Volume 2

Academy Award winners
Baseball Hall of Fame
Daytona 500 winners
Grammy winners
Heavyweight champions
Indy 500 winners
Inventions & inventors
Kentucky Derby winners
Masters Tournament winners
Nobel Prize winners
Stanley Cup winners
Super Bowl winners
U.S. Open (tennis) winners
U.S. Open (golf) winners
Wimbledon winners
World Series winners
Airline toll-free numbers
Airplane types
Bones of the body
Calories
Car loan/36 month
Car loan/48 month
Chemical elements
Constellations
Endocrines
Grammatical terms
Medical terms
Planets
Satellites
Science "ologies"
Stars
Weights and measures
Misc. Measures

Volume 3

Amendments
Constitution signers
Constitution of U.S
Declaration of Independence
Declaration Signers
Emancipation Proclamation
Gettysburg Address
JFK Inaugural
Major wars
Mayflower Compact
Members of the UN
Monroe Doctrine
Nixon Resignation
U.S. Presidents
Prime Ministers
U.S. Vice Presidents
Assassinations
Authors/Writers
Bill of Sale
Explorers/Discoverers
American Indians
Lease format
Mythology
Partnership Agreement
Pioneers in Medicine
Rental Agreement
State Abbreviations
Straight Note
Will & Testament

$32.95
PER VOLUME
(CA resident add 6.5% tax)

SCHOOL SITE LICENSE AVAILABLE

SEE YOUR SOFTWARE DEALER OR CALL TOLL-FREE
(800) 544-FACT (544-3228)
IMAGIMEDIA SOFTWARE
16640 ROSCOE PL., SEPULVEDA, CA 91343

VISA MasterCard

CIRCLE 138 ON READER SERVICE CARD

BEAGLE COMPILER NEW!

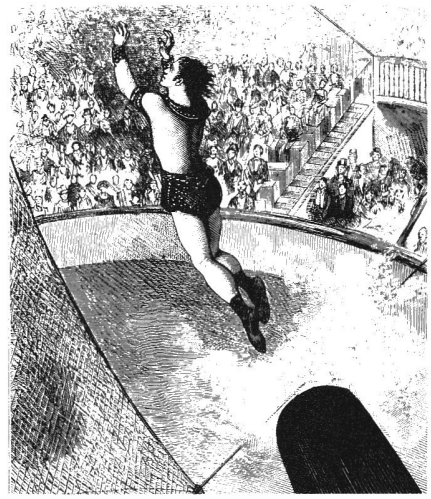
by Alan Bird
$74.95-for any Apple II (64K minimum)

MACHINE LANGUAGE SPEED FOR APPLESOFT PROGRAMS
Boot the Beagle Compiler and then run practically any Applesoft BASIC program from disk. The program will be converted *on the spot*, in seconds, to run at machine language speed-*fast!*

HOW FAST IS IT?
It depends on your original Applesoft program. 5 to 7-times speed is about average. *10-times speed*-and up-is not uncommon.

HOW EASY IS IT TO USE?
Real easy. Say you've got a normal (slow) Applesoft program named "ABC" on a disk. Simply type "RUN ABC" and within seconds, ABC is running at machine language speed!

You can make changes to your program (using Applesoft) and immediately re-run it at machine language speed.



Beagle Compiler author Alan Bird leaves for work.

"Beginning programmers love it. Experts are amazed."

❑ **THE BEAGLE COMPILER IS QUICK!**
Compiling takes a few seconds at the most. Many programs compile in under a second.

❑ **EFFECTIVE**
Most programs compile without alteration. Syntax errors, illegal GOTO's, etc., are *automatically trapped* before a program runs.

❑ **COMPACT AND CONVENIENT**
A compiled program actually occupies *less* memory and *less* disk space than its Applesoft original. Saving programs in compiled format prevents snoopers from reading or changing your original code.

❑ **PRODOS-BASED AND UNPROTECTED**
Compile Applesoft programs to and from floppy disks, hard disks or 3.5" disks.

❑ **LICENSING NOW AVAILABLE**
Now you can sell your Applesoft programs in compiled format. After you purchase the Compiler, the fee is only $50 per year.

MINIPIX DISK #3 NEW!

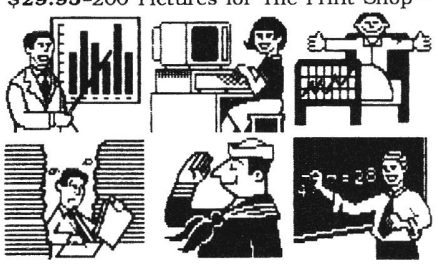
$29.95-200 Pictures for The Print Shop™

Minipix Disk #1, #2 and #3 each contain 200 nifty "graphics" for your *Print Shop* cards, banners and signs. All pictures are ready to use-no "converting" is necessary.



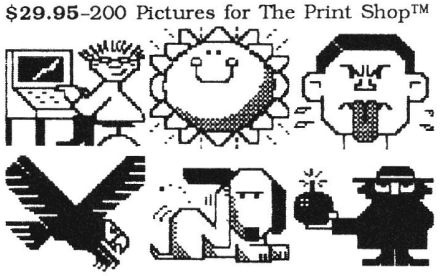
MINIPIX DISK #2 NEW!

$29.95-200 Pictures for The Print Shop™



MINIPIX DISK #1

$29.95-200 Pictures for The Print Shop™

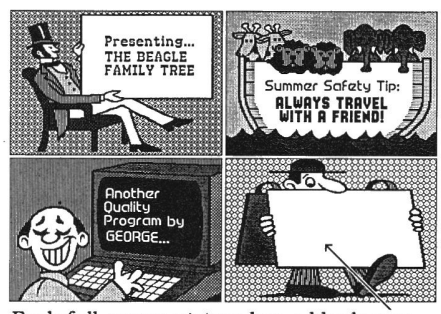


BEAGLE SCREENS NEW!

$34.95-Apple IIGS, IIc or 128K IIe

Beagle Screens will get *your* message across-anything from "Happy Birthday" to "Hands Off"- in a unique and colorful way. Use our pictures to add a touch of class to your Apple programs and presentations. Or just use them to show off your Apple.

You get *forty* captionable full-screen pictures on disk. Half are automatically animated when they appear on the screen.



Each full-screen picture has a blank area where you can add your message. We make it *easy* to add your own words and to create colorful on-screen "slide shows". Or use your printer to create unique personalized signs.



(Printing requires any standard printer dump software like Triple-Dump.)

AUTO-ANIMATION



Animation gives your messages extra punch. Twenty Beagle Screen pictures are *automatically animated* as soon as you load them onto the screen.

TRIPLE-DUMP

by Mark Simonsen and Rob Renstrom
ProDOS and DOS 3.3
$39.95-for any version of Apple II

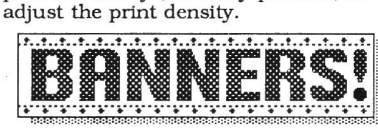
Triple-Dump lets you use your dot-matrix graphics-capable printer and any Apple II+, IIe, IIc or IIGS print:

- Hi-res graphics
- Double hi-res graphics
- Lo-res graphics
- Double lo-res graphics
- 40-column text
- 80-column text

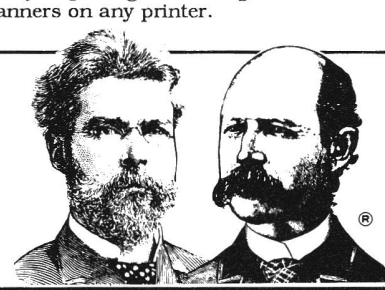
Print "hard copies" of almost any image. No programming knowledge is required.

Or, Applesoft programmers can use Triple-Dump's routines as part of their own BASIC programs.

Triple-Dump offers special effects like picture cropping, rotating and magnifying, plus the ability (on many printers) to adjust the print density.



Triple-Dump's bonus big Banner Maker lets you print giant (8"-high letters) text banners on any printer.



Beagle Bros MICRO SOFTWARE

3990 OLD TOWN AVENUE, SUITE 102C
SAN DIEGO, CALIFORNIA 92110

Available at most Software Stores

Or order by phone or mail. We ship next day (Mon-Fri). Add $2.50 shipping, $5.50 overseas. Visa/MCard/COD.

Orders and Information* **1-619-296-6400**
Orders only, Toll Free* **1-800-345-1750**
Orders only, California* **1-800-992-4022**
**Mon-Fri, 9am-4pm Pacific*
Order by MODEM (24 hours) **1-619-296-6490**

AD #362

ENTERTAINMENT

GAMEPORT

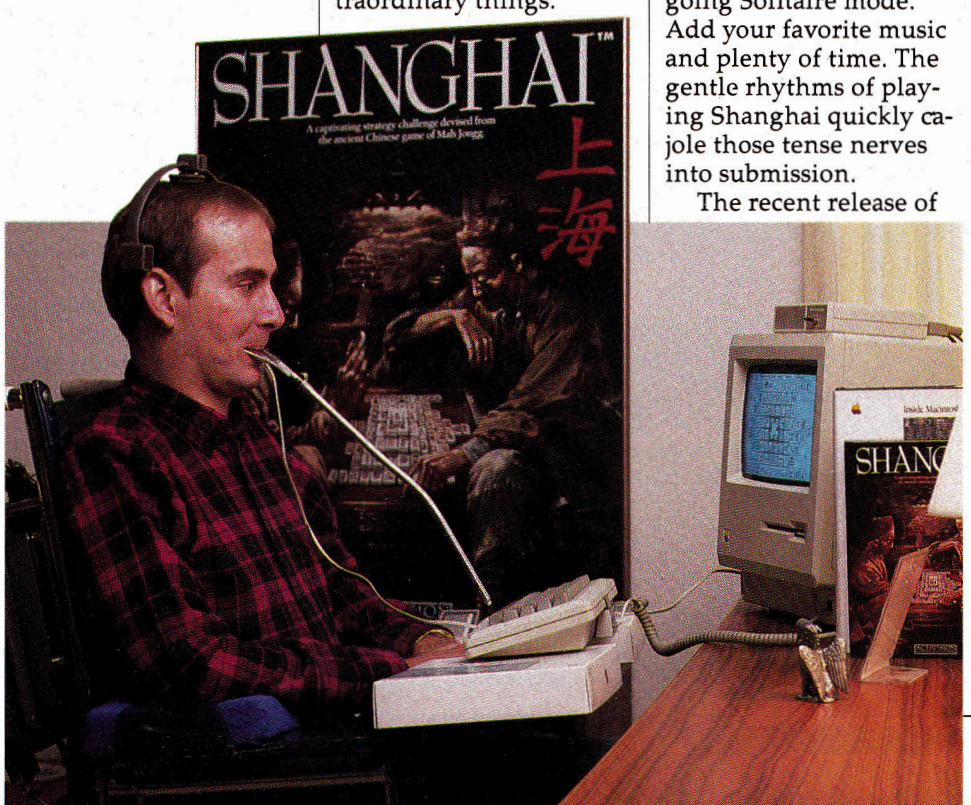
BY BOB LINDSTROM

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

FANFARE FOR THE COMMON MAN

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

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



SHANGHAI AND ITS CREATOR

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

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

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

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

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



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

ard chose to pursue his goals.

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

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

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

THE BLUE KNIGHTS

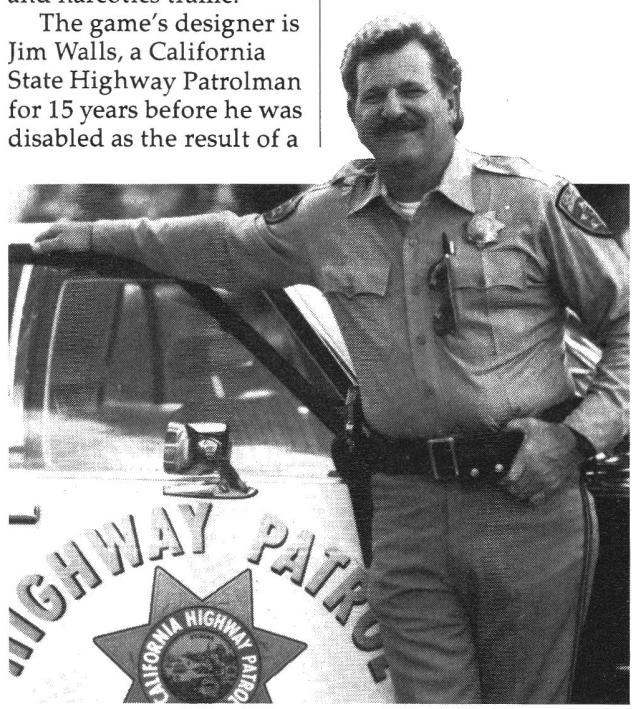
Though often romanticized and misrepresented on entertainment screens large and small, police officers stand proudly in the ranks of "everyday" heroes. Despite the frivolities of prime-time TV, law enforcement is much more than high-speed car chases and William Shatner's latest hairstyle. It's a grueling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

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

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

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

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



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

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

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

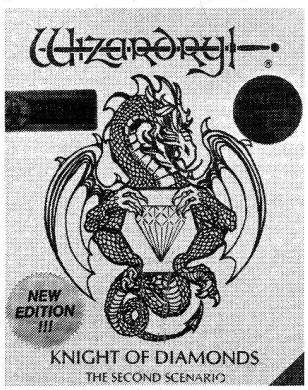
"I hope the game will give players an insight into what it is to be a police officer," Walls says—"the things we come across, how we handle them. And it should give an idea of what we feel and go through."

GAMEPORT

THE WIZARD'S NEW CLOTHES

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

Many years have passed since role players



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

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

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

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

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

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

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

Applied Engineering™

RAMUP™ For RAMSPEED.

Watch Your Boot Time *Disappear* With This Utilities Breakthrough.

RAMUP™ The Instantaneous RamCard Utility.



RAMUP™ utility software allows you to flip within 2 seconds between up to 20 Apple programs. Consider the advantages of eliminating disk swapping through a program that even a computer novice can easily use. It's true. You don't need a knowledge of programming or pathnames to get started. The entire program with an easy-to-understand instruction book, full guarantees and technical support is only $39.95.

Your Integrating Program Link

RAMUP™ is the integrating link for immediate access between programs like AppleWorks, GraphWorks, Sensible Speller, Ascii Express, BPI, Multiscribe and most other software packages. Besides being able to flip from program to program, users can boot up other software and then immediately return back to any of the programs on their RamCard(s).

The Best No-Fault Guarantees Mean That You Can't Go Wrong.

Even if you aren't an expert in software set-up, you'll find that our walk-through installation directions and full technical support will get you up and running *in a matter of minutes.* Then, if you aren't completely satisfied with RAMUP™, or your AE hardware, *we'll give you your money back in the first 30 days.* You also won't have to worry about defects — *if anything goes wrong in the first five years of use, we'll send you a replacement free of charge.* Call right now, toll free 1-800-443-6697 to order your RAMUP™ program. While you're talking to us, consider some of our other money saving values below.

In Addition To RAMUP™, We Also Have Some Of The Best Applied Engineering Product Buys That You're Likely To Find!

If you order from Quality Computers, *you can save over 20%* on Applied Engineering Products with high quality, AE installed RAM's. We stock all AE products so when you buy, ask us first! *As we mentioned earlier, — if you aren't completely satisfied, we'll give you your money back in the first 30 days — and if anything goes wrong in the first five years, we'll send you a replacement free of charge.*

PRODUCT	512K	1Mg	PRODUCT	Prices
Ramworks	$ 195	$ 259	TransWarp	$ 214
Ramfactor	218	284	Timemaster	79
Ultra II	249	309	SMT no slot clock	54
Ultra III	294	364	Ramcharger	139
GS RAM	174	239	Ram sets of 256	29

Order Toll-Free:

1-800-443-6697

Free, Friendly Technical Support (313) 885-4215
Free Newsletter with RAMUP™
Visa, Mastercard

QUALITY COMPUTERS
1365 Berkshire • Grosse Pointe, MI 48230
(313) 885-4270 (Michigan Residents)

CIRCLE 104 ON READER SERVICE CARD

GAMEPORT

FANFARE FOR THE COMMON CRITIC

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

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

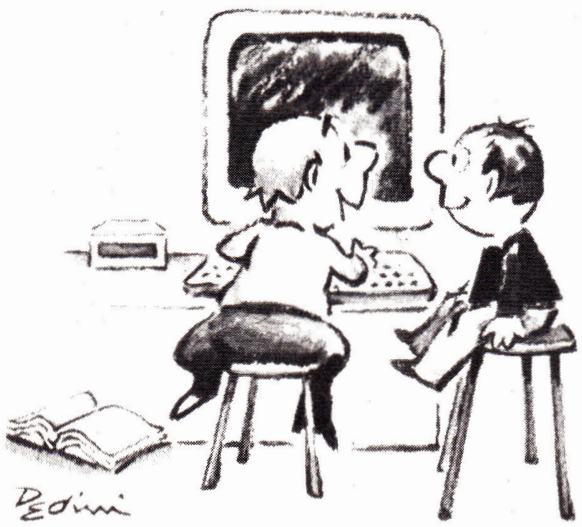
Put on weight, wear a ski mask, and pound the table while yelling like a maniac. Surprise, you're ready for a career in professional wrestling. And you can sweat, grunt, and bluster in the comfort of your own home with Epyx's Championship Wrestling.

Brother fought brother in the bloodiest battle of America's Civil War. The strategic realities of that military tragedy are re-created in The Battle of Antietam from Strategic Simulations, Inc.

She drifts the haunted halls of Tresyllian Castle more elusively than a beauty at a singles bar. She's the White Lady, and she's the spectral star of Moonmist. But don't let the lady scare you. You'll want to return to explore four different plot lines in this text adventure from Infocom. +

BY DEDINI

LAUGHTRACK

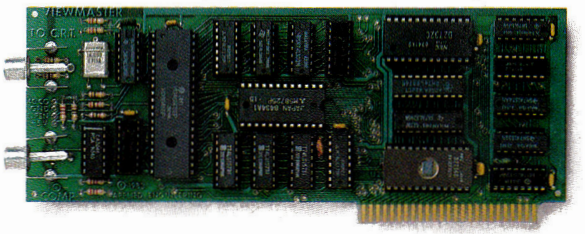


"If we keep at this we could become rich kids. At the very worst, rich old men."

From A MUCH, MUCH BETTER WORLD. Reprinted by Permission of Microsoft Press © 1985 by Eldon Dedini. All Rights Reserved.

Viewmaster 80

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



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

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

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

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

Here are just a few of the powerful features the Viewmaster 80 delivers for a great price ($149):
• 80 Characters by 24 lines • Fully compatible with all Apple languages and software • Highest compatibility with existing 80 column software • Very low power consumption • High speed (18 MHZ) scroll rate • Upper and lower case characters and true descenders, both inverse and normal; all on-screen editing functions are supported • User-definable cursor shape • Compatible with Apple II, II+ and IIe • Five-year warranty

Call today to order or for more information, 9 a.m. to 11 p.m. seven days, or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

CP/M is a registered trademark of Digital Research, Inc.

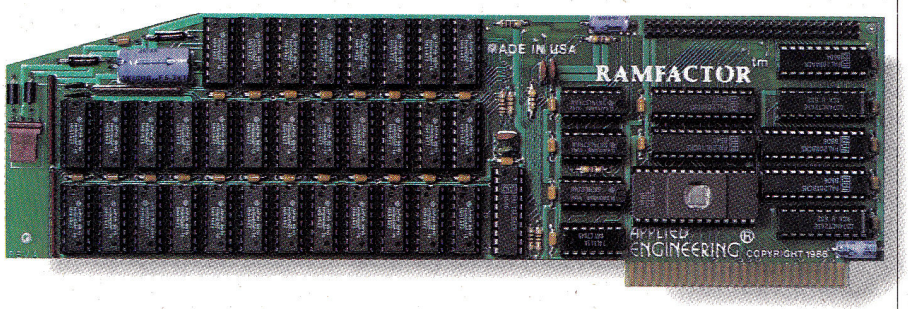
Applied Engineering
P.O. Box 798, Carrollton, TX 75006
(214) 241-6060

RamFactor™

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

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

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



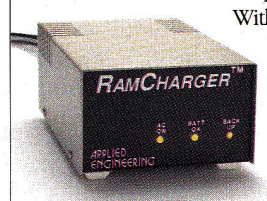
Very Compatible

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

AppleWorks Power

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

The "Instant On" Apple.



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

Powerful Program Switcher

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

Features:

- 256K to 1 MEG on main board. Expansion connector for possible further expansion to 16 MEG.
- Fully Apple II Memory Expansion compatible
- Compatible with Apple IIe, II+, IIGS, Franklin and Laser 128
- Battery back-up option allows you to turn on your Apple and run your favorite programs in less than 1 second!
- Automatically recognized by ProDos, DOS 3.3, Pascal, and standard CP/M
- Built-in RamDrive™ software (a true RAM disk not disk caching)
- Systems are directly bootable from RamFactor if desired
- Built-in self diagnostic software
- Automatic expansion with AppleWorks 1.3 or 2.0
- Allows Apple II+ and IIe to run your AppleWorks without buying any additional software
- Accelerates AppleWorks
- Displays time and date on the AppleWorks screen with any ProDos clock
- Fits any I/O slot except slot 3
- Fully socketed and user upgradeable
- Much, much more

RamFactor with 256K	**$239**
RamFactor with 512K	**$279**
RamFactor with 1 MEG	**$359**
RamFactor with 2-16 MEG	**CALL**
RamCharger backup option	**$179**
"Y" cable	**$24**
(Allows one RamCharger to power two RamFactors.)	

Order RamFactor today . . . with 15 day money back guarantee and our "no hassle" five year warranty. *See* your dealer *or call* (214) 241-6060, 9 a.m. to 11 p.m., 7 days, *or send* check or money order to Applied Engineering, MasterCard, Visa and C.O.D. welcome. Texas residents add 6¼ sales tax. Add $10.00 if outside U.S.A.

Applied Engineering™

The Apple enhancement experts.

(214) 241-6060

P.O. Box 798, Carrollton, TX 75006

ENTERTAIN



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

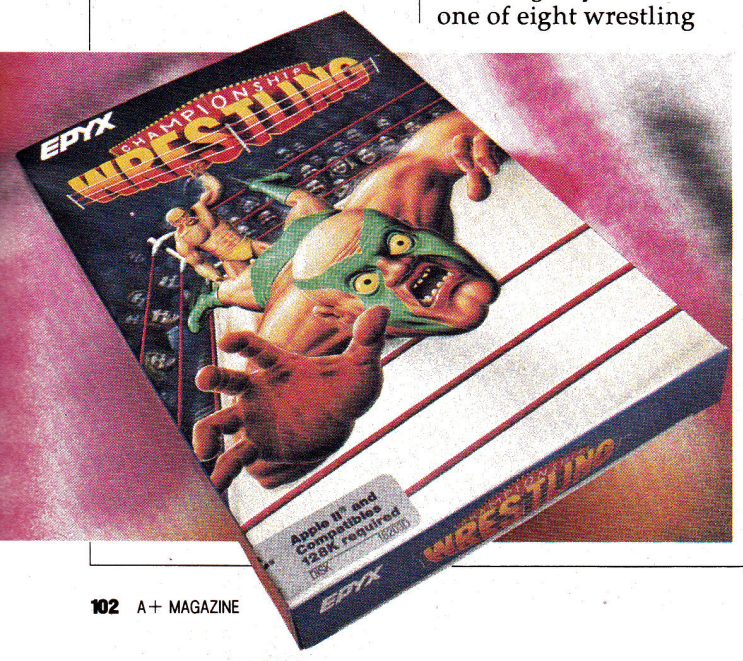
SIMULATED MAYHEM

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

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

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

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



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

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



throw or slam your opponent. Got it?

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

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

MENT REVIEWS



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

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

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

Brian J. Murphy

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

MOONLIGHTING MEETS MADMAN

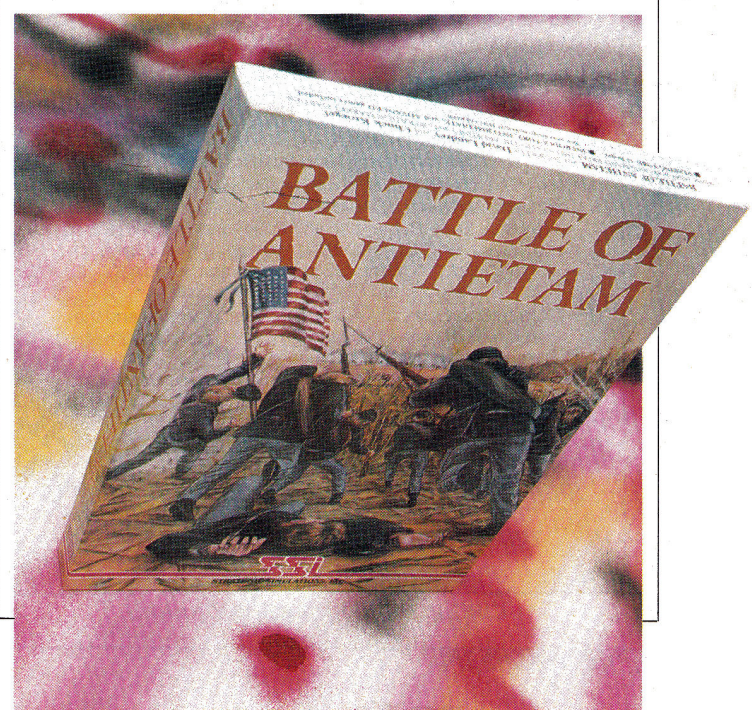
Hey muchachos and muchachettes! The top gringo is back in town, and Arriba, Arriba, Fiesta-time! But hey! Gotta blow in a few tics to do the open-heart surgery, then it's out for the gig at the stadium. I got ten new rock'n'rollin' songs I composed in the chopper. Hey, tune this in—it's about a writer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

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

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

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

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



SPECIAL UPGRADE OFFER!

ProGrappler®
Printer Interface

Orange Micro's terrific new ProGrappler printer interface sets the standard for ease-of-use and power for Apple II+, IIe and IIGS interfacing.

Now, for a limited time, you can upgrade your current parallel printer interface to the ProGrappler for only $55 (a $119 value!) plus $7.50 shipping and handling and your old board.

The ProGrappler's state-of-the-art features include:

- More than 75 text and graphics commands.
- Easy-to-use pull-down menus.
- Installs as a desk accessory on the IIGS and can be accessed at any time to do a "screen shot."
- Supports most popular parallel printers, including color printers.
- New cropping and sizing commands allow manipulation of pre-existing graphics.

To upgrade, send in $62.50 plus any qualifying parallel printer interface*, including cable to:

Orange Micro, Inc.
Attn: ProGrappler Upgrade Offer
1402 N. Lakeview Ave.
Anaheim, CA 92807

Personal checks, Money Orders and Visa/MasterCard accepted. Credit card customers must advise card type, number and expiration date. Offer valid in U.S. and Canada only, U.S. funds only. California residents must add applicable sales tax. Allow 2-3 weeks from receipt of order.

*Any parallel printer interface for Apple computers from Orange Micro, Apple Computer, Apricorn, Interactive Structures, Microtek, Practical Peripherals, Quadram, Street Electronics, Texprint, Thirdware, Tiger and Wizard.

CIRCLE 108 ON READER SERVICE CARD

COMPUTEREYES™



Capture Video Images
Only $129.95

Now you can easily and inexpensively acquire images from any standard video source – videotape, camera, disk – for display on your Apple II+, IIe, IIc, or IIgs. Capture time is less than six seconds.

ComputerEyes has everything you need: Interface hardware, complete easy-to-use software support on disk, owner's manual, and optional enhancement software. And it's compatible with virtually all popular graphics programs. GS super-res mode support available, too. Think of the possibilities!

ComputerEyes is backed by a one year warranty and the success of over 10,000 systems sold. Satisfaction guaranteed or return it within ten days for full refund. Also available: Demo Disk, $3; ComputerEyes with quality b/w video camera, $399.95 complete. See your dealer or order direct. For more information call 617-329-5400.

To order call 800-346-0090
or mail your order to: Digital Vision, Inc.
66 Eastern Avenue, Dedham, MA 02026
VISA, M/C, or COD accepted.
S&H: $4 for ComputerEyes, $9 for Camera System. Mass. residents add 5% sales tax.

DIGITAL VISION

CIRCLE 170 ON READER SERVICE CARD

REVIEWS

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

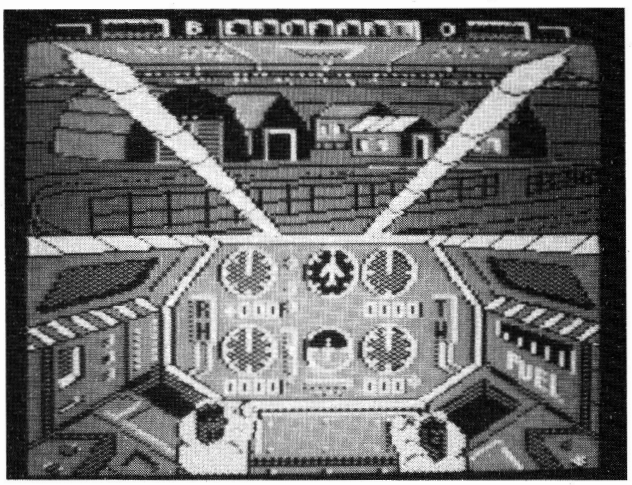
All I have to do is pilot my Whizbang Gizmo DHX-1 Attack Helicopter into the country ruled by The Mad Leader, infiltrate his base three times, and stop his plans to start a war—all under time pressure, of course. No prob—another day, another peso.

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



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

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



REVIEWS

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

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

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

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

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

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

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

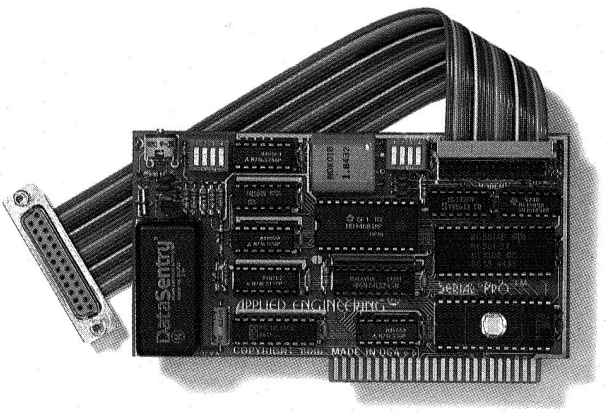
Hey, you blew the game, so you blew the movie rights. It happens. Not to me, but it happens. Luck and time, know what I mean? Mindscape, I love ya, but before you release the next one, have your computer call my computer. We'll do lunch. I'll let you know what will fly. Birds and view, know what I mean?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

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

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

INFILTRATOR
Mindscape
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
LIST PRICE: *$29.95*
REQUIRES: *Apple II Plus, IIe, or IIc; 64K RAM; joystick optional*
CIRCLE READER SERVICE NO. **421**

Serial Pro®
The intelligent multifunction card from Applied Engineering.



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

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

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

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

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

Serial Pro comes complete with manual, cable and instructions for connecting to all the leading printers and modems.
Serial Pro **$159**

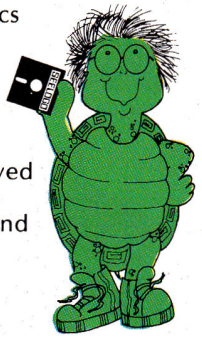
Order Today! See your dealer or call Applied Engineering, 9 a.m. to 11 p.m. 7 days. Or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

APPLIED ENGINEERING™
The Apple enhancement experts.
(214) 241-6060
P.O. Box 798, Carrollton, TX 75006

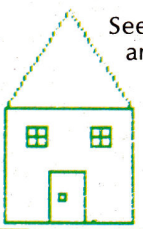
Your child will love learning *SeeLogo* at home.

You'll love the results.

SeeLogo is the ideal home version of the introductory turtle graphics language taught in thousands of schools. It will help your child learn critical skills such as sequencing, estimation, spatial relationships, and orientation. They become increasingly involved in the basic steps of problem solving — planning, executing, and revising.



With *SeeLogo* computer programming becomes child's play — and that's something you can *both* be very proud of!



See for yourself! Try *SeeLogo* for 30 days and return for a 100% refund unless completely satisfied.
Send $39.95 plus $2.00 S/H to:

K-12 MicroMedia Pub.
6 Arrow Rd., Box J-10
Ramsey, NJ 07446
(800) 922-0401

CIRCLE 116 ON READER SERVICE CARD

pd
Precision Data Products™
Complete Line of Quality Supplies for Your Computer

TOLL FREE ORDER LINE
800-258-0028
FOR INFORMATION CALL
616-452-3457

SONY
3.5" DISKETTES
Certified by Apple for MacIntosh™

- **Safety Auto Shutter** protects against fingerprints and dust
- **Safety Auto Design** is heat-resistant and guards against disk damage during handling.



Price Per Diskette

	SS	DS
Box	1.24	1.79
Bulk	1.17	1.29

GUARANTEED 100% ERROR FREE

POLY PACK 5¼" DISKETTES
(From Leading Mfr.)



36¢ Each

- Blank Jackets
- WP Tabs
- Envelopes

100% Error Free
Lifetime Warranty
Sold in Lots of 100 Only

KENSINGTON™
Mouse Cleaning Kit and Mouse Pocket
Sale $17.95 ea. (Sugg. Retail $24.95)
Mouseway
Sale $7.95 ea. (Sugg. Retail $9.95)
Free shipping with diskette order

Min. Order $25.00. Add 10% for less than 50 disks. S&H: Continental USA $4.00/100 or fewer disks. $2.00 per dozen ribbons. Reduced shipping charge on larger quantities. Foreign orders, APO/FPO, please call. MI residents add 4% tax. Prices subject to change without notice. Hours: 8:30 AM - 7:00 PM ET.

pd
Precision Data Products™
P.O. Box 8367, Grand Rapids, MI 49518
Customer Service & Information: (616) 452-3457
Toll Free Order Lines: MI 1-800-632-2468
Toll Free Order Lines: Outside MI 1-800-258-0028

MasterCard VISA

CIRCLE 228 ON READER SERVICE CARD

REVIEWS

THE GHOST GOES WEST—OR WAS THAT EAST?

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



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

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

Interactive fiction is an immensely popular form of computer entertainment, mainly because when you play this type of game you are not just a

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

passive observer—you assume the lead role in the story. Although you eventually have to follow a predetermined path to the solution, you usually have a satisfying degree of flexibility in shaping the course of events.

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

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

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

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

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

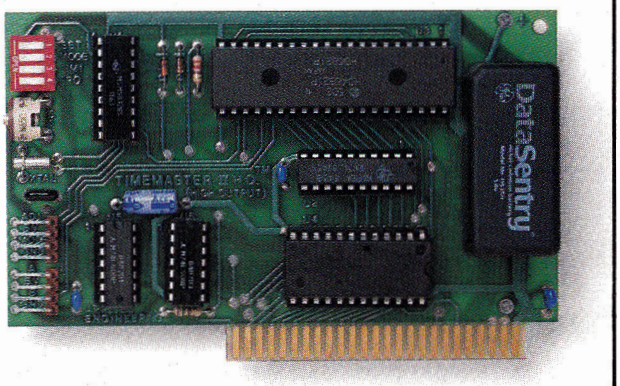
Donald Oliver

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

MOONMIST
Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
(617) 492-6000
LIST PRICE: *$39.95*
REQUIRES: *Apple II Plus, IIe, IIc, or IIgs; 48K RAM*

CIRCLE READER SERVICE NO. **422**

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



Timemaster H.O. So many features it's become the world's best selling clock card.

It's the smart way to put the time and date on your Apple IIe® or II+®. Because only the Timemaster H.O. packs *ALL* the important features of all the competition *combined,* including leap year, year (not just in PRO-DOS), month, date, day of week, hours, minutes, seconds and milliseconds. It's totally PRO-DOS, DOS 3.3, PASCAL and CP/M compatible. And, of course, it works better than any other clock with AppleWorks.

With the Timemaster H.O. you're assured of reliable, trouble-free operation along with simple, built-in, one-command time setting, accuracy through leap years, and a firmware maintained interrupt setting.

If you're using or writing software for other clock cards, you're still covered. Because the H.O. will *automatically* emulate them. And only the Timemaster H.O. adds 15 new commands to BASIC. The H.O. even comes complete with two disks full of sample programs, including a computerized appointment book, a DOS dating program, interrupt programs, and over 30 programs that others charge you extra for — or don't even offer. As a low-cost option, you can add true BSR remote control to the H.O., giving you remote control of up to 16 lights and appliances in your home or office.

• Time in hours, minutes, seconds and milliseconds; date with year, month, day of week and leap year • 24-hour military format or 12-hour AM/PM format • Eight software controlled interrupts so you can run two programs at the same time (many examples included) • Can be set precisely to the exact second • Digital I/O port for advanced applications • Allows AppleWorks to time and date stamp all data automatically • Displays time and date on AppleWorks screens and files • Five-year warranty

Timemaster H.O.	**$99.00**
BSR option (may be added later)	**$29.00**

Order Timemaster today ... with 15-day money back guarantee and our "no hassle" five-year warranty. See your dealer or call (214) 241-6060, 9 a.m. to 11 p.m., 7 days, or send check or money order to Applied Engineering. MasterCard, Visa and C.O.D. welcome. Texas residents add 6¼% sales tax. Add $10.00 if outside U.S.A.

Applied Engineering
The Apple enhancement experts.

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

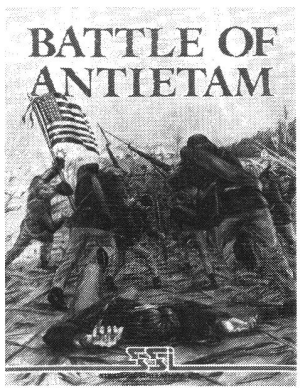
CP/M is a registered trademark of Digital Research, Inc.

REVIEWS REVIEWS

JOHNNY REB VS. BILLY YANK

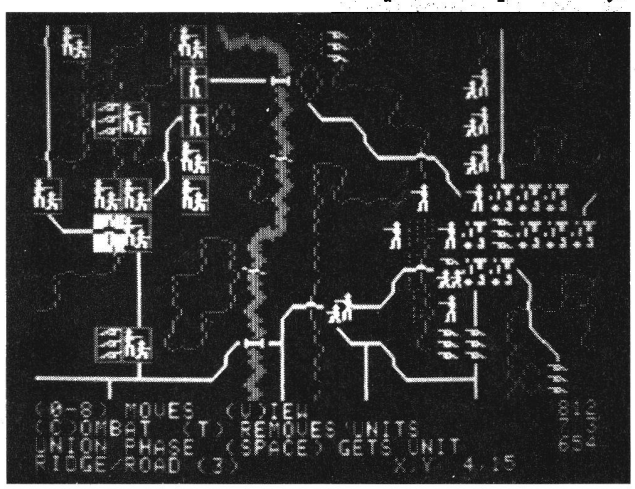
To be honest, I have a love/hate relationship with computer war games. The battles they simulate are interesting, the military concepts they present are sound, and the ability to pit your strategy against an ever-ready opponent is wonderful. They are windows to history and provide an ideal way to project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

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



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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

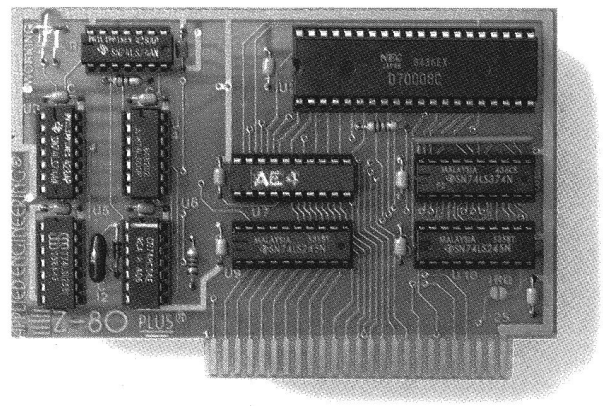
All in all, I find Battle of Antietam an outstanding simulation. It offers variable complexity, provides good historical perspective, and involves you in the game. If you are looking for a computer war game, try this one in your disk drive.

Russ Lockwood

BATTLE OF ANTIETAM
Strategic Simulations, Inc.
1046 North Rengstorff Avenue
Mountain View, CA 94043
(415) 964-1353
LIST PRICE: *$49.95*
REQUIRES: *Apple II Plus, IIe, IIc, or IIGS*

CIRCLE READER SERVICE NO. **423**

With the Z-80 Plus®, run over 5000 new CP/M® programs.



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

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

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

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

Each Z-80 Plus comes with our CP/M Ram Drive software, enabling most memory cards to work as a high-speed Ram disk so CP/M software can run up to *twenty times faster*. So packages like WordStar, dBASE II, Turbo Pascal and most others run at blinding speed.

Simply plug the Z-80 Plus into any slot in your Apple. You'll get the benefits of two computers in one—all at an unbelievably low price (only $149!).

• Fully compatible with ALL CP/M software • Fully compatible with 5¼" *and* 3½" disk drives as well as most hard disks including the Sider • Fully compatible with Microsoft disks (no pre-boot required) • Specifically designed for high speed operation • Runs WordStar, dBASE II, Turbo Pascal, and ALL other CP/M software with *no pre-boot.* • Semi-custom I.C. and low parts count allows Z-80 Plus to fly through CP/M programs with extremely low power consumption (we use the Z-80B) • Does EVERYTHING other Z-80 boards do, *plus* Z-80 interrupts • Five-year warranty

To get your Z-80 Plus or for more information see your dealer, or call 214-241-6060 9 a.m. to 11 p.m. seven days, or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 5⅛% sales tax. Add $10.00 outside U.S.A.

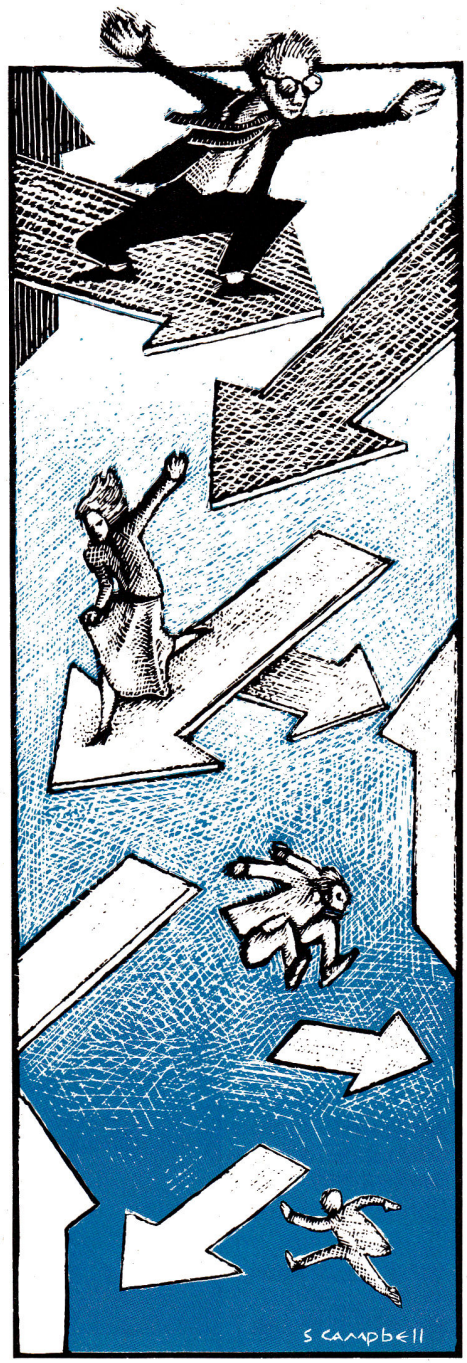
Applied Engineering™
P.O. Box 798, Carrollton, TX 75006
(214) 241-6060

CPM is a registered trademark of Digital Research.

BY MICHAEL WIESENBERG

MULTIDIGITAL MULTIPLICATION MIND-BENDER

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



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

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

Send a complete program. Be sure to include sample output and running time. If you send a disk, please also enclose hard copy. Your program must be short, elegant, and self-documenting or accompanied by a good, concise explication. The best solution wins a one-year subscription (or extension) to *A+* and a Certificate of Excellence in Programming and will be published here.

Please send all entries, which must be received by June 12, 1987, to Computer Calisthenics, Box 2329, Stanford, CA 94305. Please send entries by *regular* mail only. The author does not receive in time any mail for which he must sign. All entries become the property of the author. The winner will be selected by the author, whose decision will be final. The winning program will be announced in the August 1987 issue.

Answer to March's Puzzle

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

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

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

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

ILLUSTRATION BY STEVE CAMPBELL

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

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

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

When that occurs, you can write:

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

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

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

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

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

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

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

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

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

THE MARCH WINNER

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

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

6 YEARS
OR
60,000 MILES

90 DAYS PARTS
&
LABOR

Guarantees are important. You wouldn't buy a car without a good warranty. And you wouldn't purchase any peripherals without a good service warranty.

But it's almost impossible to find a good guarantee that promises non-stop, *useful* information for your Mac—until now...

THE MacUser
SUBSCRIBER GUARANTEE

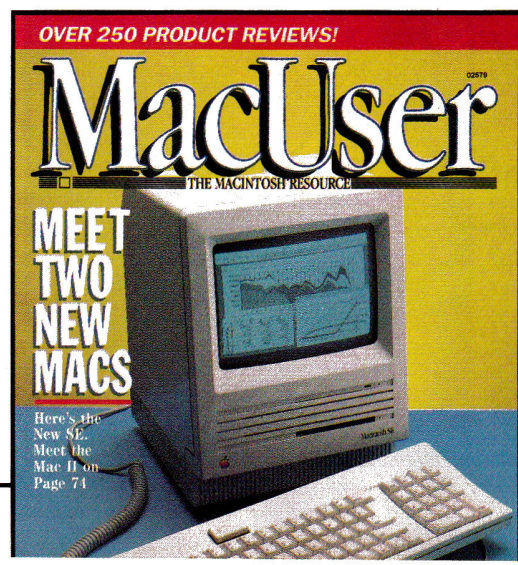
MONTHLY DELIVERY OF APPLICATIONS—PRODUCT REVIEWS AND TUTORIALS OR A FULL REFUND ON ALL UNMAILED ISSUES!

Your subscription to MacUser will deliver hands-on power user tips and techniques, in-depth coverage about the applications business, education and professional users need to know about *and* 250 product reviews each issue.

If you find MacUser does not deliver the information, ideas and coverage on desktop publishing, telecommunications, graphics, and other power-user applications, you can cancel your subscription and receive a full refund on all unmailed issues.

Guaranteed.

So, subscribe today. Deliver the input you need to maximize the performance of your Mac and SAVE UP TO 63%—GUARANTEED!



Call: Toll Free:
1-800-852-5200
for fast service!

8Z029

TIPS AND TECHNIQUES

Readers share tips for the II

SCREEN SLIDER

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

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

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

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

Robert C. Moore
Laurel, MD

INPUT TRICKS

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

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

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

Vincent D. O'Connor
Minneapolis, MN

CURSOR CHANGER

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

Chung H. Shum
Alhambra, CA

KEEPING TRACK OF DISKS

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

R. Douglas Briggs
Portland, ME

SCREEN-SLIDER PROGRAM

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

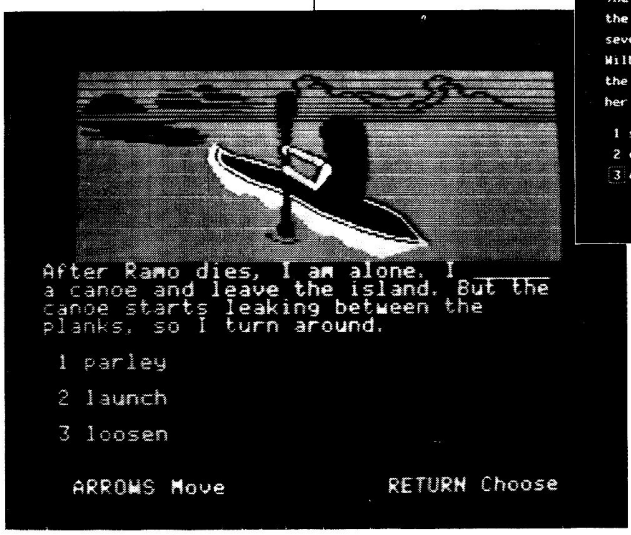
CRAZY SOUND

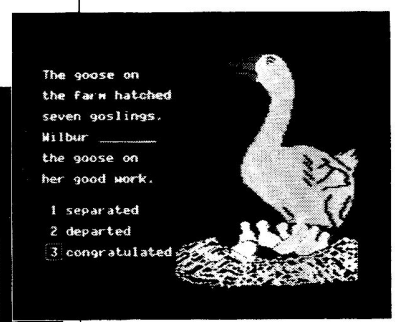
```
1  HOME : FOR D = 1 TO 40: VTAB 2: PRINT ".";: VTAB 22: PRINT ".";: NEXT
: FOR A = 770 TO 788: READ B: POKE A,B: NEXT : VTAB 11: PRINT " PRESS
FIRE BUTTON #0 TO START": WAIT  - 16287,128: CALL 770: DATA
162,,32,30,251,141,48,192,162,1,32,30,251 ,141,48,192,76,,3
```

Jackie Lee
Scarborough, Ontario, Canada

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

P I P E





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

SUNBURST SOFTWARE

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

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

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

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

CIRCLE READER SERVICE NO. **550**

3.5-INCH HEAD-CLEANING DISKETTE KIT

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

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

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

CIRCLE READER SERVICE NO. **551**



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

LINE

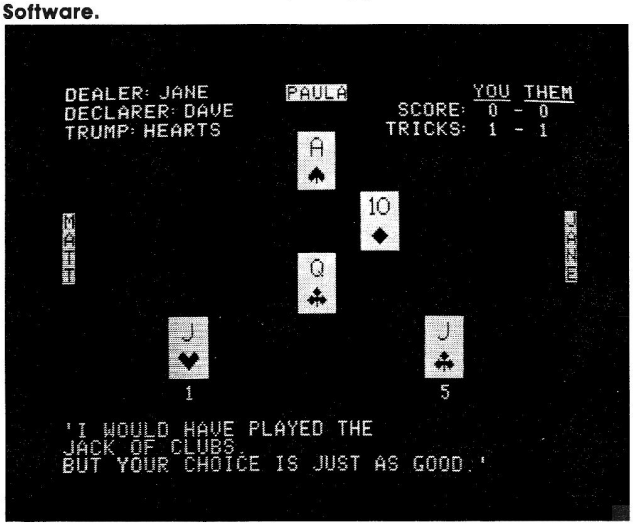
CARD PARTNER EUCHRE

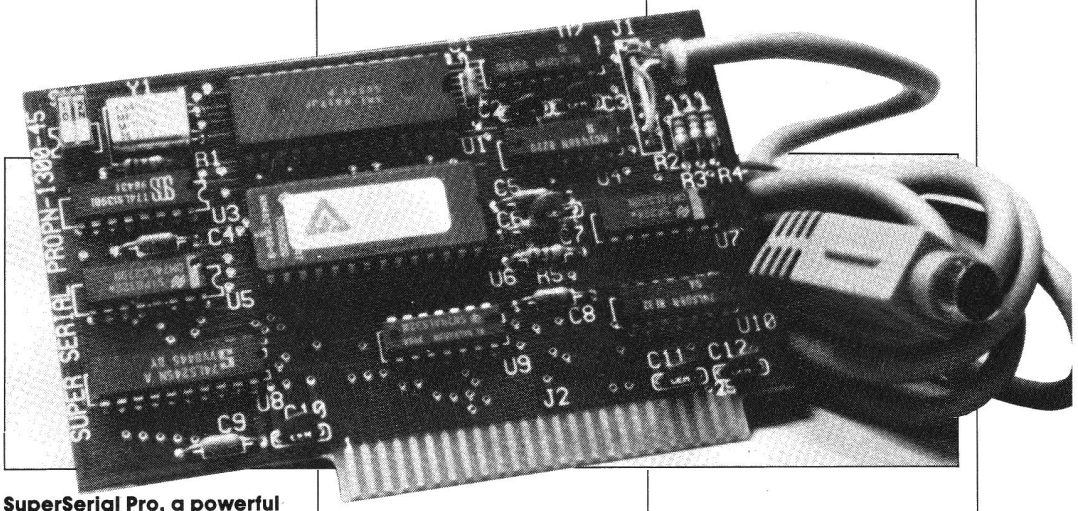
Card Partner Euchre is a computerized version of the centuries-old card game Euchre. Resembling the game Trump, Euchre is played by four people in two partnerships. In this version of the game, the computer plays three of the four hands. The program displays cards in hi-res graphics, along with each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

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

CIRCLE READER SERVICE NO. **552**

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





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

SUPER SERIAL PRO CARD

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

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

CIRCLE READER SERVICE NO. **553**

LASER-PRINTER CARTRIDGES

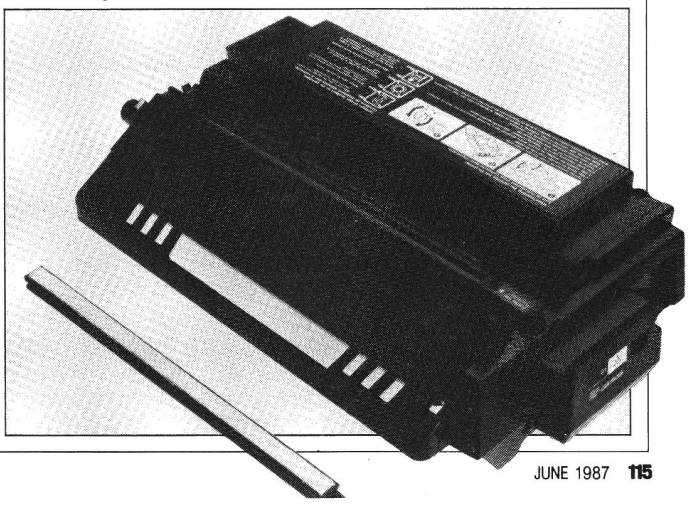
Lasers Edge has introduced a service that provides reconditioned and refilled laser-printer cartridges and purchases spent cartridges for $5 each.

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

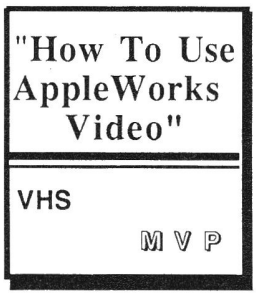
Lasers Edge
392 Salem Street
Wilmington, MA 01887
(617) 658-0178

CIRCLE READER SERVICE NO. **554**

Reconditioned laser-printer cartridges are available from Lasers Edge.



"How To Use AppleWorks Video"



A Training Video tape for VHS or Beta Video Recorders.

This "How To" video tape will take you from start to finish - helping you learn Appleworks with easy to follow instructions at your own convenience. Learn more about Word Processing, Spreadsheet functions, Database and much more in hours instead of weeks.

Introductory Offer $49.95

Order Toll Free 1-800-621-0937

Customer Service & Information: (505)885-6023

Computer Network

211 W. Fiesta #25, Carlsbad, New Mexico 88220

S & H $4.00, We accept Visa, M/C and AM cards.

CIRCLE 137 ON READER SERVICE CARD

BUSINESS • SCIENCE • EDUCATION

The complete Apple II **STATISTICAL PACKAGE** for only: **$99**

APP-STAT™

A Powerful Tool for Data Analysis and Forecasting

- Easy to use, no commands to memorize (menu-driven)
- Descriptive Statistics, t-tests (independent and dependent samples), General ANOVA/ANCOVA (up to five factors, **unlimited number of cases**, Repeated Measures, unbalanced designs, contrasts, adjusted means, and more), Correlations, Multiple Regression (up to 15 predictors, **unlimited number of cases**), Crosstabulation, Significance Tests, 10 Nonparametric Statistics, and more
- User defined (multiple) conditional selection of subsets of cases, various ways of treating missing data
- Flexible Data Editor, easy entering/editing of data, complex (conditional) transformations of variables, and more
- Can also access files created by spreadsheets (e.g. AppleWorks) and data bases
- Barcharts, Scatterplots, clear comprehensive output
- Will run on APPLE II+, IIc, IIe and II GS with 80 column display, 1 disk drive

To order send check or money order for $99 (plus $5 for shipping and handling) to:

MasterCard **StatSoft™** VISA

2832 East 10th Street, Suite 4, Tulsa, OK 74104. (918) 583-4149

ASK ABOUT THE VERSION FOR MACINTOSH!

CIRCLE 207 ON READER SERVICE CARD

P I P E

HARDWARE

POWER-PAK

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

Requires: Apple IIGS

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

CIRCLE READER SERVICE NO. **555**

SOFTWARE

SCAT SOFTWARE

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

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

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

CIRCLE READER SERVICE NO. **556**

REVISED BATTLE OF WORDS

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

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

Requires: Apple IIe or IIc, 64K RAM

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

CIRCLE READER SERVICE NO. **557**

L I N E

CHARTS UNLIMITED

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

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

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

CIRCLE READER SERVICE NO. **567**

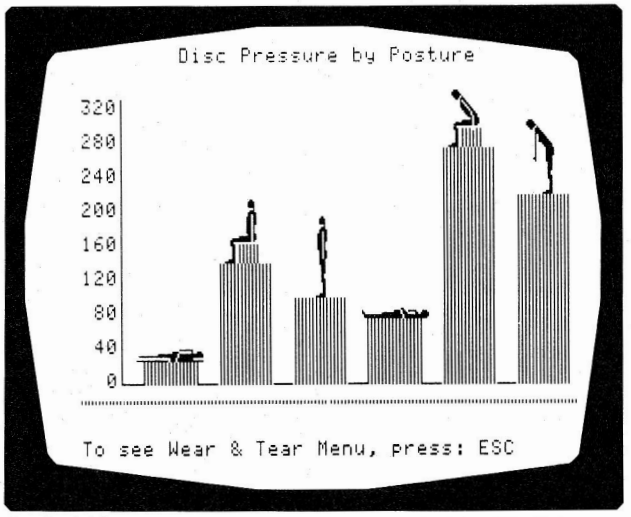
BACKAID SOFTWARE

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

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

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

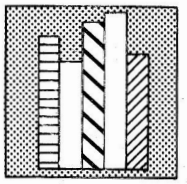
CIRCLE READER SERVICE NO. **558**



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

AppleWorks IN COLOR!

Expand AppleWorks with Visualizer™, the business graphics solution from PBI Software. Produce professional color graphics from AppleWorks data or directly from Visualizer itself.



Req. Apple IIe/IIc/ IIGS. AppleWorks optional.

$89.95

Visualizer IIe

The graphic link to AppleWorks. Dazzle your boss, teacher, and friends. Produce business graphs from AppleWorks spreadsheet data or from within Visualizer itself. Graph types include pies, exploded pies, bars, lines, stacked-bars and scatters. Then the imagination begins because now you can customize your creation. With the overlay feature, you can display several different graph types at once. Add background pictures (such as those created from DazzleDraw), place text anywhere (multiple fonts and sizes), scale the Y axis, as well create 3-D graphs (pie, bar and stacked-bar). Prints in B/W or in color on the ImageWriter II... supports over 50 printers and interface cards. Not copy protected for ease of installation to hard disk drives or RAM disks. Version 1.2.



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

$99.95

Visualizer IIGS

Special IIGS version of Visualizer; supports ProDOS™ 16, mouse, windows, pull-down menus, 640x200 super hi-res display... Creates over 10 different graph types (including bars, 3-D bars, pies, 3-D pies, exploded pies, area, lines, points, scatter, hi-lo, stacked-bar). Graph data from AppleWorks spreadsheets, or DIF file formats or from Visualizer itself. Select from over 130 colors to highlight points, bars, slices, and lines. Add text, pointers and lines to highlight specific areas of the graphs. Prints B/W and color graphs as well. Perform statistical analyses and scientific functions (i.e. linear regression, means, standard deviation, logarithmic scaling). Automatically scales and labels X and Y axes, but can also be user defined. Overlay charts on background pictures to give your data more impact. These background pictures can be created from paint programs available on the IIGS. The most powerful business graphics package available for your GS. Supports ImageWriter I/II and the LaserWriter. Not copy protected for ease of installation to hard disk drives or RAM disks. Version 1.08.

"If this program doesn't become an industry standard nothing will. Visualizer creates color business graphics directly from AppleWorks spreadsheet. This is not an ordinary graphing program..." Phil Inger Electronic Learning (2/87)

PBI SOFTWARE, INC.

1163 Triton Drive
Foster City, CA 94404
(415) 349-8765

ORDER NOW!

Toll Free **800-843-5722**
in CA **800-572-2746**
or contact your local dealer

CIRCLE 124 ON READER SERVICE CARD

PIPELINE

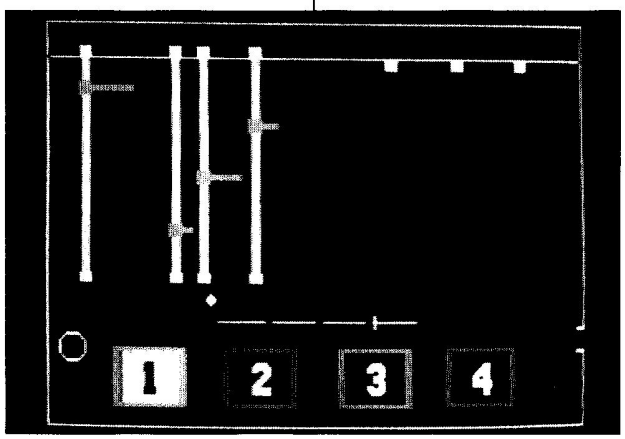
MUSICSHAPES

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

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

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

CIRCLE READER SERVICE NO. **560**



MusicShapes lets children create their own compositions.

MENUS & WINDOWS

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

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

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

CIRCLE READER SERVICE NO. **561**

AWARDWARE

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

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

Hi Tech Expressions
2699 S. Bayshore Drive
Suite 1000A
Coconut Grove, FL 33133
(800) 848-9273
(305) 854-2318

CIRCLE READER SERVICE NO. **562**

ZIMCO
INTERNATIONAL, INC.
85-39 213 St., Queens Village, NY 11427

♦♦♦ APPLE ACCESSORIES ♦♦♦
A+ MOUSE (IIc, Mac) $89
Applied Engineering Ramworksiii 256k/1Mg $175/269
Applied Engineering RGB Option $99
Applied Engineering Timemaster/Viewmaster $95/109
Applied Engineering ZRam ULTRA 1/2/3 ..... $CALL
AST Multi I/O (IIe) $149
COLOR ENHANCER IIe/IIc w/Dazzle Draw $122/88
Cooling Fan $24
80 Column Card (II+) $59
Ext. 80 Col. Card 64K(IIe) $49
Graphics Printer Card $55
KENSINGTON System Saver $59
KOALA Pad Plus $81
NEW KRAFT 3-Button Joystick $33
Joystick for Applie IIe/IBM $19
MOCKINGBOARDS A/B/C ..... $Call
OM Pro-Grappler, + or Buffered $79/120
OM Grappler + Serial or IIc $74/79
DISK STORAGE 100 ..... $11
Printer Interface Parallel $40
16K Ram Card $35
Super Serial Card $59
Diskettes (Box of 10) $7

FREE SHIPPING
For Cash or Check

♦♦♦ SOFTWARE ♦♦♦
BAUDVILLE 816/PAINT $40
Fontworks $33
NEWSROOM $33
Newsroom Clip Art Vol.1 or Vol.2 ..... $16/23
PINPOINT $46
PRINTSHOP IIGS version $42
Print Shop - New COLOR Version $33
Print Shop Companion $23
Print Shop Graphics Libraries 1 or 2 or 3 ..... $15
SENSIBLE GRAMMAR / SPELLER $53/64
Term Paper Writer $36

☞SUMMER SPECIAL☜
HAYES 1200A MODEM....$303
APPLIED ENG. RAMFACTOR
512K...$212 256K...$175
RAMWORKS 512K...$190

♦♦♦ PRINTERS ♦♦♦
Imagewriter II $465
CITIZEN 120D/MSP-10 ..... $192/294
C.ITOH Prowriter Jr. $245
EPSON FX-86E $395
Epson FX-286E $545
Epson EX-800 ..... $465
NEC Pinwriter P6* $460
OKIMATE 292/293 ..... $462/611
OKIDATA 192+/193+ $340/554
PANASONIC KXP-1092 ..... $330
Panasonic KXP-1592 ..... $419
QUME LetterPro20 + /Sprint1400* $592/899
STAR NX-10 Parallel $236

FREE SHIPPING
For Cash or Check

♦♦♦ DRIVES ♦♦♦
CENTRAL POINT 3.5" Drive $185
CORVUS Hard Drive ..... $Call
Disk Drive - Apple II Series $96
PICO Apple II Disk Drive w / 1yr.warranty $139
Disk Drive Controler card $35

♦♦♦ MONITORS ♦♦♦
AMDEK 600 (RGB) $361
Amdek 725 Color $445
Monochrome Monitor $89
PICO Surge/Swivel $50
PRINCETON HX-12E (RGB) $480
TOMPSON RGB 540x240 resolution $240

♦♦♦ MODEMS ♦♦♦
HAYES Smart Modem 300 (IIc) $152
Hayes 1200/2400 ..... $373/585
Hayes Micromodem IIe $145
1200 bps Hayes Compatible Ext. $119
2400 bps Hayes Compatible Ext. $299
PROMETHEUS PRO-MODEM $269
Prometheus 1200A $231
Prometheus 2400G $364
US ROBOTICS Courier 2400 ..... $397

✆1-800-227-6647
Inquiries, Tech Support & New York:
Call 718-479-7888

VISA/MasterCard accepted. Prices subject to change. Macintosh, Apple, IBM, printer supplies, cables, hardware, software, complete systems. Call toll-free for current prices & $3.50 color catalog. Prices reflect cash/check only. *Needs interface.

CIRCLE 126 ON READER SERVICE CARD

WIN AN EXCITING NEW **APPLE IIGS SYSTEM!**

Enter The **A+** *First Annual*

"HOW I USE THE II TO TEACH" CONTEST

October is Computer Learning Month. Share with us your creative Apple II teaching methods, and you may win one of 52 exciting prizes.

A+ Magazine will celebrate by awarding two Grand Prize Apple IIGS systems, including the AST Research-VisionPlus Digitizer, Applied Engineering 512K Ram Board, MDIdeas Supersonic stereo card and a KroyKolor printer/photocopier enhancer.

Or you may win one of 50 software packages from the leaders in educational computing.

CLASSROOM USERS: Tell us about innovative computer classes, outstanding computer facilities, or remarkable teaching techniques aimed at teaching two or more people. Have you developed new classroom applications? Curriculum improvements? Success with handicapped or special education programs? How about innovative corporate training programs?

HOME/PERSONAL USERS: Tell us how you have introduced one person to computers. It might be a story of success at home. Of parents and children sharing in the Apple II learning adventure. Has your Apple II become a center for home creativity? Of increased grade point averages? For overcoming a learning obstacle?

In addition to the Grand Prize Winners, 25 FIRST PRIZE Winners in each division will be awarded a choice of software from: Activision, Addison-Wesley Publishing Company, Blue Lion Software, Broderbund, Compu-Teach, Davidson & Associates, Designware, Electronic Arts, Field Communications, First Byte, K-12 MicroMedia, Learning Company, Mindscape, Monogram Software, Spinnaker, Springboard, Sunburst Communications, The Cerebic Institute, Weekly Reader Family Software, and Woodbury Software.

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

SEE ADDITIONAL RULES AND REQUIREMENTS ON PAGE 120.

Send your entries to:

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

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



ALL ENTRIES MUST BE POSTMARKED BY **AUGUST 15, 1987**, AND RECEIVED BY **AUGUST 21, 1987**.

PHOTO COURTESY APPLE COMPUTER, INC.

THE AMAZING VOICE MASTER®

ENTER THE FINAL FRONTIER OF MAN-TO-MACHINE COMMUNICATIONS



There is nothing else like it. Voice Master gives both speech output and voice recognition with this single hardware product! Your voice controls programs, or home appliances, robots, and more with spoken commands. Verbal response back gives status, verifies, or requests your reply! Speech output and recognition patterns are recorded in with your voice. Or use the voice of your friend, boss, teacher, mother, even the family pet! Programming is simple with new commands added to BASIC. A music bonus program lets you write and compose musical scores simply by humming the tune. Unlimited applications for fun, education, and commercial use. Design your own programs for profit. Speech and recognition quality unsurpassed by even the most sophisticated machines. Only Covox provides this high-tech marvel at a price less than most common peripherals.

The Covox Voice Master comes complete with all hardware and software for only $89.95. (Add $4 shipping and handling for USA, $6 Canada, $10 overseas.) Available for Commodore 64/128, Apple II, II+, IIc, IIe, Atari 800, 800XL, 130 XE. Specify when ordering. Visa, MasterCard phone orders accepted.

Call or write for FREE Voice Master Infopak and special combination package offers.

COVOX INC., DEPT. A+

675-D Conger Street • Eugene, Oregon 97402 • U.S.A.
Area Code (503) 342-1271 • Telex 706017 (Av Alarm UD)

CIRCLE 151 ON READER SERVICE CARD

PIPELINE

RAMUP

A menu-driven program written in BASIC, RAMUP allows even users with no programming knowledge to load and manage programs on memory-expansion boards, such as those from Applied Engineering and Apple. The program works with most ProDOS software. Users select specific software from RAMUP's menu, and the program then prompts them to insert the appropriate disks as they are copied to the RAM card. When the software has been loaded, you can select your software quickly from a desktop menu. As well as moving quickly from program to program, you can boot other software and then return to programs on your RAM card. *(List Price: $34.95)*

Requires: Apple IIe, IIc, or IIGS; 512K RAM; memory-expansion board

Quality Computers and Applications, Inc.
1365 Berkshire
Grosse Point Park, MI
48230
(800) 443-6697
(313) 885-4270

CIRCLE READER SERVICE NO. **564**

AppleWorking MADE EASY

We have AppleWorks Templates (support disks) to meet most home/small business needs.

If you don't see what YOU need write for a complete catalog -- or call to ask for our customization service -- or send $5.99 for a Sampler Disk.

Here are some of our available disks:

No.	Disk Title	Price Each	Quantity	Total
001	Catalog and Sampler Disk	$ 5.99		
201	Mortgage Amortization	24.99		
202	CheckBook Manager	29.99		
203	Finance #1: Stock - Foreign Exchange	19.99		
204	Small Business Bookkeeping	34.99		
301	Mailing List and Address File System	29.99		
405	AncestorsWorks: Trace Your Family History	29.99		
501	Running and Race Reports	34.99		
504	Golf and Bowling	34.99		
505	Baseball	34.99		
602	Teacher's Gradebook	29.99		
901	AppleWorks Tips & Techniques	19.99		

\+ postage & handling, $1.50 per order _____
TOTAL _____

make checks to:

Pacific Technology Systems
Department B
Box 8005
Rockville, MD. 20856
Tel. 301 231-9086

CIRCLE 199 ON READER SERVICE CARD

Enter The A+ First Annual

"HOW I USE THE II TO TEACH" CONTEST

CONTEST RULES

See page 119 for further details No Purchase Necessary

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

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

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

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

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

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

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

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

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

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

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

Rescue Squad

BY GARY B. LITTLE



65816 CARDS AND SOFTWARE FOR THE IIGS

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

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

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

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

ASSEMBLY-LANGUAGE RANDOM-NUMBER GENERATION

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

Lionel H. Layton
Brigham City, UT

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

PRINTING SPECIAL GRAPHIC CHARACTERS

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

Yvan Caya
Montreal, Quebec, Canada

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

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

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

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

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002. Because of limited space we aren't able to publish responses to all inquiries we receive.

ILLUSTRATION BY TOM MURRAY

A+ MARKETPLACE

THE #1 SHOWCASE FOR PRODUCTS AND SERVICES IN APPLE II MARKET

MARKETPLACE CLASSIFICATIONS

HARDWARE 123

ADD-ON-BOARDS 123
COMMUNICATIONS . . . . .
DISK DRIVES 123
DISKETTES 123
GENERAL 123
MONITORS 123
NOISE REDUCTION . . . . .
PERIPHERALS 123
PLOTTERS . . . . .
POWER PROTECTION . . . . .
PRINTERS/PRINTER ACCESSORIES . . . . .
STORAGE DEVICES . . . . .
MEMORY EXPANSION . . . . .

SOFTWARE 124-126

ACCOUNTING . . . . .
AGRICULTURE . . . . .
ASTROLOGY 124
BUSINESS 124
COMMUNICATIONS 124
DATA MANAGEMENT 124
DEVELOPMENT TOOLS . . . . .
EDUCATIONAL 124
ENTERTAINMENT/HOBBIES 124, 125
FINANCIAL 125
GENERAL 125
GRAPHICS 125
LEGAL . . . . .
MAILING PROGRAMS . . . . .

SOFTWARE *continued*

MANUFACTURING . . . . .
MEDICAL/HEALTH 125
ONE-OF-A-KIND 125
PERSONAL . . . . .
PROJECT MANAGEMENT . . . . .
PUBLIC DOMAIN 125
REAL ESTATE 125
RELIGION . . . . .
SCIENTIFIC 126
STATISTICS 126
TAXES 126
UTILITIES 126
WORD PROCESSING . . . . .

MISCELLANEOUS 126-127

ACCESSORIES/SUPPLIES 126
APPLE III . . . . .
BUSINESS OPPORTUNITIES . . . . .
COMPATIBLES . . . . .
COMPUTER INSURANCE 126
COMPUTER LEASING/RENTAL . . . . .
COMPUTER SERVICES . . . . .
COMPUTER TRAINING . . . . .
DATA CONVERSION . . . . .
PUBLICATIONS/CATALOGUES 127
SECURITY 127
USED EQUIPMENT . . . . .
USER GROUPS . . . . .

Advertising Rates and Information:
A+ Magazine Marketplace

A+ Magazine Marketplace is a special economical section for product and service listings.

Listings are grouped by category and sold by column inches. Second color option available.

Standard Directory Listings are also available for a minimum of 3 issues at $215 per issue ($645 total).

For additional information call 212-503-5115.

Production Manager
Anne R. Brockinton
(212) 503-5441

Production Coordinator
Gladys Mathieu

A+ Magazine Classified Advertising Staff
One Park Avenue, New York, NY 10016
(212) 503-5115

Advertising Directory

Advertising Director
Kathryn J. Cumberlander

Sr. Advertising Coordinator
Monica Dixon

Sales Manager
Daniel L. Rosensweig

Advertising Coordinator
Angela Kiffin

National Account Manager
Damon Abramson
(212) 503-5102

Sales Assistant
Linda Annis

A+ MARKETPLACE

THE #1 SHOWCASE FOR PRODUCTS AND SERVICES IN APPLE II MARKET

HARDWARE

ADD-ON BOARDS

APPLE COMPATIBLE CARDS

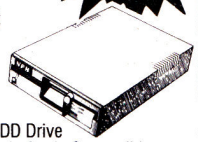
Z-80/Plus CPM card.....$29.95/$35.95
16K/128K RAM (II+).....$29.95/$89.95
Disk ctlr/EPROM burner.....$29.95/$49.95
80 column card II+/IIe.....$42.95/$17.95
Super Ser./II+ Motherbd.....$59.95/$129.00
Ext. 80 col. w/64K (IIe).....$33.95
Par. Grph. prt. card w/cable $35.95
Music card w/2 speakers.....$35.95
90 days wrty. $3 ship; Visa/MC add 4%
P.I.E.
P.O. Box 13509 DEPT. A
Minneapolis, MN 55414
612-379-1020

APPLE/LASER CARDS

SprintDisk by AST research, Apple Works compatible for Apple II,II+,IIe, & laser-128. 256K $199.00
1 MEG $179.00
AST RamStakPlus for IIGS 256K $99.00.
1 MEG $179.00 Laser-128 computers $379.00.
Postage Paid.
Additional disk drives $139.00 Postage Paid.
Monitors $119.00 Postage Paid.
Similar to our previous ad. Lowest price anywhere. Visa,MC,MO, school PO, Check.
To order call 800-992-7446
(In Iowa 319-277-6648).
MICROTECH CONSULTING COMPANY
P.O. Box 521
Cedar Falls, IA 50613

DISK DRIVES

Apple II Disk Drive ONLY $77



- 5¼" SSDD Drive
- Completely Apple Compatible
- Plugs Directly Into Apple Disk Controller
- Space Saving Trimline Design
- 164K Formatted Capacity

Interface for Apple II, IIe and II+ included. Apple IIc and IIgs adapter—$19. ***Add $5 shipping per drive.***

BCE™ 3233 K Street, NW
Department A5
Washington, DC 20007

1-800-545-7447
M-F, 9-8 EST

CIRCLE 617 ON READER SERVICE CARD

DISK DRIVES

RODEO PRODUCTS by BURKE AND ASSOCIATES, INC.

Rodeo Apple II Disk Drive	$129.00
Rodeo Unidisk Drive	$129.00
Rodeo Extended 80 (64K)	$ 29.95
Rodeo Parallel Card w/Cable	$ 29.95
Rodeo Cooling Fan Kensington Style	$ 29.95
Rodeo Disk Controller (Dual Port)	$ 29.95
Rodeo Unidisk Controller	$ 60.00
Rodeo IIe Upgrade Package Drive, Fan, & Extended 80	$169.00

Burke and Associates are vendors to over 2,300 school districts nationwide. We build and sell the finest industrial strength Apple hardware on the market. All Rodeo Products come with one year warranties.

CALL TOLL FREE:
1-800-354-6655
640 W. PATRIOT BLVD.
RENO, NEVADA 89511

CIRCLE 632 ON READER SERVICE CARD

DISKETTES

QUALITY DISKETTES

5¼" DS-DD
100% Certified
Lifetime Warranty
U.S. Mfg., hub ring **35¢**

Add 4¢ For: Tyvec Sleeves, Labels & Tab
3½ DSDD **$1.37 ea.**
3½ SSDD **$1.25 ea.**
Colored 5¼" DSDD in 16 Diff't. Colors **59¢**

Shipping $3 per 100 diskettes
Order by phone or send your check to:
AMERICAL GROUP
(818) 906-1132
14200 Ventura Blvd. Ste. 201
Sherman Oaks, CA 91423

CIRCLE 601 ON READER SERVICE CARD

DISKETTES

*Our diskettes are packaged 10 diskettes in a plain white box w/Tyvec sleeves, reinforced hub ring, color coated labels, write protect tab, lifetime warranty, major U.S. manufacturer, 100% error free.

Your Cost **$3.90/box**
Add $3 per 100 diskettes for shipping & handling

39¢* boxed products
price for diskette only

(213) 479-0345
Data Bureau, Inc.
1633 Westwood Blvd.
Ste. 120
Los Angeles, CA 90024

5.25 HD	$1.45
3.50 SD	$1.25
3.50 DD	$1.45

CIRCLE 618 ON READER SERVICE CARD

MONITORS

RGB CARDS • RGB MONITORS

Apple IIe, IIc, II+, Franklin 1000, 1200, 2000. Cards plug into slot 7. Can be interfaced with II+ 80 col. card or IIe 80 col/RAM cards. Compatible with all RGB monitors. Cable and connector supplied + much more. Colormaster—$99. Kaleidoscope II—$139. Apple IIc module—$119. Sony hi res RGB monitor/TV receiver model KV-1311CR—$450. Digital, analog, composite video, audio, wireless remote control.
VIDEO MARKETING
215-343-3000 or Toll Free: 950-1088
wait for tone—835-3629 (touch tone only)

PERIPHERALS

MOUSETRACER

Use your Mac, IIe, or IIc mouse and draw like the pros! Put cartoons, pictures, maps, etc. on the drawing board. Strap your mouse to the Mousetracer and with your favorite graphics program trace the picture of your choice. Works like a 1:1 drafting board pantograph. Send $34.95 + $3 UPS shipping. (CA res add $2.10 sales tax) to:
BRIMARK INNOVATIONS
9821 Yolanda Ave.
Northridge, CA 91324

For APPLE IIGS, IIe, IIc

13" ANALOG RGB MONITOR for IIGS.....$349
RAMPAK 4GS —> 512K $199, 4MEG.....Call
GSRAM —>1 MEG $199, 1.5 MEG.....$249
RAMWORKS III —>1 MEG $249, 512K..$199
MULTIRAM RGB —>1 MEG $249, 512K.$199
MULTIRAM RGB+: 256K $199, Battery B/U $69
RAMFACTOR —>1 MEG $289, 512K....$239
ZRAM 512K—> ULTRA I $199, ULTRA II.$249
ZRAM 1MEG—> ULTRA II $299, ULTRA III $349
MULTIRAM CX 512K $199, CX+ 512K.....199
DRIVE (5.25") for IIe, C, +, GS.....$139
CONTROLLER for the above drive.....$59
PROMODEM 1200A Internal Modem GS, e $199

PAINTWORKS+ IIGS $49, TASSTIME IIGS $39
PRINTSHOP—> for IIe, c, + $35, for IIGS $49
ON BALANCE Personal Finance Program....$69
QUICKEN IIGS, e, c, + $35, Flight Sim....$35
BEAGLE COMPILER PRODOS for IIGS, e, c $49

RIBBON—> 4 color for Imagewriter II.....$12
RIBBON—> Imagewriter Blk, Red, Grn....$5ea
RIBBON—> Scribe $5, LX80 $5, FX80.....$5

See our full page AD in NIBBLE. Shipping $3/$100 in Cont. U.S.A. All prices subject to change.

COMPUTERS PLUS COMPANY
2303 N. 44th St. #2
PHOENIX, AZ 85008
PH: 602-955-1404

CIRCLE 615 ON READER SERVICE CARD

PERIPHERALS Category
continued in next column

PERIPHERALS

ACE COMPUTER CO.

GS-RAM for IIGS	1.5 Mb:			$249
1 Mb:	$199	256K:	$129	512K: $165
RAMWORKS III:				
1Mb:	$249	256K:	$165	512K: $199
RAMFACTOR for IIe/+				
1Mb:	$289	256K:	$189	512K: $239
RAMPAK 4GS 512K-4Mb IIGS:				$199
MultiRAM RGB				
1Mb:	$249	256K:	$179	512K: $199
MultiRAM cx/ext			512K:	$189
MODEMS & MONITORS				
300/1200B Hayes Compatible				$129
Cermetek 1200B Internal				$179
Magnavox Color 1r 13 in. Anlg/TTL				$349
PRINTERS and INTERFACES				
C.Itoh 300 cps w/LQ/NLQ				$499
Grappler + w/16K Buffer				$109
FINGERPRINT G + 11e/+				$ 69
PAGEMAKER FOR MAC+				$399
DOLLARS & SENSE				$ 69
VIP PROFESSIONAL for IIGS				$195

*Prices subject to change without notice
VISA and MASTERCARD ACCEPTED

FREE Software with Applied Engineering & MultiRAM Cards

*Call for FREE shipping on selected items (In USA only) and FREE catalog

(602) 821-9393
922 N. Alma School Rd. • Chandler, AZ 85224

CIRCLE 621 ON READER SERVICE CARD

THE ENHANCERS

A.E. 16K card (II+)	$65.00
gs-RAM 256K	$130.00
RamFactor 256K	$180.00
RamWorks III 320K	$160.00
RamWorks RGB option	$90.00
Serial Pro	$120.00
TimeMaster H.O.	$75.00
TransWarp Accelerator card	$210.00
ViewMaster 80 for II+	$109.00
Z-80 Plus	$109.00
Z-Ram Ultra I 256K	$160.00
Z-Ram Ultra II 256K	$200.00
Z-Ram Ultra III 256K	$250.00
Mach III Joystick	$30.00
Lazar 128 Computer	$390.00
Mockingboard C	$115.00
Apple-Mate Modem 300/1200 baud	$159.00

Mastercard/Visa/Choice/COD
Call or write:
The Enhancers
16919 East Berry Avenue
Aurora, CO 80015
(303) 680-9959 1-800-621-8385 Ext. 257

CIRCLE 619 ON READER SERVICE CARD

A+ Marketplace — the #1 showcase for products and services in the Apple II market. To place your ad call: **(212) 503-5102**

A+ MARKETPLACE

THE #1 SHOWCASE FOR PRODUCTS AND SERVICES IN APPLE II MARKET

SOFTWARE

ASTROLOGY

ASTER-PRO
Birth Potentials/Daily Predictions/Compatibility. Best of its kind: astonishing accuracy; technically superior. Send for info. We use printed version for reports to clients. Compiled size 750K. Elaborate Point System rates compatibility & daily quality. APPLE II series.
ASTRORESEARCH
1500 Massachusetts Ave., Suite 764
Washington, DC 20005
Phone: 202-775-9423

BUSINESS



FORMSWORKS

- 100 legal/business forms to use with Appleworks
- Save hundreds of dollars on legal fees
- Save hours of typing/clerical effort
- Legal consultant: Gerald Hecht, Esq
- 30 day free trial
- Master Card / Visa accepted

ONLY $39.95
BRICKHOUSE SOFTWARE
PATTERSON, N.Y. 12563
(914) 878-2041
CIRCLE 620 ON READER SERVICE CARD

A+ Marketplace:

Kathryn J. Cumberlander
Classified Advertising Director

Daniel L. Rosensweig
Classified Sales Manager

Damon Abramson
National Account Manager

For Additional Information
call: **(212) 503-5115**

COMMUNICATIONS

COMMUNICATIONS AND EMULATIONS

SOFTERM 2
A COMMUNICATIONS PACKAGE FOR THE APPLE II, II+, IIC, &IIE

INCLUDES:
24 EXACT EMULATIONS
SCRIPT FILES
KEYBOARD MACROS
FILE TRANSFER USING
ProDos(floppy)
DOS, CPM, & Pascal

CALL FOR INFORMATION
800/225-8590

SOFTRONICS
THE LEADER IN TERMINAL EMULATION
303/593-9540 TELEX 450236
CIRCLE 606 ON READER SERVICE CARD

DATA MANAGEMENT

Recommended by Gary Little

A+ SUPER INDEX
On-disk database summarizes A+ Mag., including programs, tips and letters. Cross-references corrections & updates. Like a "tip-book" cites 1000's of fixes. Ends searches thru stacks of magazines. GUARANTEED to save TIME & MONEY!
$5 for 1986, $9 for 1983 thru 1985

FASTFIND SEARCH UTILITY
100 times *FASTER* than word processors! Search multiple disks with single keypress. AND/OR/NOT logical operators & wild card. Find *lost files*, even if you forget the names! Prints reports. A.P.P.L.E's BEST SELLER. Bonus fast SPEEDOS. Any APPLE II or III.
NOT COPY-PROTECTED
$12 & get either INDEX above FREE
Add: $2 Ship/handling, CAL res. 6.5% tax, Overseas $3
FASTFIND CO., 28503 Coveridge Dr., Dept. A1
Rancho Palos Verdes, CA 90274
VISA or MasterCharge (213) 544-2350
Modem orders save 4%: 300/1200 baud, 8 bit, no parity (213) 377-0804
CIRCLE 607 ON READER SERVICE CARD

DATA MANAGEMENT
Category
continued in next column

DATA MANAGEMENT

INFOCACHE
Comprehensive, file based data mgmt. for any Apple II. Easy to use, with the power, speed & features you need. Automatically indexed, for instant retrieval of any record. Built-in file mgmt, merge, & ultra-fast sorting. Import-Export utilities. Custom reports, mail labels, forms, mail-merge. $175.00.
MACRO SOLUTIONS
P.O. Box 2136
Boise, Idaho 83701
To order call 1-800-The-Menu

EDUCATIONAL

PROGRAM FREE_PASCAL_NEWS;

```
·VAR
... want_free_newsletter : BOOLEAN;
BEGIN
·IF want_free_newsletter THEN BEGIN
.... WRITELN('Palos Computer Concepts');
.... WRITELN('Dept. Z., P.O. Box 560');
.... WRITELN('Palos Park, IL 60464') END;
END.
```

INDOOR ASTRONOMY
This highly sophisticated sky simulation program brings the universe indoors. Plots over 7500 stars and deep sky objects on the Hi-Res screen. Menu Driven with numerous useful features. Available for Apple II+,c,e, IBM PC and C64. $59. Call or write for more info. Institutions send purchase orders.
ASTRO-LINK
P.O. Box 1978
Spring Valley, CA 92077
619-698-9174

SOFTWARE FOR TEACHERS
The first fast assembly language marks program is The Teacher's Marksheet ($39); spreadsheet style, 95 marks/student, instant automatic averaging and consolidation. Also try Touchtype ($59), a unique integrated word processor/question banker. Free 30 day trial. Apple IIGS, IIc, IIe, or II with 64k 80 col.
SOFTWARE SPIRIT
Box 825
Spirit River, Alberta
Canada T0H 3G0

GET A'S THE EASY WAY
STUDYMATE, a fast, fun, efficient way to get A's in foreign language, English vocab, science, history, etc. Quickly & easily enter your school work & STUDYMATE tests you, shows percent correct, and retests you on questions answered incorrectly. Foreign language accents. Saves work for later review. Apple IIc, II GS, IIe (128k), IBM.
Price $24.95 Visa/MC/check
JACKSON SOFTWARE
Box 9101
Winnetka, IL 60093
800-247-8080 ext. 50

EDUCATIONAL

SIGN LANGUAGE SOFTWARE
APPLE ANIMATION at its best. Micro-Interpreter 1 (Fingerspeller), 11 (CAV-ASL) computerized Animated Vocabulary of ASL, and children's Story Signer. For Apple, IBM, & compatibles. All of our software have digitized voice output option. Also available French & Spanish versions. For info & free brochure call (319) 277-6648 or write to:
MICROTECH CONSULTING CO.
P.O. Box 521
Cedar Falls, Iowa 50613

BOOK OF SCIENCE PROJECTS
HOW TO BUILD A BETTER MOUSETRAP AND 13 OTHER SCIENCE PROJECTS USING THE APPLE II® is a new 227 page book (with disk) containing 14 science projects to help students learn about laboratory interfacing via the Apple II+/IIe/IIGS gameport. $24.95.
VERNIER SOFTWARE
2920 SW 89th Street
Portland, Oregon 97225
(503) 297-5317

KIDS HAVE MATH TROUBLE? $11 for the 1st one $2 each additional

BLACK–BELT MATH HOMEWORK set is a game type software which is designed to make your kid THE TOP MATH STUDENT in his class. Sophisticated design but easy and fun to use. It updates and sorts daily record. It has music and sound effects, able to generate up to 30,000 math problems each. Consists of 4 individual softwares (on 4 D/D disks). Choice of • **ADDITION,** • **SUBTRACTION,** • **DIVISION,** • **MULTIPLICATION.** Specify IBM PC (or compatible), APPLE IIC, IIE. (need 64k mem., works on Color & B/W) VISA/MC/Check, plus $2 S/H. TOLL FREE order desk: **(800) 538-8157 Ext. 865** (in USA) **(800) 672-3470 Ext. 865** (in CA)
ROBIN SOFTWARE
P.O. BOX 1053 CUPERTINO, CA 95015
CIRCLE 624 ON READER SERVICE CARD

ENTERTAINMENT/ HOBBIES

ATTENTION MOVIE FANS!
Finally there's a database of Oscar information. Find out who won the Best Actor Award the first six times Paul Newman was nominated and didn't win. All nominees, 1928-1986 not just the winners. Six categories: picture, director, actor & supporting actor, actress & supporting actress.
Apple II version requires AppleWorks.™ Specify 5.25 inch or 3.5 inch disk. Macintosh version requires Microsoftworks.™ Send $15 to:
WRED Rabbit
P.O. Box 160
Campbell, CA 95009-0160

A+ MARKETPLACE

THE #1 SHOWCASE FOR PRODUCTS AND SERVICES IN APPLE II MARKET

ENTERTAINMENT/ HOBBIES

BRIDGE GAMES!—APPLES/MAC

Tom Throop's Bridge Baron-Winner of 1st Computer Bridge Tournament. Bid and play over 1 million deals—$49.95. Play Bridge with Sheinwold—test your declarer play on 91 deals designed by bridge author Albert Sheinwold—$29.95. Play Bridge with Truscott-top expert Dorothy Truscott shows you the secrets of winning declarer play—$29.95 $3 s&h
GREAT GAME PRODUCTS
8804 Chalon Drive
Bethesda, MD 20817
1-800-426-3748

BARD'S TALE PLAYERS!

EDITOR and HINTBOOK for Bard's Tale Editor allows you to change name, class, race, exp. gold. Bring the dead back to life. Put hit and spell points to 65000! Strength to 31! Have warriors cast spells! Hintbook has hints and maps for all dungeons (20 pages). Editor $15.95. Hintbook $9.95. Visa/MC, ck/mo + $2.00 s/h.
S&D SOFTWARE
P.O. Box 223458
Carmel, CA 93922
(408) 649-5592

MIGHT AND MAGIC PLAYERS

The toughest role-playing game ever requires a complete character editor to have a real chance of success. This editor will update all aspects of a character, restore charges to an item, view all items in the game and add any item to backpack. You can also print out characters or a list of items. Only $19.95 + 2.00 s/h for piece of mind.
GOSSELIN COMPUTER CONSULTANTS
P.O. Box 1083
Brighton, MI 48116

MULTI-USER SOFTWARE

For your 64K Apple II/+/e

APPLPARLOUR
Allows up to seven users to converse simultaneously! Includes password validation, public and private messages, and special sysop commands—Run a party line, dating service, moderate role playing games, etc. $55

DUNGEONS OF LORE
Adventure together or apart, battle monsters or each other, cast spells, send messages, buy and sell items, search, train, and many many more commands. Both random and permanent monsters and treasures. Player files protected by password validation. Be the DM! Edit rooms, monsters, items, and parley files $69

SAVE $25, purchase both for only $99

(Specify modem type if other than Hayes)

Send check or money order to:
TEXET
Texet Multi-Systems
4401 Speedway #308
Austin, Texas 78751
(512) 371-7893

CIRCLE 630 ON READER SERVICE CARD

FINANCIAL

UNPROTECTED SOFTWARE

Market strategy ... $29.95. Portfolio manager. How many shares to BUY or SELL. Reports. TRACKER STRATEGY...$29.95. Charts. When to Buy or Sell. STOCK MARKET STRATEGY ... $49.95. Combines the MARKET and TRACKER strategies. Stock selection ... $49.95. Best picks from daily listing. NYSE or TSE data disk ... $16. LOTTERY BREAKER ... $29.95. 3,4,6 digit lottery numbers. Canadian lotto's. Horse sense...$49.95. Handicapper for all tracks. Dealer buster ... $29.95. Black Jack tutor. 4 decks, 5 options. Ck. or M.O. to:
KEENTECH SOFTWARE, Dept. A
8340 Addison Drive S.E.
Calgary, Alberta, Canada T2H 1P1

GENERAL

US $8.—per disks ???

World's largest software library for Apple II, IIe, IIc and IBM/PC. Thousands of powerful programs specially for Business, Education, Entertainment, Science ... You can find all of them from our Library. For your complete Air-Mailed Catalogue send US $1.00 to:
Reliant
P.O. Box 33610
SheungWan
Hong Kong

ATTN: POWERHOUSE® OWNERS

Does the "wait" for program loading and graphic displays inhibit you from changing your X-TENS's programming? Get FASTHOUSE! Fast software for your Powerhouse.
- Loads *and* runs 3 times faster!
- Works on any mass storage device!
- Easier to use and completely compatible!

Call 512-990-2390 or send $15 to:
KADO Systems
P.O. Box 1115
Pflugerville, TX 78660

GRAPHICS

PRINT SHOP USERS CLUB

Tired of using the same graphics, fonts, and borders? You now have an option! The $30.00 Membership Fee includes 1200 NEW graphics and a copy of the newsletter on disk. Other disks are $15.00 each: Font Disk #1-50 new fonts! Border Disks #1,#2,#3-each has 200 borders! Catalog and info-$2.00. Visa and MC welcome.
Print Shop Users Club
Box 216
Mercer Island, WA 98040

GRAPHICS
Category
continued in next column

GRAPHICS

GRAPHICS FOR EVERYONE!
for use with the Print Shop™

Available Products Include:

Select Your Own

Seasonal Specialties

Mini I & II

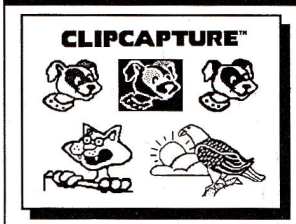
Graphic disks from $6.95 to $19.90.
Call or write for free info.

1990 SOFTWARE
P.O. Box 1862
Altoona, PA 16603
(814) 695-1928

The Print Shop is a trademark of Broderbund Software

CIRCLE 631 ON READER SERVICE CARD

CLIPCAPTURE™



- **Make Newsroom™ clip art disks with Print Shop™ graphics, Hi-Res pictures, or Newsroom photos !**
- **Create Print Shop graphics from Hi-Res pictures, or Newsroom photos !**
- **Design Hi-Res pictures using Print Shop graphics, and Newsroom clip art !**
- **Over 185 pieces of clip art included with every disk !**
- **Apple II+, //e, //c, & IIGS. See your dealer, or send $24.95 (or MC/VISA info) to:**

CLIPCAPTURE
477 Windridge Drive
Racine, Wisconsin 53402

For more information
or to place
your ad call:
Damon Abramson
National Account
Manager
(212) 503-5102

MEDICAL HEALTH

CALMPUTE IS AN EXCITING BIOFEEDBACK PROGRAM

Monitors stress thru GSR fingertip sensors. Includes a challenging car game calmprix—the calmer you remain, the faster the car goes. Stress or relaxation produce changes in beautiful color patterns or on a bar or line graph. Also probes your innermost feelings thru interactive tests and then teaches you deep relaxation. Hardware and Software $99.95. US + $4 shipping.
THOUGHT TECHNOLOGY
In U.S. 1-800-361-3651 514-489-8251

PUBLIC DOMAIN

PUBLIC DOMAIN SOFTWARE

CATALOG 2.00 OR 3.00 CAT. & DEMO DISK on demo disk specify category: utility, educational, business, games, or what you might be interested in. If you place an order for a min. of 10 disks you get 2 disks free. Brand-name software is also available. We also have Apple compatible computers and hardware available. Visa and M/C ACCEPTED.
PH# 219-563-7650
B & L CONSULTANTS AND SALES,
P.O. Box 461
Wabash, IN 46992

RENT USER GROUP LIBRARIES

APPLE DOS, APPLE CP/M and MACINTOSH user group libraries containing thousands of userful programs available to copy on your own computer! Individual disks priced at $4.00 each and packed full of programs. Catalog and directory disk available for $5.00 pp. More info? 24 hour—3 min. recording (619) 727-1015 or call 1-800-527-3744
PUBLIC DOMAIN SOFTWARE INT. GROUP
2400 Santa Rita
Las Vegas, NV 89104s

REAL ESTATE

REAL ESTATE SHAREWARE

A decision tool for brokers, investors, and those who would like to learn. Perform investment analysis of residential income & commercial properties. 1986 tax changes with transitional rules. (Don't worry, we've made this easy.) SHAREWARE...OK TO COPY AND SHARE $10 for complete software & quick guide. $75 full membership (manual tax updates, phone support, customized hardcopy) Apple II+/e/c/GS, 1 disk drive.
SHAREWARE SOFTWARE
731 Pacific #410
San Luis Obispo, CA 93401
805/541-6051 24 Hrs Visa,M/C

A+ MARKETPLACE

THE #1 SHOWCASE FOR PRODUCTS AND SERVICES IN APPLE II MARKET

SCIENTIFIC

STATISTICS CATALOG!
If you need statistics for Apple II, II+, IIe or IIc, call us. Our catalog contains professional programs for: general statistics, high level Anova, multiple regression, quality control, and associated graphics. Write or call now for a free catalog of quality statistics software.
HUMAN SYSTEMS DYNAMICS
9010 Reseda Blvd. Suite 222
Northridge, CA 91324
1-800-451-3030, 1-818-993-8536 in CA

STATISTICS

STATISTIX
ONLY $75!
A powerful yet incredibly easy-to-use statistical system. Outperforms programs costing much more. Flexible data management and transformations, mult. regression, ANOVA, most standard parametric and non-parametric tests, p-values, plots, histograms and many others.
SATISFACTION GUARANTEED!
- Apple II +/e/c/GS
- PC/MS-DOS
- 5 or more copies; 20% off
- add $5 for handling

NH Analytical Software
801 W Iowa Ave
St Paul MN 55117
(612) 488-4436

CIRCLE 628 ON READER SERVICE CARD

TAXES

ARE YOU READY FOR TAX REFORM?
If you had TAXMASTER® you would be.
TAXMASTER is spreadsheet templates that allow you to assess your tax situation in 1987, and to plan your options throughout the year. The tax changes are explained in simple English, and the W-4 Form is de-mystified. Take advantage of TAXMASTER before Tax Reform takes advantage of you!
For use with:
Apple II series - APPLEWORKS
Macintosh - EXCEL
IBM - Lotus 123
(Compatible with clones and work-a-likes)
$40.00
Order toll-free:
1-800-826-7146
ISLAND COMPUTER SERVICES
INC. E. YACHT DRIVE
LONG BEACH, N.C. 28461
(919) 278-6483
CIRCLE 627 ON READER SERVICE CARD

A + Marketplace
Second color option available
For details call
(212) 503-5115

UTILITIES

PFS FILE USERS
The "BRIDGE" gives you the ability to extract data from PFS FILE™ to either an ASCII, text file or a DIF FILE. Extracted data can be used with word processors, spreadsheets, for conversion to other data bases (Appleworks™), or for transmission to other computers. All APPLE II's. $59.95.
SMI SYSTEMS, INC.
P.O. Box 1388
Ft. Lauderdale, FL 33302
(305) 486-6115

ProFix 2.1 / DOS 3.3
ProFix 2.1 is designed to let you use standard DOS 3.3 programs & files on any ProDos device. It lets you use your HD20SC, Profile, UniDisk 3.5, or other ProDos drive for DOS 3.3. You can install 140, 280, 392, or 400K vol. on your drive (mix & match). Profix works w/Apple IIGS,IIe,IIc,II+ w/64K. Retail $49.95.
Nordic Software, Inc.
3939 North 48th
Lincoln, NE 68504
(402) 466-6502

MISCELLANEOUS ACCESSORIES/SUPPLIES

APPLE COMPATIBLES LOWEST PRICES ANYWHERE!

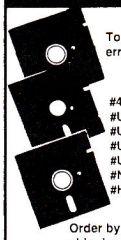
64/80 Column BD (IIe)	$ 39
256K/80 Column BD-w/Software (IIe)	$109
80 Column BD-Videx Compatible (II+)	$ 49
Z80 CP/M BD (II+/IIe)	$ 38
16K Ram BD-w/Cable (II+)	$ 35
128K Ram BD (II+/IIe)	$ 89
Graphic Parallel BD-w/Cable (II+/IIe)	$ 45
Super Serial BD Great for Modems/ Printers (II+/IIe)	$ 49
Disk Drive HH (Specify II+/IIe/ or IIc)	$129
Numeric Key Pad-16 Keys (IIe)	$ 35
Coolin Fan w/Surge Protector (II+/IIe)	$ 28
Joy Stick (Specify II+/IIe or IIc)	$ 15
Joystick w/Large Fire Button	$ 25
Mini Vacumn Cleaner	$ 10
Two Control SW Boxes (A/B) For Centronic/RS232 Connectors	$ 29
RS232 Gender Changers M/M-F/F	$ 5
RS232 Jumper Boxes-Disk Notchers	$ 5
RS232 Data Testers	$ 8

ONE YEAR WARRANTY ON ALL PRODUCTS
CALL/WRITE FOR COMPLETE LIST
ADD $3 SHIPPING (Per ORDER, not per item)

NEXO DISTRIBUTION
914 East 8th Street, Suite 109
National City, CA 92050
(619) 474-3328
10am-6PM Mon-Fri

UNIV & SCHOOL P.O.'s WELCOME!
VISA/MC OKAY—C.O.D. ADD $2.00
CIRCLE 614 ON READER SERVICE CARD

PREMIUM QUALITY! 5 YEAR WARRANTY! DISK LIQUIDATION!



Top-of-the-line highest quality disks at a fraction of the original selling price. 100% error-free, money satisfaction guarantee! Reinforced hub, heavy 9.5 mil jacket.

30 Day Money Back Satisfaction Guarantee!

#4303	5 1/4" DS/DD disks, sleeves, labels, box of 100 $39/box (39¢/disk)
#UC2JA	5 1/4" ASST COLOR DS/DD w/lbl/slv, 25-box $19.75/box (79¢/disk)
#UATJ	5 1/4" HI DENSITY (for AT) w/lbl/slv, 25-box $42.25/box ($1.69/disk)
#UD3J	3 1/2" single side disks w/labels, 25-pack $32.25/pack ($1.29/disk)
#UD6J	3 1/2" double side disks w/labels, 25-pack $37.25 ($1.49/disk)
#NN1	Disk notcher, accesses 2nd side of disk (Apple/Comdr) $5.88
#HCK	5 1/4" Head cleaner kit, up to 15 uses! $4.95

Order by phone/mail, pay by MC/Visa, send check w/order (COD $3.50 addt'l). Min order $25. UPS shipping/handling $3.50. Canada, APO/FPO, PO Boxes $6.50 shipping. Include daytime phone & street address. (Schools: call 617-868-5515 for purchase orders). Mass residents add 5% sales tax.
CIRCLE 633 ON READER SERVICE CARD
UNITECH 24-A Thorndike Street - Cambridge, MA 02141-1882 In Mass (617)868-5555 - 24 Hours-a-day, 7 days-a-week! **(800)343-0472**

DISCOUNT PRICES!
5¼ Disks: 10 for $3.98, 100 for $29.00, 1000 for $270.00. Modems: Novation, Hayes, Smarteam. Apple IIe professional for $1199.00. Apple IIc for $749.00. Printers: Star, Epson, Okidata, Panasonic, call for prices. Imagewriter ribbons: 6 for $22. Monitors. Software always discounted 30%.
SY DRAFT
26130 Greenfield Avenue
Oak Park, MI 48237
1(800) 321-2695/(313) 968-2620

RIBBONS

OVER 300 TYPES!

Examples:

DEALER SUPPLIES

	Black	Colors
Apple Imagewriter	$2.95	3.45
Diablo HTII M/S	$2.40	
EPSON MX-RX-FX 80	$2.45	2.95
MX-RX-FX 100	$3.40	3.95
LX-80	$3.50	3.75
LQ-1500	$3.50	3.75
NEC 3500	$3.95	4.50
5500/7700	$3.50	3.75
8023	$2.75	3.30
Okidata 80-82-92	$ .90	1.25
192-193-182	$4.25	5.05
Panasonic KXP	$5.25	6.30

CALL
1-800-331-6841
1-513-275-1247 (OHIO)
CIRCLE 605 ON READER SERVICE CARD

COMPUTER INSURANCE

SURE IT'S INSURED?
Insure your computer. Safeware provides full replacement of hardware, media, and purchased software. As little as $39 a year provides comprehensive coverage. With blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8am to 10pm EST (Sat 9 to 5).
SAFEWARE. The Insurance Agency Inc.
2929 North High Street/P.O. Box 02211
Columbus, OH 43202
800/848-3469 (Nat): 614/262-0559 (OH)

Advertising Rates and Information: A + Magazine Marketplace

A + Magazine Marketplace is a special economical section for product and service listings.
Listings are grouped by category and sold by column inches. Second color option available.
Standard Directory Listings are also available for a minimum of 3 issues at $215 per issue ($645 total).
For additional information call 212-503-5115.

A+ MARKETPLACE

THE #1 SHOWCASE FOR PRODUCTS AND SERVICES IN APPLE II MARKET

PUBLICATIONS/ CATALOGUES

BOOKS FOR II's & MACS
It's hard to find books for Apples at your dealer-after all, dealers sell hardware, not paperware! We have the information you need, including the IIc/IIe, Imagewriter II, ProDOS Tech Manuals & Inside MAC by Apple. We also have Apple IIgs books. More added regularly. For free info write or send address by modem:
HIEROGLYPHIC COMMUNICATIONS
Box 951, Station "B"
London, Ontario, CANADA N6A 5K1
Modems call: (519) 672-7661

APPLE II AND IIGS GUIDE
Call NOW to order the new APPLE II AND IIGS GUIDE containing thousands of programs for the APPLE II series and the new APPLE IIGS. Price: $9.95 plus $1 S/H. Also available now: Winter issue of the MACGUIDE—listing 1600 packages for the MACINTOSH. Price: $4.95 plus $1 S/H. Order software through MENU and the price of either guide is deducted from your order and you'll earn SoftCredit too! Major credit cards accepted.
MENU
1520 South College Avenue
Fort Collins, CO 80524
order line: (800) THE-MENU

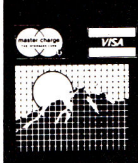
APPLECATION MONTHLY
A new monthly for all Apple II's filled with Utilities, Games, Education and FUN! Plus News, Reviews, Ads, and great tips! Been tempted by UPTIME but scared off by the price? For a limited time APPLECATION is only $36 a year or $24 for 6 issues. Half the cost of UPTIME and twice the value.
APPLECATION
420 North Ninth Street
Cannon Falls, MN 55009
(507) 263-4328

IIGS Secrets Revealed!
APPLE 16 is a lavishly illustrated, conversational, 256 page book developed for home and classroom use by Hank Harrison.
As editor emeritus of Dr. Dobb's Journal, Mr. Harrison covers all of the basics, the Launcher, the Chooser, the Desktop, the Mouse use of hard disks, telecommunications, video publishing & Bookprocessing.
This comprehensive guide to APPLE IIGS computing also covers hardware and software capabilities of the IIGS with tips on programming & applications.
APPLE 16 explores the IIe upgrade, the relationship between Macintosh and IIGS & the history of the CPU.
The author brings many years of teaching experience to bear on the IIGS revolution. This witty and powerful book is a breakthrough in style and presentation.
$24.50 includes a free newsletter, S&H.
THE ARCHIVES
1259 El Camino Real
Menlo Park, California 94025
CIRCLE 625 ON READER SERVICE CARD

SECURITY

Personalize and Protect your Apple with the Banana Chip©

When you turn on your Apple™, this remarkable new ROM replacement will display **your** name or personalized message with optional password protection.



$39.95
CALL TOLL FREE:
1-800-843-0975
Nationwide
1-800-443-9060
In California

Azure Mountain Products
14755 Ventura Blvd., Ste. 1483 Sherman Oaks, CA 91403
CIRCLE 612 ON READER SERVICE CARD

A+ Marketplace:

Kathryn J. Cumberlander
Classified Advertising Director

Daniel L. Rosensweig
Classified Sales Manager

Damon Abramson
National Account Manager

For Additional Information
call: **(212) 503-5115**

LOOK FOR THESE PRODUCTS AND SERVICES EVERY MONTH IN A+ MARKETPLACE

DIRECTORY CLASSIFICATIONS

SOFTWARE
ACCOUNTING
AGRICULTURE
ASTROLOGY
BUSINESS
COMMUNICATIONS
DATA MANAGEMENT
DEVELOPMENT TOOLS
EDUCATIONAL
ENTERTAINMENT HOBBIES
FINANCIAL
GENERAL
GRAPHICS
LEGAL
MAILING PROGRAMS
MANUFACTURING
MEDICAL/HEALTH
ONE-OF-A-KIND
PERSONAL
PROJECT MANAGEMENT
PUBLIC DOMAIN
REAL ESTATE
RELIGION
SCIENTIFIC
STATISTICS
TAXES
UTILITIES
WORD PROCESSING

HARDWARE
ADD-ON-BOARDS
COMMUNICATIONS
DISK DRIVES
DISKETTES
GENERAL
MONITORS
NOISE REDUCTION
PERIPHERALS
PLOTTERS
POWER PROTECTION
PRINTERS/PRINTER ACCESSORIES
STORAGE DEVICES
MEMORY EXPANSION

MISCELLANEOUS
ACCESSORIES/SUPPLIES
APPLE III
BUSINESS OPPORTUNITIES
COMPATIBLES
COMPUTER INSURANCE
COMPUTER LEASING/ RENTAL
COMPUTER SERVICES
COMPUTER TRAINING
DATA CONVERSION
PUBLICATIONS/CATALOGUES
SECURITY
USER GROUPS
USED EQUIPMENT

And for more information
or to place your ad
call: Damon Abramson
National Account Manager
(212) 503-5102

A+ ADVERTISING INDEX

BY PRODUCT

HARDWARE

PAGE

DISK DRIVES/STORAGE DEVICES

CMS 54
Kinson Products Corp. 78

INTERFACE CARDS

Applied Engineering .. 14,36,37, 41,67,73,100,101,105,107,109
AST Research, Inc. 2,3
Ohio Kache Systems Corp ... 71
SMT, Inc. 49

MISCELLANEOUS

Central Point Software 85
Computer Cover..... 84
Computer Friends..... 60
Covox, Inc. 120
Digital Vision..... 104
Kensington Microware Cover 4
Orange Micro, Inc. 104
Software Simplified 76
Street Electronics Corp..... 78
Sun Systems Remarketing .. 24
Telex Communications..... 35
Video Technology Computers, Inc..... 1

PRINTERS/PRINTER ACCESSORIES

Diconix 88
Dresselhaus Computer Products 82
Funk Software, Inc. 77
Texprint, Inc..... 70
Thunderware..... 8

MAIL ORDER

PAGE

Business Computers of Peterborough 12,13
CDA Computer Sales 32
Coit Valley Computers 19
Computer Network 116
Jameco Electronics 55
JDR Microdevices 18
Memory Plus Distributors ... 94
PC Network..... 31
Precision Data Products 106
Preferred Computing 51
Programs Plus 56,57
Ribbon Land..... 72
Roger Coats..... 16
Silicon Express 17
Zimco..... 118

ON-LINE SERVICES

PAGE

CompuServe 74
General Electric Information Services 69

SOFTWARE

PAGE

BUSINESS

H & E Computronics .. Cover 3
PBI Software..... 117
Peachtree Software 87
Pinpoint Publishing..... 79
Public Domain Exchange 62
Rolodex Corp..... 80

COMMUNICATIONS

SnAPP Systems 76

CREATIVITY/ PRODUCTIVITY

Electronic Arts ..... Cover 2
Unison World..... 42,43
Zephyr Services 68

EDUCATIONAL

K-12 Micro Media 106
The Learning Co. 5

ENTERTAINMENT/ STRATEGY

B/T Enterprises..... 94
Compucrafts 86
SubLOGIC Corporation..... 4

GRAPHICS

MDIdeas 25
Spectral Graphics Software .. 10

MISCELLANEOUS

Imagimedia 95
Megahaus Corporation 63
Pacific Technology Systems..... 120
Software Touch 64
StatSoft..... 116
UPTIME..... 23

UTILITIES

Beagle Brothers, Inc..... 96
Central Point Software..... 95
Quality Computers..... 99
Thirdwave Technology, Inc. 82
TML Systems 53

WORD PROCESSING/ SPELLING CHECKERS

Sensible Software 20
StyleWare, Inc. 11
Word Perfect Corp. 28,48

ALPHABETICAL

READER SERVICE NO. — PAGE

* Applied Engineering 14,36 37,41,67,73,100,101 105,107,109
* AST Research, Inc. 2,3

148 Beagle Brothers, Inc. 96
102 B/T Enterprises..... 94
* Business Computers of Peterborough ... 12,13

235 CDA Computer Sales... 32
184 Central Point Software . 95
107 Central Point Software . 85
149 CMS 54
105 Coit Valley Computers 19
* Compucrafts 86
271 CompuServe..... 74
136 Computer Cover..... 84
195 Computer Friends..... 60
137 Computer Network ... 116
151 Covox, Inc. 120

156 Diconix..... 88
170 Digital Vision..... 104
339 Dresselhaus Computer Products 82

168 Electronic Arts ... Cover 2

154 Funk Software, Inc. 77

* General Electric Information Services 69

335 H&E Computronics Inc. ..... Cover 3

138 Imagimedia 95

279 Jameco Electronics 55
167 JDR Microdevices 18
116 K-12 Micro Media 106

134 Kensington Microware .. Cover 4
133 Kinson Products Corp. . 78

158 Learning Company, The 5

241 MDIdeas, Inc 25
259 Megahaus Corporation . 63
152 Memory Plus Distributors 94

178 Ohio Kache Systems Corp..... 71
108 Orange Micro, Inc. ... 104

199 Pacific Technology Systems..... 120
124 PBI Software 117
315 PC Network..... 31
318 Peachtree Software 87
239 Pinpoint Publishing 79
228 Precision Data Products 106
* Preferred Computing 51
299 Programs Plus 56,57
256 Public Domain Exchange 62

104 Quality Computers..... 99

202 Ribbon Land 72
109 Roger Coats 16
182 Rolodex Corp. 80

165 Sensible Software, Inc... 20
231 Silicon Express 17
280 SMT, Inc. 49
119 SnAPP Systems 76
265 Software Simplified 76
173 Software Touch 64
* Spectral Graphics Software..... 10
207 StatSoft 116
188 Street Electronics Corp. 78
155 StyleWare, Inc. 11
110 SubLOGIC Corp. 4
103 Sun Systems Remarketing 24

117 Telex Communications. 35
343 Texprint 70
144 Third Wave Technology, Inc... 82
114 Thunderware..... 8
160 TML Systems..... 53

113 Unison World..... 42,43
219 UPTIME 23
115 Video Technology Computers, Inc. 1

118 WordPerfect Corp..... 28
120 WordPerfect Corp..... 48

121 Zephyr Services 68
126 Zimco..... 118

READER SERVICE CARD

Use this card to get more information about advertised products.

Void after August 31, 1987

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640

A+

The #1 Apple II Magazine

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 6 months.

	(1.) Own	(2.) Plan to Buy
Apple II GS	A	H
Apple IIc	B	I
Apple IIe	C	J
Apple II+	D	K
Apple II	E	L
Other (specify)	F	M
None	G	N

Please indicate which of the following peripherals you plan to buy in the next 6 months.

	(3.) Plan to Buy 1-3 Months	(4.) Plan to Buy 4-6 Months
Printer	T	Z
Modem	U	1
Disk Drive—Hard	V	2
Disk Drive—Floppy	W	3
Monitor—Black & White	X	4
Monitor—Color	Y	5

PLEASE PRINT CLEARLY—Use only one card per person

Name_____ Phone No. (_____)_____

Company_____ Title_____

Address_____ Apt._____

City_____ State_____ Zip_____

(Zip code must be included to insure delivery)

4. ☐ Please send me one year (12 issues) of A+ for $19.97 and bill me—I'll save 44% off the single copy price!

A+6872

READER SERVICE CARD

Use this card to get more information about advertised products.

Void after August 31, 1987

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640

A+

The #1 Apple II Magazine

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 6 months.

	(1.) Own	(2.) Plan to Buy
Apple II GS	A	H
Apple IIc	B	I
Apple IIe	C	J
Apple II+	D	K
Apple II	E	L
Other (specify)	F	M
None	G	N

Please indicate which of the following peripherals you plan to buy in the next 6 months.

	(3.) Plan to Buy 1-3 Months	(4.) Plan to Buy 4-6 Months
Printer	T	Z
Modem	U	1
Disk Drive—Hard	V	2
Disk Drive—Floppy	W	3
Monitor—Black & White	X	4
Monitor—Color	Y	5

PLEASE PRINT CLEARLY—Use only one card per person

Name_____ Phone No. (_____)_____

Company_____ Title_____

Address_____ Apt._____

City_____ State_____ Zip_____

(Zip code must be included to insure delivery)

4. ☐ Please send me one year (12 issues) of A+ for $19.97 and bill me—I'll save 44% off the single copy price!

A+6871

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

A+

The #1 Apple II Magazine

P.O. Box 40317
Philadelphia, PA 19106-9931

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 27346 PHILADELPHIA, PA

POSTAGE WILL BE PAID BY ADDRESSEE

A+

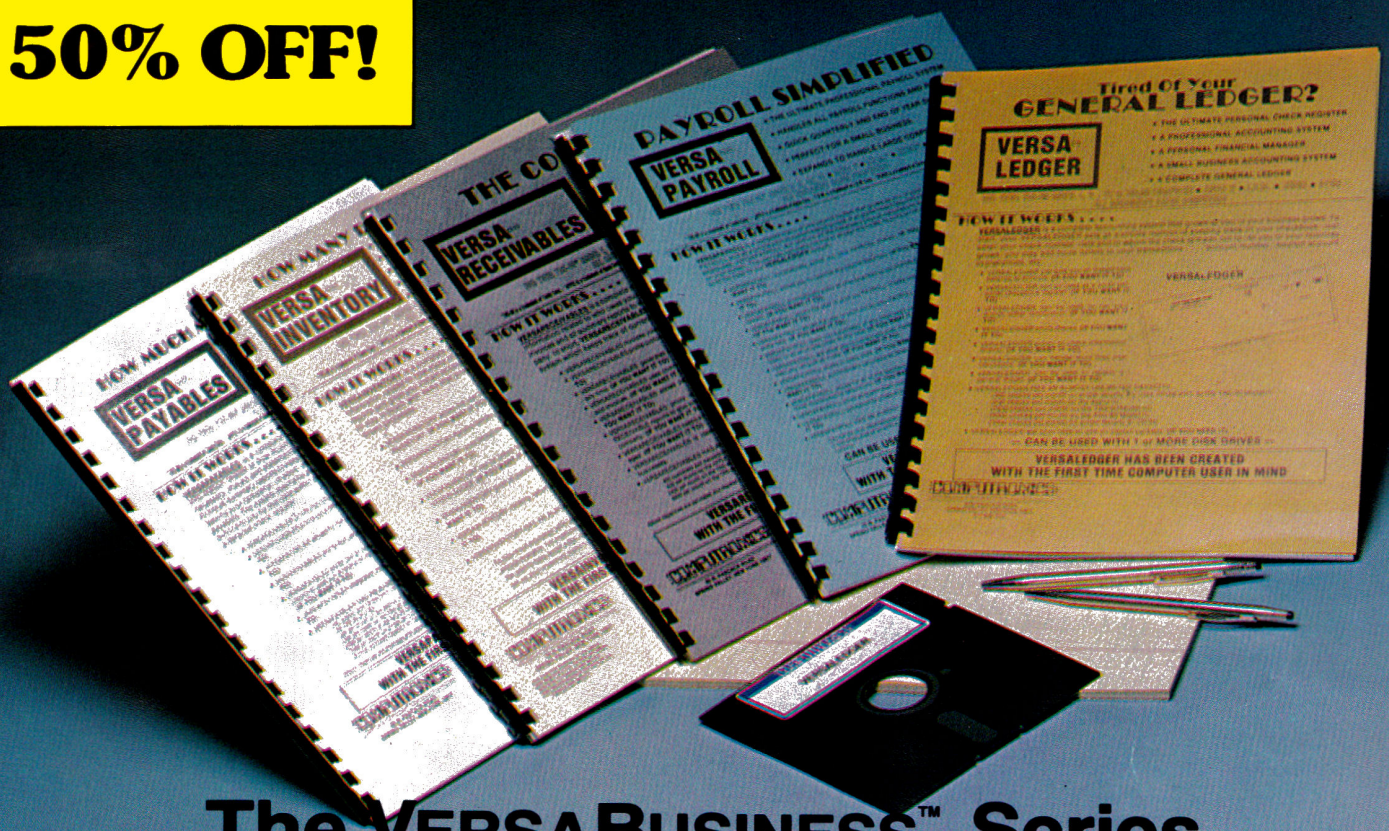
The #1 Apple II Magazine

P.O. Box 40317
Philadelphia, PA 19106-9931

Introducing the Most Powerful Business Software Ever!

FOR YOUR IBM • APPLE • MAC • TRS-80 • KAYPRO • COMMODORE • MSDOS OR CP/M COMPUTER*

50% OFF!



The VERSABUSINESS™ Series

Each **VERSABUSINESS** module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ $99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ $99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ $99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ $99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ $149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

FOR APPLE & MACINTOSH OWNERS ONLY!

Apple and Macintosh owners *only* may now take 50% off our listed price of any module(s) from our VersaBusiness Series. All sales are final (our normal 30-day money back guarantee does not apply to sale items).

To Order:
Write or call Toll-free (Outside NY State) 1-800-431-2818; (Inside NY State) 1-800-331-0362
Other Inquiries Call 914-425-1535

*add $4.95 for shipping in UPS areas
*add $5.95 for C.O.D. or non-UPS areas
*add $6.95 to CANADA or MEXICO
*add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS INC

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

CIRCLE 335 ON READER SERVICE CARD

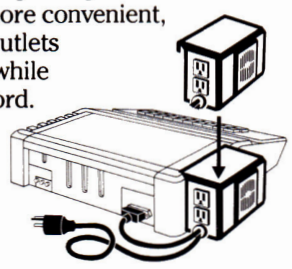
Available in two colors—original Apple Beige and new Apple Platinum.

MORE THAN ¼ MILLION APPLE II's SAVED

SYSTEM SAVER® from Kensington Microware quietly protects more than 1/4 million Apple® II's every day. Often referred to as "the piece Apple forgot," System Saver's unique combination of features have made it the most versatile, most convenient, best selling accessory ever made for the Apple.

System Saver organizes your power needs.

To make your Apple system more convenient, System Saver provides extra outlets for your monitor and printer, while replacing the Apple's power cord. One front-mounted power switch controls your whole system.



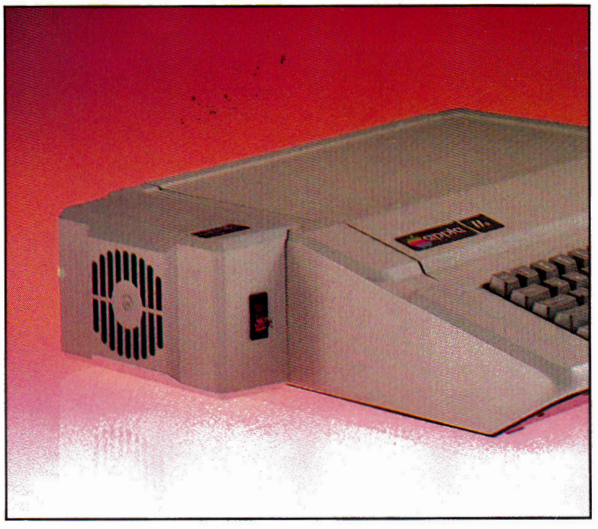
System Saver solves power line problems.

Impurities in the power supply cause 70-90% of all microcomputer malfunctions. Line noise can be interpreted as data, confusing your Apple and causing annoying system errors. Power surges and spikes can do costly damage to your computer's delicate circuitry.

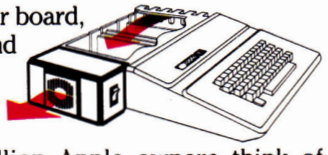
System Saver clips surges and spikes at a safe level and filters out line noise. It makes your Apple more accurate, more efficient and more reliable.

System Saver keeps your Apple cool.

Peripheral cards added to your Apple not only generate heat, they block any natural air flow through the computer. The resulting high temperature conditions can potentially shorten the lives of both your Apple and your peripheral cards.



System Saver's quiet fan draws a breath of fresh air across the Apple's mother board, over the power supply and out the side ventilation slots at the rate of 17 cubic feet per minute.



More than 1/4 million Apple owners think of System Saver as the piece Apple forgot. And 1/4 million well-protected Apples agree.

For a dealer near you, or to speak to a Kensington sales representative, call toll free (800) 535-4242 In NY (212) 475-5200.

KENSINGTON™

CIRCLE 134 ON READER SERVICE CARD

Downloaded from www.Apple2Online.com

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Also available in 220/240 Volts, 50/60 Hz.

Trademarks: Apple/Apple Computer, Inc., System Saver/Kensington Microware Ltd.
© 1986 Kensington Microware Ltd.