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SPECIAL REPORT: APPLE II TENTH ANNIVERSARY



The #1 Apple II Magazine

APPLEWORKS REPORT

New Monthly Feature
Includes Reviews of
AppleWorks 2.0 and
InfoMerge

Which
Disk Drives
are Right
for You?

THE DRIVE TO SUCCEED

POINT-TO-POINT

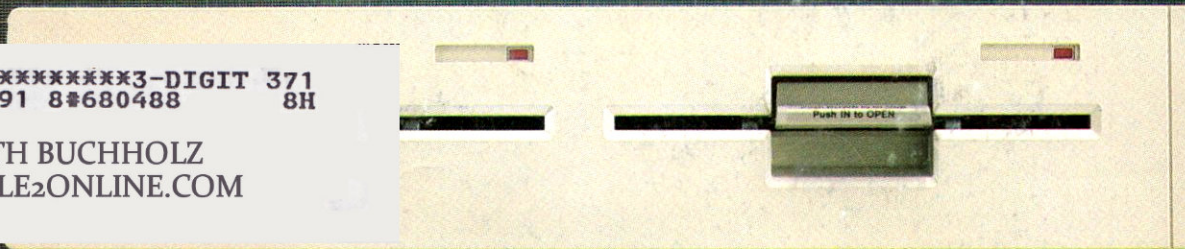
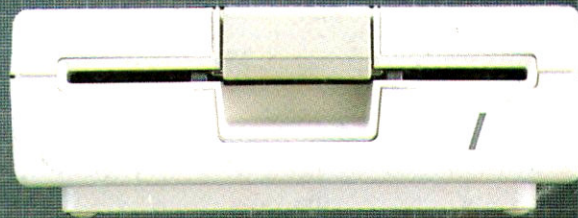
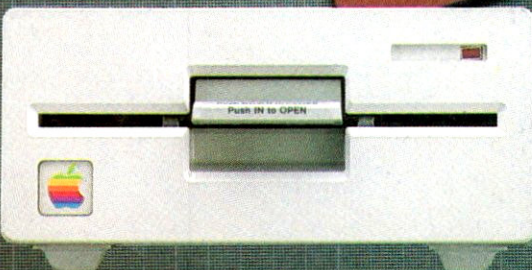
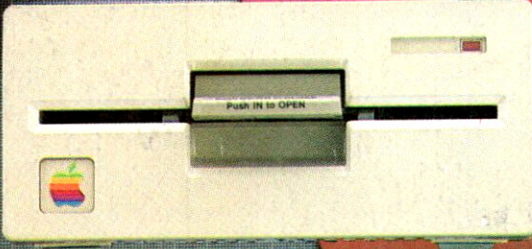
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Program Reviewed

IGS GRAPHICS

Line Eye-Filling New
Graphics Programs

IGS SOUND

Includes Free IGS
Program Listing



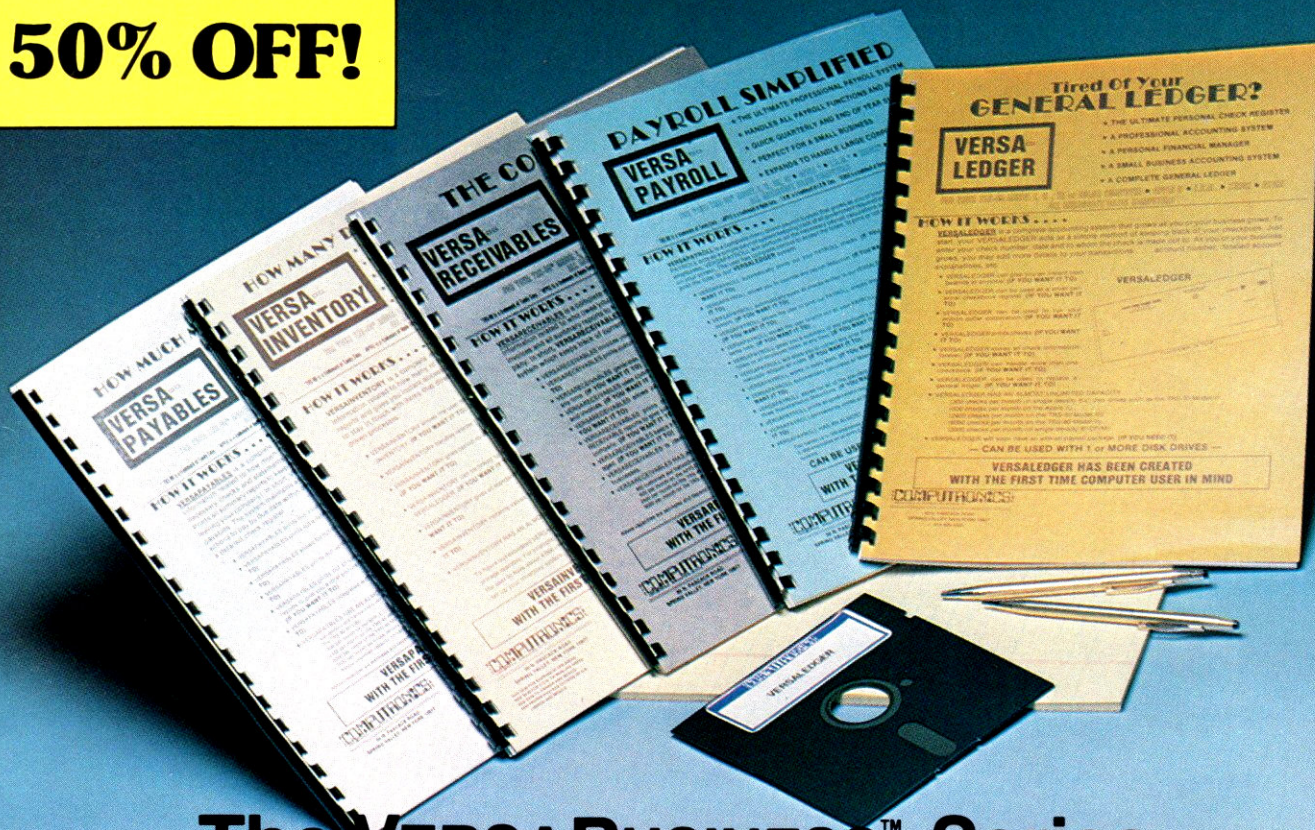
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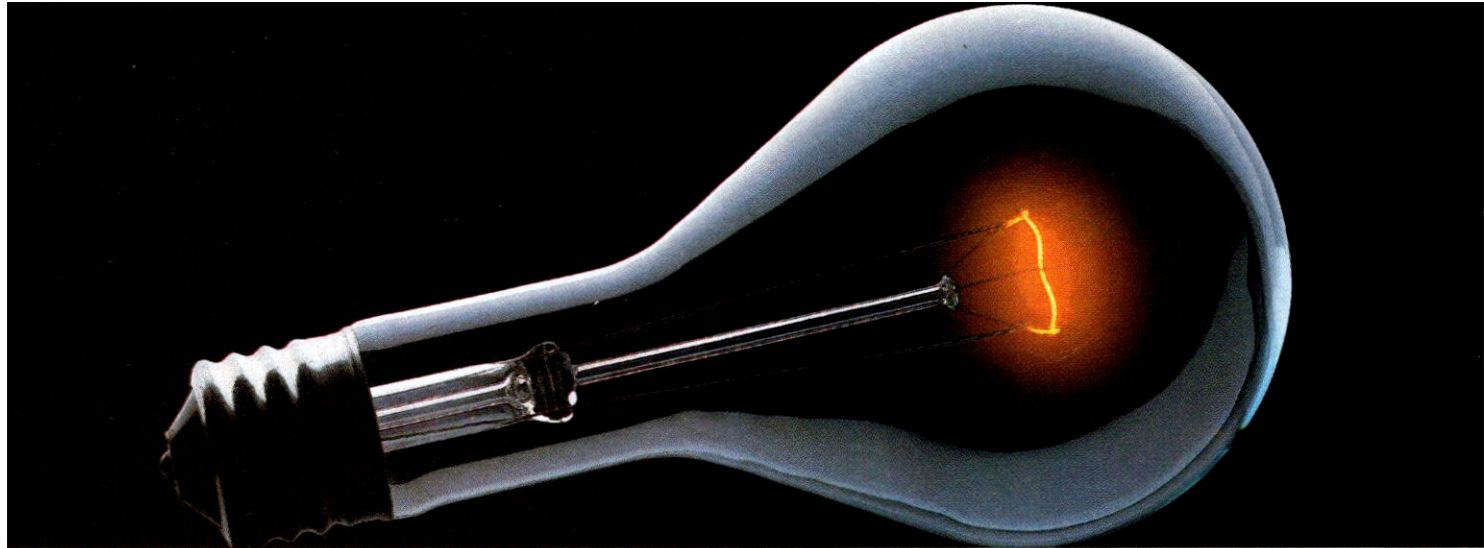
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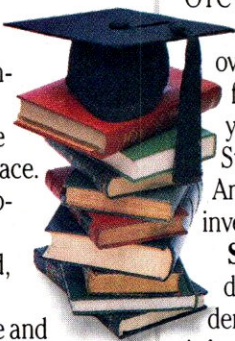


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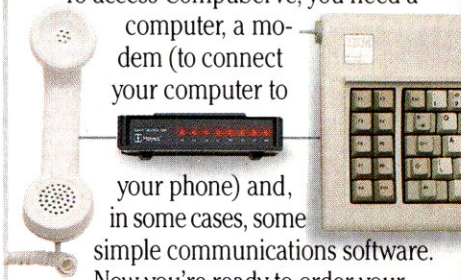
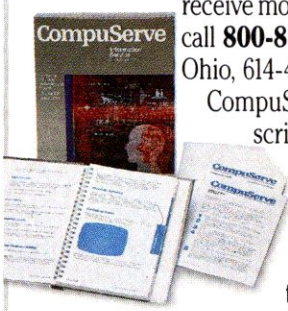
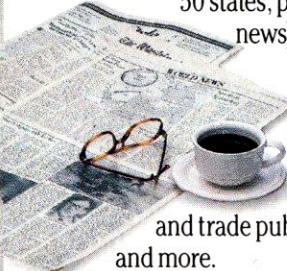
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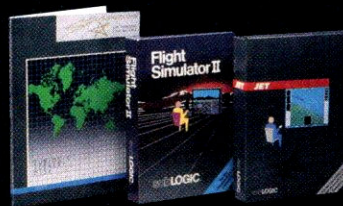
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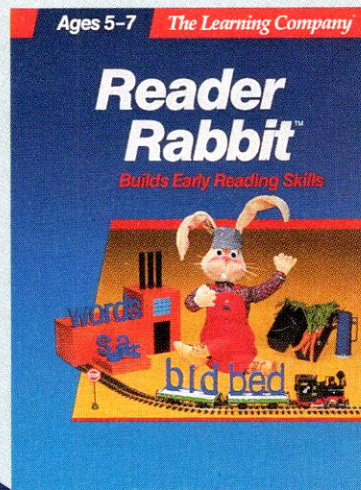


Our Three Rabbits Are Revolutionizing "The Three R's"

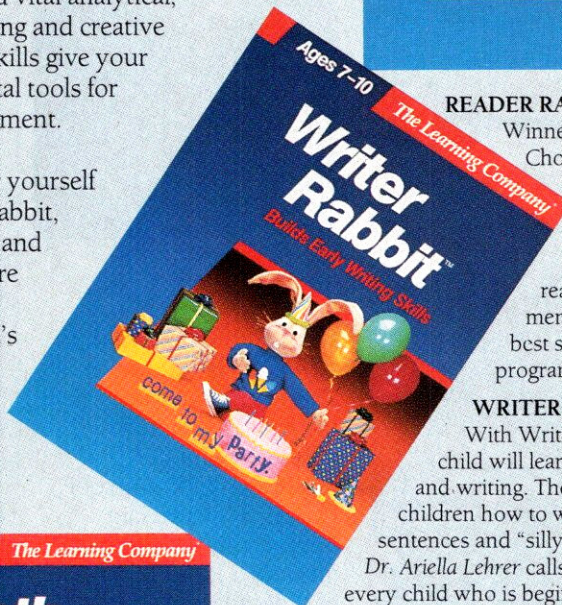
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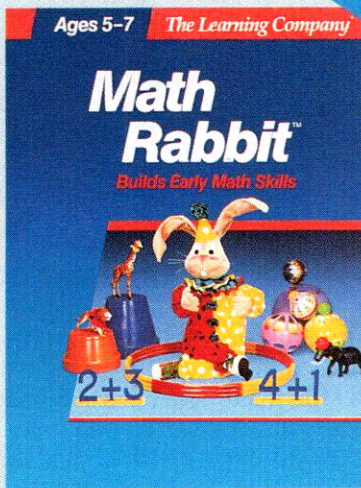
Find out for yourself why Reader Rabbit, Writer Rabbit and Math Rabbit are teachers' pets—and children's favorites!



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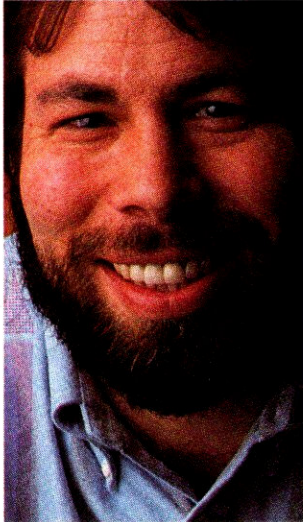
THE DRIVE TO SUCCEED

BY GARY B. LITTLE

Did you know that nine different models of Apple-brand floppy-disk drives work with the Apple II family of computers? This article will help you sort them out and find out which one is best for you.



HISTORY



38

THE COMPUTER THAT STARTED IT ALL

Ten years have passed since the Apple II ignited the personal-computer revolution. In this first of two parts, our special commemorative coverage includes a look back at the past decade and an exclusive interview with the inventor of the Apple II, Steve Wozniak, plus a revealing look at code names.

SOFTWARE

64

POINTING IN THE RIGHT DIRECTION

BY RUSS LOCKWOOD

Point-to-Point is a new telecommunications program that takes care of all the basics and works in a manner similar to AppleWorks.

COLUMNS

9

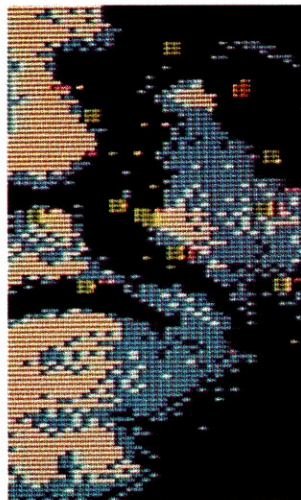
EDITOR'S PAGE

69

THE LEARNING CURVE

BY DAVID D. THORNBURG

In *Computers and Creativity, Part II*, Dr. Thornburg explores the educational applications of two commercial programs: *Fantavision* from Brøderbund, and *Creativity, Unlimited* from Sunburst Communications.



89

SPEAKING OF GRAPHICS

BY ROBERTA SCHWARTZ AND MICHAEL CALLERY

This month our graphics duo have great fun with the *Walt Disney Comic Strip Maker* and the *Walt Disney Card and Party Shop*, discuss a potential drawback of the *Laser 128's* video output, and offer some good news for *Fontrix* users.

99

GAMEPORT

BY BOB LINDSTROM

This month Bob rings out the old, wishes for something new, recommends a pair of joysticks, and looks at two games that might turn you into a real meanie.



131

THOUGHTWARE

BY STEVE ROSENTHAL

Steve Rosenthal takes a look at how Apple has changed over the past ten years and how poorly Apple's early press releases predicted the course of personal computing.

DEPARTMENTS

15

LETTERS

19

NEWSPLUS

BY LISA RALEIGH AND CHIP CARMAN

News and views of the personal-computer industry

T E N T S

DEPARTMENTS

77

A+ APPLEWORKS REPORT

The first installment of this new monthly department includes a feature report on the new AppleWorks Version 2.0; a short report on Pinpoint's InfoMerge utility; and our AppleWorks question-and-answer department, the Help Folder.

102

THAT'S ENTERTAINMENT

Following "GamePort" are reviews of Amnesia, Hacker II, Chessmaster 2000, Micro League Baseball, and Ballyhoo.



115

COMPUTER CALISTHENICS

BY MICHAEL WIESENBERG
A new puzzle involving a search for a counterfeit coin and the answer to October's puzzle about addition problems

119

TIPS AND TECHNIQUES

Useful tips, hints, tricks, and techniques for getting more out of your Apple II.

120

PIPELINE

BY CAROL PERSON AND RHODA SIMMONS

Products you want to know about—for the entire Apple II family



136

RESCUE SQUAD

BY CRAIG CROSSMAN AND GARY B. LITTLE

The A+ technical troubleshooters offer help with adding RAM to a IIc, searching text files, and using an Apple II as a UNIX terminal.

137

A+ MART

139

A+ DIRECTORY

142

INDEX TO ADVERTISERS

144

COMING SOON

IIGS

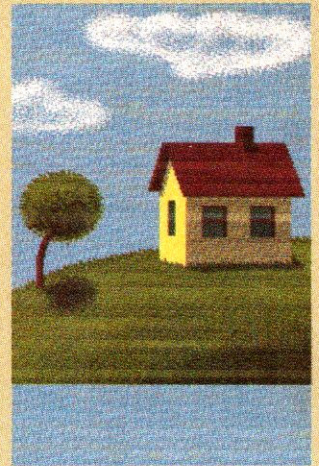
UPDATE

48

G IS FOR GRAPHICS

BY MICHAEL FISCHER

The G in Apple IIGS stands for graphics, and, wow, what great graphics compared to those of the older Apple II computers! This article previews nine slick new graphics programs that are on the way for the IIGS.



49

S IS FOR SOUND

BY STEVE MANN

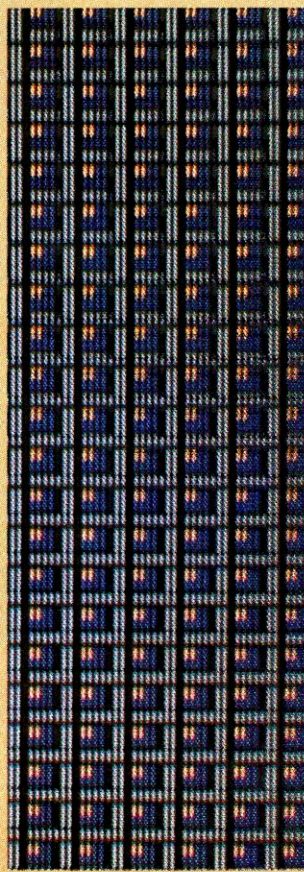
The S in Apple IIGS stands for sound, and the IIGS's sound capabilities are the best around. Although companies are taking longer to develop sound programs than graphics programs, this article tells you about the products you can use to start playing music on your IIGS.

52

ENSONIQ SOUND

BY ROLAND GUSTAFSSON

Another A+ exclusive! This free type-in program lets you compose and play simple tunes on your IIGS and demonstrates one method for using the IIGS's Ensoniq sound chip.

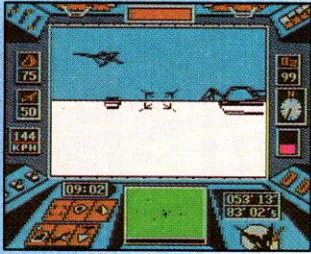


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You're caught in a blizzard with your air supply running low. Snowblind, you hear a scream overhead and it isn't the wind. An alien fighter plane has spotted you and he's got you locked-on. If he's got buddies, you could end up Spam[®]-in-a-can. Uh-oh, your radar picks up incoming fighters, tanks, missiles and rockets. Get ready for the fight of your life . . .

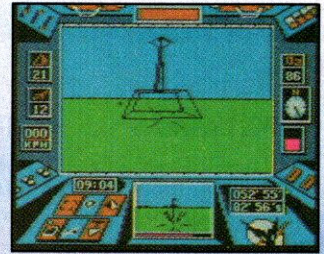


The guided missile's on-board camera. Perfect for reconnaissance . . . if you've got the time for sightseeing.

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HAVE YOU GOT WHAT IT TAKES?

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MISSION: Infiltrate alien stronghold. Search out and destroy alien main fortress. Terminate alien troops with extreme prejudice.
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ARMAMENT: 150mm cannon
2 mine dispensers
Tunnel series missile-launcher
Line-of-sight guided missiles
MAX SPEED: 100 mph
CREW: 1
MISSION SUCCESS PROBABILITY: Slim
MISSION SURVIVAL PROBABILITY: Worse

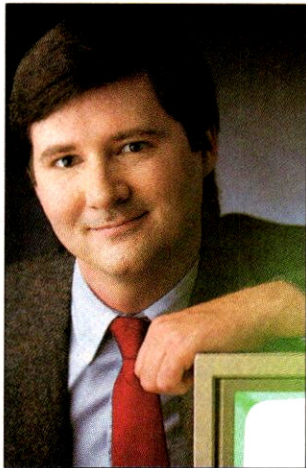


The Main Fortress. If you're good enough to find it, are you bad enough to destroy it?



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SPAM is a registered trademark of Geo. A. Hormel & Co. To buy by mail, send check or money order to Electronic Arts Direct Sales, P.O. Box 7530, San Mateo, CA 94403. Add \$5 for shipping and handling (\$7 Canadian). There is a 14-day, money-back guarantee on direct orders. For a complete product catalog, send 50¢ and a stamped, self-addressed envelope to: Electronic Arts Catalog, 1820 Gateway Drive, San Mateo, California, 94404.



No matter how many new models and new features came along, I never regretted having bought the first Apple II model and never felt bad paying to upgrade later on.

LOOKING BACKWARD AND FORWARD

It's now 20 years since the advent of BASIC and 10 years since the advent of the Apple II, two events that changed my life. Twenty years ago, two professors at Dartmouth College created an experimental computer language designed to help teach youngsters how to program computers. That experimental language was called BASIC (for Beginner's All-Purpose Symbolic Instruction Code), and I was fortunate enough to be one of the kids who learned BASIC at its inception.

In retrospect, programming in BASIC was the most important thing I was ever taught in school. After getting out of college, I took my savings and, instead of buying a car, bought an Apple II computer with 16K and a cassette tape player, because I liked its built-in BASIC. Everyone I knew thought I was crazy to sink my funds into the Apple, but I can say with conviction that buying that Apple II early on was one of the smartest moves I ever made, and it certainly turned out to be the most profitable.

No matter how many new models and features came along, I never regretted having bought the first Apple II model and never felt bad about paying to upgrade later on. I recouped my original investment through increased productivity with EasyWriter and VisiCalc alone, crude programs by today's standards. And I upgraded every step of the way: The disk drive that replaced the cassette tape recorder cost more than \$600, and upgrading from 16K to 48K and then 64K cost more than \$700 in the late 70s. Then I switched system units three times,

from the II to the II Plus to the IIe, selling the old one and buying a new one each time. And now I'm getting ready to upgrade my IIe's motherboard to the IIGS.

Ten years have passed since two guys named Steve took a homebrew computer, led a parade of talented people, and propelled Apple into becoming a company that would join the ranks of the Fortune 500 faster than any other company before it. Steve Wozniak's design of the revolutionary Apple II computer and its equally innovative floppy-disk drive marked one of the great engineering accomplishments of the 20th century.

To commemorate this historic occasion, we have put together a special ten-year retrospective of Apple and the Apple II in this issue.

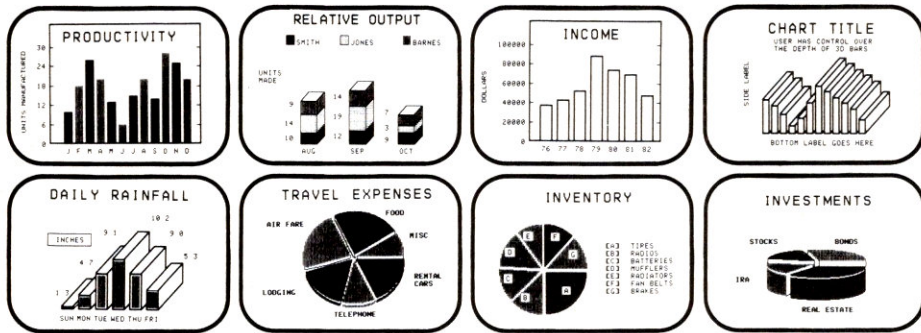
The Apple II Magazine

You'll notice some important changes in this month's issue of *A+*. The most significant is that we have dropped our coverage of the Macintosh in order to focus exclusively on the Apple II family of computers. When *A+* was founded in 1983, we covered the entire Apple product line: the Apple II, III, and Lisa. When the Macintosh was introduced in 1984, *A+* started a Macintosh section and was the only major computer magazine covering the Macintosh on a monthly basis. The Apple II family has always been our primary focus, however. With developments such as the new Apple IIGS and an MS-DOS board expected for the Apple IIe and IIGS this spring, it makes sense for us to focus entirely on the Apple II family and free up the space the Mac section would take for expanded Apple II coverage.

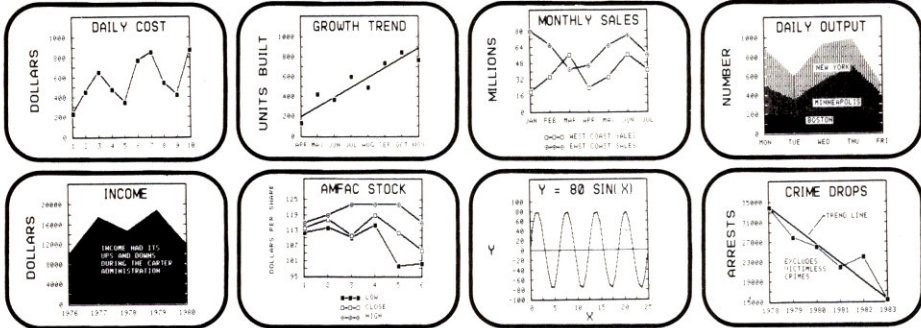
What type of expanded Apple II coverage can you expect from *A+*? Well, starting last November, we expanded our entertainment section with the addition of Bob Lindstrom's "GamePort" column, which your letters indicate is a popular item. This

ChartPower!

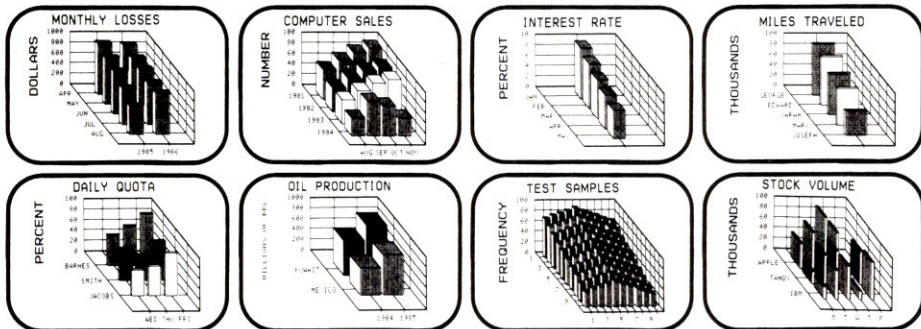
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FRED

FREDERIC E. DAVIS / EDITOR IN CHIEF

month we are pleased to announce a monthly AppleWorks department called the "A + AppleWorks Report" that will present features and short reports that cover all aspects of AppleWorks and are written by industry experts such as Chris Van Buren and his Q-Mar Group, as well as Charles Rubin.

We are continuing our leadership role in bringing you Apple IIGS articles; this month's GS coverage features closer looks at graphics and sound software for the IIGS, and the article "S Is for Sound" includes a program listing that will let you play music on an Apple IIGS. Also, starting this month, our "Speaking of Graphics" column will increase in frequency from every other month to monthly. And in the next few issues, we're going to unveil several other exciting new projects that will help A + readers get the most out of their Apple II.

In order to reflect our new focus on the Apple II family, we have changed our cover logo to read "A +, The Number One Apple II Magazine." We're not saying that just because we're the most widely read Apple II magazine; we're saying it because we're committed to being your source of useful information about the entire Apple II family.

Although an Apple II can be a lot of fun, it is definitely not limited to playing games. I know from your letters that some of you are using Apple IIs for very serious applications; you've written to tell us of such marvels as modeling mainframe software on an Apple II, running UNIX with add-in 68000 coprocessor boards, and networking Apple IIs to a 100-megabyte hard disk. We want to hear more about Apple II power users. If you are squeezing a lot of power from your Apple, send a description of your application and the system configuration of your Apple II to A + Power Users, 11 Davis Drive, Belmont, CA 94002. We'll send an A + Power User certificate to folks with the best applications, and we'll highlight some of you in an upcoming issue.



EVERY TIME I TRIED TO PRINT A SPREADSHEET IT RAN RIGHT OFF THE

"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

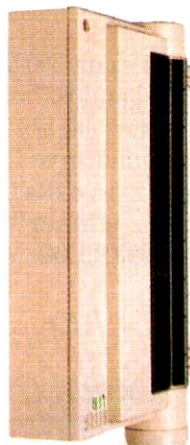
With new Sideways, the printing possibilities are nearly endless. Choose from six different type sizes — from tiny to extra-large. Select single or double density printing. Adjust margins, page size, line spacing and character spacing any way you like.

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.

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CIRCLE 154 ON READER SERVICE CARD

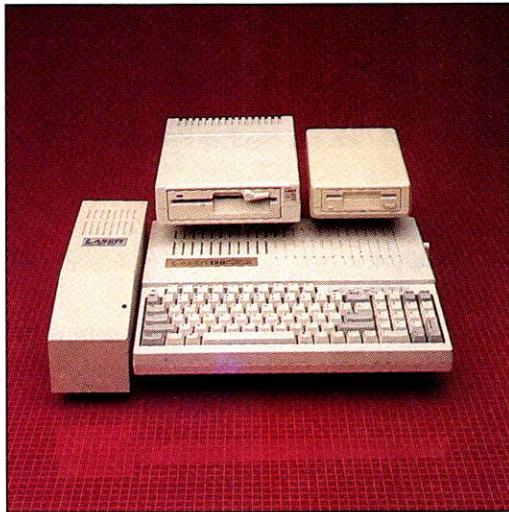
EXPAND Your Laser 128

16 bit processor, 1 meg RAM boards, 3½ inch drives...

One of the reasons you bought your Laser 128 personal computer is its expansion capability. You knew that a computer without expansion slots is a dead-end that stays behind as technology advances. Now you're ready to expand your Laser 128 to take advantage of extra memory, second disk drives, 3½ inch 800K drives, 16 bit processors, and more...

Expansion Box

The optimum way to take advantage of the Laser 128's expansion slot. The Laser 128 Expansion Box gives your Laser two fully protected, shielded, standard Apple compatible expansion slots (slots 5 and 7). It even includes its own power supply for power-hungry cards and a safety interlock switch that disconnects the 12 volt power supply if the cover is opened. Its solid metal construction insures that even a fully-expanded Laser 128 won't interfere with radio or television equipment. Best of all, its two full-length slots



will accept virtually any Apple-compatible expansion card at a price that won't break your budget. **\$79.95**

800K, 3½" Drives

Add 800K of Apple Unidisk 3.5™ compatible storage to your Laser 128 and pocket over \$180 in savings! Our Universal Disk Controller™ accepts two drives and you can even mix and match 5¼" and 3½" drives. And disks

made with the Universal Disk Controller are fully interchangeable with Apple's Unidisk 3.5. Price includes controller card (plugs into Laser 128 Expansion Box) and one 3½" 800K drive (see our other advertisement in this issue). **\$285.00**

5¼" Second Disk Drive

Add a second disk drive designed specifically for your Laser 128. It plugs right into the external disk drive port on the Laser 128 and is one of the quietest drives available. **\$150.00**

Memory/16 bit Expansion

The Laser 128 Expansion Box works well with the latest Appleworks compatible memory boards from APPLIED ENGINEERING (RAMFACTOR), and several others. We now stock Applied Engineering's RAMFACTOR board with 256K memory installed. For a limited time, buy a RAMFACTOR, and we'll give you the Laser 128 Expansion Box, **free!** We also stock the Applied Engineering Transwarp Accelerator card with the 16 bit option to run your Laser 128 3½ times faster. See Applied Engineering's ads for more information.

Laser 128

The Apple //e compatible computer that brings you the best of all worlds: Transportable like the //c, expandable like the //e, but priced like a Commodore 128! No wonder **A+ magazine calls the Laser 128 the "clear winner" of Apple compatibles! \$395.00**

Yes, I'm ready to expand my Laser 128! Please send me these items:

- Laser 128 Expansion Box**—\$79.95 & 6 s/h
- Universal Disk Controller and 800K 3½" Disk Drive**—\$285 & 10 s/h
- Laser 128 5¼" Disk Drive**—\$150 & 10 s/h
- RAMFACTOR™ with 256K Memory**—Includes Expansion Box - free! \$239 & 10 s/h
- Transwarp™ Accelerator Card with 16 Bit Processor Option**—\$249 & 6 s/h
- Laser 128 Computer**—\$395 & 20 s/h

And ship them to me at this street address ASAP:

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3.5 Inch, 800K Drives Only \$195

Compatible with IIGs, //e, Macintosh and Laser 128!

Now you can add 800K of Apple compatible storage to your Apple at an affordable price. These 3.5 inch drives are functionally identical to Apple's Unidisk 3.5 and Macintosh drives but cost half as much!

Works with an Apple II:

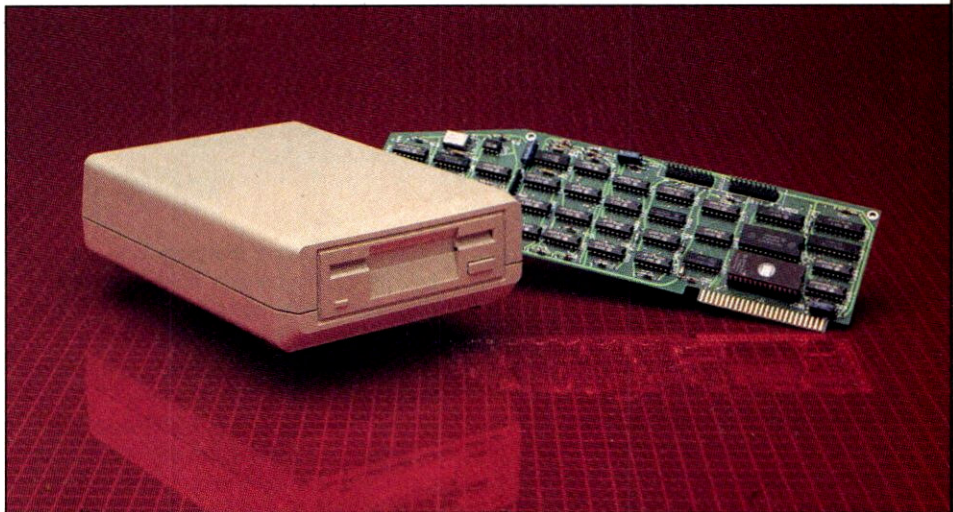
Our 3.5 inch drives connect to an Apple //e, Apple II Plus, Apple IIGs, or Laser 128 via our "Universal Disk Controller." This remarkable interface card allows you to connect two 3.5 inch drives for a total of 1.6 megabytes of Apple Unidisk 3.5 compatible disk storage.

Ideal Drives for IIGs

These are the ideal drives for Apple's new IIGs. Save over \$300 on a two-drive combination! If you're upgrading from an Apple II Plus or //e, you can even connect your current 5¼ inch drive without needing adapter cables. (Our Universal Disk Controller supports both 20 pin and DB-19 drive connectors.)

Works with a Macintosh:

These 3.5 inch drives directly connect to a Macintosh Plus or Macintosh 512 enhanced computer through the



external drive port. No interface card is necessary.

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Call today and order your 3.5 inch disk drives. Find out just how inexpensive it can be to add an 800K disk to your Apple!

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CIRCLE 107 ON READER SERVICE CARD

Yes, please send me the 3.5 inch 800K drives indicated below:

800K, 3.5 inch drive for Mac Plus, Macintosh 512 enhanced, Apple II Plus, //e, IIGs, or Laser 128. (Sorry, not available for //c). \$195 & \$10 s/h (\$15 to Canada, \$50 overseas)

Universal Disk Controller card. (Required to connect 800K drives to Apple II Plus, //e, IIGs, and Laser 128.) Controls 2 3.5 inch drives. Price includes our popular Copy II Plus disk utilities - free! \$90

And ship them to me at this street address ASAP:

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Address _____



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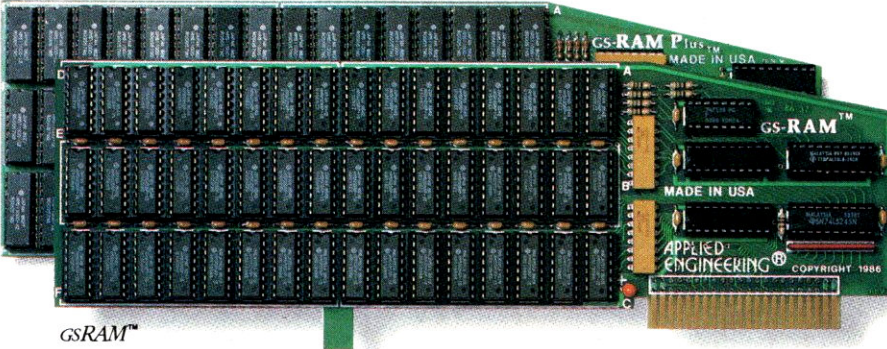
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Insist on GS-RAM™ When You Buy Your IIGs™

Expand the IIGs RAM and ROM with the GS-RAM or GS-RAM Plus with ROM Pak. Available now with 256K to 8 MEG!

GS-RAM Plus™



GS-RAM™

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.

GS-RAM and GS-RAM 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 GS-RAM and GS-RAM 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

GS-RAM for More AppleWorks Power

Only GS-RAM and GS-RAM Plus eliminates AppleWorks internal memory limits, increasing the maximum number of records available from 6,000 to over 25,000 and only GS-RAM and GS-RAM Plus increases the number of lines permitted in the word processing mode from 6,000 to over 15,000. And only GS-RAM and GS-RAM Plus offers a built-in printer buffer so you can continue using AppleWorks while your printer is printing. GS-RAM and GS-RAM Plus even expand the number of lines in the dipboard 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. GS-RAM and GS-RAM 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

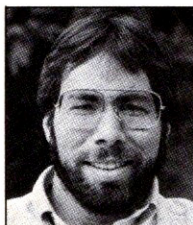
Simply plug GS-RAM into the IIGs memory expansion slot and you've got up to 8 megabytes of RAM at your fingertips—all of it instantly and automatically recognized by the IIGs. GS-RAM is compatible with all IIGs software, including AppleWorks, as well as BASIC®, ProDos, DOS 3.3, PASCAL®, "C" and CP/M®.

Grow by Bytes or Megabytes

We offer GS-RAM in two configurations so you can increase your memory 256K at a time (GS-RAM) 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 GS-RAM operates at only 375 ma, and GS-RAM Plus at only 270 ma (even with 6 megabytes on board!)

GS-RAM—for Normal Memory Requirements

GS-RAM 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 GS-RAM with less memory and expand it up to 1.5 MEG in the future—or upgrade to GS-RAM Plus for a small charge.



"I recommend Applied Engineering products wholeheartedly."

Steve Wozniak, the creator of Apple Computer

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

GS-RAM Plus—for Growing by Leaps and Bounds

GS-RAM 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 GS-RAM Plus with less memory and easily expand it in the future.

GS-RAM Plus can be expanded up to 8 MEG with an optional piggyback card.

Easy Expansion

Both GS-RAM and GS-RAM Plus use standard RAM chips that are readily available and just plug right in. So unlike other cards, you'll find expanding your GS-RAM or GS-RAM 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 GS-RAM and GS-RAM Plus will deliver the performance you're looking for—or return them within 15 days for a full refund.

| | |
|--------------------------|-------|
| GS-RAM with 256K | \$169 |
| GS-RAM with 512K | \$219 |
| GS-RAM with 1 MEG | \$299 |
| GS-RAM with 1.5 MEG | \$379 |
| GS-RAM with 2-8 MEG | CALL |
| GS-RAM Plus with 1-8 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 5½% sales tax. Add \$10.00 outside U.S.A.

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We invite your comments.

Letters

FREEDOM OF CHOICE

Dear A+: Word Handler II was my first word-processing program. I liked it. Then AppleWorks came to me as a gift from my son. Last week, after a year's disuse, Word Handler was needed to retrieve old files. It didn't work. I called Advanced Logic Systems for a replacement. I was sold up, convincingly, to a full set of The Handlers—an updated word processor, a spelling checker, and a list handler. I commented openly, with a chuckle rather than critically, on the excellent salesmanship. After all, the options were still mine.

That same evening I read, almost with a sense of déjà vu, your remark (October 1986, page 22) on the new Word Handler and its excellent spelling checker: "Warning: If you call the company with an innocent query about Word Handler's features, you may get a hard sell."

I had just done that, and I now wondered if I had fallen victim to a "hard sell." This morning, Monday, I had my first chance to see what I had bought. I liked it. After your item had led me into a dubious weekend, I am now glad that my limited awareness of what ALS had done with the original Word Handler had been expanded by a presentation that went beyond the limits of my inquiry.

This experience convinces me that (1) your caveat was fair, (2) ALS is repairing a unique history with a fine new word-processing package, and (3) the user, namely me, benefits from the clear (i.e., "hard sell"?) presentation of the merits of the package vs. a mere replacement of the old program.

A+ is my favorite computer magazine. Keep it that way by praising the praiseworthy, condemning the unworthy, and criticizing the intemperate—in effect, by doing for me what ALS, in an important sense, did to me last week.

William F. Ackerman
Aptos, CA

CARTOGRAPHIC COPYRIGHTS

Dear A+: A+ generally gives helpful advice, but "You Can Get There from Here," September 1986, has a dangerous bug. You suggest copying the map you want to recreate. If the map is in the public domain, that may be fine, but numerous maps are copyrighted. A computer user who duplicates a copyrighted map may be breaking the law. If the computer user in turn uses the duplicated map for commercial purposes, the liability and litigation headaches can be worse than a system crash.

Daniel Kegan
Kegan & Kegan, Ltd.
Chicago, IL

GOOD AND SLOW

Dear A+: I would like to comment on Dan McNeill's article on word processors in your October issue. His sketch of Perfect Writer 2.0 by Thorn EMI Computer Software was essentially correct, except for one fact. The program is abysmally slow to format a document for printing. I have used the program for more than a year in writing research papers for college, and I like its features tremendously. It is too slow, however. I have called Thorn EMI to see if a ProDOS version of the program is available, and they said no

such version was planned.

I have used products such as WordStar, MultiMate, and Word Perfect and am aware all programs experience some degradation in speed when documents are lengthy. I feel that Perfect Writer is slower than it needs to be, though. I have even purchased a McT Speeddemon accelerator card to improve matters, but it didn't help. I have tried to load the program onto a RAM card, but it does strange things when it runs, so I abandoned that idea.

I feel that Perfect Writer is a very powerful program and is easy to use. I like its environment commands and use them a great deal. It could be made better if it were adapted to the ProDOS operating system. I suspect this would take care of the slow formatting.

Joe A. Lee
Montgomery, AL

NO COMPARISON

Dear A+: After raving about SwyftWare as the best new idea in word processing (October 1985) and publishing a major article about it ("The Race Goes to the Swyft," November 1985), somehow the editors didn't see fit to have Dan McNeill include it in his survey of some 40 other word processors. But then, after reading the article and looking at the summary chart by Martin and Person, I began to feel almost relieved that it wasn't included.

Because once again, the reviewers were looking at features instead of the serviceability of the products. This is the status quo method of reviewing software, but it is not as helpful to readers as would be the more thoughtful task of reporting how efficiently each product performs in extended use, a process that would automatically include the listing of features. Isn't efficiency what people really want in a "productivity tool"?

When a product is as new and different as SwyftWare, it is impossible

Powerful Software. Persuasive Prices.

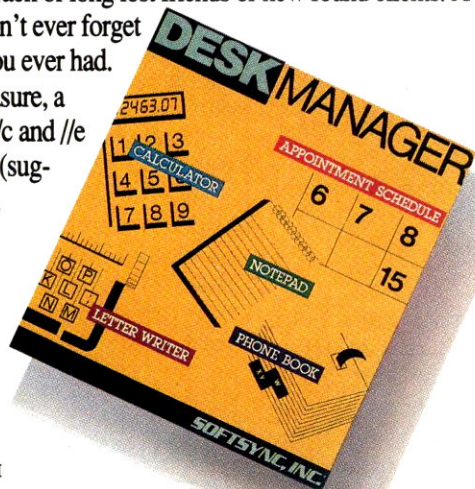
There's three things you should get from software: power, ease of use and a reasonable price. Here's three programs that can give you all the tools you need to get your work done faster, easier and better:

Desk Manager™

Five tools to organize your desktop.

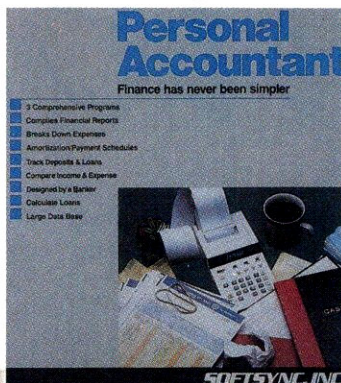
Desk Manager puts five useful tools in your Apple that you can access instantly. It's a simple word processor that gives you the ability to crank out quick letters without the fancy footwork. An appointment calendar to keep your schedule in order. A phone book for keeping track of long lost friends or new found clients. A note pad so you don't ever forget the greatest idea you ever had.

And, for good measure, a calculator. Apple //c and //e with 128K \$39.95 (suggested retail price).



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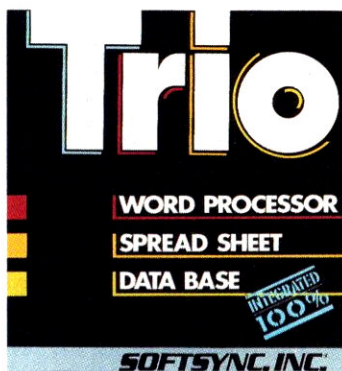
The Personal Accountant will keep track of your income, expense, loans, and deposits. It will tell you about your net worth, profits, taxes, and even speculate about the future. It generates professional financial statements and account histories. It

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The good news is that TRIO gives you the three most important software applications: an easy-to-use word processor, a powerful spreadsheet and a highly flexible data base. The even better news is you can buy TRIO for less than a third of the cost of Appleworks. Plus you get more features: like a very slick mail merge, a form letter maker, the ability to undo mistakes, printer macros and more. Of course, like Appleworks, you'll be able to write dazzlingly fast, project profits, organize lists, and more. TRIO is the most powerful integrated software package you can buy for the money. Apple //c and //e with 128K, \$79.95 (suggested retail price).



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to summarize its advantages in a paragraph or across a line in a chart. The categories of the oft-used charts have become incomplete. Before the Macintosh, for example (which was Jef Raskin's most recent creation until SwyftWare), who would have understood a "windows" column in a comparison chart?

SwyftWare replaces the sluggish feel of writing and editing on a computer. That's because its new cursor-moving mechanism, called LEAP, is faster than a mouse and much faster than cursor-control keys and doesn't make you take your hands off the keyboard or your eyes off the screen in order to use it.

Why is speed a good quality to compare? Because writing is a creative process and anything that slows you down from getting your ideas in front of you causes frustration. Many of the products in the McNeill survey cannot keep up with normal office typing speed, whereas SwyftWare can keep up with the fastest human, but this isn't mentioned. The fact that SwyftWare has eliminated any need to understand or use DOS, ProDOS, or any other disk-operating system is a boon for first-time computer users—but that wouldn't fit on the charts either.

There is a column for "Copy-Protected"—but where is there room for a product like SwyftDisk? Not only is it *not* copy-protected, but it automatically clones itself as text is copied from one disk to another. People no longer have to boot a program disk to start editing. Just put the data disk in, issue the one-key disk command, and your text is loaded in eight seconds or less. The disk command controls all disk operations—saving, loading, and booting other software.

We know from experience that the overabundance of complexity makes the computer hard to use. When we're doing something every day, such as writing, don't we want as little distraction as possible?

In other words, SwyftWare is "off the chart" in practicality and usability, and my main disappointment is that readers who refer to the article will miss out on the chance to use a product that points the way to the future instead of the best of the past.

Robin Samelson
Director, Public Relations
Information Appliance, Inc.
Menlo Park, CA

OUT IN THE COLD

Dear A+: Please tell me how I can get software publishers to respond to my letters. I have owned The Data Factory by Micro Lab and Locksmith by Alpha Logic for several years. Over the years, I have written both of their offices many letters requesting information on various subjects concerning their products. Usually there is no response. Occasionally, Alpha Logic will respond with a photocopied form letter.

One case in point: Shortly after I purchased Locksmith, I ordered the "Locksmith Newsletter." After writing several times, I received a form letter explaining that there had been some problems due to a buyout and the loss of some files. I waited a few more months and wrote again. This time I received my first and only copy of the newsletter. And the issue was dated several months before my letter. It has been over a year since then, and my further inquiries have met with silence. But they have sent me a brochure to let me know that I can buy an updated version for only \$29.95.

My experiences with Micro Lab have been almost as bad. I have written and called without success. Promises to have phone calls returned have not been fulfilled.

What can I do to change their policies on customer requests?

Bruce Schwenke
Beatrice, NE

PLEASANT SURPRISE

Dear A+: I purchased an Orange-Micro Grappler+ parallel card in 1983 for my IIe. It has served me well, but I needed to upgrade the card for firmware compatibility. Considering the condition of the computer industry, I knew this was going to be an expensive proposition. I telephoned Orange-Micro; they said no charge for the upgrade! And there was no charge for shipping and handling! Thanks to Orange Micro for a great product and great service.

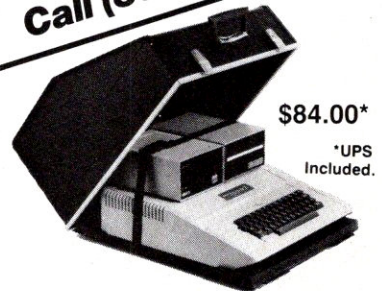
Steve Ikemura
Westchester, CA

CORRECTION

Petit Design and Engineering ("AppleWorks Templates," November 1986, page 91) has a new address and phone number: 2650 South Share Drive, Milwaukee, WI 53207; (414) 483-0003.

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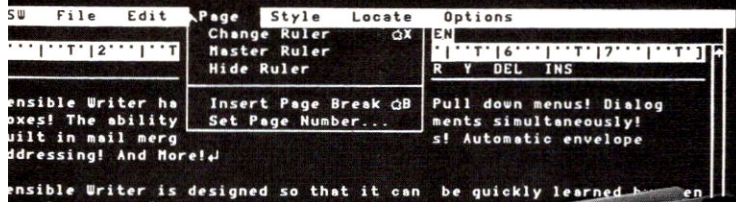


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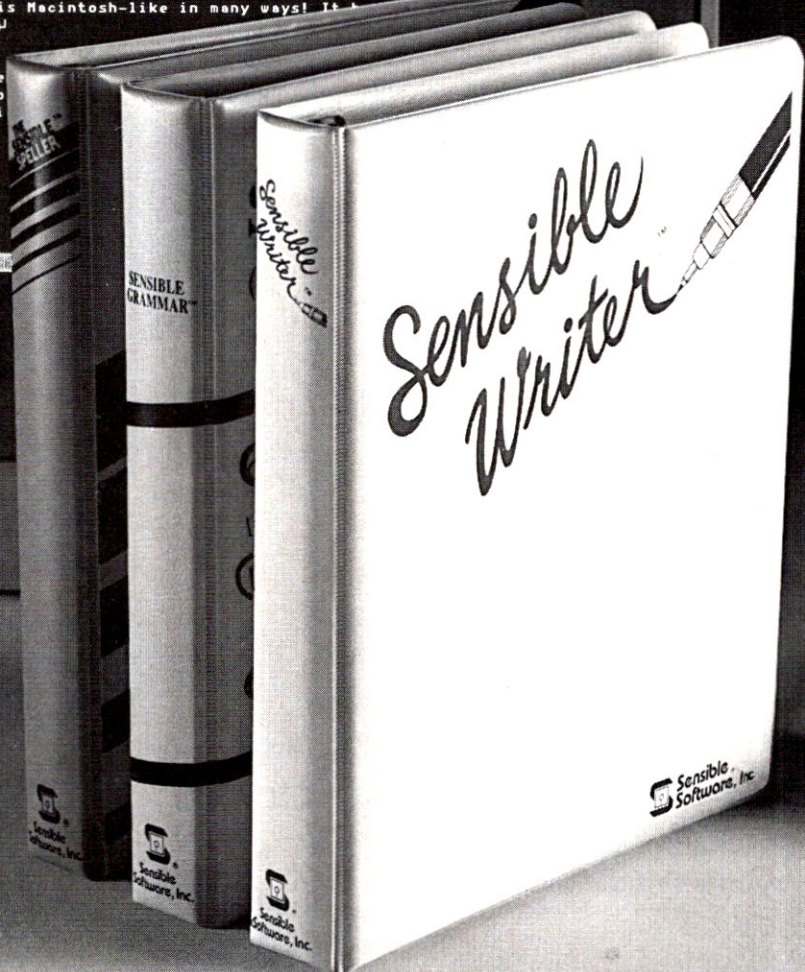


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Page 1



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 5 1/4 and 3.5 UniDisk for \$99.95.

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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.

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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.

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Sensible Speller is compatible with Appleworks and most ProDOS word processors. Supplied on UniDisk 3.5 as well as 5 1/4" 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.); Catalyzt (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.); WordTalk (Computer Aids) and WritingWizard (Scarborough Systems). Owners of trademarks indicated in parentheses. Black's Law Dictionary (West Publishing, Inc.).

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NewsPlus

For its birthday book, Apple hired 40 photographers to visit more than 100 Apple computer users worldwide.

TEN-YEAR-OLDS LOVE PICTURE BOOKS

Like any other ten-year-old, Apple Computer, Inc., has anxiously awaited its birthday and planned all sorts of celebrations. Besides putting together parties and promotions, though, Apple

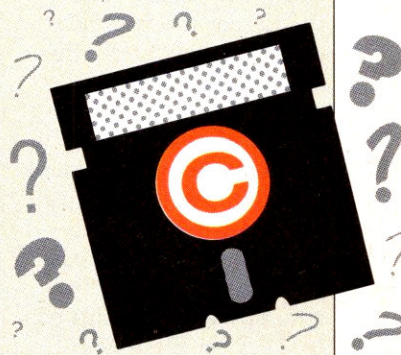
has also been working on a coffee-table picture book to honor the company—and its users.

Although Apple didn't have a final title yet for the book as we were going to press, the working title was *10 Years After*. The book is meant to tell about the people—both inside and outside Apple—who made Apple what it is today. To get user stories, Apple worked with the publisher of the *A Day in the Life of...* (e.g., *A Day in the Life of Japan*) series of picture books. Apple hired 40 of the publisher's photographers to visit more than 100 users worldwide. They found Apple users in locations as diverse as a Belgian monastery, a dolphin-research laboratory in Florida, and an eye surgeon's operating room in Colorado.

The book will be distributed free to Apple employees and various friends of Apple—perhaps even to users' groups. Exactly which friends, though, hadn't been determined as the book was being put together. At this writing, Apple is busily editing down the material it has gathered, keeping its fingers crossed that it can complete the book by January. After all, this is the month in which Apple turns 10.

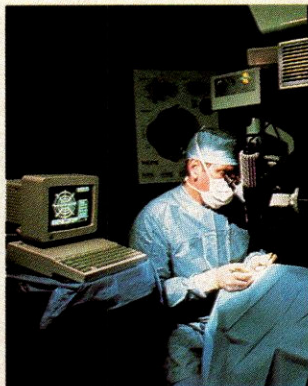
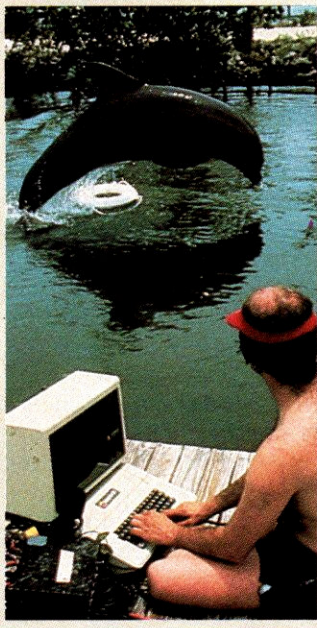
TOO CLOSE FOR COMFORT

A federal court in northern California has ruled that PrintMaster, a Print Shop look-alike program, infringes upon the copyright to The Print Shop held by Brøderbund Software and Pixellite Software. The court's decision is the first to specify that



the user interface of a nongame program is protected under copyright law. (A previous court decision found that copyright law protects the "look and feel" of video games.) Although the court discussed only the IBM PC version of PrintMaster in its decision, Claude Stern, Brøderbund's attorney for this case, says that the ruling applies to all versions of the software.

Unison World, Inc., the publisher of PrintMaster, argued that there was only one way to create a program that did the same tasks as The Print Shop. If this were true, it would mean that Print Shop wouldn't be subject to copyright protection,



NewsPlus

*Software-clone makers
are sure to take careful
notice of the Print Shop/
PrintMaster court decision.*

but Brøderbund (The Print Shop's publisher) and Pixellite (its author) brought forth Stickybear Printer, a program that does what The Print Shop does but goes about it quite differently. "A rival software publisher is completely free to market a program with the same underlying idea, but it must express the idea through a substantially different structure," the court concluded.

The case was complicated because Brøderbund at one time worked with Unison to develop an IBM version of The Print Shop, but negotiations broke down. Unison, however, continued to work on the IBM release, using the work it had already performed for Brøderbund, and turned the code into PrintMaster. "Some of the copying was done so carelessly that it left unmistakable traces," the court said. For instance, at one point, PrintMaster instructs users to press the Return key, just as they would do in Brøderbund's Apple version of The Print Shop. The IBM PC doesn't have a Return key, however; it has an Enter key instead.

The result, said the court, is that "the sequence of screens and the choices presented, the layout of the screen, and the method of feedback to the user are all substantially similar," and PrintMaster creates a case of

audiovisual copyright infringement. As this issue of *A+* was going to press, the court had not yet decided on a penalty.

Unison World certainly isn't taking this judgment lying down. The company, which was recently purchased by Kyocera, a Japanese electronics giant, plans to appeal. No matter what the outcome, other software-clone makers are sure to sit up and take careful notice.

SATISFACTION GUARANTEED

Hayes Microcomputer Products, Inc., has taken a bold step toward ensuring customer satisfaction. The Atlanta manufacturer, known best for its modems and communications software, now warrants the *performance* of its products, meaning

that customers get more than the standard parts-and-labor warranty (or, with software, the standard "buyer beware" disclaimer). Now, Hayes customers also receive the assurance that the product they buy will perform as the manual states it will. (The company doesn't include its advertising under this expanded warranty, but a company spokeswoman claims that Hayes' advertising won't tout capabilities that the company can't back up.)

You can expect other hardware and software vendors similarly to strengthen their warranties. Two important industry groups, ADAPSO and the Software Publishers' Association, have both recently begun to urge their members to guarantee that their claims and specifications are all fact and no fluff.



THE MOOD IS A LITTLE BLUE

Applied Engineering of Dallas has made its name selling enhancement products for the Apple II, such as memory-expansion and accelerator cards. Now it looks as if the company will bring another capability to the Apple II: the ability to run MS-DOS.

Although Applied Engineering is a little shy about revealing details, the word is that it's made a deal with The Engineering Department of Campbell, California, to sell the latter company's Little Blue plug-in card. Little Blue lets II users run IBM PC software. The board was developed by such ex-Apple notables as Wendell Sander (the engineer who designed the Apple III) and Peter Quinn (the engineer who managed the development of the IIe and IIc.)

Watch for Little Blue (which Applied Engineering will probably rename) in the spring.



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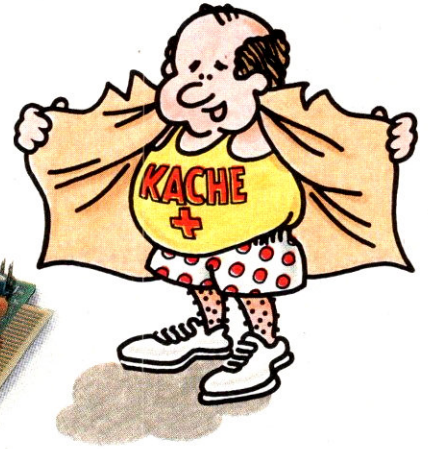
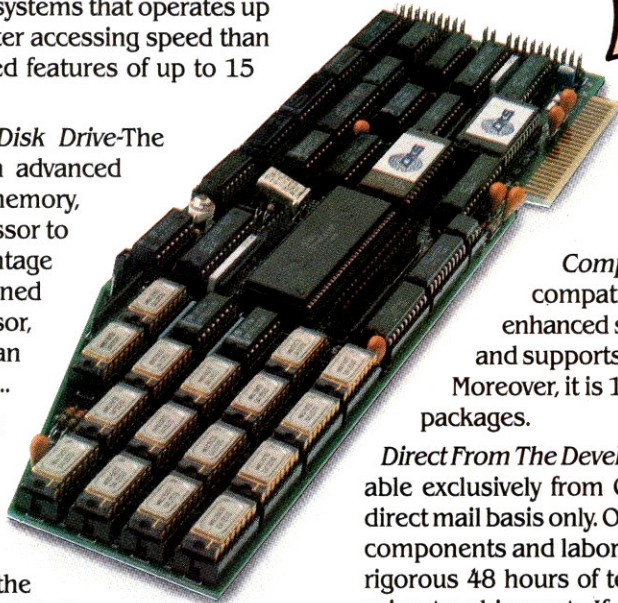
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Third-party developers will determine where the IIGs best fits.

CD ROMS ON THE APPLE IIe

Since the first CD-ROM conference last March, we have collected a three-inch-thick folder of press releases on this emerging mass-storage technology. One recent press release really grabbed our attention, however. A company claims to have a new concept in clock/calendar support for the Apple IIe: a no-slot clock that connects with the IIe via the 28-pin socket for the CD ROM chip.

CD ROM chip???

Although we highly suspect that Apple is working on CD-ROM products, it hasn't made

any announcements about its progress—especially a CD-ROM chip. We thought this press release was inadvertently leaking information about Apple's work with CD-ROMs. But the laugh is on us. Look on the Apple IIe motherboard. It has a chip that's clearly labeled CD ROM. CD does not stand for *compact disc* in this case but for the location in memory where the ROM's contents are loaded (hexadecimal \$C000-\$DFFF).

SMT's no-slot clock does look interesting.

You simply remove the CD ROM from its socket, insert the clock chip, and replace the ROM on top of the clock chip. This nifty little timepiece is no larger than the CD ROM and has a built in ten-year battery. For further information, contact SMT in San Marcos, California: (800) 648-6262 or (619) 744-3590.

IIGS DEVELOPERS' CONFERENCE

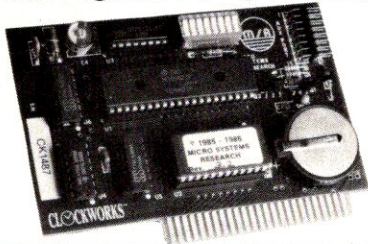
Is it a Mac or is it an Apple II? That question surely crossed the minds of the 400-450 software developers who attended Ap-

ple's IIGs developers' conference in October 1986.

The GS takes the best features of the IIe and IIc and combines them with Appletalk, a portion of Quickdraw, the mouse, and the Desktop Bus of the Mac—and still maintains compatibility with Apple II software.

Apple marketing thinks the IIGs will do its best in education and home productivity; Jean-Louis Gasseé, vice president of product development, was quick to point out, though, that third-party developers will determine where the IIGs best fits. Opportunities exist to develop products for desktop

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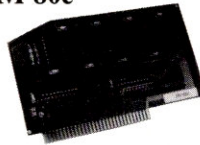
The new ClockWorks card is not just another clock based on the same old IC used in Timemaster HO, Proclock, Versacard, Multi I/O and many others, but rather a new and innovative ground-up design with new technology that gives you all the features you'd expect from a high quality product, all the compatibility you must have and above all, additional capabilities not available with any other clock. Just compare and find out why ClockWorks is the only clock/calendar card you should obtain for your Apple™.

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| LONG LIFE LITHIUM BATTERY, ALWAYS WORKS, NO RECHARGING IS EVER NEEDED. | YES | NO | NO |
| INCLUDES A DIGITAL I/O PORT FOR ADVANCED APPLICATIONS. | YES | NO | NO |
| EXTERNAL SOURCE INTERRUPTING AND FLAGGING. | YES | NO | NO |
| BUILT-IN TIME SETTING COMMANDS | YES | NO | YES |
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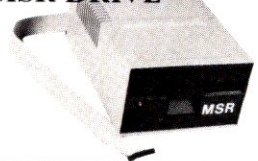


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publishing, communications, and science/technology.

Though the conference was well attended by developers from the educational market—and some Macintosh-only developers—that in itself is not necessarily the indication that the GS will take off. It's simply an indication of the curiosity of developers. For instance, Digital Research has held well-attended developers' conferences for its GEM interface and Microsoft has held Windows conferences, but those conferences have not led to either of these products becoming the predominate interface on the IBM PC. We predict,

though, that within 18 months the IIGS will dominate the home market as major software packages with the Mac-like interface become available.

Here are a few of the announcements, tidbits, and rumors from the latest Apple developers' conference:

- Third-party developers will offer PASCAL and an object-oriented BASIC language that will be portable between the Mac and the IIGS.
- Apple will develop GS BASIC derived from Apple III Business Basic.
- The common line of peripherals for the Mac and the IIGS will include floppy and SCSI hard-

We predict that within 18 months the IIGS will dominate the home market.

disk drives, monitors, keyboard, mouse, and printers.

- Gasseé hinted that we can expect portability of data between the II line and the Mac line.
- The closed IIC and Mac-Plus will migrate towards portable micros, while the IIe, IIGS and Mac will flourish with their open architecture.
- Watch for SCSI-compatible CD-ROM devices and applications that use human voice synthesis in novel ways.

KEEP COOL

Apple recommends that you install a fan for your IIGS if you have more than two plug-in expansion boards. The fan will benefit the power supply and motherboard more than the cards themselves.

Those of you who plan on upgrading your Apple IIe, take note. The fan will not be available to you because you do not replace the power supply, (where the optional IIGS fan resides), with the upgrade. So if you plan on have several cards installed, you may want to shop around for a third-party fan!



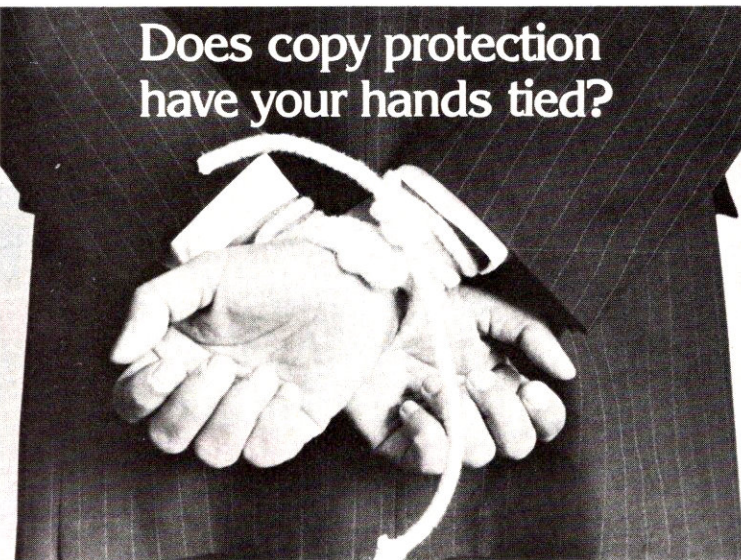
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THE DRIVE TO SUCCEED

Nine Apple Drives for the II Series

Did you know that nine different Apple-brand, removable-media disk drives work with the Apple II family of computers—five 5¼-inch drives and four 3.5-inch drives? You probably didn't, but it's a fact, and it means dealers and their customers are tearing their hair out trying to determine which drive configurations can work with each of the five different Apple II models. The configuration problem is exacerbated because Apple insisted on giving many of these drives confusingly similar names.

In this article I'll describe each of these nine Apple drives. I'll also show how you can, or cannot, use these drives with each of the Apple II models, from the original Apple II to the brand-new Apple IIGS.

Cast of Characters

The original drive for the Apple II was the Disk II, first released in 1979. It works with 140K 5¼-inch floppy diskettes and comes with a permanent cable that terminates in a 20-pin rectangular connector. The connector contains two rows of ten pins each and mates with either of the two connectors on the Disk II controller card. The controller card

occupies one of the peripheral expansion slots of a slotted Apple (the II, II Plus, IIE, or IIGS), slot 6 by convention.

Apple no longer manufactures the Disk II but now has four other 5¼-inch drives to replace it: the UniDisk 5.25, Apple 5.25 Drive, the Disk IIc, and the DuoDisk. (The Apple 5.25 Drive is really the same as the UniDisk 5.25, except that the former is light gray.) The drive mechanism in each of these drives is functionally equivalent to that of the Disk II, so all of Apple's 5¼-inch drives can read from and write to the same diskettes.

The DuoDisk contains two drives in one box, and the UniDisk 5.25, Apple 5.25 Drive, and Disk IIc are one-drive devices. All of these drives have the same type of connector cable, one that terminates in a D-shaped, 19-pin, male DB-19 connector. This connector mates with the external drive port on the back of the Apple IIc or the Apple IIGS but not with the connectors on the Disk II controller card. (Adapter cables are available—the Adapt-A-Disk from Computer Accents, for instance, is \$19.95.) To enable you to

use these drives with a slotted Apple II, Apple has another controller card, the DuoDisk Controller Card (now called the Apple 5.25 Drive Controller), with one female DB-19 connector.

Even though the Apple 5.25 Drive Controller has only one connector, you can use two (but no more than two) UniDisk 5.25 or Apple 5.25 drives with it by connecting the second drive to a similar connector on the back of the first drive. This method of connecting multiple drives is called daisy-chaining and is now Apple's "official" technique for attaching multiple drives to a system. Since a DuoDisk contains two drives, it does not have a daisy-chain connector; nor does the Disk IIc, since you can add only one 5¼-inch drive to the external drive port of the IIc. (You can, however, chain more than one 3.5-inch drive to this computer.)

In 1985, Apple started selling a 3.5-inch drive for the Apple II called the UniDisk 3.5. This intelligent device, which contains a 65C02 microprocessor and a program in ROM for controlling disk data transfers, uses double-sided 800K hard-shelled disks and works with any Apple II model (except older Apple IIc systems). The UniDisk 3.5 cable has the same DB-19 connector as does the cable for the UniDisk 5.25 and the DuoDisk, but the drive works only with its own special controller card.

When Apple announced the IIGS last September, it unveiled another 3.5-inch drive, the Apple 3.5 Drive. It works with the same 800K disks as the UniDisk 3.5 does but lacks the built-in intelligence of the UniDisk 3.5, so it doesn't work with the UniDisk 3.5 controller card; in fact, the drive works on the IIGS and the Macintosh only. The main advantage of using an Apple 3.5 Drive instead of a UniDisk 3.5 on the IIGS is that it operates slightly faster.

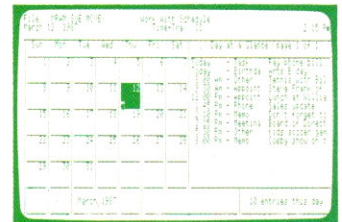
The other two Apple-brand 3.5-inch drives that you can get to work



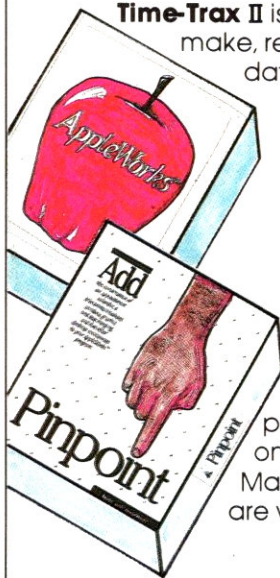
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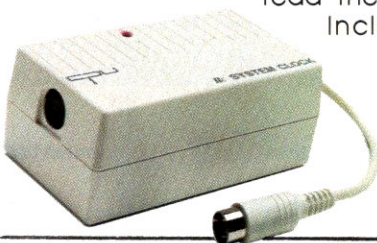


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with some members of the II family are the standard 400K and 800K external drives for the Macintosh. To use them, you must have a Universal Disk Controller (UDC) from Central Point Software (more on the UDC below). The UDC also works with all other Apple drives (except the DuoDisk). The 800K Macintosh drive you can use with the UDC is UniDisk-compatible, but the 400K Mac drive is not. Since 400K drives are now obsolete on the Macintosh, however, you can probably get them quite inexpensively if you're a bargain hunter.

Now that you have a summary of the many types of disk drives and controller cards available to Apple II owners, let's move on to an examination of which drives work with the various Apple II models—complete with some useful configuration tips.

Apple IIc

The Apple IIc is the easiest system to configure for drives because it has no expansion slots. It comes with one internal 5.25-inch drive and has an external drive port to which you can daisy-chain other types of drives.

The four types of drives you can plug into the IIc drive port are the Disk IIc, UniDisk 5.25, Apple 5.25 Drive, and UniDisk 3.5. The new Apple 3.5 Drive, the DuoDisk, and Macintosh drives do not work with the IIc. You can use the old Disk II but only if you have an adapter cable, such as the Adapt-A-Disk mentioned above.

The most popular add-on-drive setup for IIc users is simply a single 5.25-inch drive. In fact, you can't add more than one 5¼-inch drive to the external drive port—that's why you can't use the DuoDisk on the IIc.

If you want to use one or two UniDisk 3.5 drives with the IIc (the power supply may struggle if you try using more than two), you can daisy-chain them to the drive port. In order to use a 5¼-inch drive as well, that drive must be chained to the final UniDisk 3.5. Chaining a 3.5-inch drive to a 5¼-inch drive does not work.

The internal drive on the IIc works as if it were plugged into slot 6/drive 1. An external 5¼-inch drive, be it connected directly to the drive port or to the daisy-chain connector of a UniDisk 3.5, is the slot 6/drive 2 device. The first UniDisk 3.5 is the slot 5/drive 1 device, and

the second is the slot 5/drive 2 device; thus, you can boot from an external UniDisk 3.5 with a PR#5 command. You cannot, however, boot from an external 5¼-inch drive.

You can use the UniDisk 3.5 with the IIc only if your IIc has the new 32K 3.5 ROM. If you have an older Apple IIc (before serial number F6051GFA24000), have your dealer install the ROM upgrade first. To check whether you already have the upgrade, enter Applesoft BASIC and enter the following command: PRINT PEEK(64447). If the result is 0, you do have the upgrade.

Apple II, II Plus, and IIe

Unlike the Apple IIc, the II, II Plus, and IIe have no built-in drive port, so you must put an appropriate disk-controller card into a slot before you can use a drive. All three Apple-brand controller cards work with these systems; the one to use depends on which drives you are installing:

- You can connect two Disk II drives to a Disk II controller card, one to each connector on the card.

- You can connect one UniDisk 5.25, Disk IIc, or DuoDisk to an Apple 5.25 Drive Controller. If you connect a UniDisk 5.25 or an Apple 5.25 Drive, you can add another one, or a Disk IIc, by connecting it to the first drive's daisy-chain connector. You cannot connect a 3.5-inch drive to the Apple 5.25 Drive Controller, though, or daisy-chain one to a UniDisk 5.25 or an Apple 5.25 Drive.

- You can connect one UniDisk 3.5 to the UniDisk 3.5 controller card or daisy-chain one other UniDisk 3.5 drive. Don't add a third UniDisk 3.5, because neither ProDOS 1.1.1 nor ProDOS 8 can recognize it. The UniDisk 3.5 controller does not work properly with the Apple 3.5 Drive or with any 5¼-inch drive.

To date, Apple has not developed a controller card that works with both 5¼-inch and 3.5-inch drives. Such a card would be welcome because it would free up an extra slot. A third-party developer, Central Point Software, has come to the rescue, though, with the Universal Disk Controller. The UDC is the most interesting new peripheral device to come along in quite some time.

The UDC has two drive connectors to which you can connect almost any type of disk drive: the Disk II, UniDisk 5.25, UniDisk 3.5, and Mac-

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intosh 400K and 800K external (but not the DuoDisk). You can also daisy-chain multiple UniDisk 3.5 drives to one of its connectors (in this case, the other connector can have only one drive connected to it). The UDC works with the Apple 3.5 Drive too, but the UDC revision I tested disabled the drive's disk-eject button, so I had to eject disks with the end of a paper clip. Central Point is aware of this problem and expects to eliminate it by the time you read this article.

One common drive configuration for UDC users is one 5¼-inch drive and one 3.5-inch drive. In this situation, you should connect the 5¼-inch drive to the UDC's drive 1 connector and the 3.5-inch drive to the drive 2 connector. If you reverse the drives, you won't be able to boot DOS 3.3 from the 5¼-inch disk in drive 2. If you use ProDOS exclusively, the configuration doesn't

matter, because ProDOS boots properly from either drive. (You can boot from drive 2 by removing the diskette from drive 1 and entering a PR#n command [n = the number of the slot in which your disk-controller card resides].)

If you're still using ProDOS 1.1.1, you shouldn't attach more than two drives to the UDC, because that's all this version of ProDOS allows. The new ProDOS 8 (introduced with the IIGS), however, works properly with the first four drives you add to the card, as long as the card is in slot 5—it treats the third and fourth drives as slot 2 drives.

Apple IIGS

The IIGS has slots like the IIe and built-in peripheral ports like the IIc. To select whether a port, or its corresponding slot, is active, you use the Slots command in the Control Panel desk accessory. You can call up the desk-accessory menu any time by

pressing Control/open-apple/Esc.

One of the built-in ports, corresponding to slot 5, is a disk-drive port called the SmartPort; it is designed to handle 3.5-inch disk drives and any intelligent peripherals that use the data-exchange protocol and electrical specifications it defines. The SmartPort connector, located at the back of the GS, is a DB-19 type.

Another built-in port, corresponding to slot 6, is the 5¼-inch Drive Port. It actually shares its physical connector with the SmartPort, which doesn't cause problems, because 5¼-inch drives can be daisy-chained to SmartPort devices.

Most users of the IIGS will daisy-chain drives to the SmartPort instead of using plug-in controller cards. The five types of drives you can chain to the SmartPort are the UniDisk 3.5, the UniDisk 5.25, the Apple 5.25 Drive, the DuoDisk, and the Apple 3.5 Drive. It is important to understand, however, that you can't chain these drives in just any order. If you are using Apple 3.5 Drives, they must appear at the beginning of the chain, before any UniDisk 3.5 drives or 5¼-inch drives. You can use up to two of these types of drives.

At the very end of the chain come the 5¼-inch drives: up to two UniDisk 5.25 drives or one DuoDisk (which is equivalent to two UniDisk 5.25 drives). You must be aware of one caveat relating to the DuoDisk, however: Because of a hardware problem in the drive, you cannot daisy-chain a DuoDisk with a serial number below 433754. Apple has published a technical note describing a hardware fix, so track it down if you want to use an old DuoDisk with the IIGS.

Between the Apple 3.5 Drives at the beginning of the chain and the UniDisk 5.25 drives at the end of the chain can come any UniDisk 3.5 drives. The number of UniDisk 3.5 drives is limited by the capacity of the IIGS power supply. Apple recommends that you connect no more than four drives to the SmartPort (including any Apple 3.5 Drives and 5¼-inch drives), although I've tried it with six with no ill effects.

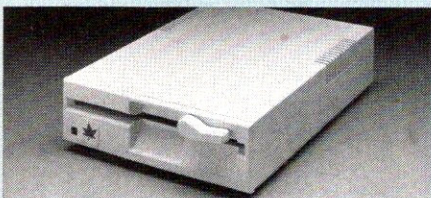
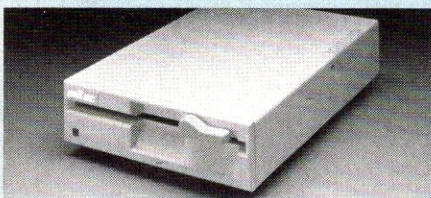
Keep in mind that any other arrangement of drives does not work: it's always Apple 3.5 Drives followed by UniDisk 3.5 drives followed by 5¼-inch drives.

NON-APPLE DISK DRIVES

In addition to the nine types of floppy-disk drives from Apple, you can find many Apple-compatible drives sold by mail-order businesses and computer stores, usually at substantially lower prices. They fall into four main categories:

- drives compatible with the 140K 5¼-inch Disk II or UniDisk 5.25 drives
- drives compatible with the 400K

Three of the available Apple-compatible drives are the ADD-514, ADD-12, and ADD-IIc from Jameco Electronics.



3.5-inch external drives of the original Macintosh

- drives compatible with the 800K 3.5-inch external drives of the Macintosh Plus and Macintosh 512K Enhanced
- drives that use nonstandard recording formats and special controller cards

Third-party 5¼-inch drives are available in full-height (Disk II size) or half-height (UniDisk 5.25 size) models. Several computer stores tell me that drives made by Shugart are more reliable than those made by Alps and that half-height drives tend to be more reliable than full-height drives, but these are only general guidelines.

The 400K Macintosh-compatible 3.5-inch drives can be had for bargain prices, now that Mac users are ignoring them and buying the new 800K drives instead. You can use them on the Apple II with the Universal Disk Controller (UDC), but you should probably avoid them because you won't be able to swap disks with people who are using standard Apple equipment. The 800K 3.5-inch drives also work with the UDC, and the disks they format are readable by the UniDisk 3.5 and Apple 3.5 drives, so you should buy them instead.

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| Applied GS-RAM 1.5 | S 299 |

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| | |
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| Apple 3.5 Unidisk | S 299 |
| Apple 3.5 Controller | S 59 |
| Apple Uni Duo Cntrl | S 29 |
| Applied Transwrap | S 229 |
| Ramworks III 256K | S 179 |
| Ramworks III 512K | S 209 |
| Ramworks III 1 Meg | S 279 |
| RGB Option | S 105 |
| Ramfactor 256K | S 189 |
| Ramfactor 512K | S 229 |
| Ramfactor 1 Meg | S 299 |
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The standard operating system for the IIGS, ProDOS 8, requires that disk devices be linked to traditional slot/drive combinations with no more than two drives per slot. How, then, does it deal with the possibility that more than two drives may be chained to the slot 5 SmartPort?

The way ProDOS 8 assigns slot/drive combinations to SmartPort disk drives is a bit unusual. In most situations, the first four 3.5-inch drives are considered to be the slot 5/drive 1, slot 5/drive 2, slot 2/drive 1, and slot 2/drive 2 devices. The two 5 1/4-inch drives linked to the SmartPort correspond to slot 6/drive 1 and slot 6/drive 2; i.e., connecting them to the end of the SmartPort chain is the same as connecting them to a controller card in slot 6.

Using the IIGS Control Panel to define a system RAMdisk, however, scrambles the slot/drive assignments slightly. The first 3.5-inch drive is still the slot 5/drive 1 device, but the RAMdisk is assigned as the slot 5/drive 2 device. The next two 3.5-inch drives "occupy" slot 2/drive 1 and slot 2/drive 2. ProDOS 8 does not recognize any other 3.5-inch drives.

Happily, all this slot/drive confusion will be eliminated when ProDOS 16 for the IIGS comes out later this year. ProDOS 16 will not require slot/drive assignments at all and will work with any number of disk devices without difficulty.

If you want, you can also use either of the two standard Apple 5 1/4-inch disk-controller cards on the IIGS. The 3.5-inch disk controller does not work with the GS, however. If you do put a controller card into slot 5 or 6, keep in mind that you won't be able to use the SmartPort or the Drive Port, respectively.

The latest revision of the Universal Disk Controller works well on the IIGS, but earlier ones did not. Central Point Software has a reasonable \$15 upgrade offer for those with old UDCs who are upgrading from a IIe to a IIGS.

A nice feature of the IIGS is that you can use the Control Panel to tell it the slot of the drive to boot from—the Startup Slot. The default is Scan, which means the GS boots from the first drive it encounters in a search beginning in slot 7 and moving down to slot 1 (the IIe uses the same method). It considers only the first drive in each slot or port, however,

so you can't boot from a secondary drive. If you prefer, you can tell the GS to boot from a given slot—you specify slot 5 to boot from the first 3.5-inch drive connected to the SmartPort, for example.

More to Come?

Congratulations, you're now a certified Apple II disk-drive expert—for now, at least! If past behavior is any indication, Apple is sure to have more types of drives up its sleeve, so you'll have to work hard to maintain your status. Until then, the cheat sheet in the table that accompanies this article should help you keep your disk-drive facts straight. +

Gary Little is the author of *Point-to-Point*, *Pinpoint's* new telecommunications program for the IIe, IIc, and IIGS.

PRODUCT INFORMATION

Universal Disk Controller

Central Point Software, Inc.
9700 SW Capitol Highway,
Suite 100
Portland, OR 97219
(503) 244-5782

List Price: \$90

Requires: any Apple II disk drive except the DuoDisk, Macintosh 400K external drive, or Macintosh 800K external drive

CIRCLE 379 ON READER SERVICE CARD

DuoDisk, UniDisk, Disk IIc, Apple 5.25 Drive, Apple 5.25 Drive Controller, UniDisk 3.5, UniDisk 3.5 Controller Card, Apple 3.5 Drive, and Macintosh 800K Drive

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010

List Price: DuoDisk (with Apple IIe accessory kit), \$599; UniDisk, \$299; Disk IIc, \$299; Apple 5.25 Drive, \$299; Apple 5.25 Drive Controller, \$69; UniDisk 3.5, \$399; UniDisk 3.5 Controller Card, \$69; Apple 3.5 Drive, \$399; Macintosh 800K Drive, \$399

Requires: see table

Adapt-A-Disk

Computer Accents, Inc.
P.O. Box 5905
Kingwood, TX 77325
(713) 664-9727

List Price: \$19.95

Requires: Apple IIc or IIGS, Disk II

CIRCLE 380 ON READER SERVICE CARD

DISK DRIVES FOR THE APPLE II SERIES

WORKS ON II, II PLUS, IIe

WORKS ON IIc

IIgs WORKS WITH SMARTPORT

IIgs WORKS WITH CARD

DAISY-CHAIN CONNECTOR

UNIDISK 3.5

YES
Requires Apple 3.5 drive controller card or the UDC

YES

YES

YES
Requires the UDC

YES

APPLE 3.5 DRIVE

YES
Requires the UDC

NO

YES

YES
Requires the UDC

YES

MACINTOSH 400K

YES
Requires the UDC

NO

NO

YES
Requires the UDC

NO

MACINTOSH 800K

YES
Requires the UDC

NO

NO

YES
Requires the UDC

NO

DISK II

YES
Requires Disk II controller card or the Universal Disk Controller (UDC)

YES
Requires DB-19 adapter cable

YES
Requires DB-19 adapter cable

YES
Requires Disk II controller card or the Universal Disk Controller (UDC)

NO

APPLE 5.25 DRIVE

YES
Requires Apple 5.25 drive controller card or the UDC

YES

YES

YES
Requires Apple 5.25 drive controller card or the UDC

YES

UNIDISK 5.25

YES
Requires Apple 5.25 drive controller card or the UDC

YES

YES

YES
Requires Apple 5.25 drive controller card or the UDC

YES

DISK IIc

YES
Requires Apple 5.25 drive controller card or the UDC

YES

YES

YES
Requires Apple 5.25 drive controller card or the UDC

NO

DUODISK

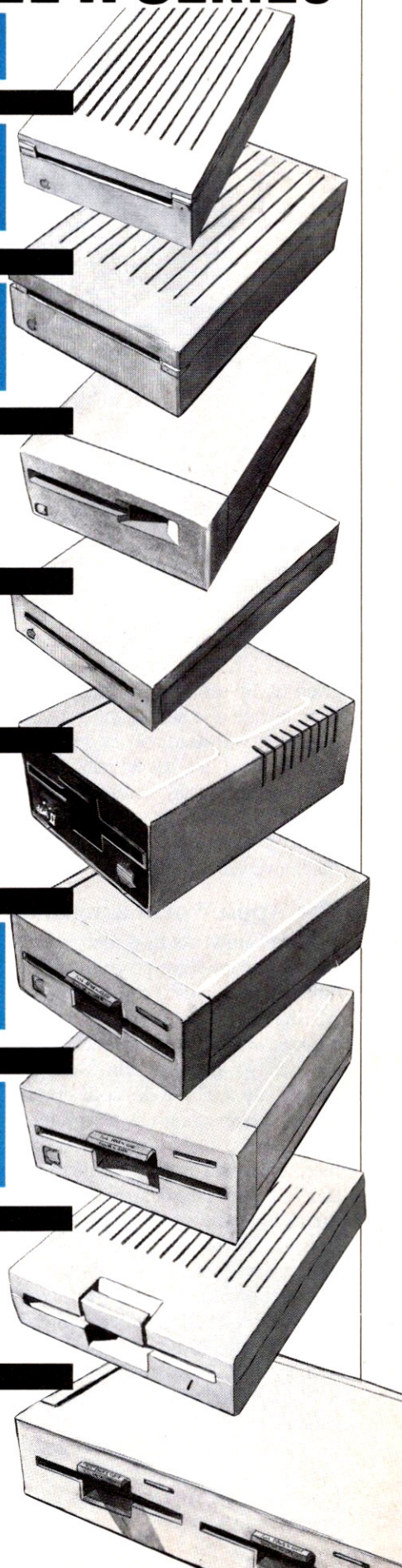
YES
Requires Apple 5.25 drive controller card or the UDC

NO

YES

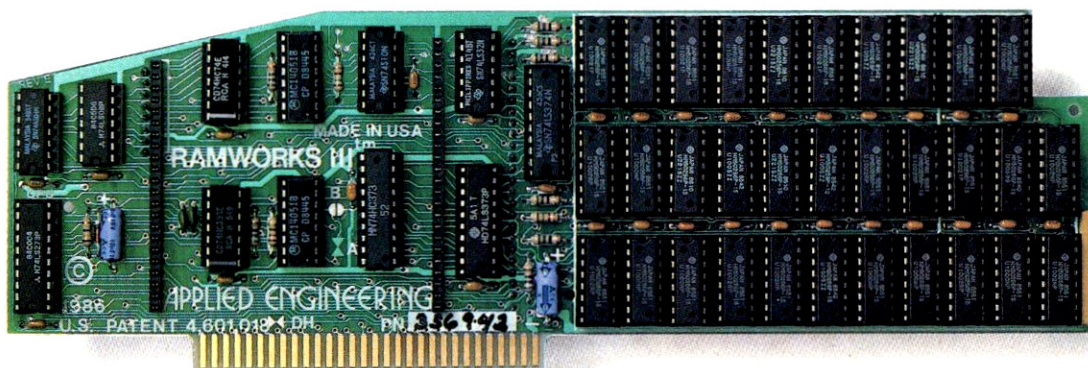
YES
Requires Apple 5.25 drive controller card or the UDC

NO



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

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

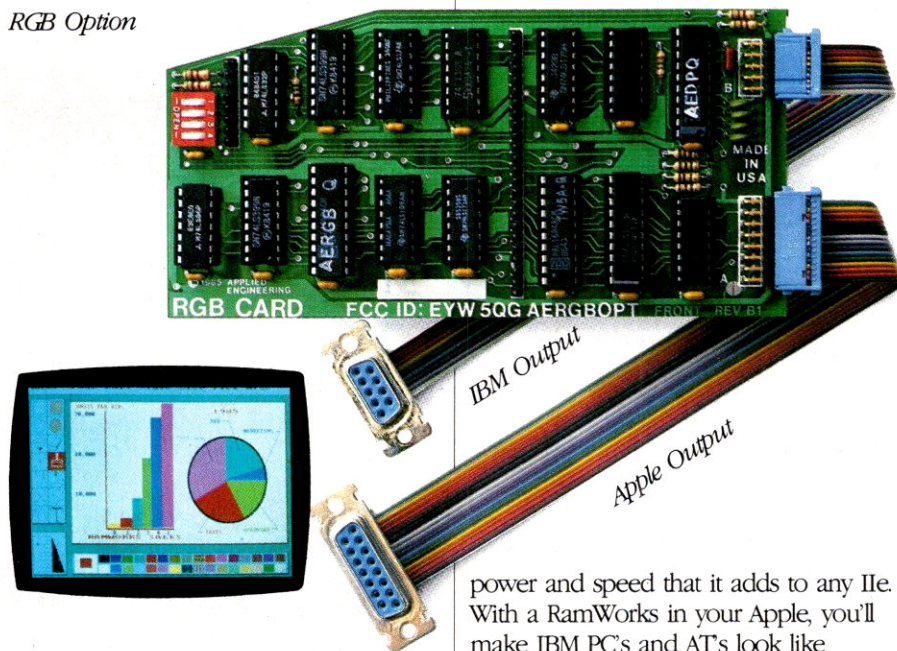
If you've got some other RAM card that's not being recognized by your programs, and you want RamWorks III, you're in luck. Because all you have to do is plug the memory chips from your current card into the expansion sockets on RamWorks to recapture most of your investment!

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 inter-

RGB Option



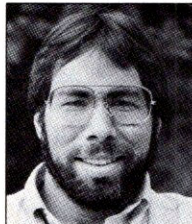
ference and remember you can order the RGB option with your RamWorks or add it on at a later date.

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



"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

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."

Apple experts everywhere are impressed by RamWorks's expandability, versatility, ease of use, and the sheer

power and speed that it adds to any Iie. With a RamWorks in your Apple, you'll make IBM PC's and AT's look like slowpokes.

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

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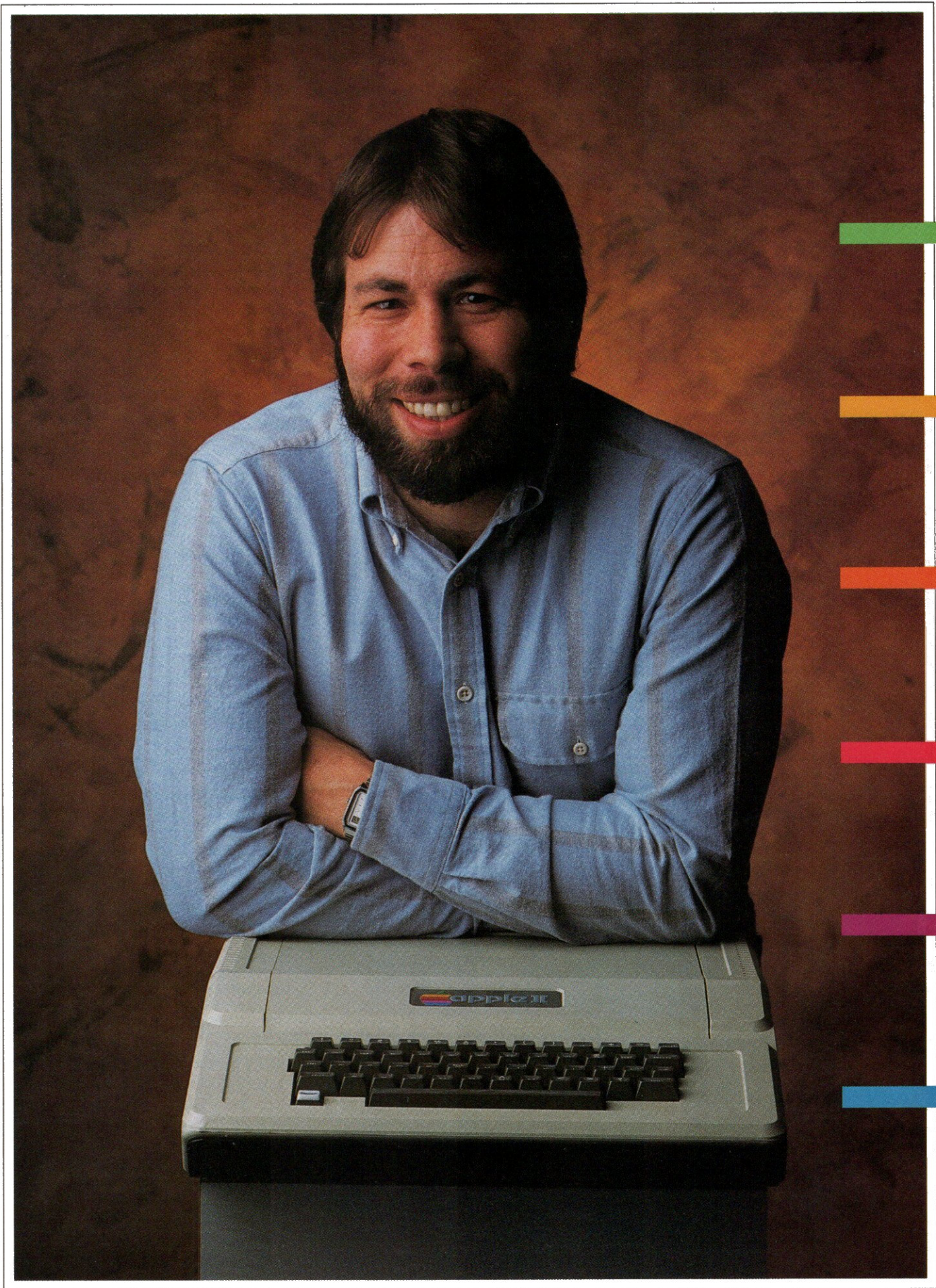
- Built-in super sharp 80 column display, (U.S. Patent #4601081)
- Expandable to 1 MEG on main card
- Expandable to 16 meg with expander cards, with NO slot 1 interference
- Can use 64K or 256K RAMs
- Powerful linear addressing 16 bit coprocessor port
- Automatic AppleWorks expansion up to 3017K desktop
- 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!

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| 65C816 16 Bit Card | \$159 |
| RGB Option | \$129 |
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Ten

years ago

this man

and this

computer

started a

revolution.

The Apple II
would change

his life,
and yours,

forever.

Steve Wozniak started a revolution. In 1975, he designed the Apple I, the computer that led to the founding of Apple Computer, Inc., in January 1977. A few months later came the release of his next design, the Apple II, and thus began a family of tremendously successful personal computers that hundreds of computer companies, from DEC to IBM, eventually imitated.

Since 1977, Woz, now 36, has hardly remained a steady fixture at Apple. He's used his personal wealth to engage in other projects, such as two highly publicized US Festivals, and he started a new

company in 1985 called CL9 (Cloud 9) that makes remote-control devices. Still, Woz has remained close to Apple. He has suffered through the times when the Apple II took a back seat to newer ideas, and he's proud to be involved in the renaissance the II currently enjoys in its latest incarnation, the IIGS.

Senior Editor Lisa Raleigh recently visited Woz at his CL9 headquarters in Los Gatos, California, where he showed up with his four-year-old son, Jesse, in tow. Woz set up Jesse with a laser-disk version of the movie *WarGames* and turned to discussing the last ten years.

WOZ

ON THE LAST TEN YEARS

A+: With Apple's ten-year anniversary coming up, do you have any plans for a celebration?

Woz: No. To celebrate, I'll get my ten-year pin. I've made sure that, even when I wasn't directly with the company, I was being paid the minimal salary that kept me on the computer as an official employee. So, when the computer cranks out how many people get their ten-year pins, I'll be on it. I never till this day have missed an Apple paycheck.

A+: At the IIGS introduction, there was a tape about the development and interviews with the development team. You appeared to be a part of that.

Woz: Yes, that was back a couple of years ago. That was when I was there. I had been a very key part of the Apple IIx development, but it was reformulated as the IIGS. I had been like the key participant in the early definitions of it. A lot of the ideas that we should be doing such a product as an enhanced II and the artificial limits [imposed] because of another product in the company were wrong—and

even ideas as to how the computer should be implemented, how the memory addressability and banking should be implemented. I took very strong stands against extending the IIe architecture because it was so bad. I advocated just totally doing a new, fresh one.

Virtually everything I supported came out in it, but what really made the product go was when Rod Moore sat down and worked out a good, usable, hi-res-graphics scheme. In the IIe, we added a thing called double-hi-res graphics, and it was unusable by software people. It was a mess. It was a nightmare. It was very limiting to the machine. The scheme that the IIGS group came up with really took off because of their strength in doing custom chips.

A+: What is it that you did well that allowed the Apple II to start the revolution that it did?

Woz: My role in the Apple II was the engineer or the designer. You tend to always want to make your own category be the most important, so it might sound a little biased, but I

Art often referred to as Apple's first logo



would say that technically its features have not really been given the credit that they deserve. It had very few chips, which made it manufacturable. I could name about ten things that you could say were so important that that's what made the computer revolution happen. They had never been done before. It's not like this was an improved version. They had never been done ever on a low-cost computer.

A+: Can you name them?

Woz: Sure. Color—never been done as a standard feature on a low-cost computer. Graphics—never been done before. High-resolution graphics. Including BASIC in ROM with the machine. 48K of RAM; that scale of memory had never been offered as a standard feature. Sound. Paddles. Game commands built into BASIC. It had never been done.

The Apple II took a really major step in its time frame that put it way ahead of everything else: it said that your output device was your home TV because it was free. The ones from Commodore and Radio Shack, plus all the hobby computers—none of them said your TV was your output device. It was either a teletypewriter or you bought their monitor.

A+: How is it that you made all these bold decisions?

Woz: There was no intent to have it be a product. It was just an intent to do the best computer I could to show off at my club. I was very lucky also. When you sit down to design a product, maybe you're very good at a certain type of optimization, but when ten things all come together at once in a very short time frame—this is all like in half a year to a year of Apple II development—it is just magic.

But, of course, the company was very successful. There were a lot of people building good computers back then—and I will say now that there was nothing close to the Apple II. Still, we put together a big company. Mike Markkula knew what to do. He came in as an equal partner and loaned us a quarter of a million dollars so that we could build a thousand Apple IIs. And he started setting up a marketing plan—where we saw our products at the start and where we would eventually sell them. It turned out we thought we were going to sell

them to the home, to do your checkbooks, and we really wound up selling them a lot into business. That was really unforeseen in the early days. We didn't even know we would ever have a floppy-disk drive.

We had Mike Scott handling operations. Steve Jobs had twice the energy of anyone else and was very brilliant, so any task that needed doing in any category got done because Steve was there. So basically everything to make the customer happy in the end, which included building it, we did successfully.

A+: Is there anything you can pick as a highlight of the last ten years?

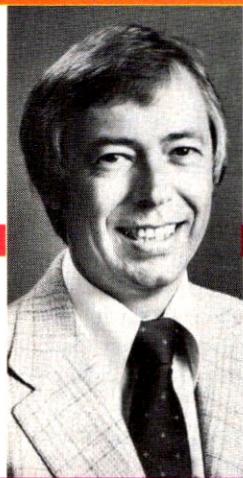
Woz: The Apple II floppy-disk controller—no question about it—as far as how well the project turned out from technical viewpoints. It's a rare story. I didn't know one thing about disk drives or operating systems. I'd never studied them, never read about them in books. Turns out the only reason our controller turned out so well was because I didn't know how to do it by the established means. It was a very fast project. It was like a week for the hardware design. Up, running, demonstrated.

A+: So that was a highlight because of your satisfaction in doing it fast and doing it right?

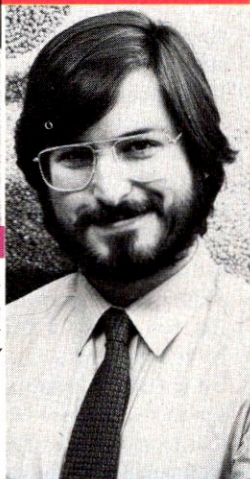
Woz: And a clever idea. A clever approach only because I would not have taken it if I had ever studied disk controllers or operating systems. All I was trying to do was an implementation that I knew could write some information out magnetically and read it back in and figure out what it was. Randy Wigginton and I went in every day over Christmas vacation of 1978. He was doing some software, and I was testing out the hardware and doing other parts of the software. In one week, we got a demo up that we could type RUN CHECKBOOK on and it would run. That's an amazing amount of hardware plus software to ever get done in that short a time frame. It totally spelled a major future for the company because Mike Markkula at that point had identified a floppy disk as our most important needed item.

A+: If Apple hadn't happened, what do you think you'd be doing now?

Woz: Oh, I'd be an engineer working on computer design at Hewlett-Pack-



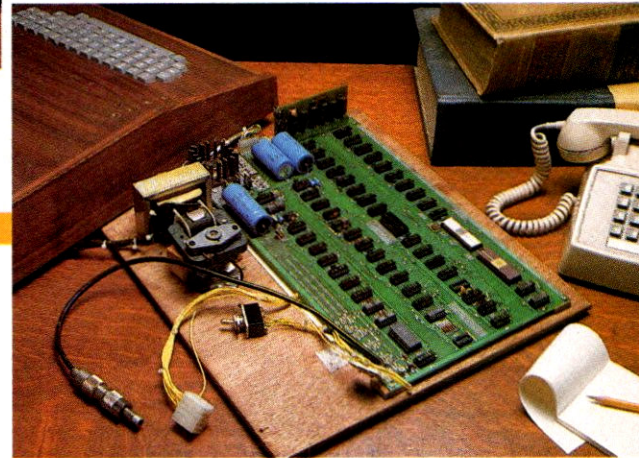
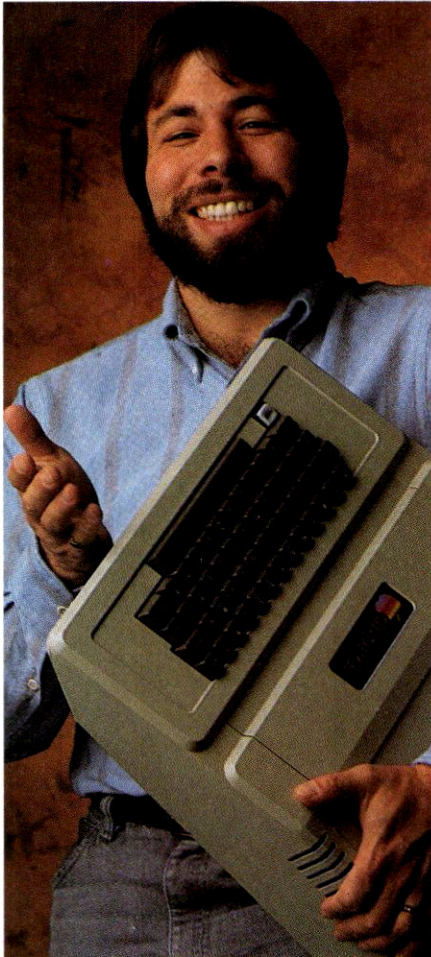
"Mike Markkula knew what to do. He came in as an equal partner and loaned us a quarter of a million dollars so that we could build a thousand Apple IIs."



"Steve Jobs had twice the energy of anyone else and was very brilliant."



"... I can sit here forever and just be doing my clever computers and clever programs."



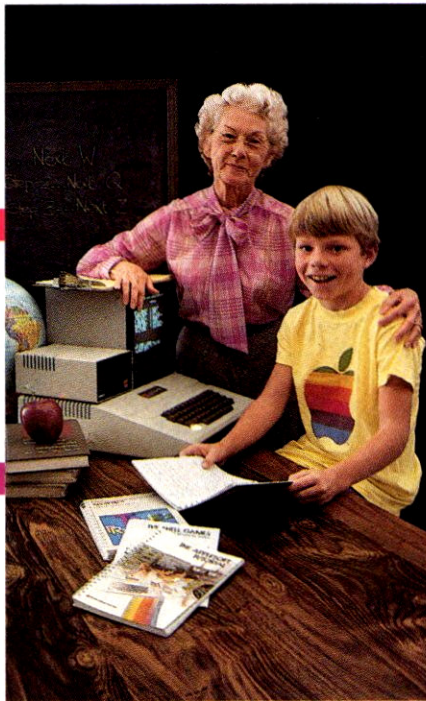
Steve Wozniak (left) designed the Apple I (photos top, right, and below right), the computer that led to the incorporation of Apple Computer, Inc. ten years ago.

ard probably. I'd probably be an engineer, if not a manager.

A+: Is there anything that you would do differently if you were starting over again and you knew what you know now?

Woz: Yeah, absolutely. If I'd known where the computer was going to be used, for what sort of applications, I would have added a few chips to make programming some of the hardware a little easier.

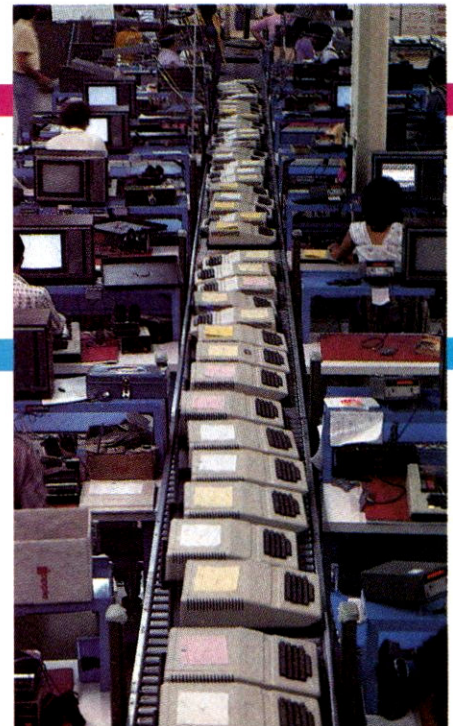
Personality-wise, I might have tried to take a stronger stand in the company, but I think not. I think I did all the right things, because you need a good engineer getting the products done when you're very small. And my attitude was: be quiet, do what I can do, because I can sit here forever and just be doing my clever computers and clever programs. And I'm not going to get in fights and argue with people and think that I have to have a higher position and run things. I thought I was doing the right thing, and I was. I would absolutely do that again. **+**



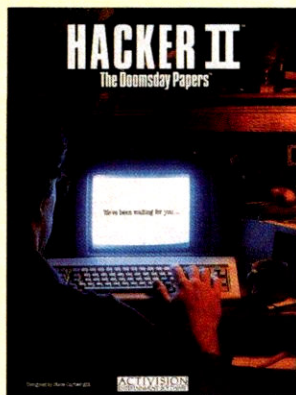
Apple's ads then (above), as now, stressed the important role computers could play in education.



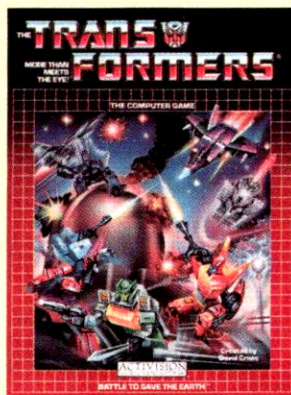
Apple IIs roll off of the assembly line.



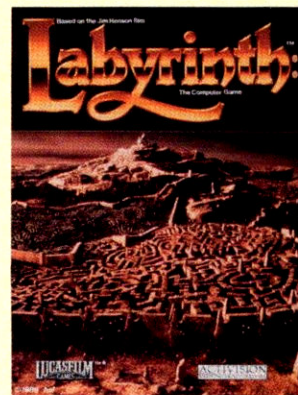
SIX GREAT NAMES IN COMPUTER GAMES



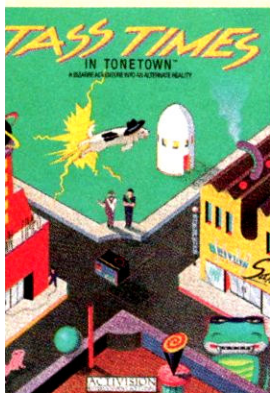
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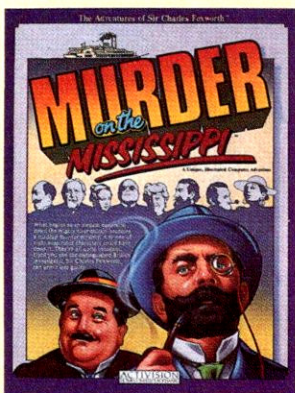
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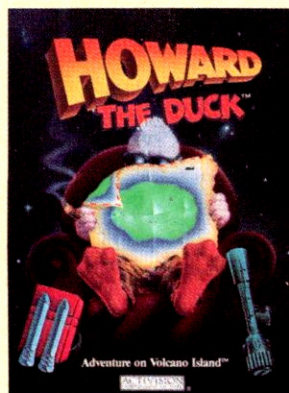
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APPLE:

THE FIRST TEN YEARS

In its
first decade,
Apple introduced
seven versions of
the Apple II,
five versions of
the Macintosh,
three versions of
the Lisa,
and two versions
of the
Apple III.

With 18 computer models and several dozen major software packages and peripherals to its credit, Apple turns ten years old this year.

Besides the one-and-only Apple I, Apple has introduced seven versions of the Apple II, five versions of the Macintosh, three versions of the Lisa, and two versions of the Apple III. Apple DOS has been rethought and rewritten at least six times; the Macintosh Finder, not nearly so old, has gone through even more (although subtler) changes. Some peripherals—most notably the disk drives and monitors—have changed appearance almost as often as Zsa Zsa Gabor has changed husbands. Manuals have been written, rewritten, rerevritten, and written over again; some have even been reedited and published by other companies. Yet in all that time, Applesoft BASIC still remains the same. What gives?

The best answer, it seems, is that that's the way the Apple bounces. Apple has a notorious history of appearing to be at the forefront technologically but a bit haphazard about refining its products and best serving its users. If you want to get a copy of the latest Macintosh Finder, for instance, don't wait for Apple to notify you that it exists. Instead, run, don't walk, to your nearest dealer or users' group with a blank disk, which will be happily filled with this month's version.

All this frenetic updating activity and releasing of not-quite-finished products dates right back to day 1 and the Apple I.

The Beginnings

Steve Wozniak originally designed the Apple I to be a video teletypewriter centered around the 6800 processor chip. In fact, if you ever get a chance to look at the silk-screened legend on the board, you'll see the evidence of its origins—an area in the lower left corner reserved for the 6800 and its support chips. Woz was able to get 6502 CPUs more cheaply, however, and

apparently was more fascinated by their design, so the final version sports this processor instead.

For the evil-sounding sum of \$666 (and 66 cents), you could purchase an Apple I. But what you got was a mishmash: a PC board with CPU, video circuitry, and memory, plus a keyboard—but no power supply, no case, no cassette interface, and no software other than the ROM. The manual was a mimeographed piece, the only reasonably good thing about it being the drawing on the cover, which depicted a likeness of Sir Isaac Newton sitting under an apple tree. Some people refer to this drawing as the original Apple logo.

The machine worked, though, and it worked as well as did anything else at the time. If you wandered on down to the Homebrew Computer Club meetings at the Stanford Linear Accelerator, you could even pick up hand-drawn schematics and get software and help from Woz himself. If you were in Bloomington, Indiana, at the time, as I was, you didn't know any of this, of course, and had to get along as best you could.

The Apple I made a workable terminal for other systems I was using at the time, but I remember that several of us at the computer store where I worked spent the better part of a week trying to increase memory from the 4K chips Apple used to the 16K chips that were becoming the state of the art.

Something about that initial offering of Apples has managed to persevere to this day. Apple is not the "master-planned" behemoth IBM is. Apple does not do anything by the numbers (other than product names, that is).

Which, I suppose, is as good a place as any to introduce the Apple II into our history. Even Apple's compilation of the company's history isn't clear on when the first II was really shipped or when it became a

Apple's PROGENY

18 MODELS IN 10 YEARS

In the past ten years, Apple has introduced 18 versions of its computers. Here's a listing of the systems that populate the many Apple computer families. The Mac XL is counted twice, both as a Mac and a Lisa, since it really is a split-personality machine.

APPLE I

The original Apple, available in kit form only

APPLE II

The first personal computer with built-in BASIC and color video

APPLE II PLUS

Applesoft in ROM

APPLE IIc

Enhanced memory and video

APPLE IIc

Portable case, built-in slots, 65C02 processor

APPLE IIc ENHANCED*

65C02 processor

APPLE IIgs

16-bit processor; enhanced graphics, sound, and memory

APPLE IIc ENHANCED*

3.5-inch drives, enhanced memory

APPLE III

Most sophisticated 8-bit personal computer ever built

APPLE III PLUS

Enhanced memory and video

LISA

First personal computer with 32-bit processor and graphic user interface

LISA 2

3.5-inch drives, file-compatible with Macintosh

MACINTOSH XL

Macintosh Finder on top of Lisa operating system

MACINTOSH First low-cost 32-bit computer

MACINTOSH 512K Increased memory

MACINTOSH XL

Mac Finder on top of Lisa operating system

MACINTOSH 512K ENHANCED

New ROMs, 800K drives

MACINTOSH PLUS

One megabyte of memory, 800K drives, SCSI interface

*Apple's formal name for these products does not include the word *enhanced*.

II Plus. The early Apple II was the charmer of its day. Woz basically took the Apple I design, waved a magic wand over it, and came up with some circuit wizardry. He designed the circuitry that generates the color display, for instance, in a way that no other engineer would have. Woz simply noted that phase-shifting certain signals had the *effect* of changing colors on a color TV.

Even today, the results seem remarkable. When you consider that the IBM Color Graphics Adapter has more than four dozen chips on it to perform its function, the half dozen chips that comprise the Apple II's color circuitry might seem inadequate, but they aren't. At 256×192 pixels, the original Apple II generates six colors, while at 320×200 , the IBM Color Graphics Card generates four. Newer Apples, of course, expand on this video concept and generate many more colors at higher resolutions.

Apple refined the cassette port of the Apple I and built it into the II. It also expanded the computer's memory capacity and added on an eight-slot bus structure and a simple analog-to-digital port to accommodate game paddles. The references to the 6800 disappeared. The BASIC that had been designed for the Apple I went through a metamorphosis, and many of the routines went into Integer BASIC for the II.

But the real breakthroughs—the hallmarks that defined Apple's market for some time to come—were the plastic case, the seven-pound weight, and the built-in power supply. This was 1977, after all, and the nearest competitor to what the two Steves had come up with was the Sol 20, which also had its origins as a video teletypewriter but weighed in at almost 30 pounds, was made of rugged sheet metal (adorned with oak side panels, in the style of some stereo equipment of the time), and was several inches bigger in almost every dimension.

Women actually *liked* the diminutive Apple II. I can't begin to count how many times a man dragged his wife into our little midwestern computer store and was drawn to all the wires and components and lights in the IMSAIs and Altairs we carried.

Meanwhile, the woman would keep asking, "What about this one over here?" pointing to the one thing in our store that looked reasonably nontechnical: the Apple II. The smart men bought Apple IIs; the not-so-smart men argued with their wives about whether or not buying an IMSAI in kit form was a wise investment of time and money.

The Apple logo helped convey a message of simplicity and comprehensibility. The Apple name was friendly. After a few months, even the Apple manuals looked approachable (although we could never anticipate which manuals were going to be included in a box—the manuals seemed to keep changing, and every shipment brought a new set of documentation). The hard-core engineering types bought the other stuff in our store; the merely curious about what computers could do bought Apples.

Since the Apple II, like most of the computers of the late 70s, was an "open" system, some engineers did buy Apples—and they did with them what engineers like to do, which is tinker. Meanwhile, Woz and his newly hired cohorts, such as Chris Espinosa, Randy Wigginton, and Rod Holt were tinkering, too.

In rapid succession, out came the Sup'R'Mod (an RF modulator that connected the Apple's video to a television set and that probably prompted the FCC's original interest in setting RF standards for computers), Applesoft BASIC (on cassette), a joystick (to replace the game paddles you normally received, with which it was virtually impossible to play the supplied Star Wars game), and any number of memory-expansion options (at that time, you could simply plug in more memory, if you knew what chips to use and how to make memory-header blocks). A parallel card and a serial card began to make connections with various input and output devices.

Within 18 months, the II Plus appeared, with Applesoft in ROM and, originally, no simple way to run Integer BASIC. Then came the Language card and Apple Disk II. UCSD Pascal was not too far behind. Music boards, 80-column video boards, and even other CPUs—such as Z80s and

What's in a CODE NAME?

Code names are a byproduct of war. And because it's warfare out there in the computer industry, computer companies have adopted code-name campaigns to baffle the enemy.

GUMBY

RAMBO

GOLDEN
GATE

PHOENIX

BROOKLYN

CORTLAND

Unfortunately, these code names sometimes end up confusing even their originators. At the press conference to announce the Apple IIGS, for example, different Apple engineers used different code names to refer to the product.

During its three years of development, the IIGS had at least seven code names: IIX, Brooklyn, Golden Gate, Phoenix, Rambo, Gumby, and Cortland (see "The Making of the Apple IIGS" in the November 1986 issue for more details). According to Wayne Rosing, who was director of engineering for the Apple II group, the company became obsessed with code names for the IIGS in the spring of 1985. "It seemed like we had a code name a week," says Rosing.

In this case, none of the code names stuck. Another Apple product—the Macintosh—did go to market with its code name intact, though. According to Jef Raskin, manager of advanced systems at Apple during the product's development, the development team suggested names of a variety of different apples. Raskin had a preference for McIntoshes. He had to change the spelling to Macintosh, though, to avoid a trademark conflict with McIntosh amplifiers.

Raskin remembers that then-Apple-Chairman Steve Jobs wanted to call the Macintosh Bicycle and went so far as to have buttons and posters made up. Nobody took Jobs up on the name, however.

Another code name that stuck was Lisa, which designated the Mac's predecessor. Before it fell victim to market forces, this computer fell victim to the acronym-concoction game as an attempt to mask the real origin of the name. Common wisdom now has it that the computer was named after Steve Jobs' daughter, and, according to Rosing, this technique followed a procedure established when the ill-fated Apple III was earlier code-named Sara, also after the daughter of someone at Apple.

Apple "reverse-engineered" the term *locally integrated software architecture* from the alleged acronym LISA. One reaction to this mouthful was that LISA really stood for "let's invent some acronym." This assessment has a certain ring of truth: A common practice among computer

companies is to come up with a product name and then fabricate a sobriquet whose first letters spell out the product name.

Rosing says that Apple came close to naming the Lisa Applause. One day, though, an engineer threw a package of Applause prophylactics onto a table, and that was the end of that name. Another factor that determined the Lisa's name, Rosing notes, was that the industrial engineers had tooled just enough space for a four-letter name onto the computer.

Peter Quinn, who was engineering manager for both the IIe and the IIc, recalls that the IIe started its code-name life as LCA, for Low-Cost Apple. At one point it was designated the Super II, but the team scrapped that because they didn't want people to guess what they were working on.

The Apple IIc spawned a wealth of code names, recalls Rob Gemmell, who was a senior product designer for Apple. "We changed the name every month or so to keep industry-watchers confused." Gemmell notes that the IIc group had people within the company confused as well.

Gemmell remembers some of the code names for the IIc: VLC, for Very Low Cost; Yoda; and ET. "We bandied around IIB [for Book]" because Jobs wanted it to look like a book, says Gemmell, and early sketches showed a rectangular machine.

For a while, Gemmell notes, it took on the names of the sons and daughters of people at Apple: Chels, short for Chelsea, daughter of the marketing director; Jason; and Lolly, after the daughter of Peter Quinn.

When it came time to code-name the IIc, "We went nuts." In addition to all the names noted above, the IIc was at various times called Sherry, Zelda, and Teddy. The latter name came from the test group. "It stood for Testing Every Day, or something like that," Quinn recalls. Quinn also remembers that an Apple executive once decided to try using obscene code names to discourage the media from using them. One such name was LF, for Little F-----. An extension of that name was ELF, which meant Everybody's LF.

And so, over the last ten years, Apple has waged its code-name campaigns.

—John A. Barry

6809s on add-on cards—that simply plugged into the expansion bus began to appear. One third-party developer even offered IBM-compatible eight-inch disk drives.

Other changes happened faster at a less visible level. The II Plus had a Revision 6 motherboard, then Rev. 7 (which seems to have two varieties) and Rev. 8. The ever-changing motherboards gave rise to a new game: Can You Guess What Apple Is Up To? By examining these circuit boards, you could see circuitry that hinted at future functions. Tracing the schematics of older machines and comparing them to the layout of the new motherboards revealed lowercase capability long before Apple actually made it available to its customers.

Slight changes in the video ROM appeared, the benefits of which were open to rampant speculation. An enhanced keyboard caused all of us who had installed lowercase converters in our machines to weep in misery. Many of us had rushed to buy new Apples (and sell our old ones) when new systems came out, and we often found that add-on products didn't always transfer to

the next machine. A lowercase converter, for instance, wouldn't work with a later Apple II Plus unless you discovered the special way to connect it.

The Apple IIe offered further improvements to the final version of the II Plus. The chip count on its motherboard was lower, because it combined the functions of many chips into one. The IIc went one step further by eliminating the slots and putting the most typical add-on enhancements onto the motherboard. The IIGS further reduces the chip count by combining still more functions, but it opens up whole new areas to explore by adding a new processor, faster memory access, some sleight-of-hand gimmicks to increase the video resolution, and a new way to create sounds.

So I return to the question, why is Applesoft BASIC still the same old Applesoft BASIC? After all, everything else about the II seems to have changed in the last eight years.

The answer is typical Apple: BASIC retains compatibility with the past while allowing Apple to explore new frontiers of technology. At some point in a product's history,

the company freezes its design and reduces it into a building-block component. Add new components and you have a new machine—and, oh by the way, it's sort of compatible with what we used to sell.

Consider the Apple II Disk Controller. First there was the 13-sector version and then the 16-sector version (a few of us went on to piggy-back chips on our controllers to create the 13/16-sector version). Almost the same thing exists today inside every Apple II and Macintosh in the form of an IWM chip, short for Incredible Woz Machine. Almost ten years of disk-drive technology have gone by, and Apple is still using the building block Woz made at Christmastime in '78.

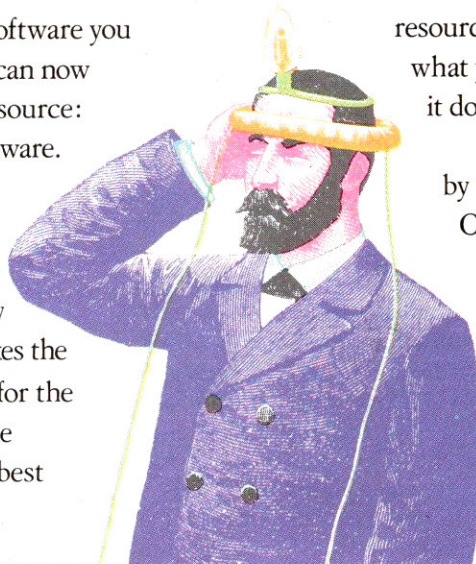
Apple has declared the Apple II motherboard, Applesoft, and the video circuitry as the basic building blocks, and turned them into a two-chip set that went into the IIe and IIc and that now has been further reduced in the IIGS.

Next month, we continue our look back at Apple's first decade, and Apple's Vice President of Product Development Jean-Louis Gassée offers his thoughts on the next ten years. +

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A desktop of drawing tools and a rainbow of color

The G in *Apple IIGs*, as we all know, stands for *graphics*, specifically the new super-high-resolution graphics that display up to 256 colors from a palette of 4096. Until you see some of the software for the IIGs, however, you can't begin to appreciate the impact of the enhanced graphics.

This article looks at these programs, emphasizing the features that show the significant added power of IIGs graphics. This software does more than just bring color to a Macintosh-like application or increase the resolution and color choice of an Apple IIe/IIc program.

None of the programs I tested were final products, although many should be available by the time you read this issue. Each of the prototype versions is somewhat slow, particularly in file access; speed should be improved by the time of release, though.

Since this article is an overview and not a review, I'll discuss some features that were only in the planning stages when I tested the programs. Of course, *A+* will review these products when they are commercially available.

All of the prototype programs require at least 512K of RAM, but several of the programs' publishers said they planned to use overlays to permit the release version to get by with only 256K.

Painting

At this writing, three paint programs are available in prerelease form: 816/Paint, DeluxePaint II (for the IIGs), and Paint-

works Plus. Each of these programs uses the 320 × 200-pixel, 16-color, superhi-res mode. DeluxePaint II also works in the 640 × 200 mode with 16 blended colors; 816/Paint has 4 true colors in the 640 mode. The Apple IIGs permits 16 colors per line and a total of 256 on the screen. The paint programs limit you to 16 colors on the screen, however, because of the difficulty of displaying a separate 16-color palette for each line.

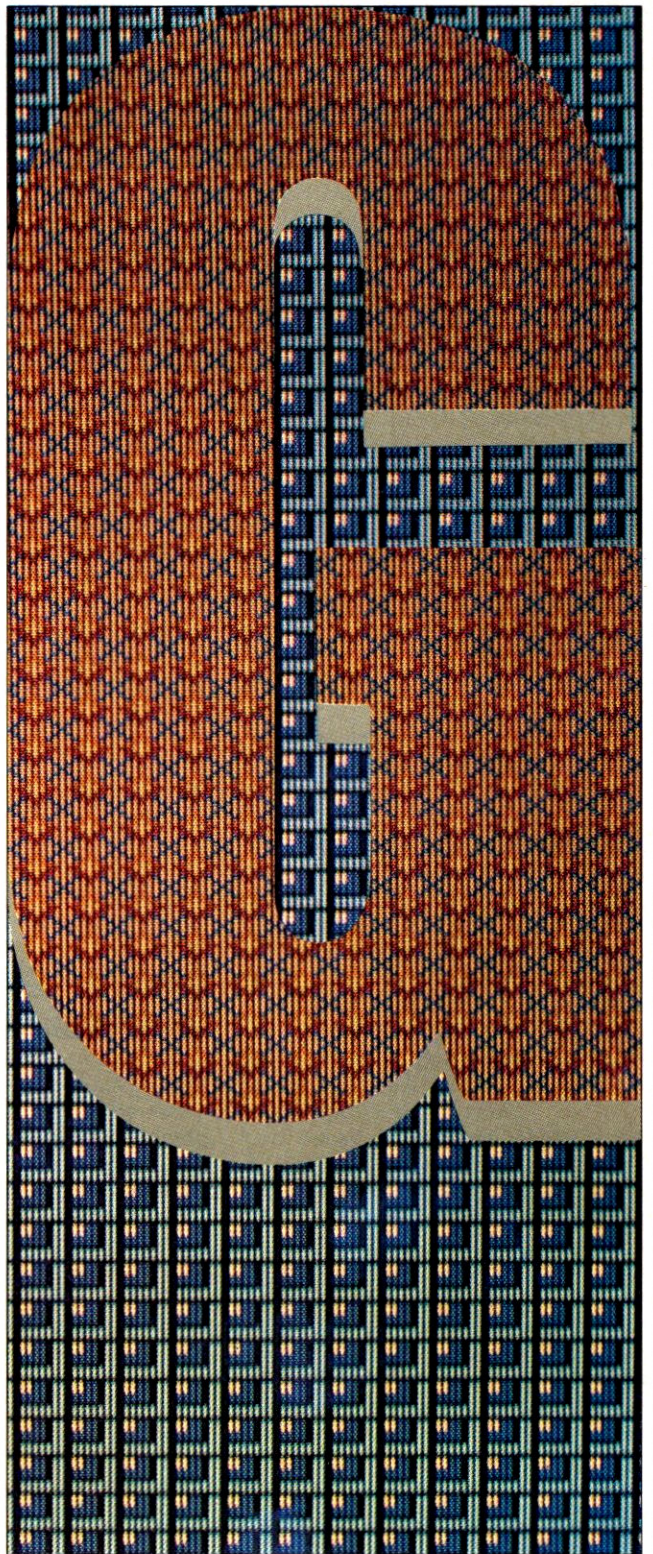
The double-high-resolution mode of the Apple IIe and IIc also has 16 colors, but you can't change them. With the IIGs you can select the 16 colors from 4096 possibilities. You can thus choose to create either a 16-color rainbow or a rain forest with 16 shades of green.

Choosing Colors

The programs provide a simple method of selecting from the 4096 colors. They do not show all 4096 colors during the selection process. In fact, the IIGs hardware doesn't permit display of all 4096 colors at once. Instead, each of the paint programs has three vertical scroll bars that you use to pick from 16 different intensities of red, green, and blue.

DeluxePaint II and 816/Paint have three other vertical scroll bars that adjust the hue, saturation, and black level (corresponding roughly to color, tint, and brightness on a color television). Paintworks Plus lacks the hue choice. Figure 1 shows the palette-modification screen of 816/Paint with

(Continued on page 54)



IS FOR GRAPHICS

*A sonic preview for
Apple's newest computer*

As you know, the S in *Apple IIgs* stands for *sound*. By including the Ensoniq Sound Chip, also called the Digital Oscillator Chip (DOC), in its new machine, Apple has shown that it is committed to high-quality sound. The IIgs has more advanced sound-generation capabilities than does any other personal computer on the market, and third-party hardware and software vendors are hard at work on products to take advantage of those capabilities.

A variety of professional musical instruments from Ensoniq, including the Mirage Digital Sampling Keyboard and the Ensoniq Piano, also use the DOC. This marvelous chip is quite versatile. It contains 32 digital oscillators, silicon devices that generate sounds, and you can control the volume, frequency (pitch), and sound type for each one. With the right software, the IIgs can emulate a small symphony orchestra. In addition, the DOC can do "sampling"—it can "listen" to a sound that enters into the IIgs and record it. No ancillary hardware is available yet to let you do that, but you can expect such capabilities later.

The most obvious use of the DOC's abilities is for musical systems, although equally interesting possibilities come to mind for computer games, educational software, and future CD-ROM applications. The DOC has some inherent limitations that restrict its appeal to professional

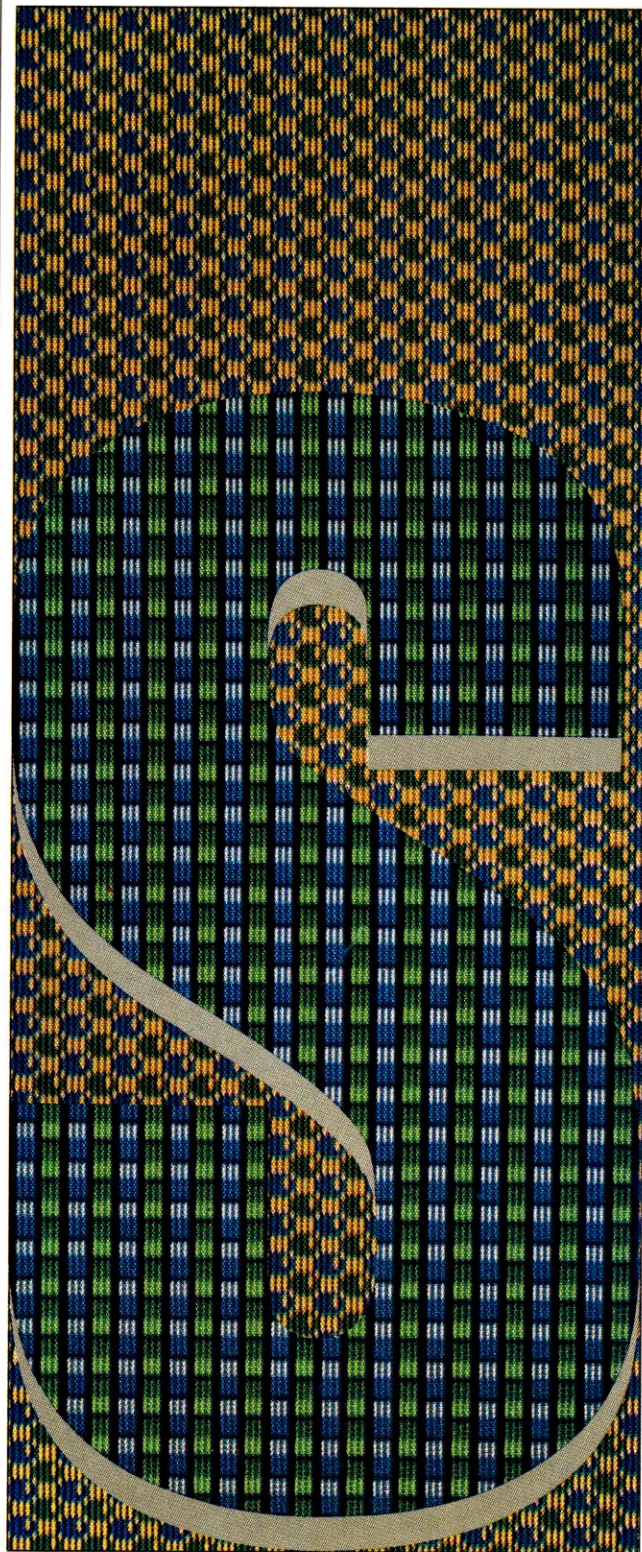
musicians, however. The most obvious problem is its bandwidth, the frequency range it can reproduce. Most audio equipment you can buy can reproduce from about 20 to 20,000 cycles per second, even though most people can differentiate only up to about 16,000 cycles per second. The DOC is limited to a maximum of about 10,000 cycles per second, meaning that its quality is a bit less than high fidelity. That's not a problem for playing music directly from the IIgs, but for professional recording that limit is too low. Fortunately, Apple included interface circuitry that lets third-party developers tap into the DOC's signals and overcome that limitation.

The First Product Wave

At this writing, several products are already coming to market that take advantage of the IIgs's sound capabilities. The most notable so far is a combination system that includes Music Construction Set from Electronic Arts, MDIdea's SuperSonic stereo card, and Bose RoomMate loudspeakers from Bose Corporation, which is long recognized as a leader in producing quality audio gear. This snazzy combination (which costs about \$2500 for a system with two disk drives and a color monitor) will appeal to music educators, semi-professional musicians, and other IIgs users who need a pleasant diversion from time to time.

Music Construction Set, rewritten for the IIgs, is the brainchild of Will

(Continued on page 50)



IS FOR
SOUND

S IS FOR SOUND

(Cont'd from page 49)

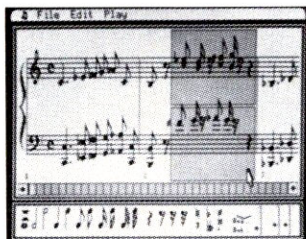
Harvey, the 20-year-old Stanford University student who conceived the original Music Construction Set for the Apple II about five years ago. This simple but sophisticated program lets you create a musical composition by clicking on notes and other music notation with the IIGS mouse and positioning these items on a music staff. You can assign separate sounds to the upper and lower parts of the staff, play back your composition, and store it on disk. Each masterpiece can be up to 300 measures, enough for a fairly long composition.

The new Music Construction Set has several features that the original Apple II program lacked. Of course, it takes advantage of the special interface features and high-resolution graphics of the IIGS, including pull-down menus and a scroll bar for the main score. It handles more measures and has additional time signatures and note types. In addition, the new Music Construction Set has built-in MIDI capabilities—MIDI is the near-universal interface for professional electronic musical instruments. It lets you hook your IIGS up to a music synthesizer and either play your MCS compositions with that synthesizer's sounds or play music on your synthesizer using one or more of the Music Construction Set sounds. The program includes 16 pre-defined voices, but Harvey and his associate Jim Nichols expect to add more sounds as they become available.

The MDIdeas SuperSonic plug-in card for the IIGS lets you play stereo music on the computer.

When you combine it with Music Construction Set, each half of the musical staff automatically plays from a different stereo speaker. If you assign a different voice to each half of the staff, you can generate sophisticated, professional-sounding music, particularly when you attach the computer to a pair of Bose RoomMate speakers.

These special-edition speakers, the finishing touch in a complete IIGS



The Music Construction Set

music system, are available from selected Apple dealers. Color-coordinated to match the IIGS case, they provide high-fidelity sound at a reasonable price of \$229 per pair. You can also use them with your portable tape system.

The Wave of the Future

The IIGS has limitations other than the basic bandwidth of 10,000 cycles per second. Although the DOC has 32 oscillators, it can produce only up to 15 simultaneous voices. Each voice requires two oscillators, and Apple has reserved the remaining two oscillators for special purposes. In addition, only 64K is set aside in the IIGS memory to store the digital representation of the voices, which limits the degree of resolution, or reproducible detail, of each voice.

Fortunately, the IIGS design is flexible enough that third-party developers can overcome most of these limitations. Developers can plug auxiliary products directly into the outputs of the DOC,

through a special connector, allowing them to create their own custom hardware enhancements. With appropriate software, developers can double the 15-voice limit to 30 voices, and they can also double the 64K limit to 128K with a bit of fiddling around. There are also ways to get around the 10,000-cycles-per-second limit.

We should expect to see a variety of products that take advantage of all the IIGS's capabilities. Watch for add-on circuit boards that let you turn the IIGS into a sophisticated, multitrack digital tape-recording machine (Apple has been using a rough prototype of such a product in-house for the last few months). You should be able to enhance your IIGS so that you can create your own digitally sampled musical sounds, even storing complete compositions in the computer's memory. There will also undoubtedly be sophisticated software for generating, modifying, and controlling complex sounds, rivaling the capabilities of sophisticated digital synthesizers that cost tens of thousands of dollars.

Here's a brief sampling of some of the IIGS products that are already on the way:

- Deluxe Music Construction Set from Electronic Arts, a more sophisticated version of Music Construction Set that includes sophisticated score-printing capabilities and the ability to define and edit your own sounds,
- KidsTime from Great Wave Software, an introductory music program that allows children to hear high-quality sound by playing on a simulated piano keyboard with the mouse or the computer's

keyboard as they see the notes highlighted on the piano keyboard and musical score,

- A digitizer card from MDIdeas that lets you record and play back sounds and complete musical passages,
- Instant Music from Electronic Arts, a performance-oriented program that lets nonmusicians create musical compositions, and
- Music Studio from Activision, Inc., which works with the SuperSonic Stereo Card, is intended for novice as well as professional use, and can create compositions with up to 14 voices.

Steve Mann, a former professional musician, is a San Francisco writer and consultant who specializes in business and productivity systems. With the introduction of the IIGS, he is once again an active musician.

PRODUCT INFORMATION

Music Construction Set for the IIGS

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

List Price: \$49.95

Requires: Apple IIGS

CIRCLE 368 ON RS CARD

Bose RoomMate Loudspeakers

Bose Corporation
100 The Mountain Road
Framingham, MA 01701
(617)879-7330

List Price: \$229 per pair

Requires: Apple IIGS

CIRCLE 369 ON RS CARD

SuperSonic

MDIdeas, Inc.
1111 Triton Drive,
Suite 205
Foster City, CA 94404
(415)573-0580

List Price: \$59.95

Requires: Apple IIGS

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Apple IIGs, IIe, IIc

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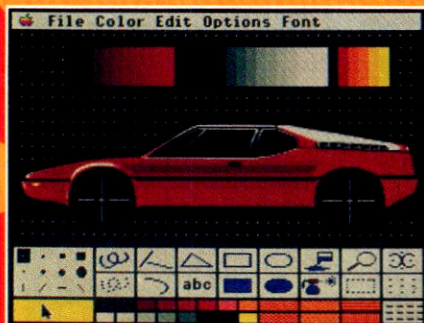
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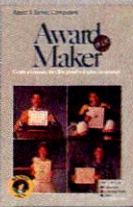
816/Paint includes two ProDOS disks: a 3½" 800K disk for the IIGs, and a 5¼" disk for IIe and IIc machines.

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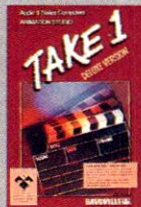
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ENSONIQ SOUNDS

A sample program

We asked Roland Gustafsson, a free-lance programmer, to write a short sound demo that would demonstrate some of the capabilities of the IIGs sound chip and allow you to create your own simple melodies. We wanted a short program to work with DOS 3.3 or ProDOS. The program, written in BASIC, does not use the toolbox but directly accesses the Ensoniq-chip sound registers. Direct access allows you to hear up to 32 oscillators on the sound chip; using the sound routines in the toolbox, on the other hand, assigns two oscillators per voice for a maximum of 15 voices (the other 2 voices are used for timing). If you want to hear the effect of various waveforms, change the formula in line 1230 (the variable Y must be from 1 to 255). To hear the effect of a square waveform instead of a sine waveform, change line 1230 to $Y=1+254*(A>127)$.

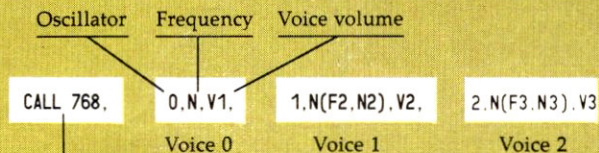
Here's a brief description of the program:

- Line 10 Allocates variable memory and assigns some variable values
- Line 20 Executes subroutine to compute frequencies and store them in the computer's memory, puts machine code into the computer's memory, and puts the waveform into the Ensoniq RAM
- Line 30-70 Main loop
- Line 30 Reads the data for the sample melody
- Line 40 Passes variables to and executes machine-language program located at hexadecimal \$300
- Line 50 Sets up variables for envelope
- Line 60-70 Subloop for voice 0: This subroutine lowers the volume at the end of the note, creating a simple envelope. (It is difficult to do envelopes in BASIC, so only one was added.)
- Line 1200-1300 Plots sine wave on the screen and downloads it to the Ensoniq RAM

| Description of Variables | Range |
|--------------------------|-----------------------------------|
| T | Tempo |
| V1 | Voice 1 volume |
| V2 | Voice 2 volume |
| V3 | Voice 3 volume |
| BF | Buffer for computing waveform |
| D | Duration for chord |
| F | Octave for voice 1 |
| N | Note in octave for voice 1 |
| F2 | Octave for voice 2 |
| N2 | Note in octave for voice 2 |
| F3 | Octave for voice 3 |
| N3 | Note in octave for voice 3 |
| N(F,N) | Frequency to pass to Ensoniq chip |

*A -4 prevents the envelope from occurring.

The BASIC Line That Communicates with the Ensoniq Chip



Executes a machine-language program located at hexadecimal \$300 that allows you to communicate directly with the Ensoniq chip and expects the following variables in groups of three. You can write a program that uses all 32 voices.

```

10 DIM N(6,12):T = 75:V1 = 230:V2 = 190
   :V3 = 190:BF = 16384
20 TEXT : HOME : GOSUB 1000
30 READ F,N,D,F2,N2,F3,N3:N = N(F,N)
   : IF NOT F THEN 80
40 CALL 768,0,N,V1,1,N(F2,N2),V2,2,N(F3,N3),V3
50 E = D * T - 20:E = ABS (E) :
   D = ABS (D) - .1:V = V1
60 FOR A = 1 TO D * T
   : IF A > E THEN CALL 768,0,N,V:V = V - 15
70 NEXT : GOTO 30
80 TEXT : HOME : PRINT "Happy Birthday Apple!":
   END
1000 REM Compute frequencies
1010 FOR A = 1 TO 12: READ N(6,A): FOR B = 5 TO 1
   STEP - 1:N(B,A) = N(B + 1,A) / 2: NEXT B,A
1020 DATA 20856,22080,23400,24800,26280,27840
1030 DATA 29500,31240,33120,35080,37160,39380
1100 REM Machine code
1110 FOR A = 768 TO 871: READ B: POKE A,B: NEXT
1120 DATA 76,30,3,175,202,0,225,9,64,141,60,192,
   160,0,140,63
1130 DATA 192,140,62,192,185,0,64,141,61,192,200,
   208,244,96,175,202
1140 DATA 0,225,141,60,192,32,76,231,134,58,32,
   190,222,32,103,221
1150 DATA 32,82,231,72,187,169,0,32,95,3,250,169,
   32,32,95,3
1160 DATA 32,76,231,169,64,32,95,3,169,128,162,0,
   32,95,3,169
1170 DATA 160,32,95,3,169,192,32,95,3,32,183,0,
   208,192,96,5
1180 DATA 58,141,62,192,142,61,192,96
1200 REM Download wave form to Ensoniq RAM
1210 HGR : HCOLOR= 3:C = 128 / 3.1415926:
   YF = 160 / 256
1220 FOR A = 0 TO 255
1230 Y = 128 + 127 * SIN (A / C): REM Sine wave
1240 H$ = A,Y * YF: POKE BF + A,Y: NEXT
   : CALL 771
1300 RETURN
2000 REM Music data
2010 DATA 3,1,3,0,0,0,0,3,1,1,0,0,0,0,3,3,4,1,
   6,0,0
2020 DATA 3,1,4,2,6,2,10,3,6,4,2,6,2,10,3,5,
   -4,2,1,2,11
2030 DATA 3,5,4,2,5,2,11,3,1,3,2,5,2,11,3,1,1,2,5,
   2,11
2040 DATA 3,3,4,2,1,2,11,3,1,4,2,5,2,11,3,8,4,2,5,
   2,11
2050 DATA 3,6,-4,1,6,2,10,3,6,4,2,6,2,10,3,1,3,2,
   6,2,10
2060 DATA 3,1,1,2,6,2,10,4,1,4,1,6,0,0,3,10,4,2,6,
   2,10
2070 DATA 3,6,4,2,6,2,10,3,5,4,1,11,2,8,3,3,16,1,
   11,2,6
2080 DATA 3,11,3,1,0,0,0,3,11,1,1,0,0,0,3,10,4,1,
   1,0,0
2090 DATA 3,6,4,2,1,2,10,3,8,4,2,5,2,11,3,6,12,2,
   10,3,1
2100 DATA 1,0,12,0,0,0,0
2110 DATA 0,0,0,0,0,0,0
    
```

Roland Gustafsson is a free-lance programmer who has worked with Apples since 1977 and is still willing to program in BASIC.

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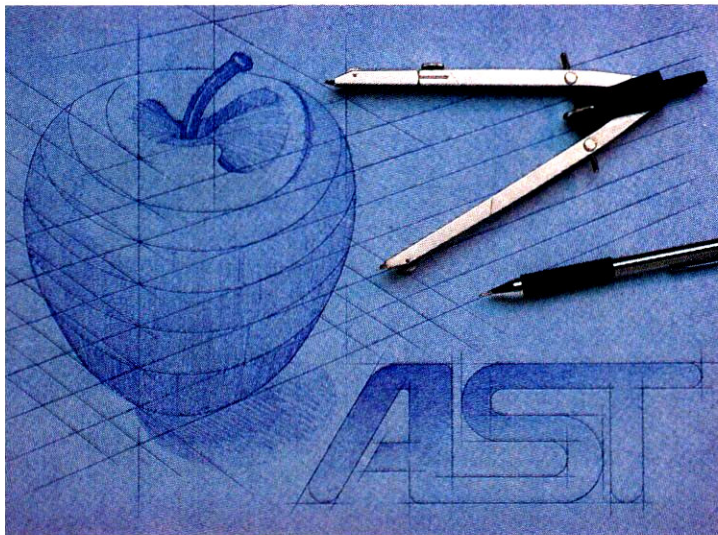
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G IS FOR GRAPHICS

(Cont'd from page 48)

the scroll bars for color selection.

The two groups of scroll bars represent alternative methods of adjusting a color. Moving a scroll bar in one set affects the scroll bars in the other set. Whether you use one set of bars or both depends on which method is most comfortable for you. I find it easiest first to adjust the hue with the red, green, and blue bars and then adjust the brightness with the saturation and black-level controls.

DeluxePaint II and 816/Paint also provide a method for designing a palette or partial palette

color schemes by switching palettes, instantly changing all 16 colors at once. (Figure 2 shows multiple palettes in Paintworks Plus.)

Both 816/Paint and DeluxePaint II have color cycling. In 816/Paint, cycling means switching palettes; in DeluxePaint II, it is rotation of the colors within all or part of the palette.

Paint Features

In their look and feel, the IIGS paint programs resemble MacPaint, only with the addition of col-

olves a lot of curved lines, you will find the spline of 816/Paint and DeluxePaint II useful. You set the two endpoints of a line and pull on a section of the line. The program then connects the selected point to the endpoints with a smooth curved line.

Figure 1: The palette-modification screen of 816/Paint with scroll bars for color selection

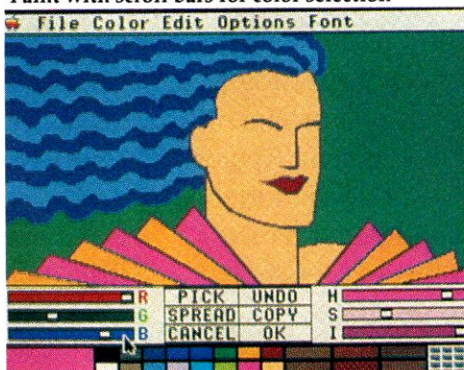
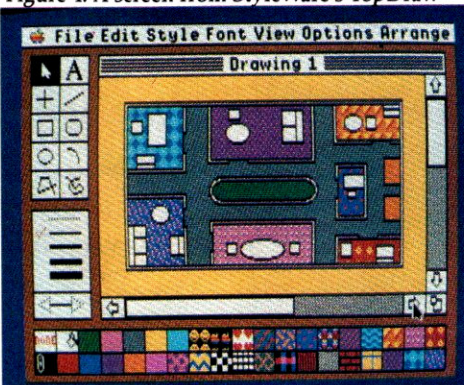
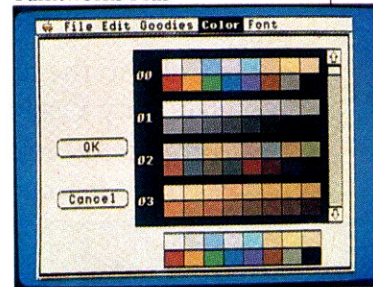


Figure 4: A screen from StyleWare's TopDraw



most advanced features, including some different methods of applying color to the screen ("smearing" colors like fingerprint with the mouse, blending colors together, and smoothing the transition between two different colored areas) and a semiautomatic, three-dimensional perspective drawing mode. These extra features come at a price, though—the program is more complex to

Figure 2: Multiple palettes in Paintworks Plus



use than the others, and it costs more.

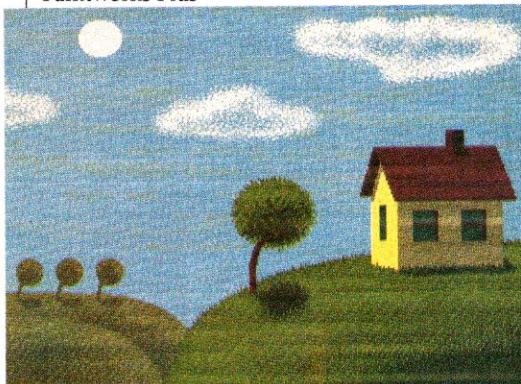
File Format

One potential problem with the three paint programs is the data-file format. Apple II users know that hi-res graphics pictures are in a standard format. Pictures you create with one program can be read by another program. On the Macintosh, paint programs tend to follow the MacPaint file format.

The three IIGS paint programs, however, have four different picture-file formats, and they aren't always compatible. Paintworks Plus can read 816/Paint files but not DeluxePaint II files. 816/Paint cannot read DeluxePaint II files, but it can read Paintworks Plus files, provided you first modify the file type. DeluxePaint II cannot read either Paintworks Plus or 816/Paint files.

If these picture files were compatible, you could work on a picture with different programs. For example, you could

Figure 3: Unretouched printed page from Paintworks Plus



with an even spread of colors by gradually transforming one color into another with intermediate hues. 816/Paint even allows you to spread colors among palettes.

Color spreading can save you a lot of work. If you know the color extremes you want and don't want to calculate the intermediate colors, just select the Spread option and let the program choose the colors.

Paintworks Plus and 816/Paint have multiple palettes in memory at once—816/Paint has 8 palettes, and Paintworks Plus has 128. You can easily try out different

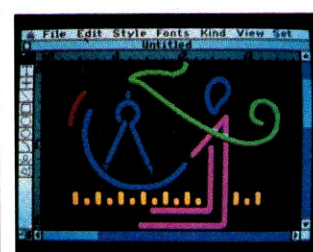


Figure 5: Drawing Table, Brøderbund's GS draw program

or. They use a mouse and have pull-down menus. To paint with these programs, you select a tool from among the screen icons. Each of the programs has some features, besides color, that MacPaint lacks. The usefulness of these capabilities depends on your needs.

If your painting in-

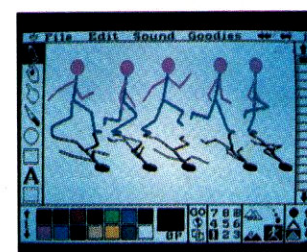
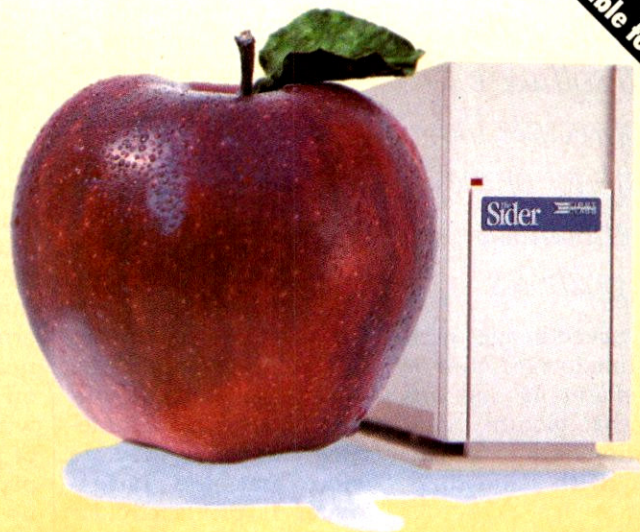
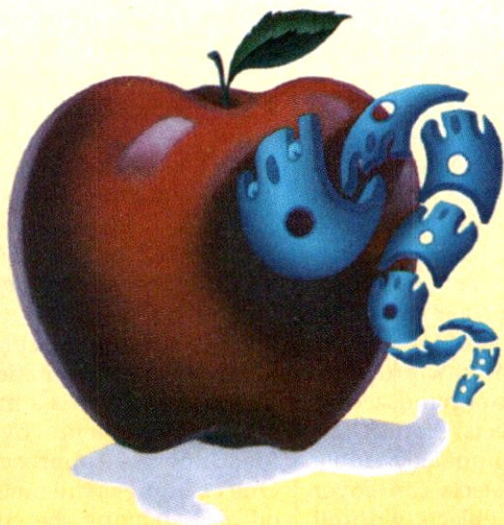


Figure 6: Fantavision brings animation to the IIGS.

Paintworks Plus provides another enhancement that goes beyond MacPaint's capabilities, a simple form of animation that combines pictures like frames in a movie. More complex animation requires a program such as Fantavision (see below).

DeluxePaint II has the

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A

You have to see some of the IIGS software to appreciate the impact of the enhanced graphics.

make curved images with the spline in 816/Paint or DeluxePaint II and include that picture in an animation sequence you created with Paintworks Plus.

Apple Computer is attempting to work with the program developers to define a common structure, so the problem may be solved by the time this article appears.

Printing

Each of the three programs prints pictures in color on an ImageWriter II printer with a four-

band color ribbon. Although it is impossible to reproduce all 4096 colors accurately on an ImageWriter II, the output is representative of the actual image, even when the image consists of colors of a similar hue. Figure 3 shows an unretouched printed page from Paintworks Plus.

The printed image differs from the screen image in other ways. The Apple IIGS screen contains pixels that are somewhat taller than they are wide, and the ImageWriter II prints circular dots. An object that appears square on the screen thus appears rectangular when you print it.

DeluxePaint II lets you adjust the aspect ratio so that a square on the screen remains a square when printed, and 816/Paint promises to do so as well. If you need

square squares and circular circles in printed copy, you need to be sure that the program properly adjusts the aspect ratio.

Drawing

Macintosh users are familiar with the difference between draw and paint programs. A paint program places pixel patterns on an electronic canvas, permanently covering whatever is underneath it. A draw program, on the other hand, works with objects (collections of pixels), not individual pixels. Objects can cover up other objects without destroying them.

Draw programs are particularly useful for computer-aided design (CAD). If you are designing a room's furniture arrangement or the layout of electronic equipment, such a program may help you. You can move any component around with-

out affecting the other parts.

Two draw programs are announced for the IIGS. TopDraw is basically a 320-mode, super-hi-res, color version of MacDraw. You can modify the color palette of 12 colors with the red, green, and blue scroll bars and save the changed colors.

TopDraw uses the Apple IIGS graphics display to give you information in a manner that is a major improvement over MacDraw's approach. One example is the method of displaying the currently selected color or pattern (see figure 4). A pencil appears on the left side of the current drawing color or pattern (see the black selection in the illustration). A spilling paint can appears on the right side of the current fill color or pattern (see the white selection in the illustration).

Infocom introduces four new games

Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy,"™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos."™ It has a scratch n' sniff card and a 3-d comic book to excite all your senses. Once your interest is

piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

One's really warped.

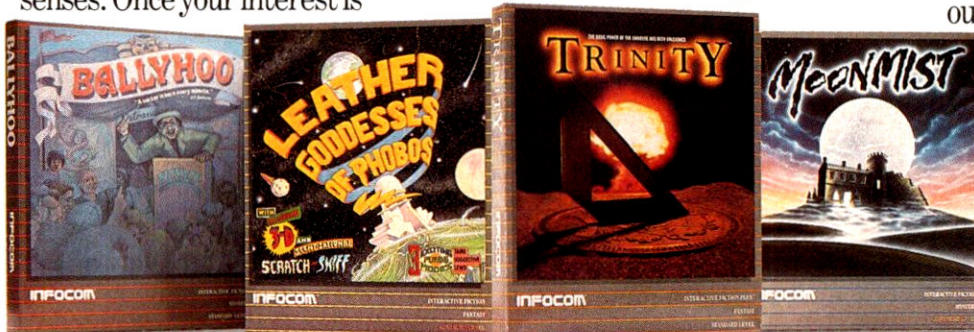
Then there's "Trinity."™ It answers the question of whether a game can be both light-hearted

and profound. You journey through a time warp into a mischievous fantasy world where all atomic explosions are mysteriously connected. "Trinity" takes you back to the dawn of the atomic age and puts the course of history in your hands.

One's a real circus.

It has been said that the circus is the only really mysterious thing left in civilization.

One thing's for sure, there is plenty of mystery in "Ballyhoo."™ While trying to locate the circus owner's kidnapped daughter, you are somersaulted into a three-ring world of deception and crime. To solve the crime



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When you specify the corner of a rounded rectangle in TopDraw, you use a scroll bar surrounded by a rounded rectangle. That rectangle immediately shows you the effect of the choice. In MacDraw you must pick a number from various buttons in a dialog box and view the results later, using time-consuming trial and error to get the desired effect.

The other IIGS draw program, Drawing Table, functions in the 640 super-hi-res graphics mode. Its authors designed it more for simple and fast creativity than for formal computer-aided design (see figure 5). You can have up to four windows open at a time, including a window of library shapes. The screen colors are restricted to the eight primary colors that an ImageWriter II can easily reproduce.

The library, which comes with the program, has many shapes, such as trees, furniture, flow-chart icons, and architectural symbols—it's like having electronic press-and-rub symbols.

Drawing Table provides several improvements over MacDraw. You can pick a line thickness from 20 different choices and can zoom in and out on your object in up to 16 levels.

Both programs print with either the ImageWriter (in color on the ImageWriter II) or LaserWriter printers (as soon as Apple provides the printer drivers).

Combined Functions

GraphicWriter is a program that shows what you can really do with Apple IIGS graphics. It combines paint, draw, word-processing, and desktop-publishing functions.

Note that I use the term *combines*, not *integrates*. An integrated program generally has different operating modes that permit the transfer of data from one mode to another mode. GraphicWriter has all its functions in one operating mode, however. You choose whether to perform either a draw, paint, or word-processing operation without switching modes.

You place text and objects in a "region," a part of the entire document that you can move around the page and resize. If you want multiple-column text, you merely create regions with the desired column width, position them on the page, and put text into them. You can enter text (color or black-and-white) from the keyboard or from a disk file.

GraphicWriter pro-

Fantavision is one graphics program that remembers the other part of the IIGS's name: sound.

vides three separate modes of color overlay. Heavy Paint covers up whatever is underneath. Water Color overlays the background images with a transparent color, as if it were placing colored plastic over a colored background. The color of the background images changes, but the objects are still visible. By selecting between these two modes, you can determine whether multiple levels of objects will be visible or not.

es. One really smells.



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and save your hide from a permanent spot in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

One's really haunting.

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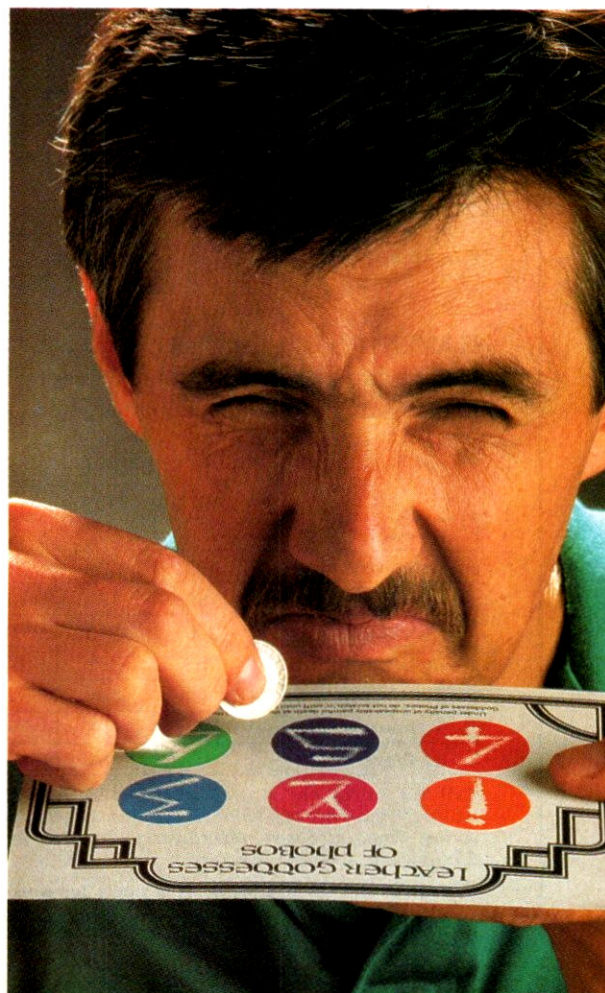
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The Dye mode works only with black objects. When you draw in the Dye mode over a black object, you change every black pixel in that object to the new color while leaving every other pixel in the object unchanged. You can produce a precise, multicolored image by first drawing it in black and then coloring different parts of it in the Dye mode.

GraphicWriter is not simply a paint or draw program with a text function; it is a competent word processor in its own right. It has multiple forms of text justification, line spacing, and tabs, and includes headers, footers, and color text display.

GraphicWriter is an ideal program for creating newsletters, pamphlets, brochures, and signs, and qualifies as an adequate stand-alone

word-processing or drawing program.

Graphing

At this writing, Visualizer, from PBI Software, is the only graphing program for the IIGS that has been announced. The program has a variety of graph types, including bar (three types), column (two types), pie, line (two types), and scatter. The program can also show linear regression and standard deviation. It creates graphs from either AppleWorks spreadsheet data or its own mini-spreadsheet.

The program employs the 640-pixel super-hi-res screen; you can specify colors for all parts of the graphic display, including bars, pie wedges, legends, lines, titles, grids, and tick marks.

You can display graphs over background pictures. For example, you can display a company

sales-figure graph over a company logo, or world population trends over a world map.

Display Printing

The Print Shop is a program familiar to most Apple II users. This software has migrated from its origin on the Apple II family of computers to many other popular personal computers. The IIGS version of Print Shop runs in the 320-pixel super-hi-res mode and is mouse-operated. You can print text and graphics in multiple colors, although each line of text can have only one color.

The Print Shop graphics editor works like a typical IIGS application in that it is mouse-driven and has tool icons. It resembles a paint program in the magnification mode.

The Print Shop has always been a program that cries out for the use of

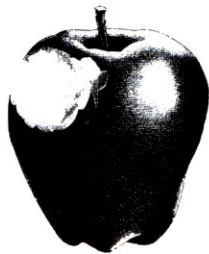
color. In the past, you had to resort to colored paper or ribbons that could print in only one color. The IIGS version brings full color to The Print Shop.

Animation

The IIGS is a natural product for animation. The IIGS version of Fantavision, which runs in the 320-pixel super-hi-res mode, fulfills the promise of the IIGS.

It is one graphics program that remembers the other part of the Apple IIGS's name: sound. It comes with a library of 12 digitized sounds, including a squealing car brake, a slamming door, and squeaking shoes. Sound libraries will include other sounds, much as the present graphics libraries for The Print Shop offer images.

Fantavision does not employ the standard IIGS user interface, although it



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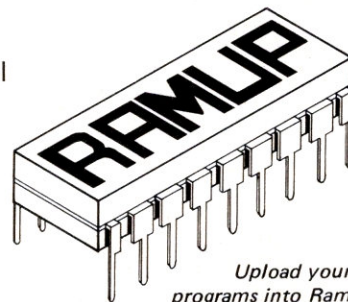
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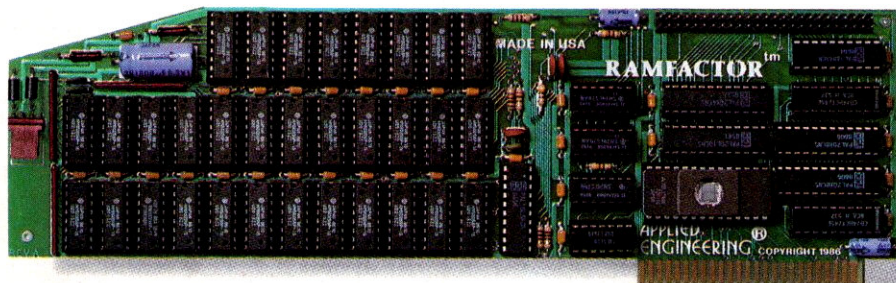
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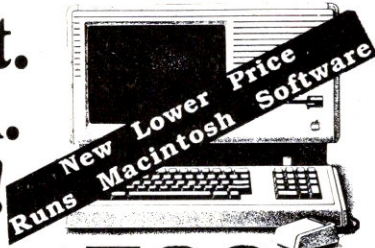
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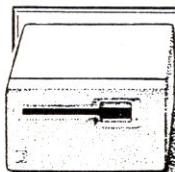
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is mouse-based and uses tool icons (see figure 6).

Creative Promise

The graphics programs announced for the IIGS promise much creativity. Their many features offer a wide selection for producing works of art, designs, business graphics, entertainment, and much more.

A few programs have sound, and many take advantage of the increased power of the 16-bit processor in the IIGS, but these programs really excel when it comes to color. They don't just add

color to an application—rather they incorporate it as a fundamental feature.

These new programs will surely offer us a rainbow of possibilities. +

Michael Fischer is author of The Apple IIGS Technical Reference as well as 65816/65802 Assembly Language Programming (both from Osborne/McGraw-Hill) and coauthor of the Apple II Expansion Guide (Tab Books). He is an attorney, author, columnist, and programmer. He has owned and used Apple computers for nearly ten years.

PRODUCT INFORMATION

Note: All programs require an Apple IIGS with 512K RAM and a 3.5-inch disk drive. A color monitor (preferably analog RGB) is recommended.

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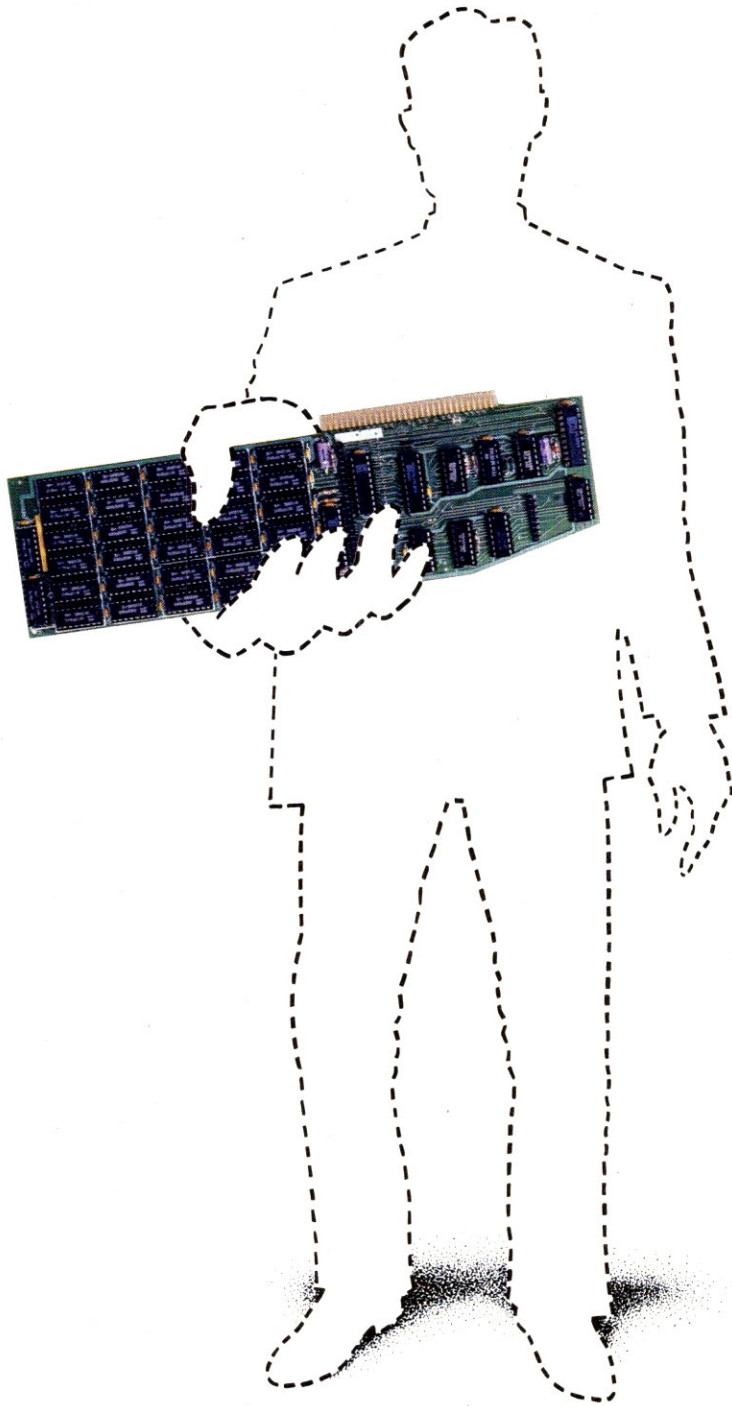
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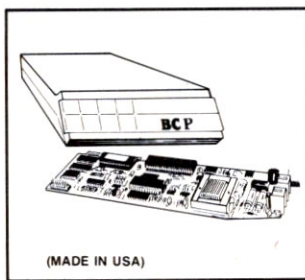
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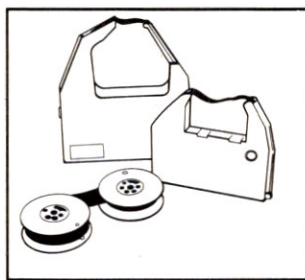
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POINTING IN THE

When you are trying to connect from point A to point B, your telecommunications program must be fast, flexible, and feature-filled. It should also be transparent—that is, it should not interfere with the operation of the remote computer. Finally, it should be relatively easy to operate, allowing you to log on and off painlessly. If you're in the market for such a program for your IIe, IIc, or IIGS, take a close look at Point-to-Point from Pinpoint Publishing.

Point-to-Point was written by Gary Little, certainly no stranger to *A+* readers. The program started out as a homemade telecommunications program called Modem Magician (see the April 1986 issue of *A+*, page 30, for a capsule description), and Little has expanded and upgraded it into its current incarnation. The result is a polished, commercial program that retains the programmer's vision.

Although imitating the Macintosh desktop style on the II is all the rage these days, Little opts for a menu-driven format within the file-folder context that AppleWorks pioneered. All the information you need resides in one set of folders or another, and you can get at all the folders through the interlocking menu structure. On the screen, changing information is as easy as picking the desired item from the

SOFTWARE BY RUSS LOCKWOOD

Point-to-Point, a telecommunications program that's right on target

menu, watching a folder overlay another, and then selecting a choice from a submenu. Although the program does not work with a mouse, the process is fast and smooth.

Points of Interest

Point-to-Point contains a telephone directory that can hold up to 16 phone numbers. Each number is associated with a specified set of communication settings, such as the transmission rate, duplex, data format, time delays, and line feeds. When you save a communications file to disk, the program saves all the settings as well. Thus, you can configure a file once and never have to worry about it again.

Furthermore, each phone number is associated with up to 16 macro phrases up to 31 characters long. The macros can invoke a set of 14 "meta" commands that form a pseudo programming language for sending files, waiting for certain prompts,

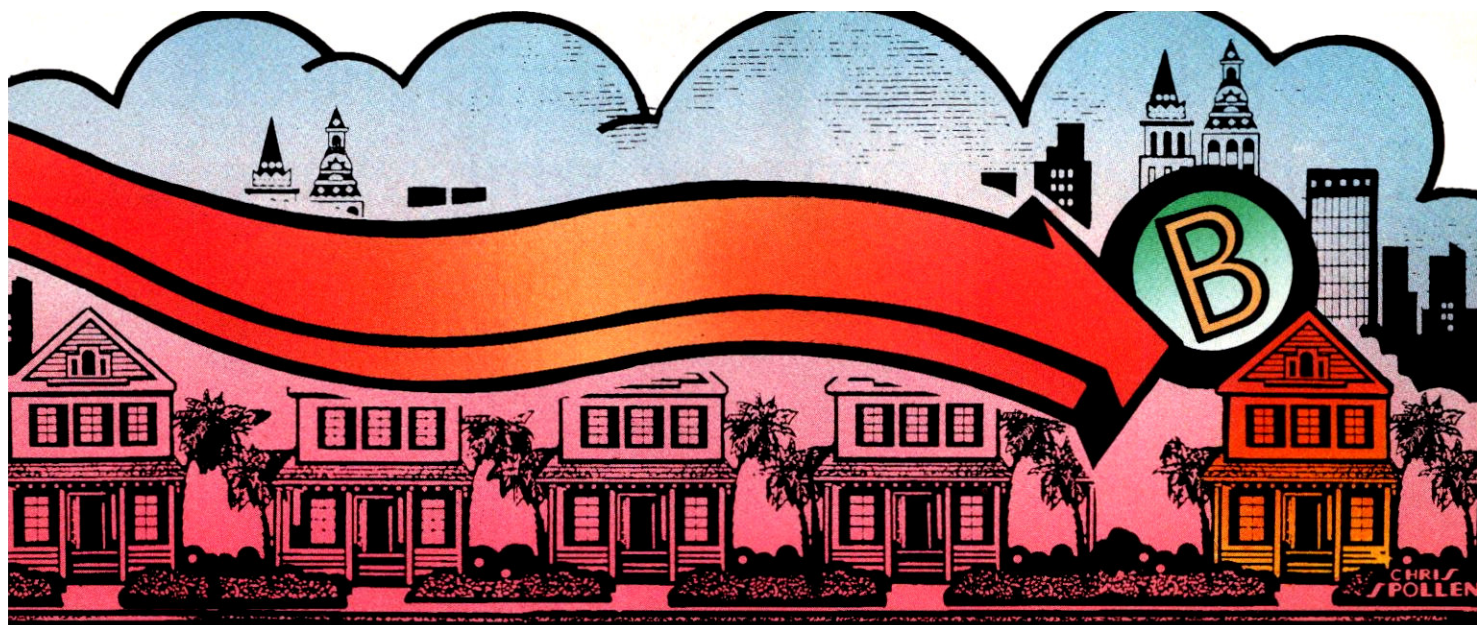
and linking macros. This group of commands generally provides a flexible macro format.

The program provides transmission rates between 110 and 9600 bits per second, a variety of data-bit formats, and a small 17K RAM buffer. You can download files larger than 17K to disk and append them to other files.

AppleWorks Files

If you want to use Point-to-Point with AppleWorks files, you should be aware that AppleWorks uses a proprietary method to store text files. Point-to-Point cannot load an AppleWorks word-processing file directly into the capture buffer without converting the file into an ASCII standard text file that has a carriage return after each formatted line. Pinpoint Publishing includes a utility program that converts AppleWorks files (as well as reports generated from database and spreadsheet files) into standard text files and vice versa. Point-to-Point also offers an option for converting files on the fly while it's in its Communications mode.

You can transfer AppleWorks files directly with the XMODEM protocol. Point-to-Point includes a variant of the standard (Christensen) XMODEM protocol called Extended XMODEM Protocol (EXP) for transferring ProDOS file attributes and



RIGHT DIRECTION

data to another Point-to-Point system. Its main advantage is the ability to send a group of files in a single batch. If either the sender or receiver is not using EXP, Point-to-Point automatically switches to the standard XMODEM protocol and does not send file attributes.

In addition to the AppleWorks utilities, the program includes utilities for converting Applesoft BASIC programs, binary programs, and Pascal text files to standard text files, allowing you to send source code but not executable programs. To send an executable program directly from disk, you use the XMODEM protocol.

Point-to-Point provides 16 open-apple commands for on-line use. These handy commands perform a variety of functions, from file transfer to clearing the buffer. The program also includes a simple text editor—nothing flashy but enough for you to compose or edit short files in the buffer.

On the negative side, Point-to-Point does not include terminal emulation, since those who tested prerelease versions found little call for it. Extended-memory cards do not increase the capture buffer, although the extra RAM can serve as RAMdisk storage.

The 112-page manual does a commendable job of explaining Point-to-

Point's intricacies. It includes logical, step-by-step instructions; effective screen illustrations; and a comprehensive index. If, after reading the manual, you still have questions, the tech-support people at Pinpoint are knowledgeable, friendly, and fast.

In addition, the program comes with a handy quick-reference card that details various commands, file extensions, interfaces, and even a couple of tricks.

Finally, Point-to-Point is not copy-protected, which will endear it to customers. To steal a quote from the manual: "We distribute all our software . . . on non-copy protected disks because we want our software to be convenient to use and because we trust you."

Pointlessness

Whether or not Pinpoint is right in trusting us is another story. A pirated prerelease copy of Point-to-Point floated around the bulletin-board-system (BBS) circuit before the program was released. The prerelease copy had bugs in it, and one brazen pirate, who left neither name nor number, called Pinpoint's technical-support staff, seeking information.

Pinpoint is concerned that people may confuse this bug-filled, prerelease copy with the real commercial release. So, if someone offers you a

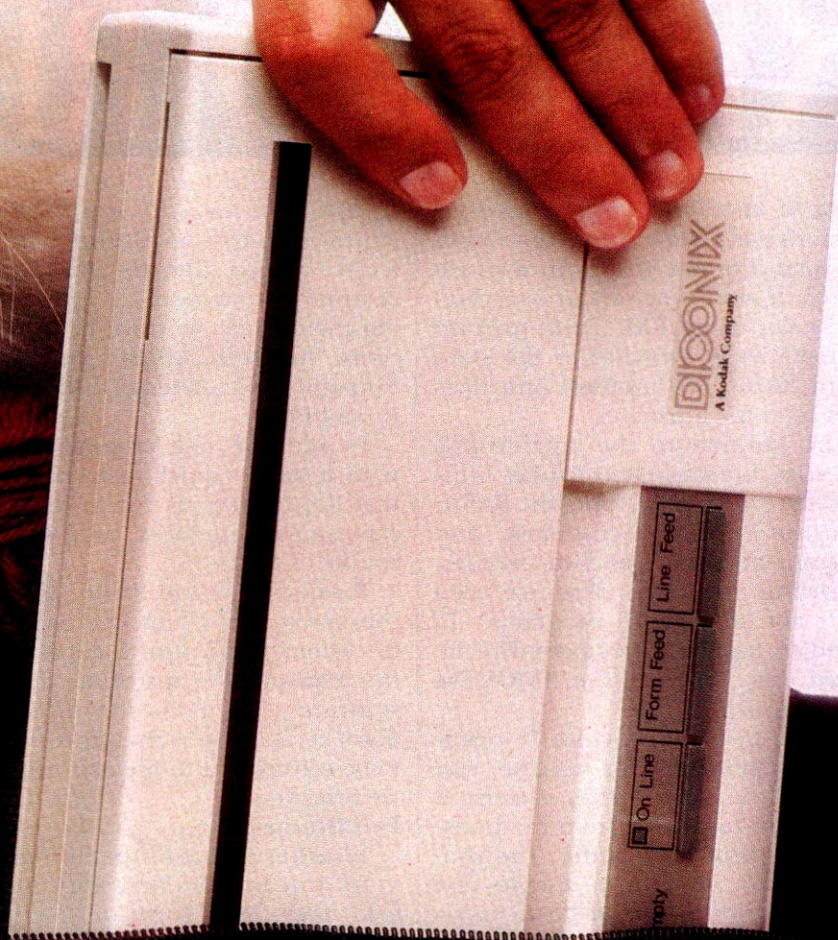
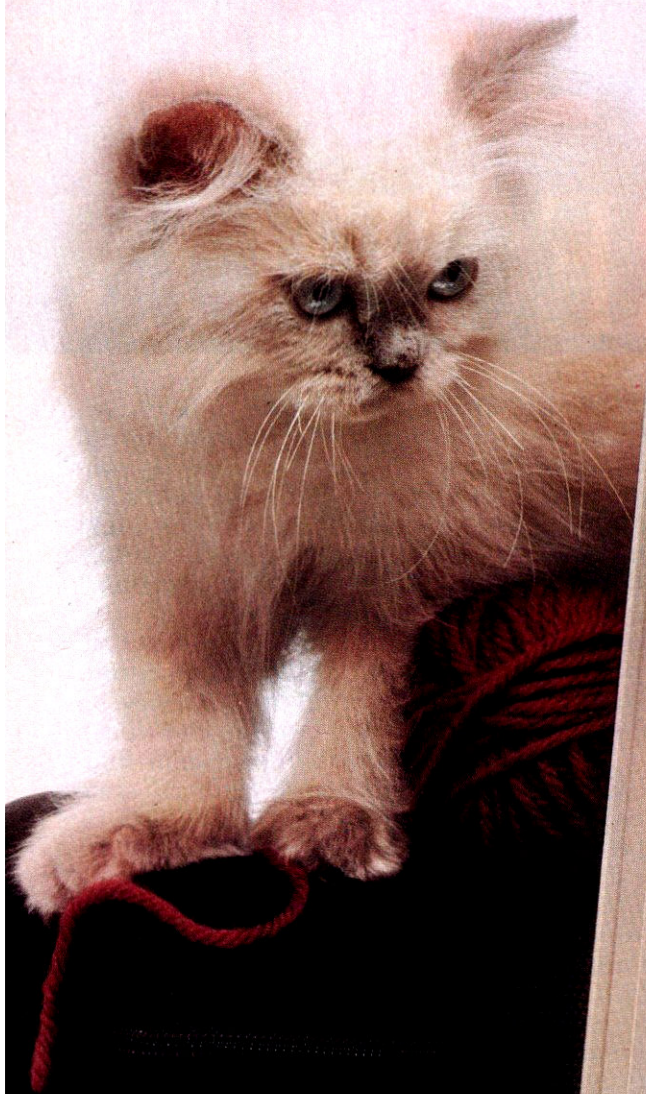
"free" copy of Point-to-Point, beware the pirate loot. As the manual notes: "Illegal copying of our software makes it harder for us to make a living selling the software you'll be USING AND DEPENDING ON every time you use your computer."

Point/Counterpoint

Point-to-Point has one main rival, CommWorks, a telecommunications program from PBI (see the review on page 53 of the October 1986 issue). Both of them use the same file-folder setup and offer roughly the same features. Comparing the two is almost like deciding whether Lite beer is less filling or tastes great.

Note that I said "almost." CommWorks offers rudimentary DEC VT-52 and VT-100 terminal emulation, but Point-to-Point does not. CommWorks can use extended memory as either active capture buffers or RAMdisks, but Point-to-Point uses the extra memory as RAMdisks only. CommWorks has a 35K buffer vs. Point-to-Point's 17K, but Point-to-Point allows you to append files on disk with data in the buffer, and CommWorks does not. Point-to-Point has a slightly better set of macro commands and an extensive set of utility programs for converting executable program listings into text files. CommWorks has a special, proprietary version of the XMODEM protocol for use with ProDOS/

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CIRCLE 156 ON READER SERVICE CARD

Point-to-Point is a feature-packed telecommunications program that is well thought out and easy to operate.

AppleWorks files. Point-to-Point also has a special, proprietary version of the XMODEM protocol for ProDOS file transfer and batch file transfer. The Point-to-Point documentation is superior to that of CommWorks.

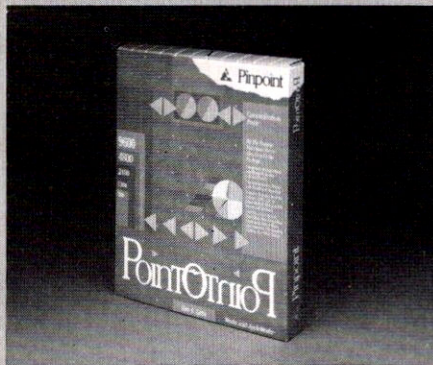
Finally, the retail price: CommWorks, \$95; Point-to-Point, \$129.

The Point Is . . .

Point-to-Point is an excellent, feature-packed telecommunications program that can satisfy most users. It is well thought out, easy to operate, and not copy-protected, and it has enough utility programs to let you transmit many different types of files. Its main competition is from CommWorks, and by comparing the two reviews, you can decide which program is right for your telecommunications requirements. +

Russ Lockwood is a technical editor for AT&T and former assistant editor at Creative Computing. He is also A+’s regular telecommunications columnist.

PRODUCT INFORMATION



Point-to-Point

Pinpoint Publishing
P.O. Box 13323
Oakland, CA 94661
(415) 654-3050

List Price: \$129

Requires: Apple IIe with Extended 80-Column Card, IIc, or IIGs; 128K RAM; one disk drive; modem

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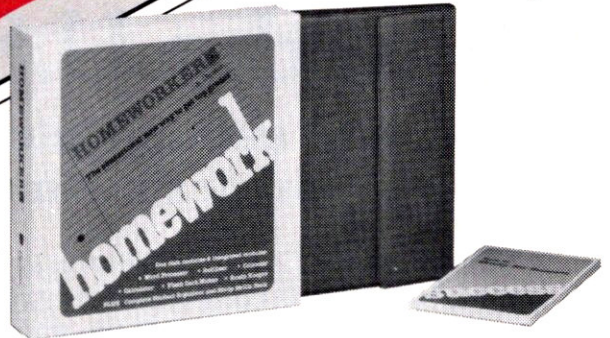
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| B. Denver is north of Salt Lake City. | <input type="checkbox"/> | <input type="checkbox"/> |
| C. "Live Free or Die" is the motto of Vermont. | <input type="checkbox"/> | <input type="checkbox"/> |
| D. The shortest drive from Austin to Fort Wayne would take you through Des Moines. | <input type="checkbox"/> | <input type="checkbox"/> |

(*To find answers, see below.)

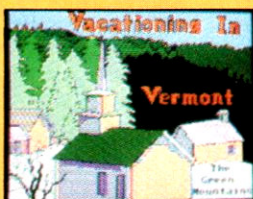
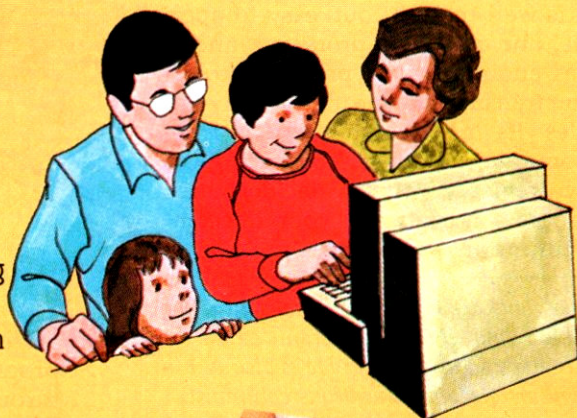
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The Learning Curve

BY DAVID D. THORNBURG

COMPUTERS AND CREATIVITY, PART II

Creativity, Unlimited and Fantavision meld art and mathematics.

Last month I discussed the creative use of computers in education by exploring the richness of the mathematics and patterns of a simple computer-graphics program. This month I'll explore the educational applications of two commercial programs: Fantavision from Brøderbund and Creativity, Unlimited from Sunburst Communications.

At first glance, these programs may appear to be nice tools for the creation of pretty pictures but little else. In fact, students can use them to explore mathematical topics such as transformation and symmetry, and they go far beyond the ability of books or blackboards to illustrate these concepts.

With the programs, students can learn by experimenting and making discoveries. Too many educational computer programs are designed to lock students into predefined activities. Although such programs may be successful in forcing learners to provide the "right" answer, youngsters often produce this answer whether they truly understand its derivation or not—such is not the case when children are led to make discoveries independently.

Years ago, the educational philosopher George Leonard said it was as criminal to bore a child as to beat him, suggesting that children are natural learners and that teachers should provide students with tools that can let learning happen. To do so, they can share their own views—i.e., engage in traditional teaching—



but they can also provide vehicles for direct experience, discovery, and creative expression.

When we create, we surprise our-

These two programs go far beyond the ability of books or blackboards to illustrate mathematical concepts.

selves with our own thoughts. Time stops, and we remain suspended for hours, or even days, tinkering with our new discovery, exploring its ramifications, and placing it within the larger context of our knowledge. This process has come to be known as higher-order thinking. It is, in fact, the most important thinking we do—far more important than the

mindless recalling of facts. This is where programs such as Fantavision and Creativity, Unlimited come in.

FANTAVISION

Brøderbund's Fantavision program lets you create animated computer-graphic scenes. Computer animation can involve a variety of methods. At one extreme, you can draw each picture frame by frame and then command the computer to display the pictures in sequence as though it were flipping the pages of a book. This technique (similar to that of film animation) can produce striking results, but it uses a great deal of memory and is hard to do well on a computer with the memory and speed limitations of an Apple II.

Another technique for computer animation—one that Atari, Commodore, and others offer—relies on special graphics hardware that enables the creation of "sprites," graphical elements that you can move against a fixed background

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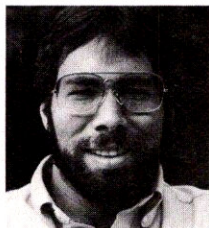
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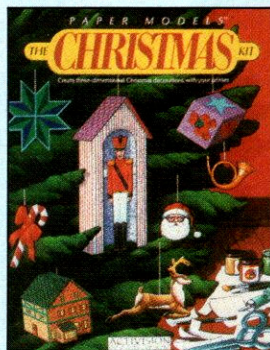
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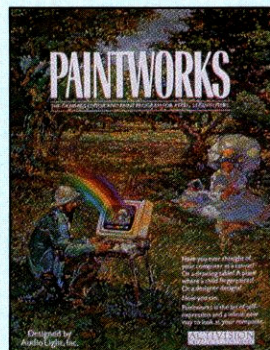
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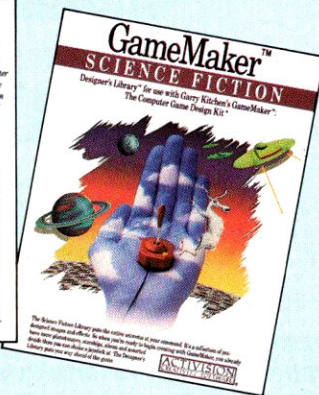
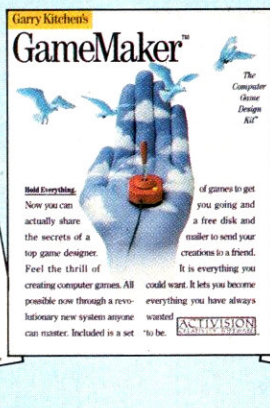
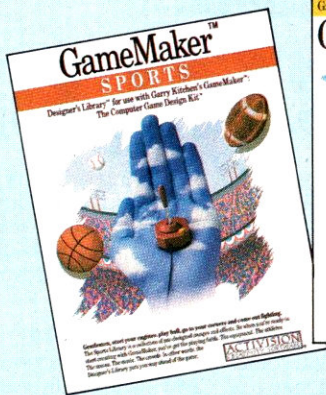


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in love with this technique several years ago when large graphic workstations were first in development. The film *Hunger* from the National Film Board of Canada is a wonderful tribute to the power of this animation technique, as well as being a superb film. On a more mundane level, tweening often shows up in television advertisements.

The Apple Artist

Rather than being content to watch the results of other artists' endeavors, Fantavision users can create amazing results on their own. The Fantavision screen provides drawing tools and a simple text font. You can build graphic objects from other shapes or by connecting dots with straight lines. Closed polygonal shapes filled with different colors can create detailed pictures of the sort you might create with a traditional graphics program.

The program also provides tools for the rotation and stretching of images, which makes it easy to create animated sequences that show a word growing out of a single dot, for example.

Because the images you create with Fantavision are transformed by a mathematical procedure (each dot in one image moves along a straight line to its corresponding position in the next key frame), Fantavision can let math students experiment with linear transformations. The goal of such experimentation may be less to identify the mathematics in an art form than it is to find the art in mathematics. Once students have seen a dynamic display of geometric transformations, they are likely to gain a deeper understanding of the mathematics behind the equations.

CREATIVITY, UNLIMITED

Whereas Fantavision uses a sequence of fixed frames to create animation, Creativity, Unlimited from Sunburst Communications uses an animated process to create a fixed image—that of an intricate tiling pattern of your own design.

People have been fascinated by repeated patterns for thousands of years. The intricate Islamic patterns that adorn buildings and fountains in the Middle East show up in other forms in the blanket patterns of Native Americans. Now, with a tool such as Creativity, Unlimited, students can create graphic motifs of their own and then use them to create repeated patterns on the screen.

Magic Stamps

On the surface, Creativity, Unlimited behaves like a tool for creating patterns with a rubber stamp. First you select (or design) a stamp pattern and then move it around on the screen to stamp copies in different places (see figure 4). You can rotate or reflect motifs across the vertical or horizontal axis to build intricate tiling patterns. One graphic feature of the product is that if one black image overlaps another one, the region of overlap will appear white. The

program accomplishes this effect by using the machine-language XOR command. This characteristic of the product takes some getting used to, but it increases your ability to create interesting patterns.

Moving Right Along

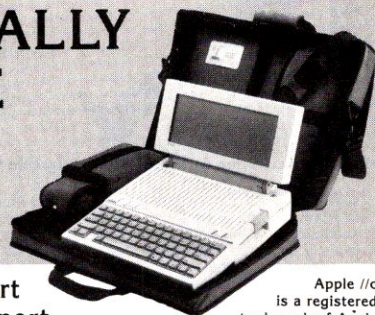
The animated aspect of Creativity, Unlimited involves the method of filling the screen with a tiled pattern. Rather than making you move the stamp to each position by hand, the program lets you record steps. For example, you can instruct the

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computer to record the movement and stamping of seven images in one line and the movement of the motif to the beginning of the next line. From then on, you can fill the screen with this pattern by choosing the Repeat Steps command.

Creativity, Unlimited's recording ability saves a lot of work and also encourages you to find the repeating aspect of a pattern. Thus, the program can help you discover some of the mathematical transformations that form the basis of the mathematics of symmetry.

I wasn't exposed to these ideas until I took a graduate course in crystallography, but with this program even third-graders can learn and use them easily.

Putting It Together

These products illustrate two of the many ways computers can foster creativity and still fit into a traditional curriculum.

The challenge is to identify some of the millions of other ways that computers can help keep the creative energy of teachers and students alive and vibrant. For just as it is criminal to bore a child, it is also criminal to bore a teacher! +

David Thornburg is the designer of Calliope, a nonlinear idea processor for the Apple and Macintosh lines of computers. He teaches a graduate course in creativity at Stanford University and writes books and conducts seminars on this topic. You can reach him in care of A+, 11 Davis Drive, Belmont, CA 94002.

PRODUCT INFORMATION

Fantavision

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17 Paul Drive
San Rafael, CA 94903
(415) 479-1170

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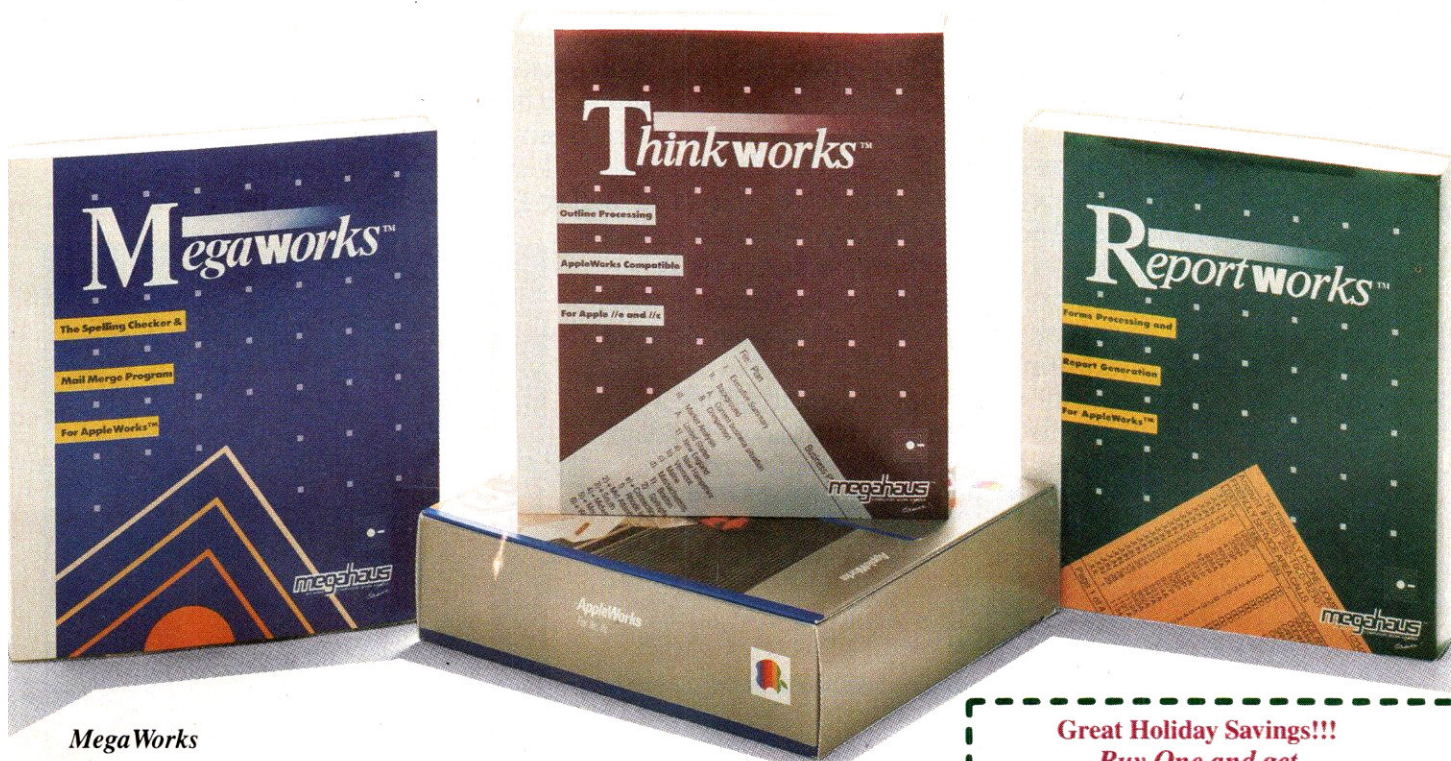
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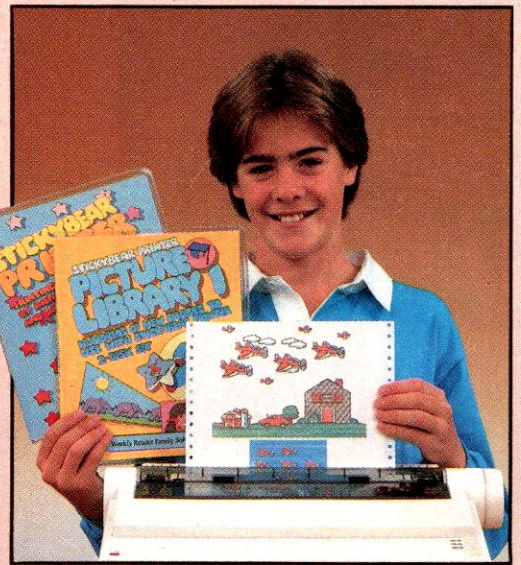
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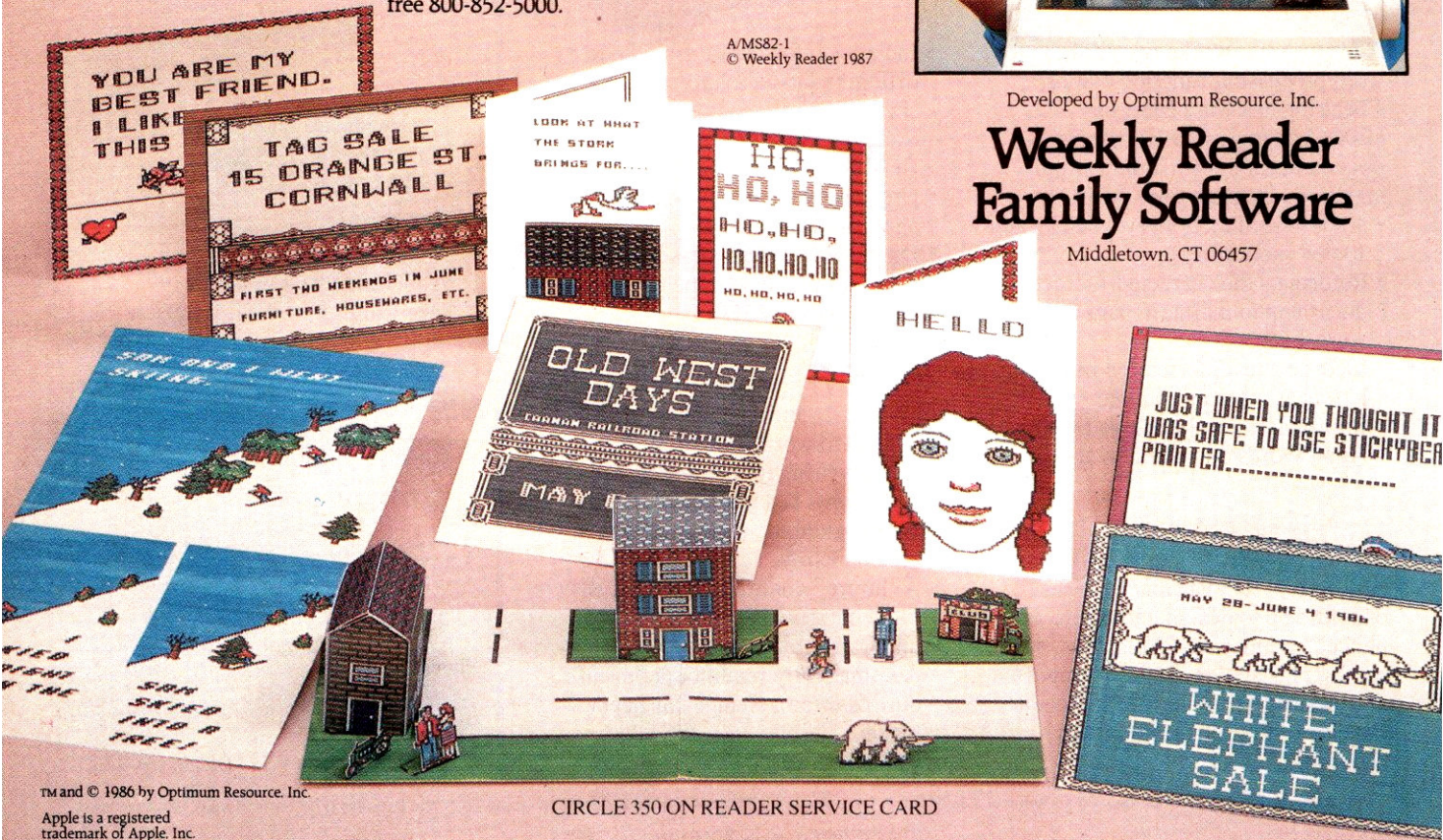


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FEATURE REPORT BY CHRISTOPHER VAN BUREN

APPLEWORKS' VERSION 2.0

When Apple introduced the new Apple IIGS computer in September, it did not neglect the most important part of the system: software. Besides hot new GS-specific software, such as graphics, page-makeup programs, and educational tools, the IIGS has a new version of AppleWorks.

AppleWorks Version 2.0 works with the entire Apple II family of computers and replaces all previous versions. Owners of earlier versions can upgrade for a price. Is there any advantage to having an older version? Not much. (New features aren't the whole story, however. The cost and practicality of upgrading are important too.) Later, I'll tell you about upgrading and how to protect your AppleWorks investment.

New Features

All in all, Version 2.0 offers some new features that are worth having. If you purchase or upgrade to a IIGS, you must also upgrade to Version 2.0 if you have an older release, since older versions do not work with the IIGS.

In fact, only a small group of people—owners of an Apple II Plus or unenhanced IIe who are running AppleWorks with a modification program that emulates the enhanced IIe (or the IIC) and who have less than 128K of memory—would be better off with older versions. These

people should keep their old versions because Version 2.0 requires 128K of memory, whereas earlier versions can work with less.

Let's take a close look at the new features. AppleWorks 2.0 has a complete, simple, and effective mail-merge capability for the word-processing and database modules. It also has a few new spreadsheet functions, including @ROUND, which rounds to a specified number of places, and @AND and @OR, conditional operators for IF statements.

Finally, AppleWorks 2.0 makes full use of the greater memory capacity in the new IIGS and also of extra memory in the IIe when you use Apple's Extended Memory Card. The new version increases the size of the desktop, the line limit in the word-processing module, the record limit in the database manager, and the row capacity in the spreadsheet module.

Mail Merge

The most important feature that affects Apple IIe and Apple IIC owners is the new mail-merge capability. As with AppleWorks itself, its power is in its simplicity. To use the mail-merge option, you start by "printing" (copying) a database (the one that contains the merge fields) to a special Clipboard option for mail merge (see figure 1).

You can rearrange the database

first to put it in a specific order for the records, using the open-apple/A command. The open-apple/R (Record Selection Rules) command lets you specify particular records from the database, such as "all customers in New York."

After you've printed to the Clipboard, you can move to the word processor and prepare your form letter. Note, though, that copying or moving any information places that information on the Clipboard and replaces whatever was there. Therefore, you must create your form letter before doing anything that might erase the Clipboard's contents. When you come to a place in the letter where you want to include something from the database, issue the open-apple/O (Print Options) command and select the new mail-merge option by typing MM. You will see a list of available "categories" (such as name, address, or phone number—also known as "fields") that you can merge into your letter.

You can use a category several times in the letter, and you can place several categories on the same line (AppleWorks adds one blank space after each category). When you select a category, a special marker appears that indicates the name of the category and where it will merge into the letter. After you've selected the category, AppleWorks asks if you want the line omitted if the category is empty. If the database contains nothing in a certain category for any given record, you can either leave the line blank or take the space out

entirely, closing any gaps in the document.

When you've finished setting up the form letter, you can print the document with or without the merged items in place.

New Spreadsheet Functions

AppleWorks 2.0 offers a few nice spreadsheet functions that many of us have been asking for. It is possible to accomplish the tasks these functions perform in pre-2.0 versions, but doing so requires some tricky maneuvering.

@ROUND

This new function rounds a value to a specified number of places, which is quite different from using the open-apple/L command to display a number with various decimal places. The @ROUND function permanently changes the number to the rounded version, and any subsequent calculations based on this number use the rounded number. In contrast, the open-apple/L value format merely displays a number in a certain format; it does not change the number. Calculations including the number use the original number, not the rounded (formatted) version. This distinction can amount to a significant difference in values when you're adding columns. The format for @ROUND is @ROUND (n,x), where *n* equals the number, cell reference, or formula to be rounded and *x* equals the number of decimal places to which it is rounded. For example, if cell A1 contains the number 5.145, you can change it to 5.15 with this function: @ROUND(A1,2).

@AND

The @AND function is an extra parameter of the @IF function that allows a second condition in the formula. Without @AND, the @IF function tests a condition. If the condition proves true, the function returns one value; if it proves false, it returns another.

To prove a condition true or false, the function must use one of the following operators:

- > greater than
- < less than
- = equal to
- <= less than or equal to
- >= greater than or equal to
- <> not equal to

Here's an example:

@IF(A1 < A2,C5,C6)

("if the value in cell A1 is less than that in cell A2, then return the value in cell C5; otherwise, return the value in C6").

Using the new @AND function, you can add an entire level to the conditional statement:

@IF(@AND(A1 < A2,A3 < A4),C5,C6)

("if the value in cell A1 is less than that in cell A2 AND the value in cell A3 is less than that in cell A4, then return the value in C5; otherwise, return the value in C6"). Notice that the @AND function precedes the actual conditional statement and that the entire conditional statement goes inside the parentheses of the @AND function.

@OR

The @OR function works like the @AND function but serves a different purpose. It acts as an "and/or" condition; if either or both of the conditions are met, the statement proves true. Here's an example: @IF(@OR(A1 < A2,A3 < A4),C5,C6) ("if the value in cell A1 is less than that in cell A2 OR that in cell A3 is less than that in cell A4, then return the value in C5; otherwise, return that in C6").

New Move Command

Version 2.0 has an enhanced Move command. As in earlier versions, pressing open-apple/M lets you remove information from one spreadsheet and paste it into an-

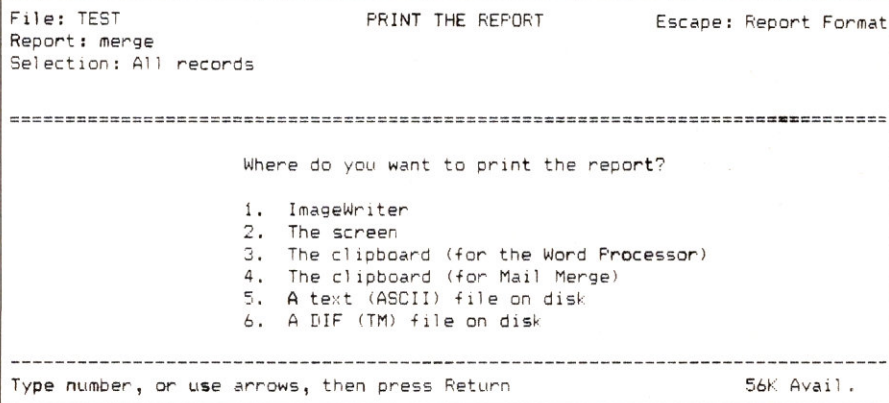
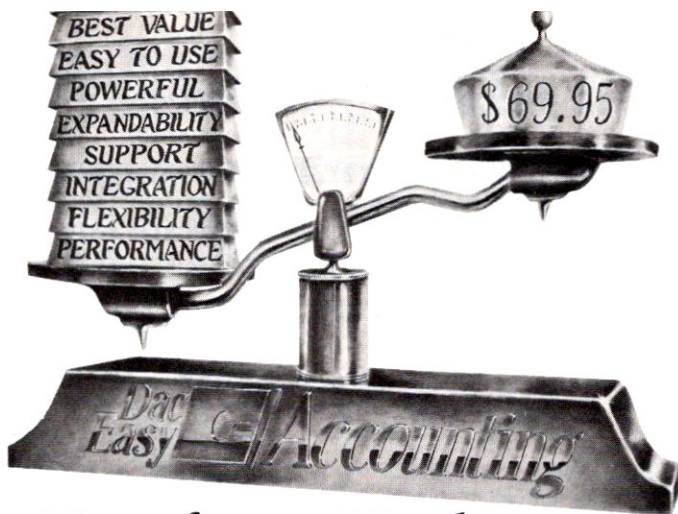


Figure 1: New option for printing to Mail Merge



Perfect Balance

APPLE users, now the scales are in your favor. Dac-Easy Accounting for the Apple gives you the best price plus tremendous performance. Add the improvements made to the Apple version, and you get the best value in the industry. Even the experts agree. Dac-Easy Accounting for the IBM was recognized by *InfoWorld* as 1985's "BEST SOFTWARE VALUE."

No other accounting package can match the explosive user base or the unanimous acclaim from industry experts. Dac is the perfect choice for your first accounting system or for upgrading from a single module system. Either way compare, and you will join over 150,000 people who have computerized with Dac-Easy.

PERFORMANCE

Accurate information when you need it is what performance is all about. Fast, flexible reports give you what you need to know to manage cash-flow, turn inventory and increase profits... Listen to the skeptics-turned-believers.

"Dac-Easy Accounting is so inexpensive... we were skeptical... We expected to find a program that couldn't compete on a feature-by-feature basis... We were wrong."
InfoWorld, 1985*

INTEGRATION

Dac-Easy's seven modules work together perfectly. Enter data once and it's posted to the other modules automatically. Equally important is that most modules can be used stand-alone. If your needs are for a general ledger only, then you will have the best and still be able to grow into accounts receivable, payable, inventory, billing and purchase order without spending more time or money. With Dac-Easy Accounting, you have the total solution.

FLEXIBILITY

Dac offers the rare ability to handle either service or product-oriented companies without sacrificing features which are important to both. *"Dac-Easy Accounting is everything its designers say it is... It is also flexible enough to fulfill the accounting needs of almost any type of business."*
Journal of Financial Computing, 1985*

FEATURES

General Ledger

- Unlimited multi-level accounts with screen inquiry for three years
- Pencil and pen correction option
- Automatic budgeting by department
- Unlimited journals and departments
- Excellent audit trail and flexible financial statements

Accounts Receivable

- Open invoice or balance forward per customer for unlimited number of customers
- Multi-sorted mailing labels
- Statements and invoices support special comments
- Detailed history for three years for number of invoices, sales, cost, and profits
- Customized aging report
- Automatic sales forecasting

Accounts Payable

- Checks handle multiple invoices, unlimited allocations and cash available protection
 - Multi-sorted vendor labels and directories
 - Customized aging report
 - Automatic forecasting of purchases
- #### Inventory
- Average, last purchase, and standard costing
 - Physical inventory with perpetual comparisons
 - Accepts fractional measure such as dozens
 - Automatic forecasting of product needs
 - Automatic forecast of product sales
 - Detailed three-year history for every product
 - Alert and activity reports
 - Screen inquiry for on-hand/on-order/sales/cost/profit/turns/GRO/etc.

Purchase Order

- Inventory and non-inventory items
 - Allows up to 99 lines
 - Per line discount in %
 - Accepts generic deductions
 - Accepts back orders and returns
 - Purchase journal
- #### Billing
- Service or Inventory invoicing on plain or pre-printed forms with remarks
 - Prints sales journal
 - Allows return credit memo

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- Unique program that automatically forecasts using your three-year history:
- Revenue and expense accounts
- Vendor purchases
- Customer sales, cost and profit
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- Four different forecasting methods

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ALSO AVAILABLE FOR IBM AND ATARI ST

Dac-Easy Accounting and Payroll are now available for the Atari 520 & Atari 1040 ST. Dac-Easy Accounting, Dac-Easy Payroll, Dac-Easy Word II, Dac-Easy Base, Dac-Easy Port, Dac-Easy Mate, Dac-Easy Accounting Tutor, and Dac-Easy Payroll Tutor are available for the IBM PC and compatibles.

*IBM version reviewed.

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Find out for yourself why Dac-Easy is the fastest selling accounting package in history. Call us today!

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Yes, please rush me Dac-Easy Accounting for the Apple!

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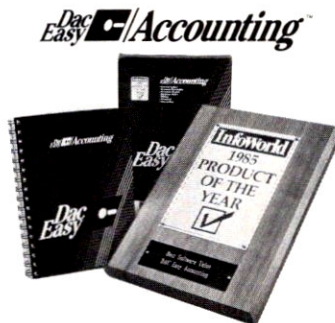
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30 Day Money-Back Guarantee
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#637



CIRCLE 140 ON READER SERVICE CARD

THE BEAGLE COMPILER

NEW!
COMING
DEC. 1

\$74.95 (for any Apple II-64K min.) / by Alan Bird

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.

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?

Say you've got a normal (slow) Applesoft program on disk named "ABC". Simply type RUN ABC and, within seconds, ABC is running at machine language speed!

It's just that easy.

If you want, make changes to your program (using Applesoft) and immediately re-run it at machine language speed.

"Beginning programmers love it. Experts are amazed."

IT'S QUICK!

Compiling takes only a few seconds (more or less—it depends on a program's size).

EFFECTIVE

Most programs compile without alteration. Syntax errors, illegal GOTO's, and so on, are automatically trapped before a program runs.

COMPACT AND CONVENIENT

A compiled program actually occupies less memory than its Applesoft original. You can even save in compiled format so people can't read or change your original Applesoft code.

PRODOS BASED

Compile Applesoft programs from ProDOS floppy disks, hard disks or Unidisk 3.5's.

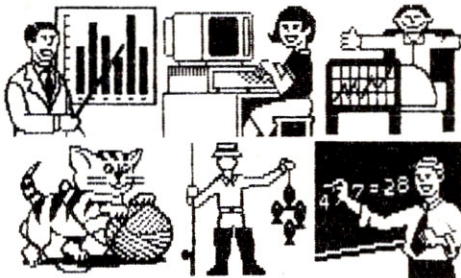
Like all Beagle Bros software since 1980, The Beagle Compiler is not copy-protected.

MINIPIX DISK #2

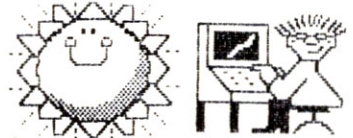
\$29.95 / by Fred & Sara Crone

NEW!

MINIPIX DISK#2 is 200 pictures—ALL NEW and ready to use with THE PRINT SHOP™:



Plus—you'll find 200 more pictures on MINIPIX DISK#1:



Coming soon: MINIPIX DISK#3 and Minipix for THE NEWSROOM.™

BEAGLE SCREENS

\$34.95 (for any Apple IIe, IIc or IIGS)
by Fred & Sara Crone, Matt Reimer,
Bert Kersey and Rob Renstrom

NEW!



Choose from a dozen caption typestyles to give your messages variety. Beagle Screens is compatible with Font Mechanic fonts too.

AUTO-ANIMATION

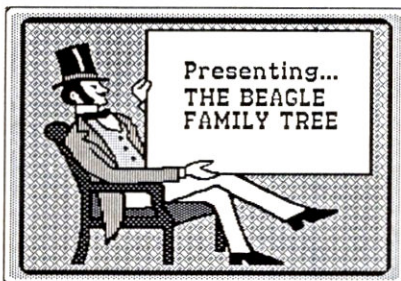


Animation gives your messages extra punch. Twenty Beagle Screen pictures are automatically animated as soon as you load them onto the screen.

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 or presentations.

Or just use them to show off your Apple.

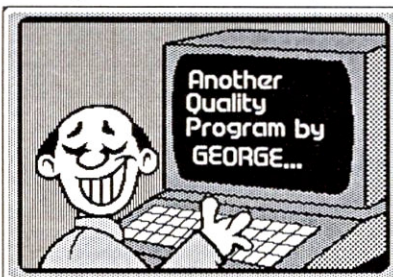
You get forty captionable full-screen pictures on disk (samples shown here). Half of the pictures are automatically animated as soon as you put them on the screen.



Each picture has a blank area (or "balloon") where you can add your own message.

We make it EASY to add your own words and create colorful on-screen "slide shows".

Or print the pictures up as unique signs. (Printing requires a dot matrix printer and any standard printer software like Triple-Dump.)



It's easy—just type the message on the screen, and save the picture on disk.

TRIPLE-DUMP

\$39.95 (for any version of Apple II)
by Mark Simonsen & Rob Renstrom

TRIPLE-DUMP combines with your dot-matrix (graphics-capable) printer and any Apple II to print:

- Hi-res graphics
- Double Hi-res graphics
- Lo-res graphics
- Double Lo-res graphics
- 40-column text
- 80-column text

Make "hard copies" of all kinds of images with absolutely no programming knowledge.

Or, if you're a programmer, use Triple-Dump's routines in your Applesoft programs.

Triple-Dump offers picture cropping, rotating and magnifying, plus the ability (on many printers) to adjust the print density.

BANNERS!

Print giant (8"-high letters) text banners on any printer. Great for special occasions!

BUY BEAGLE PRODUCTS AT YOUR SOFTWARE STORE.

If your dealer is out of a particular disk, get on his case. Tell him he can have any of our products in his store for you within a couple of days by contacting any major Apple software distributor. Or by phoning Beagle at 619-296-6400.

Or you can order by mail (we ship fast!):

Call Toll Free (orders only—
Mon.-Fri., 9am-4pm Pacific time):
1-800-345-1750 (Calif. 1-800-992-4022).
Visa, MasterCard or COD (or mail a U.S. check).
Add \$2.50 shipping (\$5.00 if overseas)
+\$3 if COD +6% if California.

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SAN DIEGO, CA 92110



Beagle Bros
MICRO SOFTWARE

MACROWORKS

\$34.95 (for AppleWorks version 1.3 or older)
by Randy Brandt

Note: New AppleWorks Version 2.0
requires New SUPER MACROWORKS→

MACROWORKS streamlines AppleWorks' word processor with new features. For example, one keystroke now deletes the character or word at the cursor. Another keystroke jumps to the start or end of a line. Another erases an entire line.

Change your mind? Press ⌘-U to "undo" your last delete-command.

New! AppleWorks MOUSE CONTROL

MacroWorks lets you use your Apple's Mouse to control AppleWorks' menus, scrolling, word-block highlighting, and so on.

APPLEWORKS MACROS
MacroWorks will convert any series of keystrokes into a new one-keystroke solid-Apple (●) command. (All open-Apple commands stay intact.)

Use MacroWorks' built-in macros or define your own. For example, make ⌘-N type your name and address. Or let ⌘-X save or print all of your desktop files, nonstop.

You can set up macros that execute any often-repeated function. You can even skip over unwanted AppleWorks questions like "How many copies?".

JUST BOOT APPLEWORKS, AND GO!

MacroWorks is not a time-consuming "pre-boot" disk. To start up, just boot AppleWorks like you always do. Now you've got optional Mouse control and you've got over 4,000 keystrokes-worth of macros at your fingertips.

SHAPE MECHANIC

\$39.95 (for any version of Apple II)
by Bert Kersey & Mark Simonsen

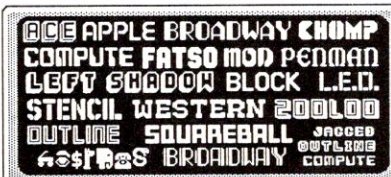
SHAPE MECHANIC converts hi-res drawings into animatable shapes that can be put on the screen with simple Applesoft commands. It also converts sections of hi-res pictures into "drawable" shapes.



Easy "List and Learn" demos on the Shape Mechanic disk teach you how to create your own hi-res programs.

HI-RES TYPEFACES TOO

30 proportionally spaced hi-res screen display fonts—both large and small—are included on the Shape Mechanic disk. Each character may be edited or redrawn as you choose.



SUPER ^{NEW!} MACROWORKS

\$49.95 (requires new AppleWorks version 2.0)
by Randy Brandt

SUPER MACROWORKS provides the same AppleWorks enhancements and improvements as MacroWorks, **PLUS:**

AUTO STARTUP

Boot AppleWorks and it will get itself up and running without another keypress. It will also automatically load any file that you want.

DIRECTORY DATABASE
Read file names from any or all of your disks into the AppleWorks Data Base.

Now you can sort by file name, type, date, etc., and make printouts, to see what's *really* in that disk library of yours.

NO MORE TYPING PATHNAMES!

When AppleWorks wants a pathname (another disk or directory), you now select from a menu instead of typing. Simply highlight the name you want—it's just like loading files.

TIME/DATE MACRO

One keystroke prints the current date or time anywhere in AppleWorks—in any application.

READ-THE-SCREEN MACROS

Convert from lower case to upper and back! Cut and paste anywhere, including from field-to-field or record-to-record in the Data Base.

LOCAL/GLOBAL MACROS

Define macros that work in one specific application (for example, in the Spreadsheet, but not in the Data Base).

Updates: Mail old MacroWorks manual front cover+\$22.50 to Beagle Bros (add 6% if California).

"...THE BEST SINGLE APPLEWORKS ADD-ON AVAILABLE TODAY."

—A+ Magazine
Oct. 86

"...IF YOU USE APPLEWORKS, BUY MACROWORKS."

—Editor's Choice
inCider, Aug. 86

FONT MECHANIC

\$29.95 (for any version of Apple II)
by Mark & Jon Simonsen

FONT MECHANIC gives you thirty new hi-res display typefaces compatible with all of the programs on Shape Mechanic, Apple Mechanic and Beagle Screens.



POWER PRINT

\$39.95 (for any Apple II-64K min.)
by Rob Renstrom

Works with most full-font downloadable printers, including: Apple DMP and IMAGEWRITER (I & II), EPSON (FX, JX, EX, OKIDATA (92, 93, 192, 193), PANASONIC (1092, 1093), STAR (DELTA, RADIX, SD, SG, SR), and more

POWER PRINT lets you "download" a second typestyle into your printer's memory, so you can alternate between your standard printer-font and a custom font with special characters and symbols:

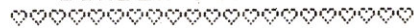
ABCdabcdE6789*E?

ABCDE12345♦♦♦♦□

ON ENGLISH



BORDER FONTS TOO!



(Custom fonts appear on your printer, not on the screen. Any key can be made to print any character.)

OUR FONTS OR YOURS

Many custom printer-fonts are included on the Power Print disk. An easy-to-use Font Editor lets you redraw any of the characters in our fonts. Or you can design your own custom fonts and special characters from scratch.

You can even design a set of custom characters that combine to print a small illustration like a signature.

Honestly,

A. Lincoln

Uncle Abe

For a creative touch, print your logo at the top of all of your word processing documents.

FAST—and Compatible with APPLEWORKS

Unlike other printer-font software, Power Print won't slow your printer down one bit. And it's compatible with AppleWorks, and most other Apple software.

G.P.L.E.

\$49.95 (for any version of Apple II)
by Neil Konzen

GP.L.E. is Beagle Bros' "Global Program Line Editor"—still the **NUMBER ONE** editor for your Applesoft programs.

INSERT AND DELETE characters and words in your basic programs. No more awkward "cursor tracing" to make changes.

SEARCH AND REPLACE: Find every occurrence of any word or variable in a program. Or replace any word with any other.

ESCAPE MACROS: GPLE lets you make Escape-anykey do almost anything you want. For example, Esc-1 can Catalog drive 1. Esc-N can type your name and address, etc.

BUY BEAGLE BROS PRODUCTS AT YOUR SOFTWARE STORE.

Or order by mail (we ship fast!). Call Toll Free (orders only—Mon.-Fri., 9am-4pm Pacific time):
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Visa, MasterCard or COD (or mail a U.S. check). Add \$2.50 shipping (\$5.00 if overseas) +\$3 if COD +6% if California.

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other (or to another location within the same spreadsheet). The new version gives you the extra flexibility of moving the formulas in spreadsheet cells or just the results of those formulas. In other words, you can strip out the formulas and place only the resulting values in the new location.

One reason for wanting to strip out formulas is to avoid errors when moving values (the results of the formulas) to another spreadsheet. If the formulas, after moving, cannot accurately recalculate their values as they did in the original spreadsheet, they will produce errors. One reason why they might not recalculate accurately is if they refer to cells that did not also get moved to the new spreadsheet. By stripping out the formulas altogether, you can avoid this problem.

This added feature has a limitation: It requires you to move not only your desired cells but also any other cells they reference. This requirement defeats half the purpose of the feature; if you're going to move all the cells, then they can recalculate the same results no matter where you move them.

Memory and Capacity

Memory expansion has been an option for Apple IIe and IIc owners for some time. Some manufacturers of memory cards offer up to three megabytes of extra RAM. To enable AppleWorks to take advantage of this memory, these manufacturers have offered "patches." A patch is a small program that goes into AppleWorks and changes its programming in various ways, such as increasing the size of the desktop, the area in memory where your files are stored. A patch can also increase the number of lines you can type into the word processor, the number of records you can store in a database, and the amount of information you can enter in each row of a spreadsheet.

Ironically, with all the patches available for memory upgrades, Apple's own Memory Expansion Card is the only one that does not come with a patch to increase capacity limits in AppleWorks' three modules. Now Version 2.0 gives owners

of Apple's Memory Expansion Card the same capacity upgrades that owners of, say, Applied Engineering's or Checkmate Technology's expansion products have been enjoying for some time. No patches are required in this case because Apple has built the capabilities into the program itself. Now other companies are rushing to update their patches to be compatible with the new version of AppleWorks. If you own a non-Apple memory-expansion card, wait for upgrade information from your manufacturer before you update to Version 2.0 of AppleWorks.

*Now other companies
are rushing to update
their patches to
be compatible with
the new version
of AppleWorks.*

If you have a IIGS, you'll notice that AppleWorks runs a bit faster than it did on previous Apple II models. This speed difference is due to the 16-bit power of the new computer. Some people have drawn comparisons to using an Apple IIe with an accelerator card.

AppleWorks 2.0 comes with new reference and tutorial manuals. The reference manual is completely rewritten for the new version. It resembles Apple's Macintosh manuals in its use of multiple columns and organization. Besides explaining all the new features, it's an improved manual all the way around. It offers numerous tips for the three modules and has extra information about printers and printer setup (a common area of confusion).

How to Upgrade to Version 2.0

To get the new version, you must get a special mailing envelope from your local Apple dealer or users' group and follow the directions on the mailer. Apple tells me that if you don't use the mailer, you won't get the update. Don't forget your check for \$50 for the update fee. That's

right—\$50. It gets you the new version on both 5¼-inch and 3.5-inch disks, a completely new manual, and a new reference card. If you think that's a bit high for the features you get, I tend to agree.

Products That Work with 2.0

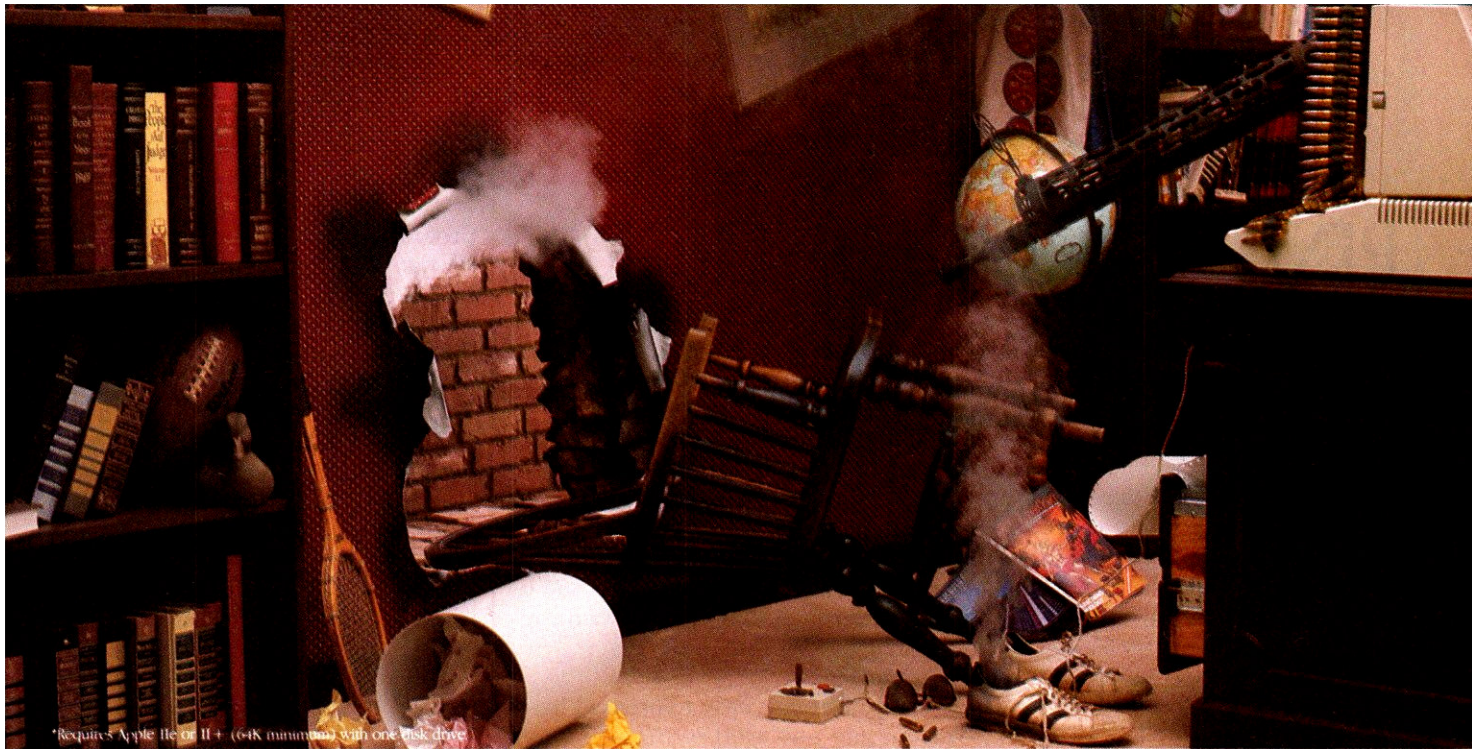
Products that work with AppleWorks 2.0 fall into three categories: templates, programs that work with AppleWorks data files, and programs that modify the AppleWorks program itself.

Programs that read from or write to AppleWorks spreadsheet, database, or word-processing data files will most likely work without being updated. The third category of products—desktop-expansion, macro, and accessory programs—modify, or patch, the actual AppleWorks application and will need modification to work with Version 2.0. (If your program had to be "installed" on AppleWorks and the manufacturer warned you that installation modified AppleWorks, then you will most likely need an updated version of your program in order for it to work with 2.0.) By the time you read this article, the updates of most products that require them will have been completed, but check with your program's manufacturer to make sure.

Is It Worth It?

Version 2.0 of AppleWorks has some nice new features. As a casual upgrade, it would be worth having, but the \$50 fee for the upgrade is baffling. First, 2.0 doesn't have enough new features to warrant rushing out to your local Apple dealer, \$50 check in hand, and filling out a special mailer. Second, you *can* perform the new spreadsheet functions in versions 1.1, 1.2, and 1.3 with some tricky formulas. The mail merge is effective, but \$50 goes a long way toward one of the better, third-party mail-merge programs, such as Pinpoint's InfoMerge (see review in this issue), AutoWorks from the Software Touch, or MegaWorks from Megahaus.

Of course, buyers of the new Apple IIGS need AppleWorks just as owners of previous models do. And 2.0 serves well. **+**



*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!"

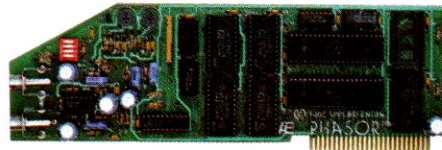
*Steve Wozniak, the creator
of Apple Computer*

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.

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PINPOINT'S INFOMERGE

Pinpoint Publishing recently announced a new mail-merge program, called InfoMerge, for AppleWorks documents. Although a plethora of mail-merge programs is already on the market for AppleWorks, this one deserves some attention because of its special record-selection and display abilities.

Pinpoint Publishing has emerged as the premier desk-accessory maker with its Pinpoint desk-accessory program. The program includes accessories such as a calculator, notepad, telephone dialer, quick envelope labeler, and graphics-merge program. A later addition that you can add to the original collection is the Spelling Checker desk accessory.

InfoMerge is different, though. It's not an accessory at all. It's a separate mail-merge program that works

InfoMerge performs all the basic functions of a mail-merge program, and it has some other features worth noting.

with AppleWorks files. Instead of using the program while in AppleWorks, you must start the program separately—one disadvantage over AppleWorks' own mail-merge option in Version 2.0, which works right inside of AppleWorks.

Mail merge, the ability to take a generic letter and customize it for each recipient, is synonymous with form-letter creation. If you have a business (or an awful lot of friends), this kind of program can be a great timesaver. A good mail-merge program lets you designate where in your "master letter" you would like to place sets of personalized information called records. This information usually includes names and addresses, but it can also include special words or phrases within the body of the letter. In addition, mail-

merge programs let you take an existing list of names, addresses, and other information from the AppleWorks database and automatically merge each record into the master letter.

InfoMerge performs all the basic functions of a mail-merge program, and it has some other features worth noting. Let's take a look at some of the program's advantages and disadvantages.

Advantages

InfoMerge is easy to use and has a complete and well-written manual. It lets you review your documents on the screen prior to printing or merging. An especially nice feature is the ability to calculate fields from the database and place the results in the document. You can enter personalized information directly from the keyboard while the letter is printing, instead of getting it from the database. InfoMerge automatically loads the database file associated with a form letter and prints up to 99 copies of each letter. Instead of printing empty insertion fields, it removes blank spaces from documents.

InfoMerge has some handy record-selection capabilities that allow you to choose which of the resulting form letters you want to print, and the program respects any record-selection rules you've established in the AppleWorks database. It lets you format dates in several ways and send printer codes for special printer functions that AppleWorks does not handle.

Disadvantages

The biggest disadvantage of InfoMerge is its slow overall operation—especially when you're merging long documents. It also limits the length of the form letters you can create (they can take up 3–5K of memory). Also, InfoMerge cannot merge information into justified text.

As you can see, this product has more advantages than disadvantages. Pinpoint has had the luxury of improving on the other mail-merge

programs that work with AppleWorks, although with that luxury comes the problem of being the last out of the starting gate. Here are some details about a few of its more important abilities.

Record Selection

Figure 1 shows the InfoMerge selection options. In addition to estab-

Merge and Print


1. Display for current record
2. Print for current record
3. Print for all subsequent records
4. Print for next n records
5. Go to first record
6. Find a record
7. Advance n records
8. Display current record values
9. Help  -?

Figure 1: The InfoMerge selection options

lishing record-selection rules, you can select specific merged letters for printing.

Calculations

InfoMerge's ability to calculate numeric categories in the database gives the program extra power. The format is simple: If you want to multiply a field named Cost by a field named Quantity, you enter this formula into your letter:

$\wedge < \text{Cost} > * < \text{Quantity} > \wedge$

The carets signify the Superscript beginning and ending markers in the document, which are necessary when you are calculating fields. The greater-than and less-than symbols signify merge fields coming from a database, and the asterisk indicates multiplication.

InfoMerge automatically loads the database file associated with a particular form letter if you enter a special command into the form letter when you create it. By doing so, you can avoid the frustration of having to remember which list goes with which letter.

Dates

AppleWorks stores and formats dates in the database. Any field containing the word *date* becomes a specially formatted date field. Unfortunately, AppleWorks has only one date format:

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You'll also enjoy superior color graphics. InCider Magazine said, "Graphics is one area where VIP really outshines Lotus, as the on-screen

pictures are much better on the Apple than on the IBM®"

And VIP Professional offers more raw spreadsheet power: A large 8,192 row by 256 column sheet and additional data query fields. Plus, VIP Professional is the *only* mouse-driven spreadsheet that features pull-down menus and addresses over 4 megabytes of memory on IIe or IIc and 8 megabytes on IIGS.

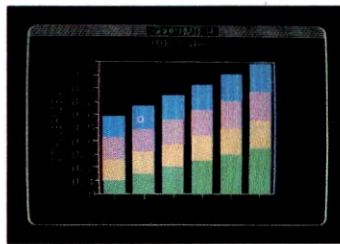
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Like AppleWorks, VIP Professional integrates a spreadsheet, database and text processing. But VIP Professional's spreadsheet and database are far more powerful—and VIP also offers colorful graphics and a mouse interface.

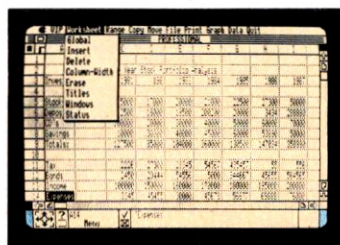
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1986 Editor's Choice Award
AmigaWorld, November-December 1986

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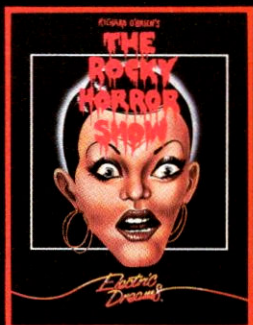
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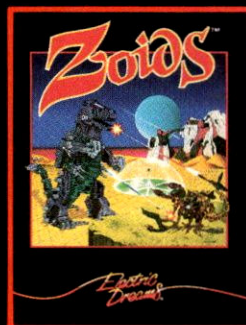
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Sep 10 87

InfoMerge, on the other hand, can format date fields in any way you like, such as

September 10, 1987

10 Sep 87

10/07/87

Speed

InfoMerge can be slow. When you're used to menus appearing in a flash in AppleWorks, menus in InfoMerge seem to take forever. Merging itself is slow too. InfoMerge requires that you exit from AppleWorks (where you created the form letter and the list) and reboot.

These are the only significant disadvantages InfoMerge has, compared with the AppleWorks mail-merge option in Version 2.0. The AppleWorks option cannot calculate fields after merging them; it does not automatically load associated merge files (in fact, it gets confused if you load the wrong combination); and it is limited to one AppleWorks date format.

If you want mail-merge features, do some comparing. At least five mail-merge programs available for AppleWorks are worth considering. Some others include AutoWorks from The Software Touch, MegaWorks from Megahaus, and SpellWorks from ALS Software.

Overall, InfoMerge has more features than other merge programs do and costs less, but it's also slightly slower than the rest. Consider whether you need a mail-merge capability at all, and if you find that you do, consider InfoMerge. +

PRODUCT INFORMATION**InfoMerge**

Pinpoint Publishing
P.O. Box 13323
Oakland, CA 94661
(415) 654-3050

List Price: \$79 (includes a template called Instant Business Letters, which sells separately for \$49)

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

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QUESTIONS FROM OUR READERS

PAGE NUMBERS IN PLACE

Q. *Help! I have not been able to put page numbers, dates, and other such information in the upper right-hand corner of the page. No matter what I do, they end up either in the center or at the left margin of the page, and that's not where I want headers and footers. Is there a solution that is both quick and not too complicated for someone whose concern is with words and not with programming?*

June Bonfield
Fargo, ND

A. To print your page numbers in the upper right-hand corner of each page, move the cursor to the top of the document and enter open-apple/O to get the Print Options display. Select LM (for left margin) and press Return. Now enter a left margin of, say, 6.5 inches. Press Esc and move the cursor down a line. Now get the Printer Options display again and select HE to start a page header.

The page-header indicator will appear on the document. Remember that the line following this indicator will print as the header on each page. To print page numbers in the header, call up the Printer Options display again, select PP (for Print Page Numbers), and press Esc. Notice that the caret that indicates the location of your page numbers is off to the right—because you set the left margin to put it there.

The next line of the document should set the left margin back to something normal for the rest of the document. The first few lines of the document should look like this:

---Left Margin: 6.5 inches

---Page Header

---Left Margin: 1.0 inches

You can adjust the contents of the header and the margin settings to position the information as desired.

ADDING IT UP

Q. *Does the AppleWorks spreadsheet program provide any way to add a column of figures that were obtained with formulas, so that you get an accurate column total when the figures being added are printed to two decimal places? The computer considers seven decimal places when it adds the column, even though only two places are showing.*

Please tell me I'm the dumbest guy who ever owned an Apple and explain how to accomplish this seemingly simple task.

John N. Ayres
Jermyn, PA

A. Well, John, sorry we can't call you the dumbest guy who ever owned an Apple. Until recently, there was no simple way of accomplishing this task. As you discovered, the spreadsheet calculates seven decimal places, regardless of how many places you display. Using the open-apple/L Value Layout com-

*Version 2.0 of
AppleWorks has
a new rounding
function.*

mand, you can format numbers to display zero to seven decimal places. The numbers appear to be rounded off but, in fact, still calculate at their original number of places, which can cause addition errors when true rounding is required.

Thankfully, Apple has addressed this problem in version 2.0 of AppleWorks, which has a new rounding function. This function permanently changes the numbers, making column totals correct. +

Please send your questions and problems to Help File, A+, 11 Davis Drive, Belmont, CA 94002.

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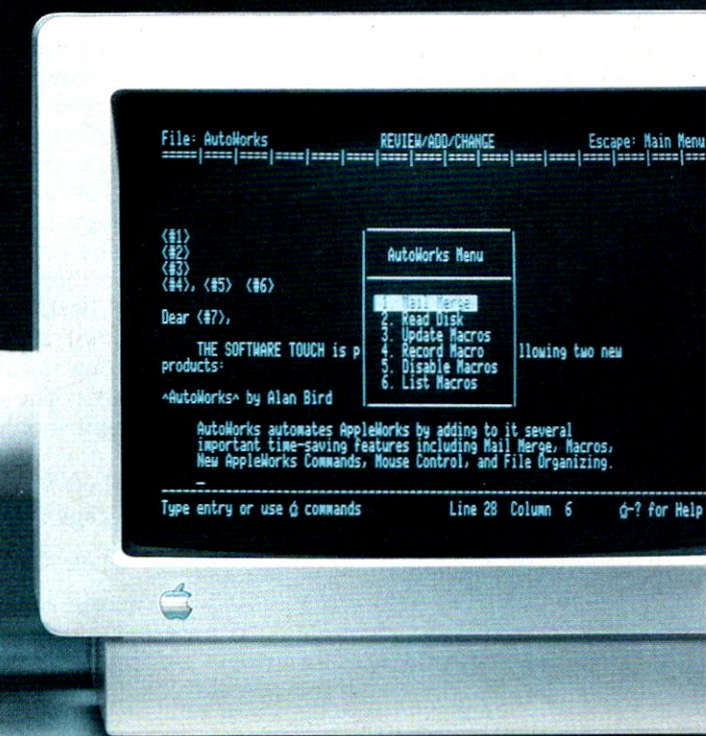
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*Creating comic strips
and party goods with
the Disney superstars*

When you read this, 1987 will be upon us. We expect an exciting year for Apple graphics; the Apple IIGS is here. As we write this—in September—we're anxiously awaiting our computers and software, and we look forward to sharing our experiences with you. Meanwhile, something for everyone . . .

Comic Strip Maker

We saw the Walt Disney Comic Strip Maker at Apple's GS rollout. At first we wondered why a product that worked on all 64K Apple II computers would be featured at an event spotlighting the GS. When we got our hands on the program, however, the answer became evident. The Walt Disney Comic Strip Maker (WDCSM) is a superb program.

WDCSM lets you create three-

panel comic strips with the Disney cartoon superstars: Mickey and Minnie Mouse; Donald and Daisy Duck; Goofy; Pluto; Uncle Scrooge; and even Huey, Dewey, and Louie. The program has three main options: Be a Comic Writer, Branch-a-Comic, and Create Your Own Comic. The first option presents you with 12 canned comics—graphics and text.

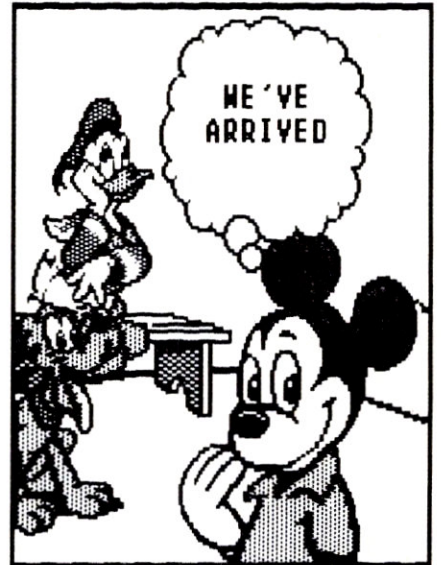
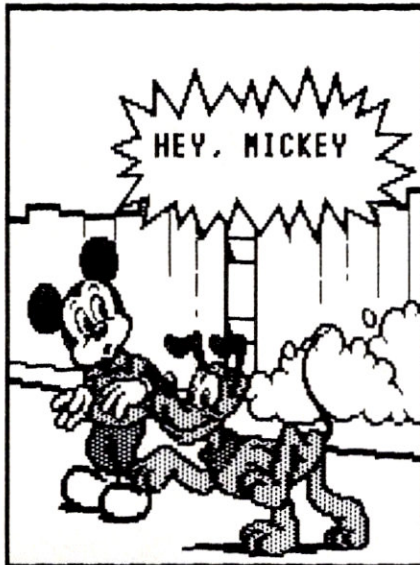
*We expect an
exciting year for
Apple graphics in 1987,
and here's a superb
beginning from Bantam.*

With these, you can rewrite the text, but you can't change the graphics. In Branch-a-Comic, you can select from the same 12 comics, but now you can choose different second and third

frames. Once again, you have the option of using the provided text or creating your own. You can use these options for study and practice and then go on to the final option. In Create Your Own Comic, you build a comic from scratch—well, not quite from scratch.

Make a Comic Strip

You build each panel, or frame, of your comic from dozens of images that come on the flip side of the program disk. First, you choose a background: blank, inside, outside, downtown, or by the sea. Each selection features several scenes, so you cycle through them until you find one that's suitable for your story. Then you use the background as it is or flip it horizontally. Next, you add the story elements: characters, objects, and text balloons. You have lots of choices. The Disney cartoon characters are available in several poses, and you can elect to use a close-up or full body image for each



SPEAKING OF GRAPHICS GALLERY

PORTRAITS OF THE ARTISTS

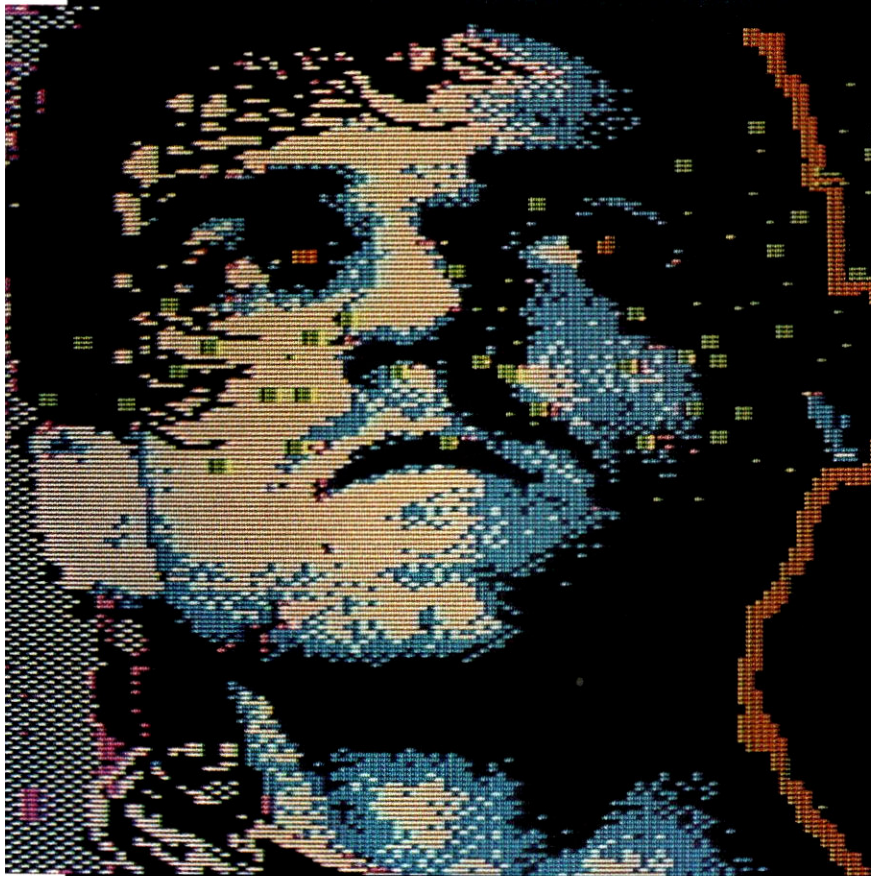
Apple II artists captured their portraits with a digitizing camera and enhanced the images with graphics software.



ALLEN MEYER *New York*



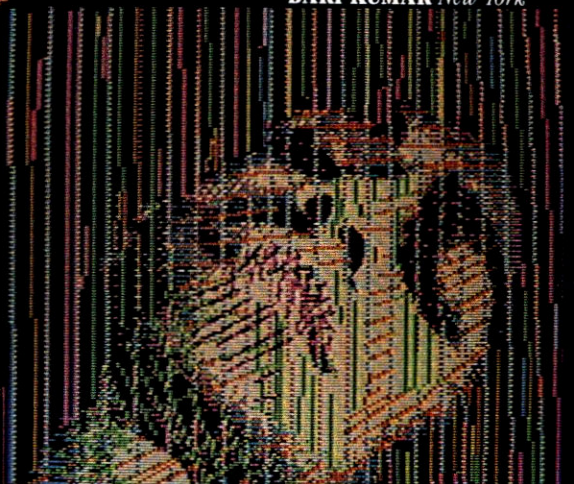
BARI KUMAR *New York*



YUVAL ROBICHEK *New York*

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. Send your artwork to: A+ magazine, 11 Davis Drive, Belmont, CA 94002, Attn: Graphics Gallery. Submissions cannot be returned.

BARI KUMAR *New York*



pose. After you've selected a character, you can flip it or crop it and then move it into the frame. You select objects such as chairs and trees in the same way as you choose characters. Once you've placed your characters and objects, you can add the dialogue balloons. The standard variety of comic-strip balloons are available: dialogue, thought, surprise, and narrative. Once you've placed the balloon, you type in the text.

The program is structured so that you can work on each frame sequentially or first choose all backgrounds, then all objects and characters, and so on. By the way, you needn't use all three frames; single-frame creations can serve as party invitations. At the same time, longer stories can stretch over multiple strips, just like many weekday comics in newspapers do.

After you've constructed your strip, you can save it to a data disk or print it out. The program works with most popular interface cards and printers, including color printers. The colors are restricted to the blue/orange color set, and only parts of the characters and objects are colored. If you want a full-color, Sunday-type comic strip, get out the watercolors!

Bravo, Bantam

We are impressed by the program's user interface. Simple enough for young children to operate, it isn't so simplistic that it will drive adults mad.

The program uses clearly designed icons, and you make every choice after getting a visual cue; you see each character or object before you select it. As you might imagine, this method requires quite a bit of disk access, so if you have only one disk drive, you'll be doing a lot of disk swapping. If you have two drives, however, you can copy side 2 of the distribution disk, which contains all the art, and you'll sail along. We did find one part of the user interface clumsy: To end text entry, you must press Control-C. Young children will definitely need help with this aspect of the program.

WDSCM can be an excellent educational tool for teaching organization, planning, and logical thinking, skills that are all necessary in every aspect of comic-strip creation. Since the text is necessarily restricted to a few choice words, you must plan your story. If you stick with three

This program can be an excellent tool for teaching organization and logical thinking.

frames, there's room for little more than setup and punch line. Of course, a story can spill over into six or nine frames. Either way, you must prepare a script.

The graphics too require plan-

ning. Objects and characters you place on the frame last overlay the ones you placed first. Thus, if you want Mickey to hold a fishing pole, you must place the pole before you place Mickey. If you do it the other way around, the pole will be in front of Mickey's hand, looking as if it were glued to his glove.

And then there's layout. With the flipping, cropping, and sizing options, you have lots of graphic freedom. The goal is to make each frame look good and have it relate to the

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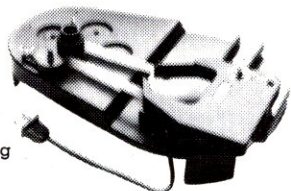
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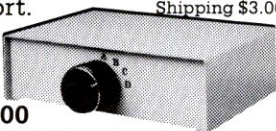
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other frames in the strip. Unfortunately, once you've placed an object onto a frame, you can't lift it back up. To make a change, you'll have to redo the entire frame, so start by sketching frames on paper.

Creating a good comic strip requires effort. The 12 canned strips on the disk (48 in the Branch-a-Comic mode) provide good examples. Working with the Disney characters and seeing the professional quality of the printouts should be all the incentive a youngster needs.

Although Comic Strip Maker is a powerful teaching tool with an easy-to-use user interface, we're not sure that we would recommend it as an entertainment package for home use. Unless children have shown a particular interest in creating comic strips, they may tire quickly of this program.

A Disney Alternative

Another program, Walt Disney Card and Party Shop, may be more fun for home use. This program has fundamentally the same user interface but allows the creation of cards and party items. The Card and Party Shop offers fewer poses and objects than the Comic Strip Maker does, but it features more of the Disney characters, including Bambi and Snow White.

A NEW TEAM

Computers and comics seem to be a hot pair right now. At least two regularly published comic books are created with computers. Shatter, from First Comics, is created with a Macintosh, and Vector, from Now Comics, is created with the AT&T Frame Creation System. With ComicWorks available for the Macintosh and the Walt Disney Comic Strip Maker for the Apple II, many of you might be tempted to create your own comic strips. You'll need guidance, and Will Eisner's new book, *Comics and Sequential Art*, fills the

bill. Although Eisner doesn't deal specifically with computers, he does cover all aspects of comic-strip creation. We think the book is essential reading for budding comic artists.

ODDS AND ENDS Shimmering Image

We recently discovered that the Laser 128 computer has a compatibility problem that severely affects artists. The composite video mode of the Laser 128 doesn't work the same

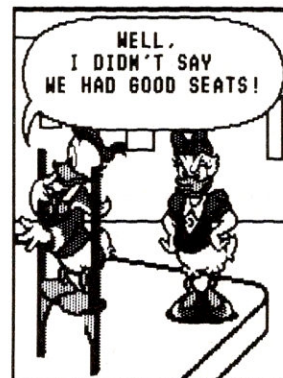
We recently discovered that the Laser 128 computer has a compatibility problem that severely affects artists.

as the Apple's does. Instead of the standard Apple colors, the 128 puts out a shimmering multicolored image. If you're considering a Laser 128, you'll also have to buy an RGB monitor for compatible graphics.

Fontrix Tips

Fontrix fans, take note. The Apple Fontrix Club is a national users' group. Membership gets you a newsletter, two "graffles," and discounts on selected Fontrix add-ons. AFC is currently selling Pattern Painter for graffles, which lets you fill enclosed areas, draw lines, and paint with brush tips.

Also new for Fontrix users is the Fontrix Utility Pak, a set of drawing routines for use with Fontrix graffles. Utility Pak allows you to put frames around graffles as well as draw lines, grids, and polygons on them. You can use it to create geometric abstractions; the printed results are stunning.



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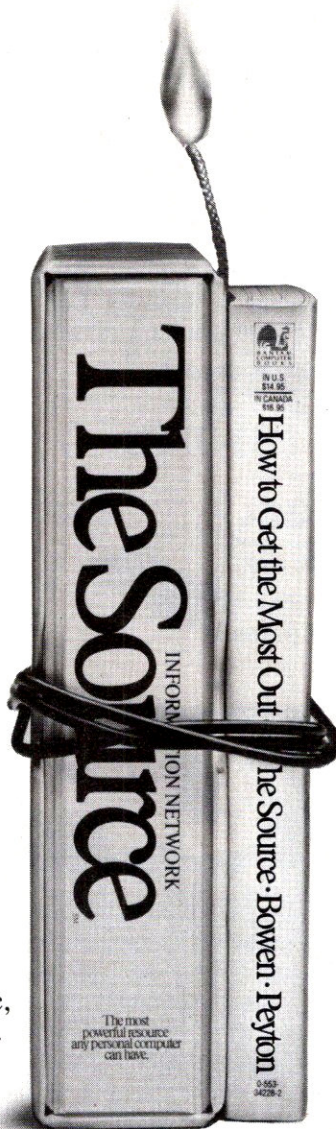
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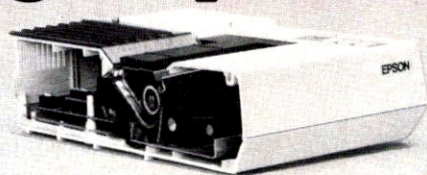
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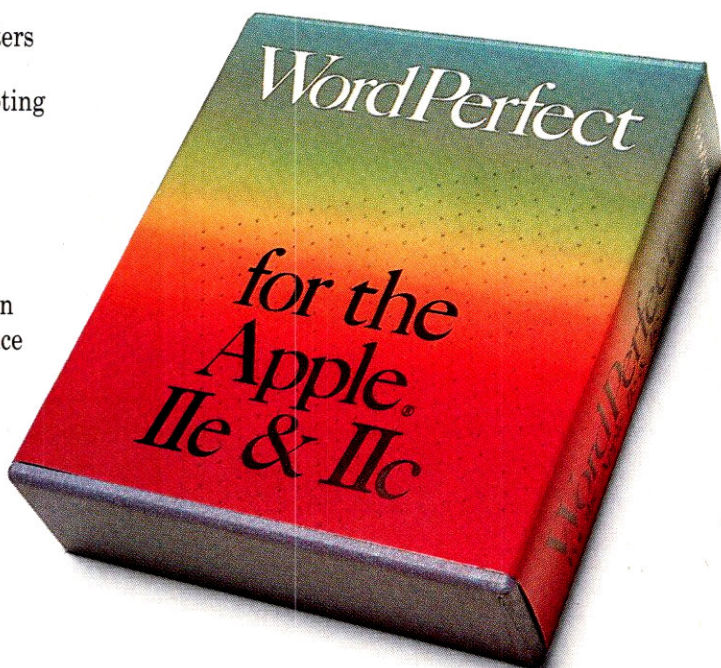
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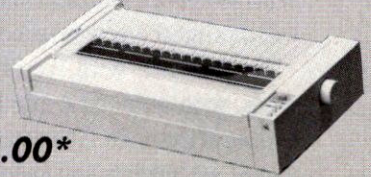
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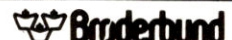
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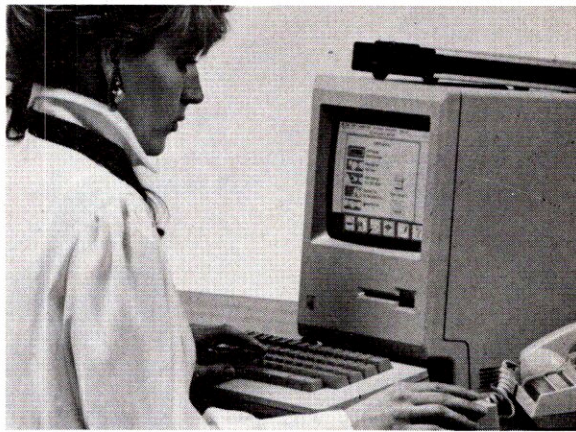
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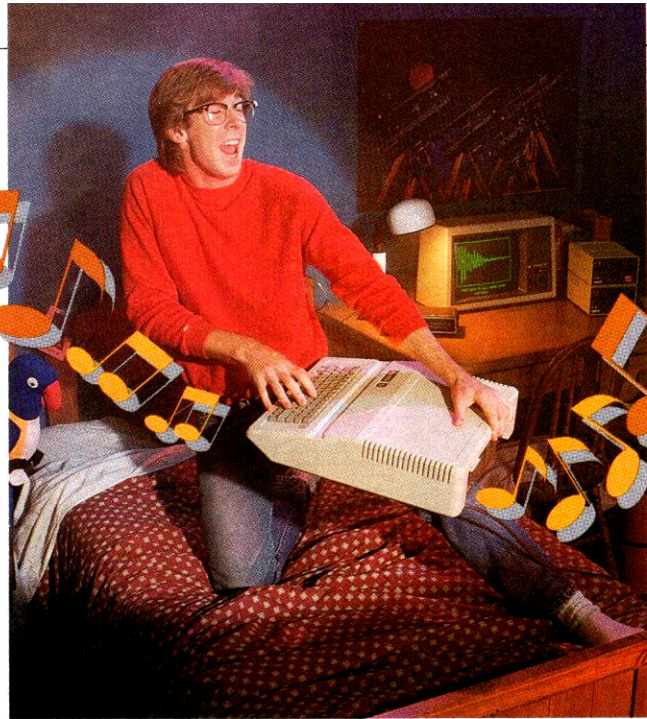
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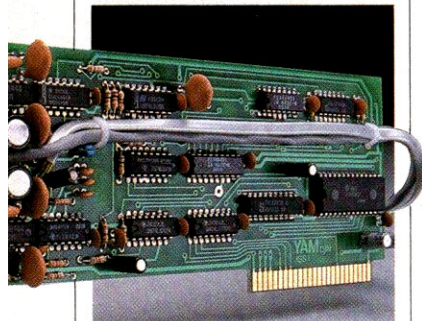
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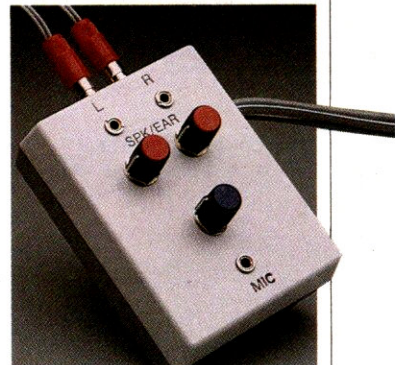


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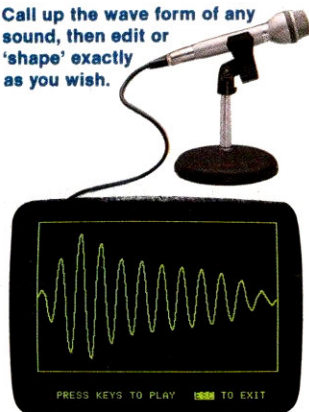
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GamePort

BY BOB LINDSTROM

A call for more innovations and fewer sequels, a look at three macho games, a peek at a joystick, and previews of this month's reviews

BRING IN THE NEW

Depending on whether you read this before or after midnight January 1, you'll either be waiting to ignite those Fourth of July leftovers and blast in the New Year, or you'll be caught between a rock (that noisy New Year's Eve bash) and a hard place (Apple's annual stockholders' meeting).

But before launching into '87, let's take a quick look back at '86. Last year we saw *Ultima IV*. Wasn't that another role-playing game? We saw *Leather Goddesses of Phobos*. Wasn't that another text adventure? We saw *Airheart*. Wasn't that another animated arcade game? Hmm, déjà vu seems to be setting in, and we saw that too, done up as a Mac

graphic adventure.

The intention of "GamePort" is not to put down these fine programs, all of which are among the most innova-

tive products the entertainment-software industry has to offer. Let's face it, though: Computer games are beginning to look like Sly Stallone movies. To quote comedian Jay Leno on *Rocky IV*, "He plays a boxer in this one . . . What range!"

The perpetual question of game buyers—"What's new?"—should be rephrased as "What's renewed?" Like the fourth sequel to a Hollywood hit, games are tending to look like more and more of the same.

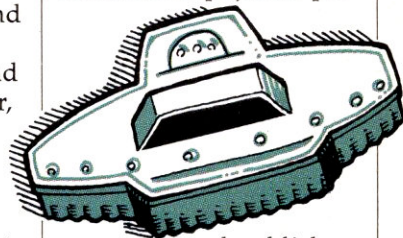
Sure, the graphics and sound are getting better, and so's the animation. And as the Apple IIGS gains acceptance, we can expect to see old favorites gussied up with more color and more sound. Converting old games to let them run on a new IIGS is like stuffing Ralph Kramden into a rented tuxedo, though. He looks different, but he's still the bus driver we all know and love.

The often-cited mission of game publishers is to tap into the mass entertainment market, to make computer games as popular and widespread as motion pictures. You know, *Saturday Night at the Monitor*. But, so far,

many firms are locked into the Friday the 13th syndrome, recycling and releasing yet another software Jason to stalk and slash wallets.

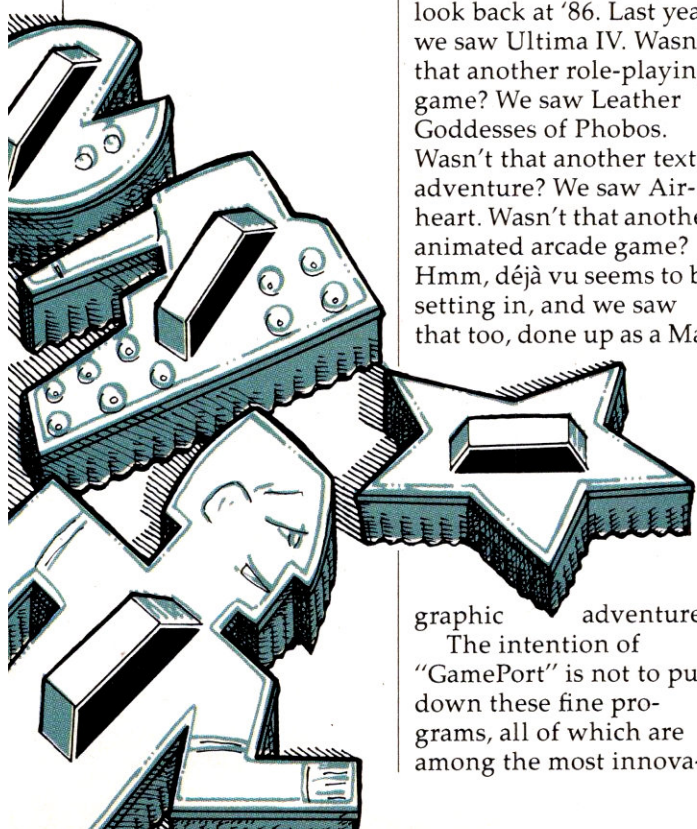
I have a lot of respect for software publishers. They are smart, innovative people. They are in love with and obsessed by computer games, many of them even more fanatically than you and me. They have brought entertainment software on a long journey since the days of *Breakout* and *Pong*.

The last mile is the longest, though, and too often the trek to a new form of computer entertainment stops just as pro-



grammers and publishers are about to step off the well-trodden path. So we get a bigger, splashier, longer, louder, multidisk version of a game that we liked the first time around and that we're expected to love the second, third, and fifth times.

I'm not saying that sequels are undesirable. The world will always have room for *Ultima 27*. Richard Garriott and a few others like him have taken game refinement to new heights over the years. I, for one, am not inclined to say no when



asked to annihilate space aliens in yet another shoot-'em-up. I enjoy reducing strange life-forms to stray molecules. I've seen *Close Encounters* five times and still don't think those little devils are cute.

Anyway, here's my New Year's message to programmers and publishers: Even if some of us can't say no to the latest incarnation of a proven entertainment formula, let's not get complacent in '87. "GamePort" is behind you 100%. All we ask is that you lead the way. Entertainment software can be much more than finding the object and solving the puzzle, much more than creaming hostile aliens or plotting the military destruction of Eastern Europe. Maybe it can even be an enriching experience.

STICK 'EM UP

Perhaps you thought that *Ultima IV* or *Phantasia* was the game player's ultimate quest. Sorry—the greatest challenge of them all is finding the right joystick. It may be just a piece of plastic and metal, but it can make the difference between high scores and satisfying game play or angrily dropping your Apple off the roof of a five-story building.

For Apple II series computers, CH Products has two solid models. The Mach II (\$44.95) has dual fire buttons, auto-centering, and true positioning modes as well as trim dials for fine-tuning joystick response. The Mach III (\$54.95) has all of those features and adds a fire button on the top of the joystick.

GET NASTY

Are you plagued by a Mr. Nice Guy image? Software critics and used-car salesmen don't usually have that problem, so I can't speak from experience, but if you need to crack that Pollyanna personality, here are a couple of opportunities.

Strategic Simulations' *Roadwar 2000*, designed by Jeffrey A. Johnson, takes place in a devastated USA following biological and nuclear warfare. In an effort to restore order, you assemble a gang of hoodlums, pillage the countryside for gas and auto parts, customize your own war wagons, and hit the interstates in search of loot.

As usual for SSI, strategic elements play a greater role than do graphics or fast action. In this Mad Max-like scenario, highway combat adds tactical strategy to the studs-and-chains role-playing. Break up a couple of highway gangs, raid the local supermarket, and pile up a cache of tires and gasoline. Then tell your real-life friends what you're doing in your spare time. It's just the thing to crush that cream-puff reputation.

How about a round of *Robot Rascals*? Electronic Arts is promoting Dan Bunten and Alan Watson's latest as one of the first family-oriented computer games, and that it is. A handicapping system allows two to four players—adults or children—to participate, and

neither group gets bored or baffled. What's more, it's cute for the kids without being cloying for the adults.

It's also a great way to make friendly enemies. Players draw cards representing items randomly hidden in a computerized landscape. Each player manipulates an on-screen robot that wanders the landscape in search of several items. You collect all the objects that appear on your item cards and return home to win the game.

Sound innocent? Well, I didn't mention that you can steal items from other players, force them to trade cards and hunt for new items, or even make off with another guy's stuff and ditch it into the lake, where he can't recover it. Talk about rude tactics.

Robot Rascals can provide the setting for a nice sociable evening (something *solitaire* computer games can't claim), or you can succumb to those killer instincts and get a rep as a real meanie.

And lest you get the idea that software publishers are a bunch of pussycats, I offer for your consideration *Sub Mission*, a new arcade/strategy game from *Mindscape*.

In this one, you engage in a submarine battle on a distant planet in order to save the lives of Sigourney and Peter. Don't run out of air supplies with Sigourney or Peter on board, though. If you do, the program will erase the character from the

diskette. Permanently.

A utility that comes with the program can resurrect the hapless victim, but only once. After that, who knows?

What's next? How about a program that sends an electric shock through the keyboard every time a player chooses the wrong item in a text adventure? You software publishers *do* realize I'm just kidding. Don't you?

REVIEWING THE REVIEWS

Variety? We have it in this month's review section: adventure, sports, a classic board game, and arcade strategy.

Programmer Steve Cartwright's *Hacker II*, Activision's sequel to the hit *Hacker*, creates its own world as players undertake a remote-controlled, *Mission Impossible*-type errand in deepest Siberia.

If you're into intellectual humiliation, play a few grueling rounds of chess with *Chessmaster 2000*, the latest computer-vs.-man challenger from Software Country.

It's a three-ring text adventure when Infocom attends a mysterious circus, in *Ballyhoo*.

Micro League Baseball combines dugout strategy and on-field graphics in a *Micro League Sports Association* simulation that's almost like watching the real thing on TV.

And wasn't there another one, too? Oh yes, I almost forgot. *Amnesia* from Electronic Arts is Campbell Award-winning science-fiction author Thomas M. Disch's entry into the world of interactive fiction. +



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Reviews

IDENTITY CRISIS

What would you do if you suddenly woke up one morning not knowing who you were, where you were, or how you'd gotten into that condition? And how would you handle it if your problems weren't just merely amnesiac: You quickly find out that a strange woman

wants to marry you, the state of Texas wants you for murder, and a strange man

is out to kill you. Well, put your thinking caps on, for this is the situation you face in the new all-text adventure game *Amnesia*, written by acclaimed science-fiction author Thomas M. Disch.

At the beginning of the game, you find out that you are in the (fictional) Hotel Sunderland in good old (nonfictional) New York City. In the course of playing *Amnesia*, you must travel the streets of the Big Apple, and an incredible display of programming lets you

go anywhere in New York, from Battery Park (the southernmost part of Manhattan) to as far north as 110th Street. That involves close to 4000 separate locations, including 650 streets. Now if that sounds amazing, how about this: In the course of your wanderings, you may also travel a virtually complete Manhattan subway system!

The game also keeps track of time as you play, so that at night stores close, muggers emerge, the evening news is televised, and you have to find someplace to sleep until morning. You also have to eat regularly, which brings up another

BALLYHOOD
Infocom

CHESSMASTER 2000
Software Country

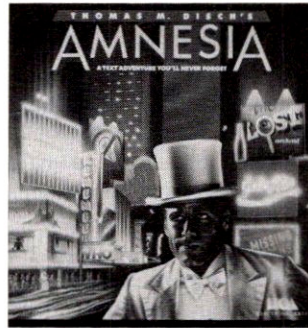
HACKER II
Activision, Inc.



sticky problem: finding money. Fortunately, you can solve this quandary in more than one way, but in the game (mirroring real life in New York), it's not easy.

The mystery evolves fairly logically, but chance meetings play a large part in its solution. I advise saving the game regularly. Toward the end, your options lessen, and you are constantly in grave danger. If at any point in the game you get killed, you must reboot the system and restore one of the three earlier positions you've saved on a separate disk.

The game also has a scoring system, awarding points for character de-



velopment, survival, and solving the mystery. The biggest mystery here is the point system; nowhere can you find out how many points are possible. Because of the sheer size of the game and the many options available in Manhattan, Amnesia has some replay value, if even just to better your score. But if you don't know

what numbers you are striving for, why try again?

The packaging has some neat extras: a street and subway guide to Manhattan, a visitors' guide to New York City, and a cross-street indicator of dubious helpfulness. Electronic Arts has also provided a manual that contains hints for some of the more difficult puzzles.

Heretofore, the text-adventure field has been dominated by the releases of another software publisher, Infocom. Amnesia, a first effort in this genre by both author Disch and software pub-

lisher Electronic Arts, represents an impressive debut.

Amnesia's text has a novel-like depth and development, and although the game-play system has some minor but irritating bugs, they will probably be worked out in future releases of the game. I hope to see more adventure games from both Disch and Electronic Arts in the future.

Donald Oliver

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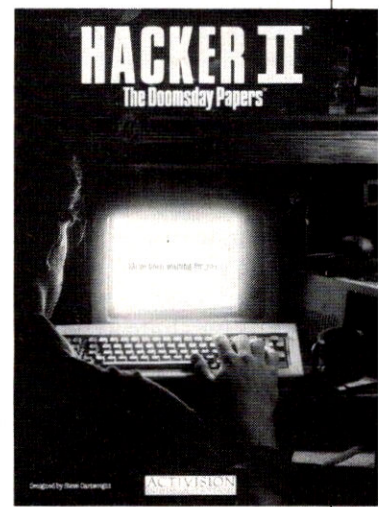
You're an innocent hacker, just logging onto one of your favorite electronic bulletin-board systems. Suddenly you seem to get a transmission malfunction. Another phone-line glitch? Not this time—it's the CIA! Its operatives want you to help them recover The Doomsday Papers. They feed you a line about national security and global destruction. The usual. Of course you agree with their assessment—you're the best man for the job, after all.

Little did you know what you were getting into. The CIA spooks have set up a satellite link to a military complex somewhere in Siberia and have sneaked three MRUs (mobile remote units) into the installation. Your job is to use the MRUs to breach the computerized security system and avoid the guard while you (1) discover the combination to the vault, (2) obtain the classified documents, and (3) deliver the documents to an agent waiting just outside the complex. All the while, the clock keeps ticking...

To accomplish this mission, you must become something of a video technician, because your main tools will be four video-output screens. You use the joystick to select any combination of security monitors, live cameras, videotapes of specific rooms, and your currently active MRU on a map of the complex. By making clever use of the videotape bypass system, you can temporarily render a particular security camera

inoperative. If you fail to synchronize videotape time with real time, however, you may find warning bells sounding, and the dreaded Annihilator will hunt down and destroy your helpless MRU.

So much for the scene. The game itself is very difficult. As with the original Hacker, you start the game with little information. Oh, you do get a highly technical manual, complete with front- and back-panel diagrams of the Multi-Function



Switching Matrix, some theory about Phnordman video matrices, and something about the Adaptive Differential Pulse Coded Modulation (ADPCM) circuitry. But you'll soon forget about all the tech-speak when you find yourself working with the matrix itself on the satellite uplink.

You must experiment with the display screens, observe the security monitors, and move with extreme caution. You must discover the tricks for success for yourself, and even if you know all of them, the game can be very hard to beat.

The program contains numerous subtle details. For instance, when you pause or fast-scan a video-

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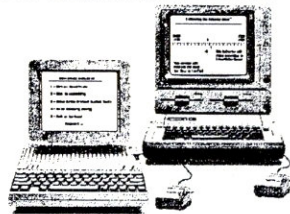
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tape, a telltale (and realistic) static line appears in the display. Also, when you first bring up a monitor, you must adjust the vertical hold to prevent picture roll. You can also select what each display screen will show, including which of the 40 security monitors is active on that screen. Finally, you can take direct control of the MRU. After you finish this job, you'll be able to qualify as a bona fide video technician.

Revealing any more details might defeat the mysterious purposes of the game. Suffice it to say that Hacker II is unique, difficult, hectic, and thoroughly challenging. Patience and perseverance—not to mention quick wits and devious thoughts—are appropriate attributes to take into Hacker II sessions. As a sequel to Hacker, Hacker II is more than successful, but it does not need to ride the coattails of its predecessor. It can stand alone as ideal entertainment for anyone who hasn't had enough challenge lately.

Rusel DeMaria

HACKER II
 Activision, Inc.
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LIST PRICE: \$39.95

REQUIRES: Apple II Plus, IIe, IIc, or IIgs

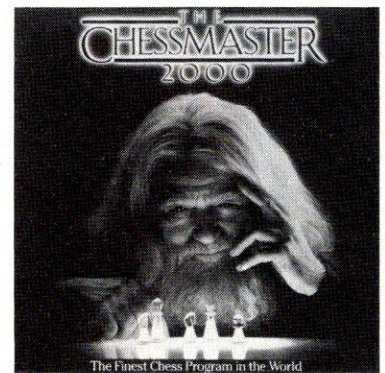
CIRCLE READER SERVICE NO. 386

CHESS AS YOU LIKE IT

Until lately, the standard for personal-computer chess programs has been Hayden's Sargon III. Chessmaster 2000, a program loaded with advanced features and

boasting superb color graphics, may change all that.

Chessmaster easily passes the first and most obvious test of any chess-playing program—playing chess well. It has 20 levels of competence (numbered 0 to 19), and at each level, Chessmaster's play is solid enough to prove a stiff challenge for any player. In the highest levels, the program uses advanced algorithms to



provide an almost unbeatable opponent for you. Take note: This program placed first in the USCF Open tournament personal-computer division. Playing mainframes and personal computers, it even vanquished a Cray I running Qube software.

You can modify Chessmaster's toughness by invoking the Coffeehouse feature, which switches the style of play from tournament-intense to coffeehouse-casual. In the latter mode, the program occasionally makes an obvious error.

To novices with tender egos I suggest setting the play level to 0 in the Coffeehouse mode. To further handicap the opposition, select the Easy mode, preventing Chessmaster from "thinking ahead" about the best moves to beat you.

Chessmaster is loaded

Interlude II

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You see, the map on the right only gets you to the outskirts of town. After that, you're on your own.

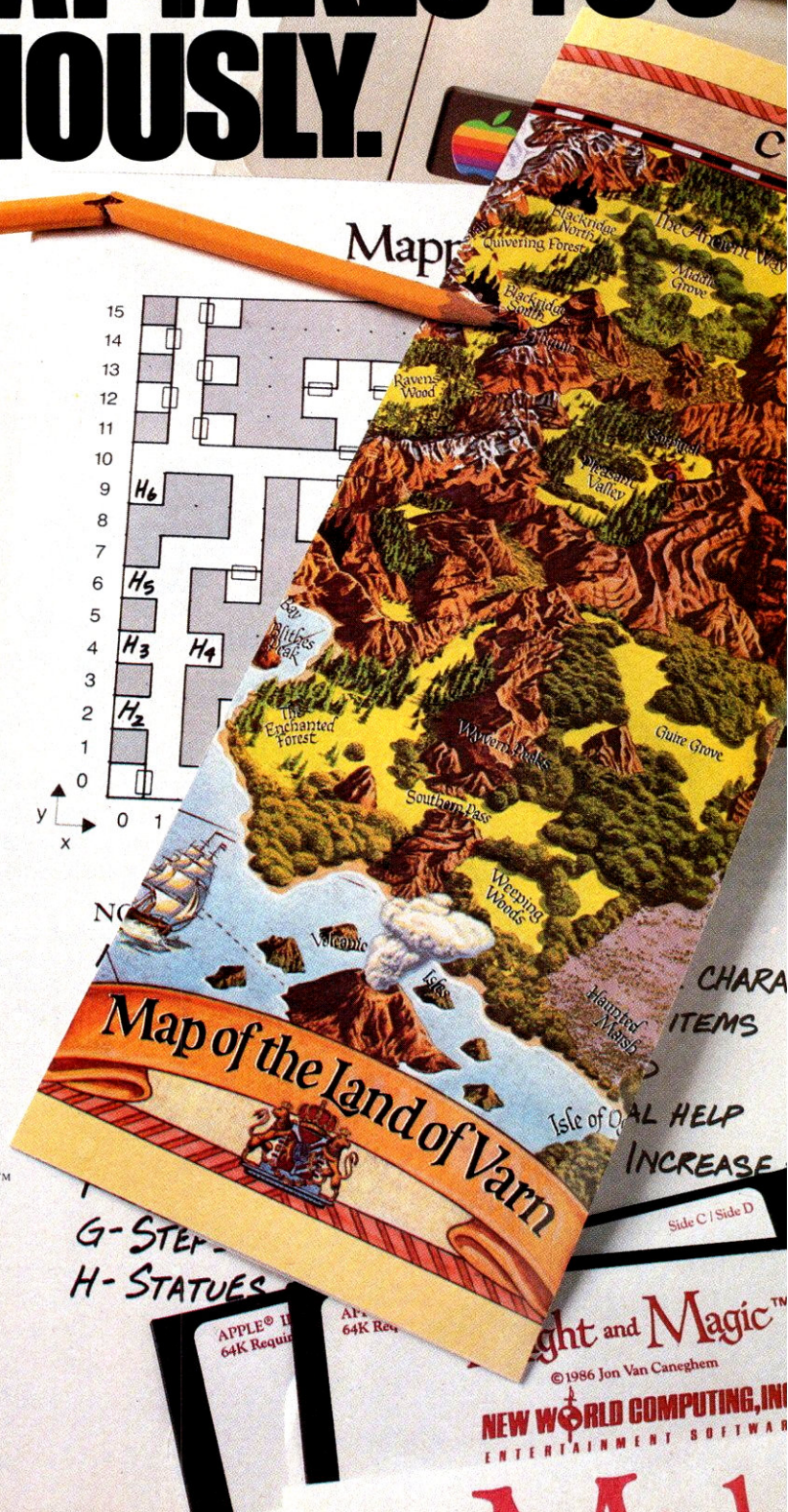
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CIRCLE 149 ON READER SERVICE CARD



with goodies that beginners will like. If you find yourself in the soup, a few taps of the left-arrow key will take you back as far as you like to the blunder that started all the trouble. The Teaching feature places marks on all squares into which a specific piece can move. Chessmaster can also give you hints on your next move.

Learners—and experienced players too—will enjoy the Chessmaster Think feature, which displays the possible moves as Chessmaster sorts them. Experienced players will find Chessmaster's library of 98 world-class grand-master games useful. You can observe the games, or you can intervene at any point to see how you would do in the situation the program is depicting.

If you are the kind of player who likes to sharpen your game by solving "chess problems," Chessmaster 2000 will prove an invaluable tool. The program lets you "edit" the board and set up any sort of situation. At the most competitive level of play, Chessmaster's opposition in solving any problem is convincingly realistic. In combination with problems from a good chess book or with grand-master games from newspapers or chess magazines, the editing feature may become Chessmaster 2000's chief selling point for serious players interested in improving their skills.

Matching the quality of play and the versatility of the program are its graphic beauty and ease of use. The color graphics allow the standard two-dimensional board repre-

sentation, as well as a striking three-dimensional view. You can rotate views whenever you want and switch from black to white pieces or vice versa.

The program is so simple to learn that you'll be able to operate most of its features without the aid of the manual. You can issue commands in any of the three most popular forms of notation, or you can move your pieces with a joystick. By toggling the Escape key, you can alternate from a view of the board to a listing of a game's moves. At the end of the game, you can print the entire game listing for a permanent record.

It all adds up to a program, written by true lovers of the game, that any serious chess player—or any beginner—will appreciate. Chessmaster opens this fascinating game to all, providing not only the competition that all players desire but the joy of the game as well. Is it the best personal-computer chess program ever? The answer is yes.

Brian Murphy

CHESSMASTER 2000

Software Country
Distributed by Electronic Arts
1820 Gateway Drive
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(415) 571-7171

LIST PRICE: \$39.95
REQUIRES: Apple II Plus, IIe, IIc, or IIgs; 64K RAM; one disk drive; joystick optional

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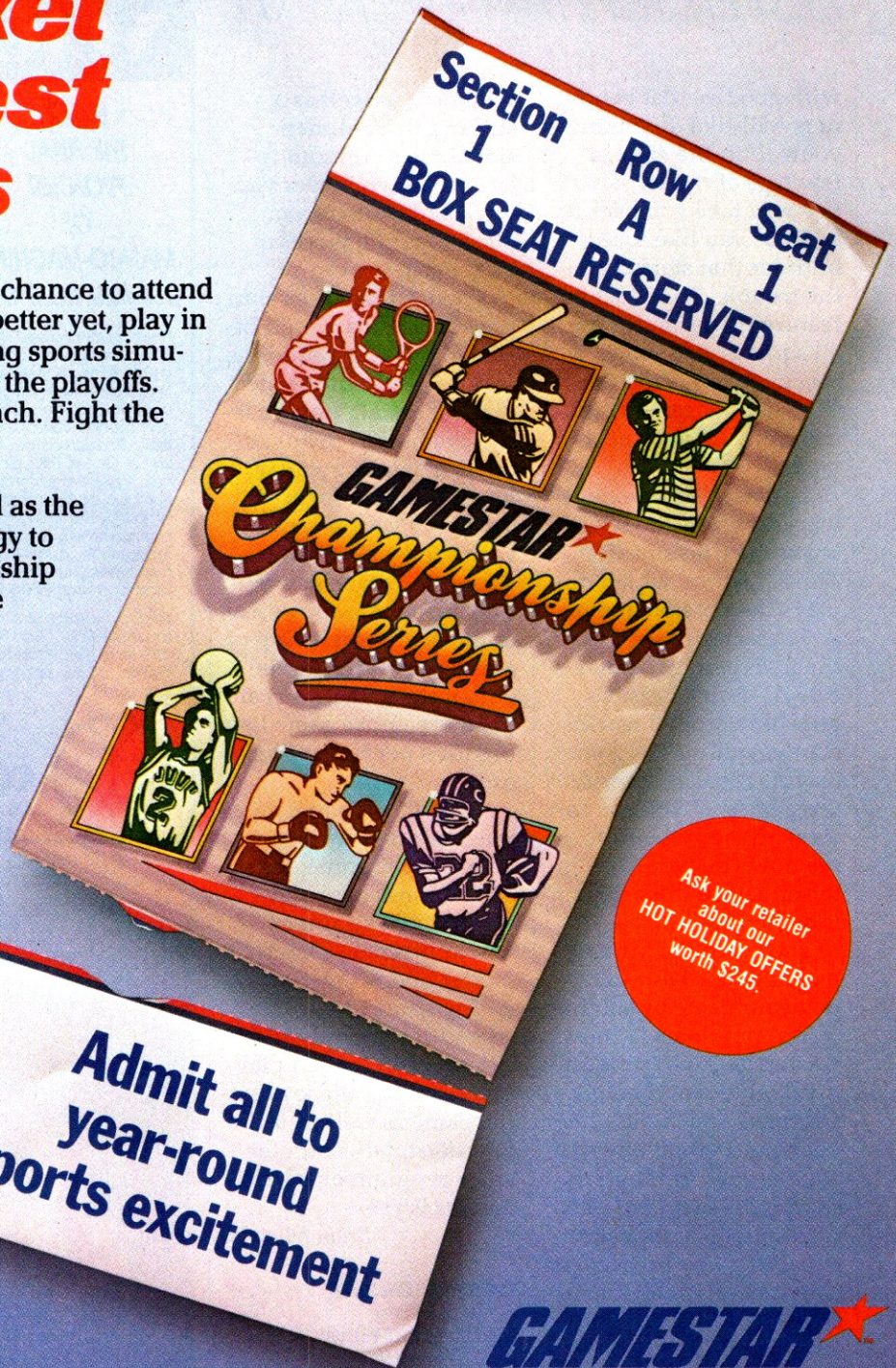
CIRCLE 116 ON READER SERVICE CARD

Your Ticket To The Best In Sports

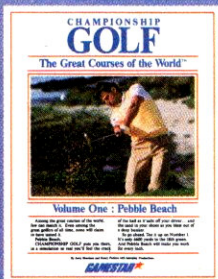
When was the last time you had the chance to attend a championship sporting event—or better yet, play in one? Gamestar's series of outstanding sports simulations gives you that chance. Make the playoffs. Play in the final round at Pebble Beach. Fight the heavyweight champ for the title.

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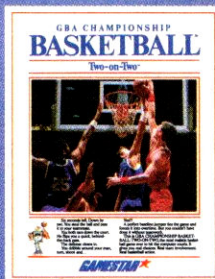
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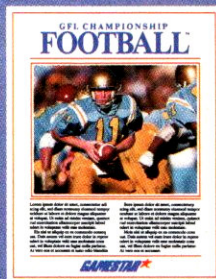
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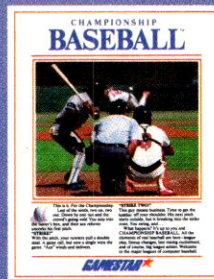
Available for IBM PC, PCjr and Tandy 1000, Commodore Amiga, and compatible computer systems. Coming soon for Apple II, Atari ST and compatible computer systems.



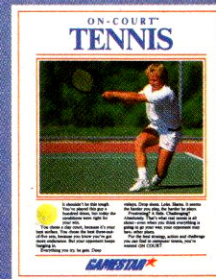
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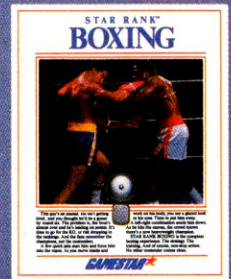
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Available for Commodore 64 and 128 computer systems.

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League Baseball promises to deliver innings of baseball mania for many seasons to come.

First of all, this is no silly hand/eye, joystick, slap-the-ball kids' game. No sir. You're the manager of a major-league team with real players, real stats, and honest-to-goodness strategies to follow. It's heads up or your opponent will knock your cleats off.

Here's how: Micro League Baseball contains 25 terrific teams, most (as you will see) picked at their prime. Teams such as the '27 Yankees with Ruth and Gehrig and the '61 Yankees with Maris and Mantle. How about the "Big Red Machine" Cincinnati Reds of '75 with Johnny Bench and Pete Rose? There're Charlie Finley's mean-looking '73 Oakland Athletics and the '55 Brooklyn Dodgers, whose 42 Duke Snider home runs blasted in 136 runs! And, just for laughs

of first place.

You'll also find dream teams comprising American and National League All-Time Greats, (Ted Williams, '41; Yogie Berra, '50; Catfish Hunter, '73. Get the picture?). You also get the Philadelphia Phillies All-Time Greats (Pete Rose, '80; Steve Carlton, '72; Tony Gonzales, '66. Remember?) And, finally, the Detroit Tigers All-Time Greats.

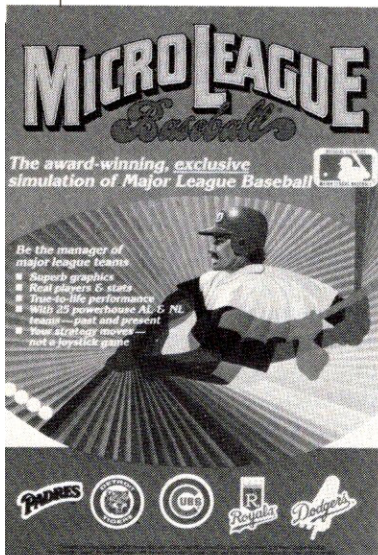
To bring the dream teams up to date, you also have access to the American and National League 1984 All-Star Teams.

Start your afternoon in the sunshine by choosing which two teams you'd like to take the field. You can manage both teams or just one of them, playing against the computer. Or (if you feel like putting your feet up and having a hot dog) you can have your Apple manage both teams and watch them slug it out without lifting a finger (or a bat).

Next you select whether or not you want this contest to be a designated-hitter game. The computer moves on to show you the pitching rosters, batting lineups, and fielding positions for both teams. As the manager, you'll be able to make changes or alterations in these lineups.

And now the fun begins. You're at bat and you have to determine your strategy. You might just swing away or try to beat out a surprise bunt for a hit. With runners already on base, you have the option of calling for aggressive or safe base-running, base stealing, a hit and run, or a sacrifice bunt.

With your team in the field, you have a variety



(or perhaps tears), you'll find the lovable '55 Washington Senators, the perennial cellar dwellers, in the year they finished dead last—43 games out

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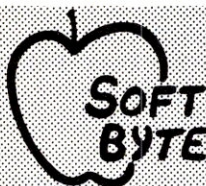
You keep it up to date by simply adding the latest winner each week, and you can produce hard copies on any printer if you so desire. This program will cut those big odds down to size and may even pay for your computer (or your house).

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of defensive strategies. You can throw a fastball, curveball, slider, or off-speed change-up; throw a pitchout when you sense that the baserunner may be about to steal; bring your first and third basemen or all the infielders in to hold the runners to their bases; or even issue an intentional walk (like when the Babe comes to bat with the bases loaded!). Remember that this game is not hand/eye and joystick coordinated. The players and teams behave just as they do (or did) in real life, based on stats about them that the computer has stored.

You have instant access to all the stats about both teams' players during the game, so you can stop at any point and review batting averages, home runs, and RBIs or take a look at hits, strikes, walks, and stolen bases for the season. For pitchers you'll see wins and losses, ERAs, innings pitched, hits given up, saves, walks, and strikes. For true baseball maniacs, these batting and pitching stats alone will be endlessly fascinating.

And finally, for baseball addicts, *additional* team disks are available from the Micro League Sports Association, including all 26 NL and AL teams of '83 or '84, the World Series teams from 1960, or the last ten years of any particular team franchise. You might even want to become a general manager/owner and begin making trades, drafting players, and creating your own team.

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Peter Tucker

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HAVE I STAYED TOO LONG AT THE FAIR?

When any theatrical performance is over, a curtain (either real or symbolic) descends, and the audience leaves the theater chattering about the experience they have just shared. Unbeknownst to most of them, the curtain rises again a few moments later, and a single work light at center stage often makes the performance space, once full of magic and illusion, look cold and harsh. Although this scene is not for public consumption, in every theater I have ever been in, someone always stays to look.

This phenomenon forms the basis of Infocom's new all-text interactive-fiction/adventure game *Ballyhoo*. In *Ballyhoo* you have just attended a showing of *The Circus That Time Forgot*, and you linger behind the departing crowd. As soon as you realize that no one is watching you, you begin exploring the circus. And just as in the case of curiosity and the cat, poking your nose where you're not supposed to can lead to disturbing complications.

While hiding in the prop tent, you stumble on a mystery: The circus owner's little daughter, Chelsea, has been kidnapped, and the investigation is in the hands of an incompetent detec-

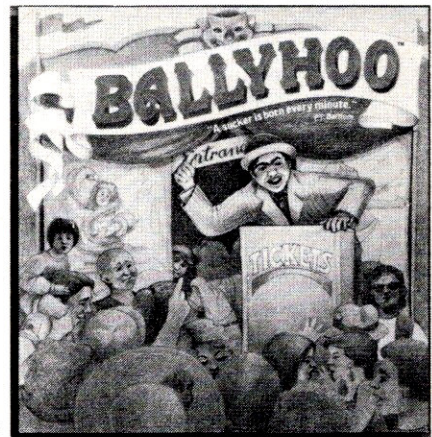
tive. Being a Good Samaritan, you take it upon yourself to find and rescue the girl.

While on the trail, you have to perform various circus stunts. Now who has never fantasized about doing circus stunts? Well, get yourself ready, because in *Ballyhoo* you will have to tame two ferocious lions and walk a high-wire tightrope not once, but *twice*—without a safety net!

You also have the opportunity to fraternize with many of the colorful circus folk and animals, a seemingly safer (but still potentially perilous) activity. On the human end, there's Mr. Munrab himself, the circus owner; Harry, the talkative guard; Tina, the fat lady in the sideshow; Rimshaw, the hypnotist; Comrade Tom Thumb, the midget; Chuckles, the clown; and even the bizarre Andrew/Jenny, half-man, half-woman. As for the menagerie, *Ballyhoo's* circus has Hannibal, the elephant who scares easily, and Mahler, the gorilla who has seen too many King Kong movies.

Uncovering the underside of show business can be a mind-expanding experience for those of you who have had little exposure to backstage life. The performers who work so well together onstage are less than friendly offstage—as befits a mystery story, you will find among them the expected melange of jealousies, intrigue, and back stabbing.

Ballyhoo is a puzzle-oriented mystery game. It has a basically linear structure, and as is cus-



tomary for the genre, it makes you solve certain problems in a specific sequence in order to move on with the story.

Ballyhoo's writer, Jeff O'Neill, has made a promising start with this, his first game. To my over-critical eye, however, the motives behind the main story could have been more consistent, and some of the loose ends could have been tied up. An example of the latter involves one of the subsidiary characters, a roustabout (laborer). Through your exploring, you find out that he lives in a cage in the menagerie, but you never find out why!

Despite my quibbles, *Ballyhoo* is another entertaining feather in Infocom's already highly decorated cap. It is a particularly good introductory game for novice adventurers or for anyone who wonders what the circus is like after the curtain comes down.

Donald Oliver

BALLYHOO

Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
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REQUIRES: Apple II Plus, IIe, IIc, or IIgs; 48K RAM

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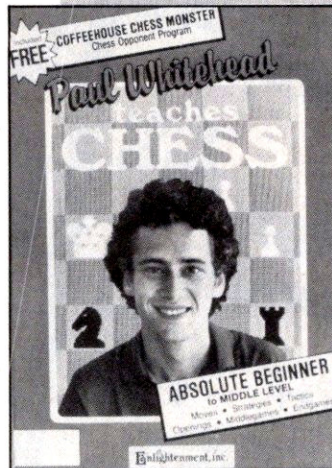
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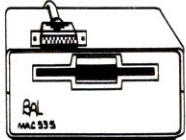
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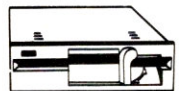
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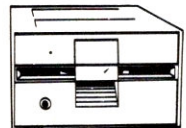
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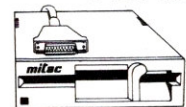
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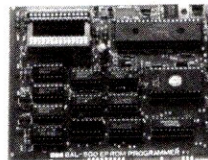
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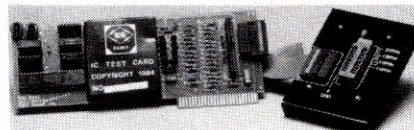
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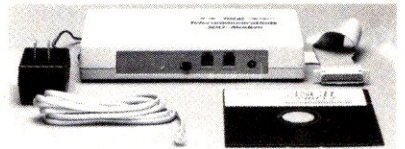
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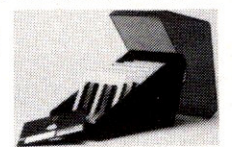
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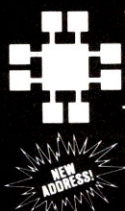
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Will you weigh in with a winning program?

Here's a puzzle you may have seen elsewhere. You may be able to figure it out with good old-fashioned logic, but can you teach your computer to think logically?

I have 12 coins and a balance scale, for which I have no weights. The coins all *look* and *feel* identical, but I know that one of them is counterfeit. It is either marginally lighter or heavier than any of the other coins. All I am permitted to do is put some of the coins into one of the pans in the balance and some into the other. What is the minimum number of weighings that will allow me to determine the counterfeit coin, and what specifically are those weighings?

Send a complete program that solves the puzzle. If you send a disk, please also enclose hard copy, including output and running time. Your programs must be short (you can see approximately *how* short by the listing of this month's winner), elegant, and self-documenting. The best solution wins a one-year subscription to *A+* and a Certificate of Excellence in Programming and will be published here.

Please send all entries, which must be received by January 9, 1987, to Computer Calisthenics, Box 2329, Stanford, CA 94305. 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 April 1987 *A+*.

Answer to October's Puzzle

October's puzzle requests a program that finds valid three-item addition problems that use all of



the digits from 1 to 9 once each, each of the form $a+b=c$, such as, for example, $128+367=495$ and $276+318=594$. Since there are many approaches to this problem, the fastest-executing program *with the best documentation* is probably the best.

Determining which program was actually fastest was difficult, however, because entrants used various programming languages, running on various computers. Comparing BASIC (an interpreted language) with Pascal and C (compiled languages) is, in a way, a bit like comparing oranges and apples (get it?).

Execution speeds ranged from less than two seconds for an assembly-language program to literally hours. Although James Kuzeja, of Billerica, Massachusetts, submitted the program that was the fastest and one of the best documented, I can't very well reprint his nine-page 6502 assembler listing here.

Laura Weathers, of New Windsor, New York, gets October's prize for her TurboPascal program (running under CP/M), which executes in less than a minute and a half, printing out all of the 168 solutions to the problem.

Many solutions printed out twice as many iterations, but half should have been eliminated, because, for example, $318+249=567$ is the same set of numbers as $249+318=567$. Laura's program, representing the three items as *A*, *B*, and *C*, specifies that *A* must always be less than *B* (in the statement *IF* ($C < 988$) *AND* ($A < B$) ...). This bit of cleverness ensures that only one set of each two possibilities is produced, since *A* never exceeds 497, the number produced when 987, the largest number that fits the qualifications, is divided

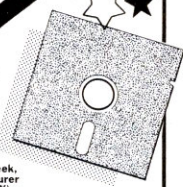
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by 2 (and rounded up).

The program examines only trip-lets because a second's examination shows that one four-digit number plus one single-digit number producing another four-digit number leaves at least the digits in the thousands and hundreds positions untouched. The only other possibility is 2, 3, 4, which has to put a 0 in the

hundreds' place. (The highest set to fit the rules is $65 + 987 = 1052$.)

In Weathers' program, *I1* through *I6* are the digits of *A* and *B*, and *J1*, *J2*, and *J3* are the digits of *C*. The Boolean array *USED* specifies if certain digits have been found in *A* and *B*, and later in *C*. *USED[0]* is always true, because 0 is not a permissible digit. +

OCTOBER'S WINNER: Laura Weathers

```
VAR
K,
A,B,C,
I1,I2,I3,I4,
I5,I6,J1,J2,J3:INTEGER;
USED:ARRAY [0..9] OF BOOLEAN;
BEGIN
FOR I1:=1 TO 9 DO { Initialize USED array }
  USED[I1]:=false;
USED[0]:=true;
K:= 0; { number of solutions }
WRITELN(LST,'Solutions are:');
```

```
FOR I1:=1 TO 4 DO { first digit of the first number }
  IF USED[I1]=false then { use this number else loop back }
  BEGIN
  USED[I1]:=true; { this number is not available }
  FOR I2:=1 TO 9 DO { second digit of the first number }
    IF USED[I2]=false then
```

```
  BEGIN
  USED[I2]:=true;
  FOR I3:=1 TO 9 DO
    IF USED[I3]=false then
    BEGIN
    USED[I3]:=true;
    FOR I5:=1 TO 9 DO
      IF USED[I5]=false then
      BEGIN
      USED[I5]:=true;
      FOR I6:=1 TO 9 DO
        IF USED[I6]=false then
        BEGIN
        USED[I6]:=true;
```

```
A:=(I1 * 100) + (I2 * 10) + I3;
B:=(I4 * 100) + (I5 * 10) + I6;
C:=A + B;
```

```
IF (C < 988) AND (A < B) then
BEGIN (C is small enough and dups are filtered out)
J1:=C DIV 100;
J2:=(C - (J1 * 100)) DIV 10;
J3:=(C - (J1 * 100)) MOD 10;
```

```
IF USED[J1]=false then
BEGIN
USED[J1]:=true;
IF USED[J2]=false then
BEGIN
USED[J2]:=true;
IF USED[J3]=false then {we have a solution}
```

```
  BEGIN
  WRITELN(LST,A,' + ',B,' = ',C);
  K:=K+1;
  END;
  USED[J2]:=false;
  END;
  USED[J1]:=false;
  END;
  END; { end if (C<988) and (A<B) }
  USED[I6]:=false;
```

```
  END;
  USED[I5]:=false;
  END;
  USED[I4]:=false;
  END;
  USED[I3]:=false;
  END;
  USED[I2]:=false;
  END;
  USED[I1]:=false;
  END;
WRITELN(LST);
WRITELN(LST,'There were ',K,' unique solutions');
END.
```

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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 (include #/expir) & P.O.'s. For fast delivery send Cashier's/Certified check/Money Order. C.O.D. (add \$6) & personal checks accepted (allow 16 days). Tex res add 6 1/8% tax.

Checkmate Technology's **MultiRam CX** card easily expands your IIc to 640k and has a **CX+ Piggyback** to add another 512k (over 1152k total)! It's 100% compatible with all IIc software/hardware & upgradable with a 65C816 kit (\$105) to likely run new technology software — all using about 50% less power than Z-RAM! It has the **SAME FREE SOFTWARE, FREE UPDATES & 5 YR WARRANTY AS IIe CARDS**. For a limited time, buy a IIc System Clock for \$50 w/ 512k or larger card.

| | |
|--|-------------|
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| 1024k MULTIRAM CX Combo | 354. |
| 256k MULTIRAM CX+ | 210. |
| 512k MULTIRAM CX+ | 222. |
| 1200 Baud IIc Modem (+\$20/cable) | 159. |
| Clip-on IIc Rechargeable Battery | 129. |
| IIc Flat Panel Display (W O W !) | 299. |
| IIc System Clock (w/ 512k+ card) | 50. |

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Unfortunately, you don't find that out until it's too late. Unless, of course, if you buy from us.

Every program that we sell comes with a personal tutor. We are trained experts in educational software. We majored in the subject. And we won't sell you anything until we're sold on it ourselves.

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Not only will you get an education, but you'll get your pick of software that's the head of its class. Curriculum-based, problem-solving and administrative software that earns high marks with teachers and students.

Mindscape/Scott, Foresman software covers the subjects of math, reading and social studies for kindergarten through 8th grade. The use of graphics, animation and puzzles makes humdrum subjects really hum. The programs encourage group discussion and research. The packages

come packed with a teacher's guide and classroom ideas.

Harding & Harris are specialists in developing IEP software. Their Automated IEP lets teachers concentrate more on their students than on their IEP's. This program displays rules, policies or regulations right on the computer screen. You have your choice of using existing goals or selecting from pre-made goal banks for Communicative Disorders, Physical Therapy, Daily Living Skills and more.

Courses By Computers are publishers of comprehensive math curriculum software covering Kindergarten through 4th grades as well as all high school math and algebra. The CBC software comes with many teacher support tools and student workbooks. CBC gives you the option of purchasing a management system that makes diagnostic/prescription teaching as easy as ABC.

American Guidance Service has created a six-diskette series designed to help students from preschool and up understand and apply language concepts and develop vital problem-solving skills. Each program taps a different thinking process using three very original games. Players accompany SOC, an adventurous computer whiz around the world, learning logical thinking skills as they go.

Addison-Wesley are designers of curriculum-based software that covers life science, calculus and algebra for 7th graders and up. The programs can be used to support Addison-Wesley text or can be used to supplement other books on life science and calculus. These programs are top of their class because they're easy for students to use without much teacher supervision.

To find out more information about these exciting programs, call one of us listed below in your local area. We guarantee you'll get nothing but the best software. And it will definitely be an educational experience.

ABC School Supply, Norcross, GA (404) 447-5000
Audio Fidelity, Richmond, VA (804) 285-8781
Berta-Max, Seattle, WA (206) 547-4056
Canada Soft, Toronto, Ontario, CANADA (416) 869-1872
Center for Creative Leadership, Charleston, WV (304) 345-1620
Colborn School Supplies, Denver, CO (303) 778-1220
Computer Express, Fairbanks, AK (907) 479-4098
E.I.S.I., Los Altos, CA (415) 969-5212
Fas-Track, Columbus, OH (614) 471-9620
Film Services of Hawaii, Honolulu, HI (808) 834-7628
J.L. Hammett Company, Braintree, MA (617) 848-1000
Hart, Inc., Asheville, NC (704) 645-4734

J.R. Holcomb Company, Cleveland, OH (216) 341-3000
Kurtz Brothers, Clearfield, PA (814) 765-6561
J.S. Latta, Cedar Falls, IA (319) 266-3501
J.S. Latta, Inc., Huntington, WV (304) 523-9433
Learning Lab, Northridge, CA (818) 701-9438
Pyramid School Products, Tampa, FL (813) 621-6446
Regency Educational Systems, Inc., Dallas, TX (214) 931-5787
Statewide Teaching Aids, Alexandria, LA (318) 445-2572
Stone's Southern School Supply, Raleigh, NC (919) 821-7210
Strider Computers, British Columbia, CANADA (604) 594-5422
Thompson Book & Supply, Oklahoma City, OK (405) 478-3963
Tools That Teach, Seal Beach, CA (213) 596-2504

TIPS AND TECHNIQUES

Readers share tips for the II

Welcome to the new "Tips and Techniques" section, which will contain tips concerning the Apple II Plus, IIe, IIC, IIGS, and IIw (that stands for *whatever*). For the first few months, we will be using a sampling of tips adapted from Bert Kersey and Bill Sanders' *The Big Tip Book for the Apple II Series* (Bantam Books, 1986). We are looking for:

- ingenious routines
- practical tips on such topics as connecting an on/off switch to the IIe's speaker (see SILENT NIGHT in this month's column)
- insignificant tricks such as TWO-LINER CODE
- one-liners such as ONE LINER CURVE
- two-liners such as CHIP CHIRP
- three-liners (for all of you Apple III users)
- Easter eggs (unusual commands embedded inside a program that cause secret messages to appear)
- warnings
- whatever you feel might be useful or fun for other readers

Put it in a poem; make it exotic, weird, or witty—but keep it simple,

short, and easy to understand. Mail your Apple II tips to

A+ magazine
Attn: Tips and Techniques
11 Davis Drive
Belmont, CA 94002

If we publish your tip in this column, you'll receive credit, and we'll pay you \$2500 (that typo got your attention—it should be \$25.00).

OUR FAVORITE TYPOS

OK. YOU LIAR, YOU RUB ME THE WRONG WAY AND IT WILL BE YOUR RUIN. CAN YOU LSIT THE COMMON APPLESOFT COMMAND TYPOS IN THIS SENTENCE?

ONE-LINER CURVE

Not only can you get color from black and white, but we found a way for you to makes curves out of straight lines:

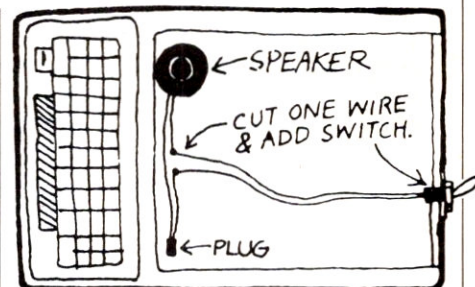
```
20 HGR : HOME : FOR C = 1 TO 6: VTAB 22:
  HTAB 18: PRINT "COLOR ";C: HCOLOR= C:
  FOR X = 1 TO 93: HPLLOT 2 * X + 50,0 TO 3
  * X,191: NEXT: NEXT
```

CHIP CHIRP

Your cat will go crazy when you play this one:

```
10 FOR X = 0 TO 17: READ A: POKE 12345 +
  X,A: NEXT : DATA 173, 48, 192, 136, 208,
  4, 198, 0, 240, 7, 202, 208, 246, 166,
  0, 208, 239, 96
20 N = RND (1) * 6:R = 1 + RND (1) * 66:
  FOR X = 1 TO N: POKE 0,R: CALL 12345:
  NEXT : GOTO 20
```

Try changing N and R to constants. It's all kinds of fun!



Silent-night switch

SILENT NIGHT

Around 2:00 A.M., a Control-G can sound like an air-raid siren. And sometimes, even on Saturday afternoon, a little silence is nice. It's a simple thing to put a switch on your Apple speaker. Just cut one of the speaker wires and run new wires to a toggle switch (see figure above).

TWO-LINER CODE

```
1 GOTO 2" + TO = = POS ABS
  AT OR ABS + TO OR OR -
  FRE AT SGN INT TO SGN POS
  PLOT TO = = ^ AT - - PLOT
  STORE ABS + AT + AT TO SGN
  ABS FN AT TO ABS > NOT
  TO = = ^ AT SPEED= PLOT NOT
  > SGN AT FRE AT SGN !"
```

```
2 HOME : FOR L = 2056 TO 2121:
  PRINT CHR$ ( PEEK ( L));; NEXT
```

Pipeline

NO-SLOT CLOCK

The No-Slot Clock is a clock/calendar add-on board for the IIe that connects to the computer via the 28-pin socket for the CD ROM chip. Users remove the CD ROM chip, replace it with the No-Slot Clock, and then place the CD ROM chip over the add-on board. An accompanying utility disk offers support for DOS 3.3 and ProDOS. The product stamps ProDOS programs automatically with the time and date and also works with programs that actively search for and/or display time and date. (List Price: \$75)

Requires: Apple IIe
Systems Manufacturing
Technology (SMT)
1145 Linda Vista Drive
San Marcos, CA 92069
(800) 648-6262

In CA (619) 744-3590

CIRCLE READER SERVICE NO. 500

KACHE BOARD

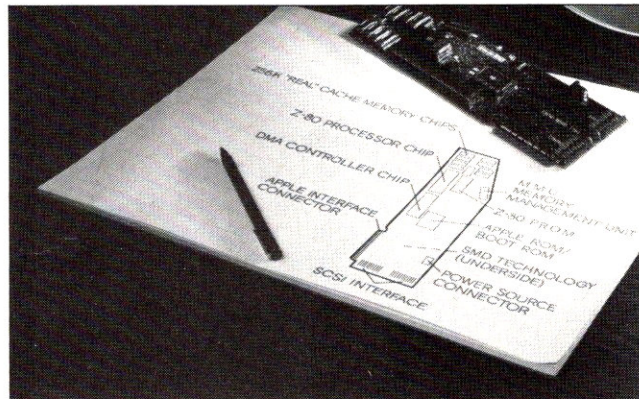
The Kache Board is an intelligent DMA (direct-memory access) hard-disk controller board for Apple computers that increases hard-disk-access speeds by 25-30%. The board contains a Z80 microprocessor that manages the operation of the cache-memory buffers, automatically filling cache memory with up to 256K of most frequently accessed data. The Z80 also maintains the cache's data content, saves data as

changes are made, and directs data transfer to and from the cache. Offering a performance superior to that of a RAMdisk, the Kache Board comes with an external power source and all necessary cabling. (List Price: \$395)

Requires: Apple II Plus or IIe

Ohio Kache Systems Corp.
4166 Little York Road
Dayton, OH 45414-2566
(800) 338-0050
(513) 890-3913

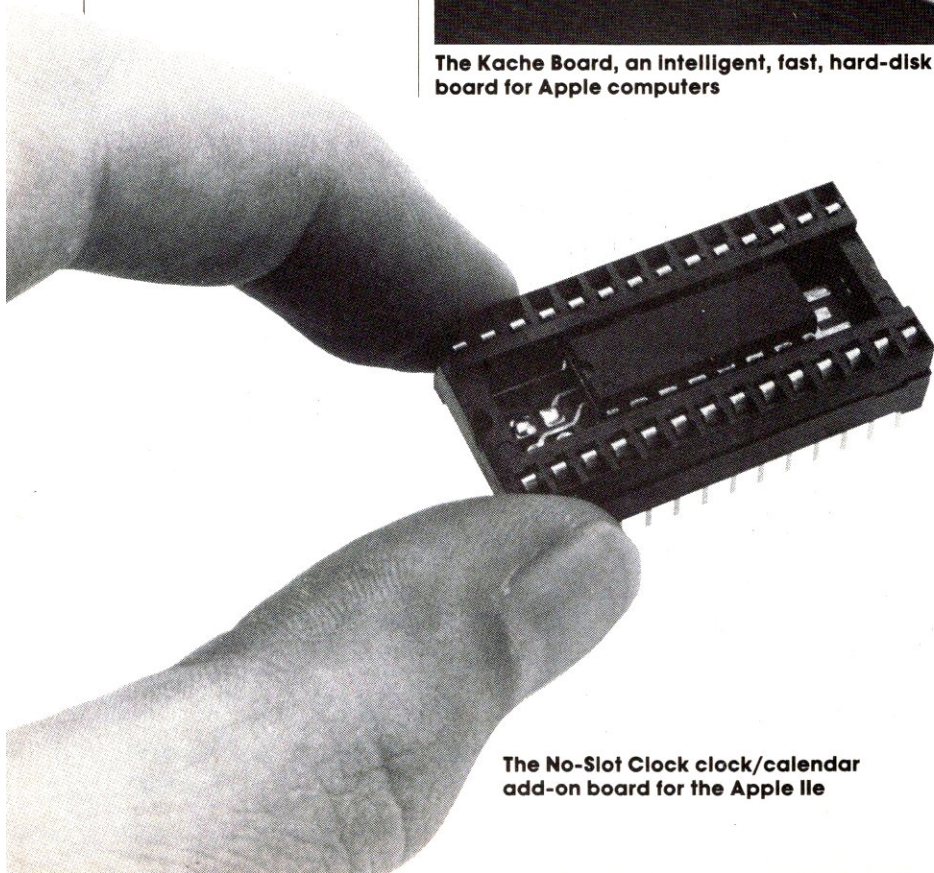
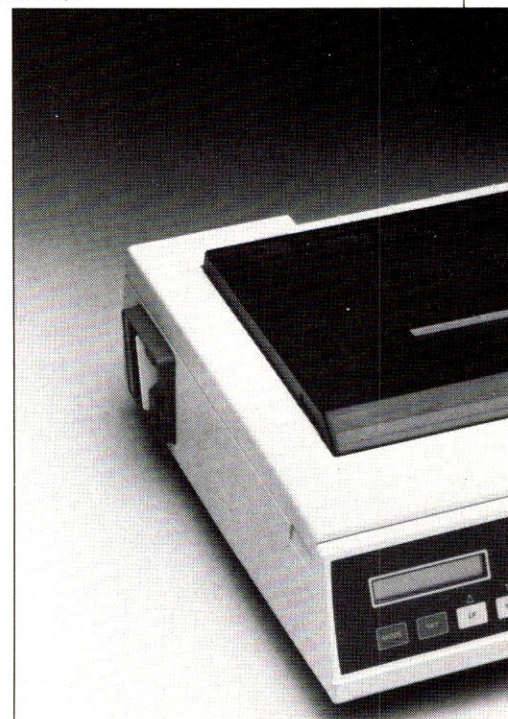
CIRCLE READER SERVICE NO. 501



The Kache Board, an intelligent, fast, hard-disk controller board for Apple computers

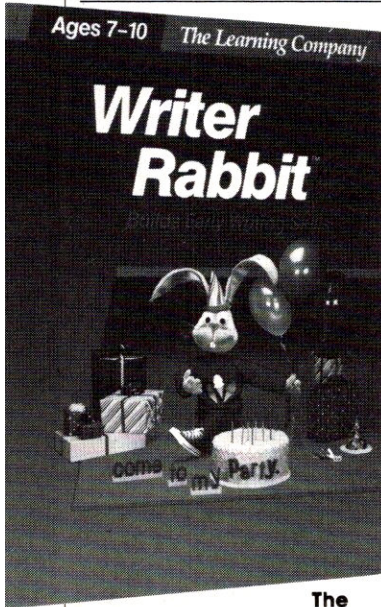
PROWRITER C-715 RELIANT PRINTER

A high-speed, seven-color, 24-pin dot-matrix printer, the ProWriter C-715 Reliant prints up to 300 cps in draft mode and 100 cps in letter-quality mode. Plug-in, credit-card-size identity cards enable the printer to emulate most other popular printers. Users can select a variety of print features by pressing a button on the printer's front control panel; selected modes are displayed on a 16-digit LCD. Other features of the printer include a quiet mode, proportional printing, automatic paper loading, push-pull tractor or bottom feed, both Centronics parallel and RS-232C serial interfaces, and a 32K buffer. In addition, the printer can load cut-sheet paper automatically and provides a hex dump and interpretation



The No-Slot Clock clock/calendar add-on board for the Apple IIe

of the dump for debugging. (List Price: \$1295)
 C. Itoh Digital Products
 19750 S. Vermont Avenue
 Suite 220
 Torrance, CA 90502
 (800) 423-0300
 (213) 327-2110
 CIRCLE READER SERVICE NO. 502



The Learning Company's Writer Rabbit helps to develop children's writing skills.

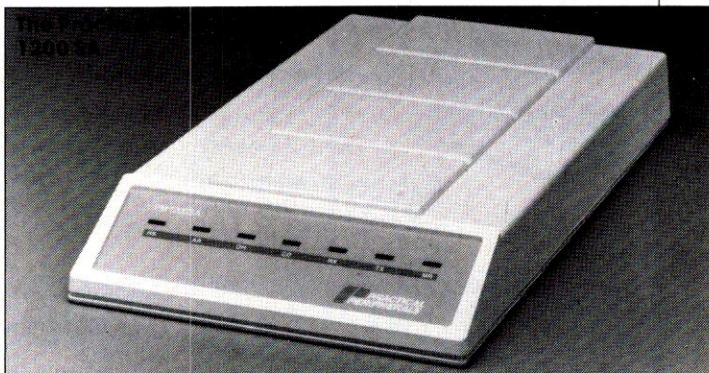
WRITER RABBIT

The second program in The Learning Company's educational-software line that focuses on basic skills, Writer Rabbit builds on the approach used in the first program, Reader Rabbit, which teaches reading and spelling. Intended for children ages 7 to 10, Writer Rabbit teaches the fundamentals of recognizing and writing good sentences, paragraphs, stories, and letters. In the program, the animated character Writer Rabbit guides children through six games that teach them how to recognize and use simple sentence parts. Users can control the program's content and level of difficulty, and the program has a Tracking feature for monitoring children's progress. The program is available in a version for home use and as a School Edition,

which includes a backup disk; a teachers' guide with lesson plans, a scope, and a sequence chart; and student activities. (List Price: \$39.95; School Edition, \$54.95)
Requires: Apple II Plus, IIe, IIc, or IIGs; 64K RAM
 The Learning Company
 545 Middlefield Road
 Suite 170
 Menlo Park, CA 94025
 (415) 328-5410
 CIRCLE READER SERVICE NO. 503

configuration, pulse or tone dialing, and a volume-controlled speaker. Two modular jacks accommodate voice and data calls, and indicator lamps show the modem's status. The unit measures about 10½ × 5½ × 1½ inches and comes with an 8.5-volt plug-in power adapter, and a data-interface cable.

The modem can also be upgraded with the Practi-

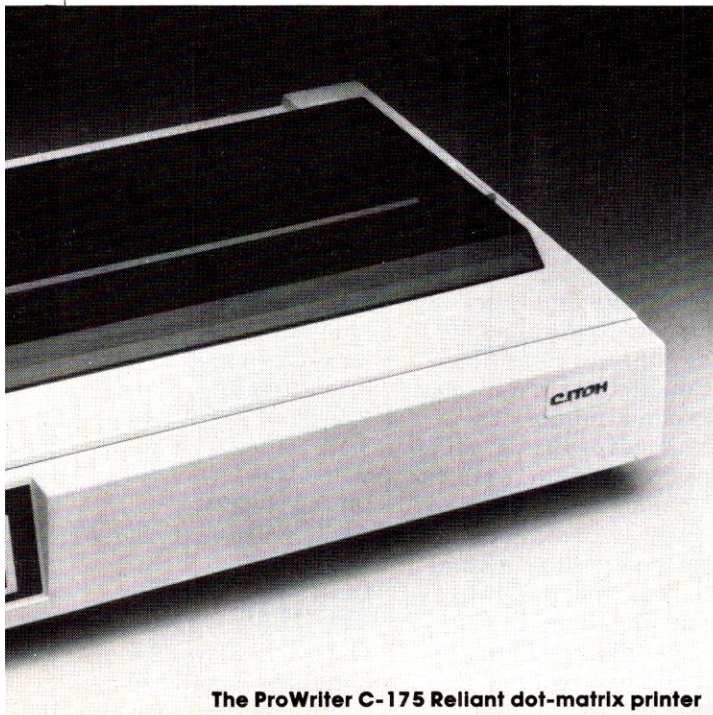


PRACTICAL MODEM 1200 SA

A stand-alone 1200- or 300-bps modem, the Practical Modem 1200 SA is fully Hayes-compatible, includes auto-dial/auto-answer, and works with most communications software. Features of the modem include semipermanent storage of up to ten telephone numbers, menu-driven

cal Communication Microbuffer, a plug-in module programmable in BASIC. (List Price: PM 1200 SA, \$239; Practical Communication Microbuffer, less than \$200)
 Practical Peripherals
 31245 La Baya Drive
 Westlake Village, CA
 91362

(818) 991-8200
 CIRCLE READER SERVICE NO. 504



The ProWriter C-175 Reliant dot-matrix printer

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A new product in Electronic Specialists' computer-protection line, the Modem/Power/Static Pac provides a complete protection package for traveling portable computers. The package



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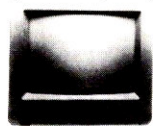


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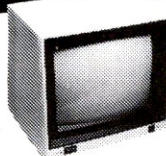
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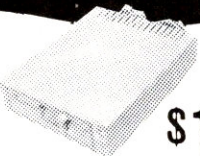
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6870 Shingle Crk. Pkwy
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Minneapolis, MN 55430

Pipeline

combines broadband AC power filtering, extended-range spike suppression, modem RF filtering, modem spike suppression, and a static discharge plate. The product comes with a six-foot power cord, a three-prong outlet, and a CEE-22 universal portable-computer power connector. (List Price: \$184.95)

Electronic Specialists, Inc.
171 South Main Street
Natick, MA 01760
(800) 225-4876
(617) 655-1532

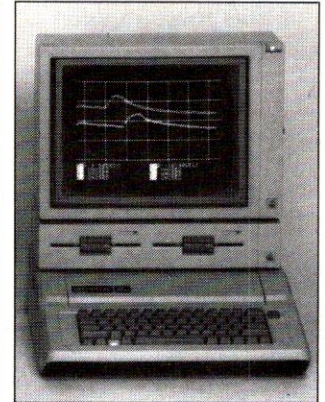
CIRCLE READER SERVICE NO. 505

HARDWARE

OMNISENSE

The Omnisense and Omnisense-Plus workstations from Interactive Microware are microcomputer-based, auto-ranging, auto-calibrating, multichannel data loggers and monitors. The workstations can monitor analog or digital sensors and record results in any desired units. Users can display data on paper charts and/or the display screen in several formats, including a multipoint graphic recorder and detailed text-screen displays. The unit checks all analog input values for out-of-limit conditions; can calculate and display maxima, minima, and averages of analog values; has "composite" or calculated data channels; and comes with common sensor-type definitions and the ability for users to define their own.

Omnisense-Plus adds multichannel batch or process control, with



The Omnisense workstation is an integrated monitor, recorder, and controller.

menu-programmable logic configuration of proportional, PID, digital-by-analog, and digital-by-digital state controls. Both workstations offer an easy-to-use menu-driven format and include an on-line, context-sensitive reference facility called Diskourse. Users can press the Diskourse key to view reference screens relating to the current operation, page back and forth through the reference, and return to a program where they left it. (List Price: Omnisense, \$2820 [includes enhanced Apple IIe, 64K RAM, extended 80-column card, UniDisk 3.5 drive with controller, Apple monitor, Epson LX-80 dot-matrix printer, printer-interface card, and software]; Omnisense-Plus, \$2930) Interactive Microware P.O. Box 139 State College, PA 16804-0139 (814) 238-8294

CIRCLE READER SERVICE NO. 520

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The card also allows transparent printing of BASIC programming files and non-ASCII files in addition to standard ASCII text. (List Price: \$65; educators' price: \$55.25)

Requires: Apple II, Omninet
Corvus Systems, Inc.
2100 Corvus Drive
San Jose, CA 95124
(408) 559-7000

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SOFTWARE

SPEECH CONSTRUCTION SET

Covox, developer of the Voice Master speech and music processor, has released the Speech Construction Set, a software package for software developers. The package lets users edit and refine digitally encoded speech recorded with the Voice Master module using a cut-and-paste approach to modify various elements of the sonic waveform that constitutes the speech. The software is menu-driven for ease of use and uses high-resolu-

tion graphics screens. (List Price: \$49.95)

Requires: Apple II Plus, IIe, or IIc; Voice Master
Covox, Inc.
675-D Conger Street
Eugene, OR 97402
(503) 342-1271

CIRCLE READER SERVICE NO. 513

INSURANCE-FORM WRITERS

Two insurance-form processing programs are available from Andent. The Dental Insurance Form Writer lets users prepare Universal ADA Insurance Claim Forms on a computer, and The Medical Insurance Form Writer lets users prepare Universal Health Insurance Claim Forms. Users

can prepare, save to disk, reload, edit, and print each form as many times as they wish. They can also create a master form for each patient/family and save it for later use. Each floppy disk can hold forms for more than 100 families, and a hard disk can contain an unlimited number. Users can copy the program disks for backup purposes and can list and modify the programs. (List Price: \$100 each)

Requires: Apple II, II Plus, or IIe
Andent, Inc.
1000 North Avenue
Waukegan, IL 60085
(312) 223-5077

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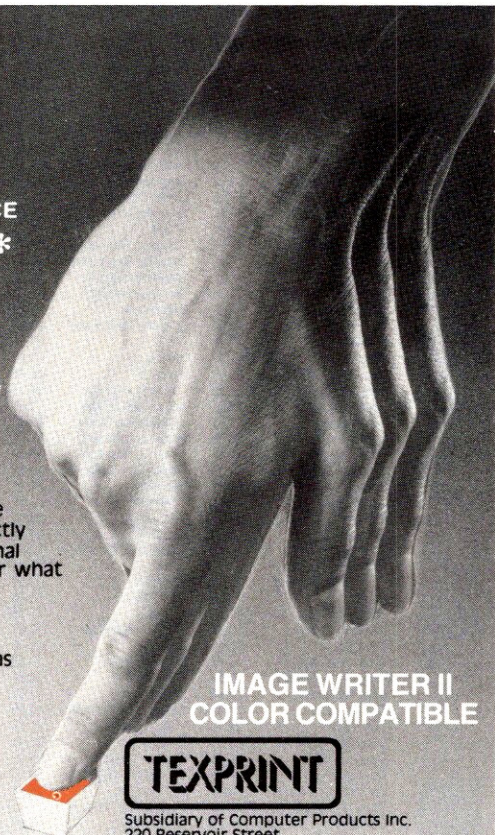


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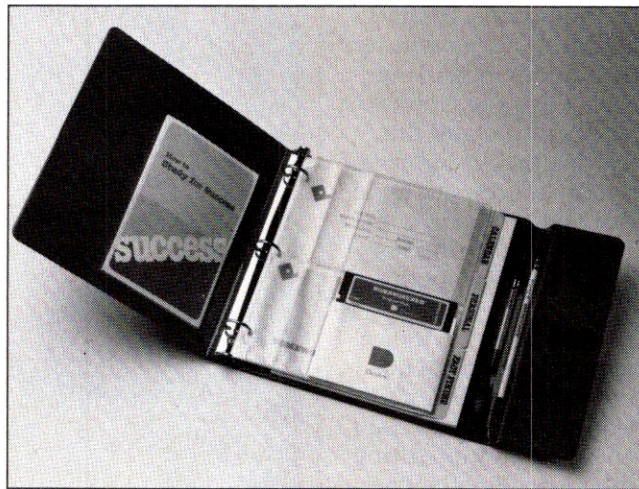
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A productivity program for high-school and college students, Homewor-ker is an easy-to-use program comprising six integrated modules—Textwriter, Outliner, Flash Card Maker, Calendar, Grade Keeper, and Calculator. The program also has on-screen tutorials, fact-finder files, and a clipboard for transferring material from one module to another. The program comes in a notebook-size student organizer with divider pages, notepaper, phone/address book, disk holder, and study accessories.

(List Price: \$89.95)

Requires: Apple IIe or IIc,



Homewor-ker comes in a notebook-size organizer file.

128K RAM
Davidson & Associates
3135 Kashiwa Street
Torrance, CA 90505
(213) 534-4070

CIRCLE READER SERVICE NO. 509

FORECAST

Monogram's tax-planning program Forecast automatically performs all tax calculations, such as dividends and interest,

capital gains and losses, taxable social-security income, self-employment tax, tax credits, and income averaging. It also gives an immediate estimate of year-end taxes, displaying a worksheet that can contain up to 51 tax categories. It offers two planning modes—Alternative lets you compare different tax scenarios, and Projection lets you see the projected impact of one scenario over four years. The program works as a stand-alone product or with records from the company's Dollars and Sense software, has detailed help screens, and can be updated when tax tables change. (List Price: \$59.95)

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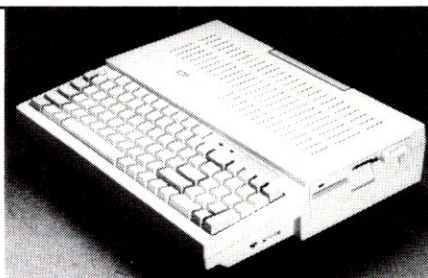
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| 120 & 25 NLQ | \$349 | \$285 |
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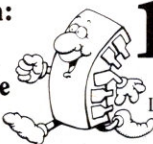
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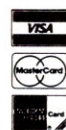


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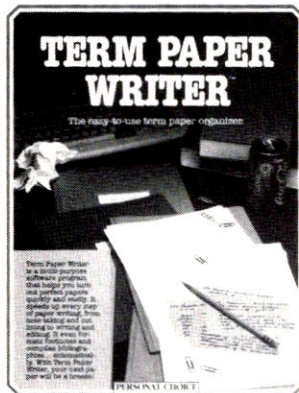
CIRCLE 129 ON READER SERVICE CARD

Pipeline

Requires: Apple II, II Plus, IIe, or IIc
Monogram
8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529
CIRCLE READER SERVICE NO. 510

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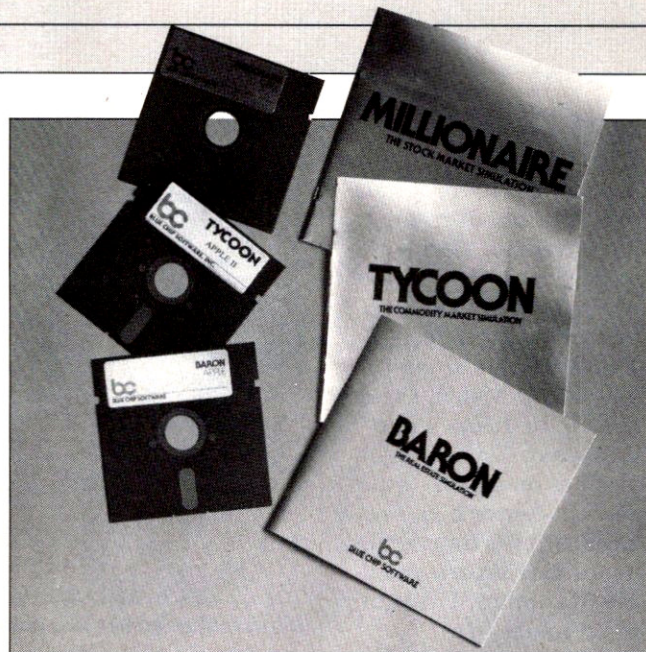
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lets you create, format, and print documents up to 20 pages long using four steps. The Notetaker, an electronic card file, lets you collect information by source and topic that you can transfer directly into your master document. The Outliner then lets you organize lists of ideas into topical groups or a formal outline. The Writer is a full-featured word processor with a variety of editing functions. Finally, The Footnote and Bibliography Compiler can insert footnotes on appropriate pages and compile bibliographic information directly from The Notetaker. (List Price: \$59.95)

Requires: Apple IIe or IIc, 128K RAM
Personal Choice Software
A Division of Activision
2350 Bayshore Parkway
P.O. Box 7286
Mountain View, CA 94043
(415) 960-0410
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Blue Chip Software's The Economics Challenge package

THE ECONOMICS CHALLENGE

Blue Chip Software has released The Economics Challenge, a curriculum package in its line of simulations designed to introduce users to business markets. The package includes Millionaire, Tycoon, and Baron. It comes with a teachers' guide containing lesson plans, student activities, student quizzes, and various sup-

port materials. Developed in cooperation with the Illinois Council for Economic Education, the package has proven suitable for fourth-grade through high-school students. (List Price: \$99.95)
Requires: Apple II Plus, IIe, IIc, or IIGS
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6744 Eton Avenue
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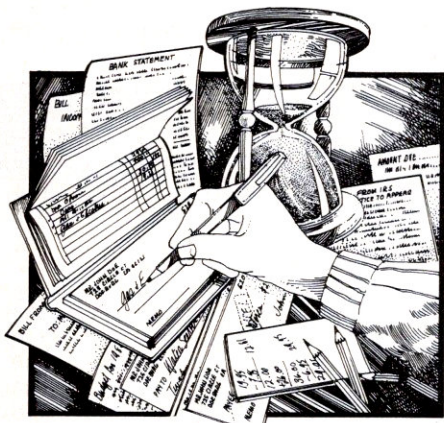
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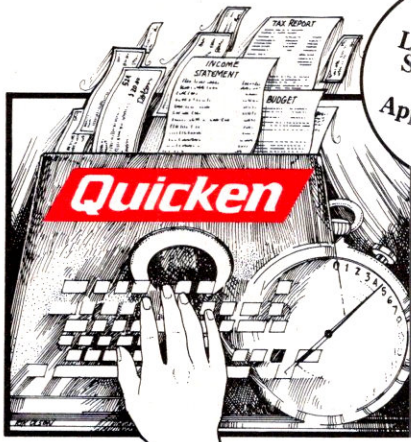
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Compatibility:

IBM® PC, XT, AT, PCjr., and compatibles with 192K RAM and one or two floppy disk drives or hard disk. Any printer. No modem required. 1-2-3 and Symphony optional.

Apple® Iigs, IIc and IIe (IIe requires extended 80-column card), with one or two floppy disk drives, or UniDisk™ 3.5. Any printer. No modem required. AppleWorks optional.

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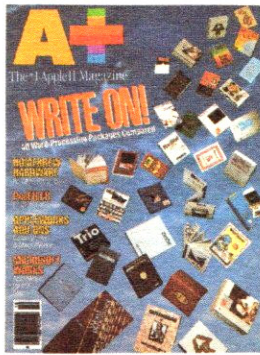
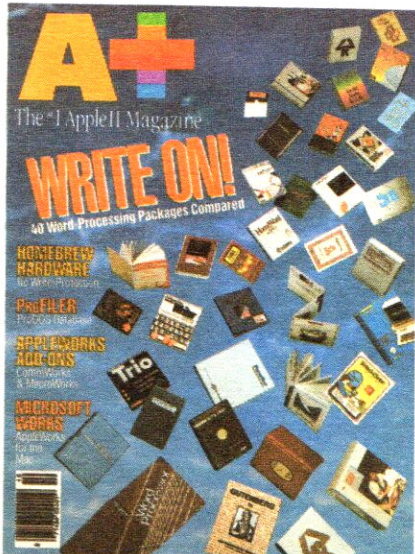
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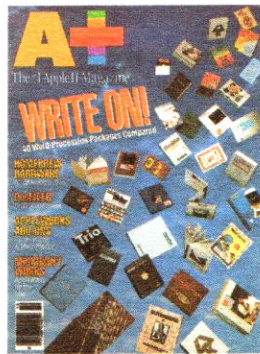
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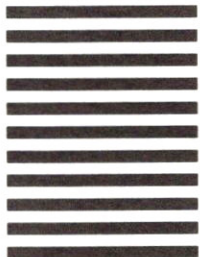
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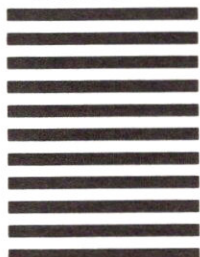
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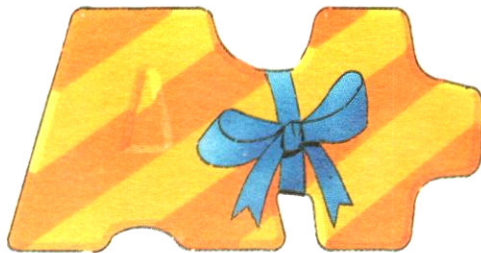
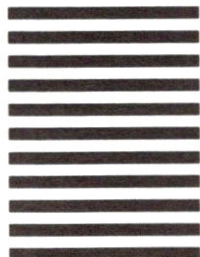
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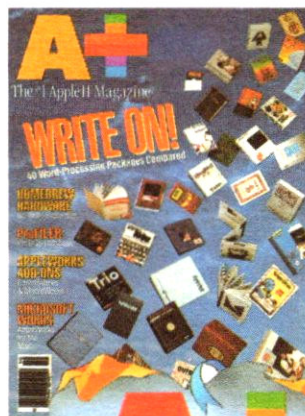


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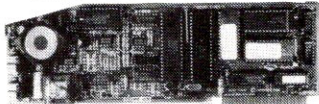
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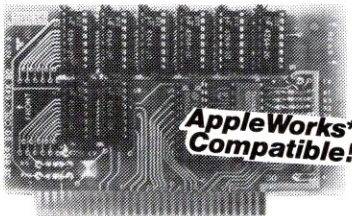
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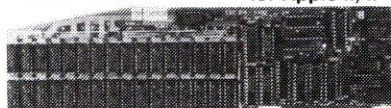
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If "prediction is difficult, especially about the future"—as I'm told an ancient Chinese proverb states—then it's not surprising that Apple's path over the past ten years has sometimes been quite different from what the company expected. In fact, the disparity between early predictions and what actually occurred tells us a good deal about the uncertain nature of development and possibly something about the next ten years as well.

Going back to those first ten years, by the way, isn't as easy as you might expect. In its earliest days, Apple was more concerned with day-to-day business and future development than with preserving an accurate historical record for later analysis. Apple's Corporate Library, for example, began keeping comprehensive records and clippings only around 1980, during the fourth year after Apple incorporated.

Furthermore, much of the brashness that made Apple possible was based on an attitude that Apple was unique and so original that nothing else that had happened before really mattered. On the one hand, that attitude made possible some incredible design work, but on the other, it left behind a trail of statements that ignored reality, such as the clearly exaggerated claim that "Apple invent-

ed the personal computer" (the Apple II actually had more than a dozen predecessors).

I did find, however, a selection of early documents in Apple's library, including a fairly complete set of press releases dating back to shortly after the firm incorporated in January 1977. One of the earliest, dated January 18, 1978, gives us a fairly good idea of what Apple thought

term back then, used fairly interchangeably with "personal computer," with good reason—the year 1978 had not yet witnessed the success of VisiCalc and other spreadsheets nor the widespread availability of affordable high-quality printers for word processing. The Apple II and similar machines were rarely seen in large or small businesses. Apple was not ashamed, at that point, to be thought of as the maker of a home machine.

According to the release, the sale was supposed to "demonstrate the appliance nature of home computers," a concept that Apple is still struggling to make a reality. Although the Macintosh, and now the new Mac-like interface on the IIGS as well, bring that idea closer than ever to fruition, even a complex computerized microwave oven is still much easier to use after the first day or two than a general-purpose personal computer.

On the hardware side, the Apple II was "designed to be used directly with any color television set and any inexpensive audio tape cassette player/recorder." You can still use a TV set as a monitor, but Apple has long since given up supporting audiocassettes as a mass-storage and program-distribution medium.

The sale, by the way, dropped the \$1295 price of an Apple II with 8K of memory to \$995, which is roughly what an Apple II costs today. The difference, of course, is that today's Apple II has more features, more memory, and more behind it. Apple



then about its current position and future direction.

The release is headlined "Apple Computer's First Ever Computer Sale Heralds Mass Marketing of Home Computers," which itself is a good indication of how times have changed. In those days, "mass marketing" was a positive goal at Apple, not the pejorative term for unsupported sales through discount houses that it seems to have become.

Home computer was also a positive

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Apple's path over the past ten years has sometimes been quite different from what the company expected.

seems to have stuck close to its stated goal of enhancing the power of its machines, rather than engaging in an unwinnable price war.

Different Targets for Software

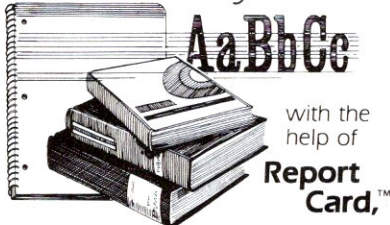
If the Apple II hardware has changed more in an evolutionary than a revolutionary way, you can't say the same about the software. Back in 1978, Apple saw the software possibilities as being quite different from what the firm sees today.

Back in 1978, according to the release, "programs [fell] into four categories: education, control, entertainment and computation." Education, although listed first, gets the least elaboration. The release cites two programs, a "stimulating mathematics program that teaches basic math skills" and "a clever version of hangman that improves spelling and vocabulary." Because schools had yet to make the Apple II their computer of choice, the release makes no mention of classroom instruction, school discounts, or the absolute necessity of having a computer in your formative years if you hope ever to get into college.

By contrast, control applications got much more play than they do now. With an Apple II, the release suggests, you can "control household lighting, the home furnace, sprinkler system and a host of other home appliances." That kind of function is still a possibility, and some people have used their machines accordingly, but home control hasn't yet proven to be a popular application for general-purpose computers of any brand.

Looking forward rather than backward, it may turn out that Apple was right about home control and merely wrong about the timing for it. If you look at current proposals to revise the national electrical code to provide for "smart outlets," recent developments in semiconductor technology that combine power-control circuits and logic on the same chips, and the auto-indus-

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| 1. Sales through dealers and carriers, street vendors and counter sales | 38,636 | 36,000 |
| 2. Mail paid and/or requested subscriptions | 160,376 | 157,000 |
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Vice President

try development work on sharing a fiber-optic connection between computer and peripherals, you'll get the impression that the control end is about to burst forth with a new generation of possibilities.

Personal computers are also finally evolving to the point at which they're ready to tackle home-control applications. What Apple seems to have forgotten in the early days is that home control is a full-time occupation for a computer that can do only one task at a time. Consequently, any other interesting application for that computer makes home control less attractive. Because the next generation of personal computers is generally expected to include multi-tasking (the ability to do more than one job at a time), sometime in the next ten years, we'll be able to consider home control as an option rather than as an exclusive choice.

Crunching Numbers, Having Fun

In 1978, Apple didn't regard "computation" as number crunching. Instead, computation meant

*Ten years ago, most
personal-computer
companies were small,
and few lasted long.*

"basic finance programs," with the spotlight on a program named Checkbook. As with current checkbook programs, the main virtue was not mathematics (which you can probably do just as well with a hand calculator) but the ability to sort out and display all expenses of any selected type.

The original Apple II was not a complete mathematical lightweight, though. Applesoft BASIC, which ran in the larger 16K machines but not in the low-end 8K model, had "floating point mathematics with scientific notation... multidimensional string arrays... [and] transcendental functions."

The press release makes no mention of business bookkeeping at all! Even though by 1978 every large business relied on a mainframe computer and many smaller and medium-size firms had minis, an Apple II with 16K of memory and audiocassette storage was not powerful enough to make business record

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keeping and finance a viable option on that machine.

Also lacking in the release is any mention of word processing or any other text-processing application. In 1978, a "letter quality" printer cost far more than an Apple II did and ran at one or two dozen words per minute, at best. In addition, you had to enter text in all capital letters (which is all the Apple II had on its keyboard) and look at text in the 40-column mode.

Fortunately for many early Apple II purchasers, game development was not nearly as embryonic. Steve Wozniak had been writing games since before Apple was formed, and many of the earliest uses of color on the Apple II were for various forms of electronic entertainment. Big sellers in 1978 included Pong, Breakout, Star Trek, "and many more."

Is Apple Forever?

In January 1978, Apple as an idea was less than three years old—the corporation just passing its first birthday. The Apple II had only recently come out; the Apple III was yet to be designed. Most personal-computer companies were small, and few lasted very long.

It was a brave claim then to say that the Apple II, with its expandability and built-in BASIC that made it possible to write custom programs, would "not be obsolete for many years." Who could have expected that not only the firm, but also the basic Apple II design, would outlast the decade, outlive Steve Job's tenure, and withstand even the onslaught of the IBM PC?

Apple, though, is alive and well and aiming for a lot more than ten more years' more. If technology, like the science on which it is based, moves mostly through successive periods of refinement, punctuated only occasionally by moments of synthesis and unfolding, there's no guarantee that the next ten will be as exciting, but then it could be just as good or better.

My own guess is that we'll continue to see rapid evolution in both hardware and applications, with new connections between personal computers and such fields as health care and telecommunications. Fortunately, you don't have to wait all ten years to see if my crystal ball is any better than Apple's. You can check it out right here in this very space in the months and years to come. +

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Rescue Squad

BY GARY B. LITTLE AND CRAIG CROSSMAN

ADDING IIc MEMORY

Q. I have a 128K Apple IIc, and I want to add more memory to it so I can use a big RAMdisk instead of a second disk drive. How can I do this?

Hans-Juergen Kuehne
Garbsen, West Germany

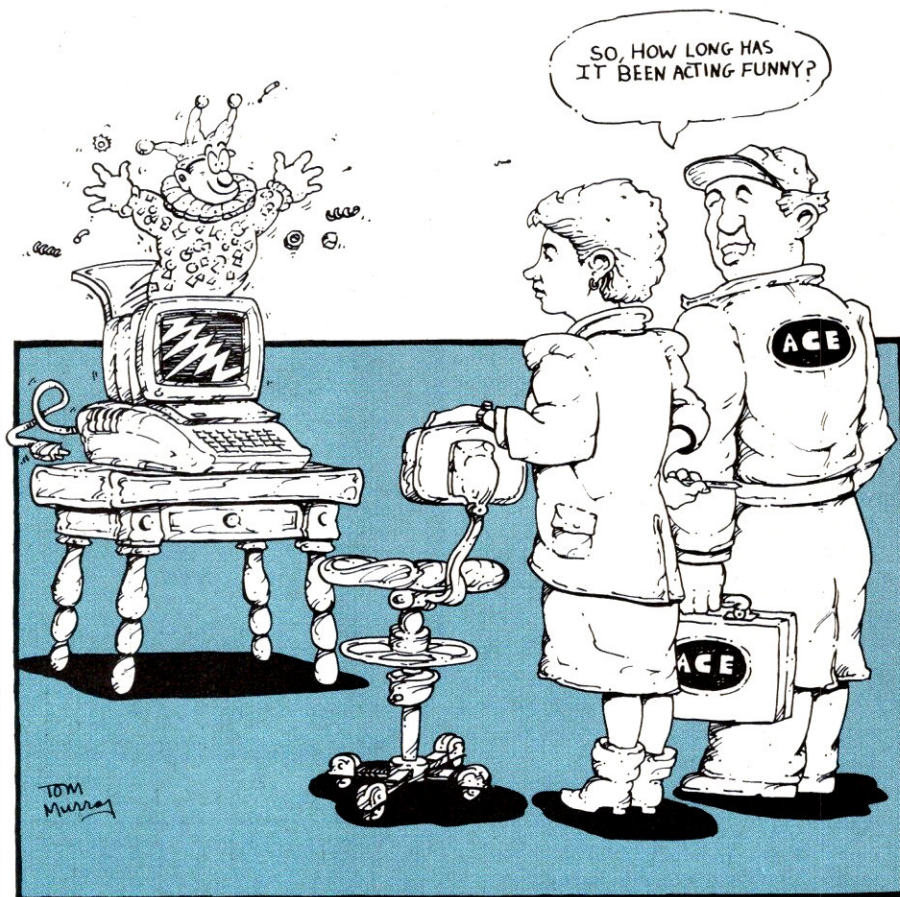
A. You should investigate three memory-expansion products for the IIc. Probably the most interesting is the Z-RAM Ultra card from Applied Engineering (P.O. Box 798, Carrollton, TX 75006; [214] 241-6060). You can choose from three different Ultra cards:

- the 512K Ultra 1
- the 1-megabyte Ultra 2 with clock
- the 1-megabyte Ultra 3 with clock and Z80

The availability of a Z80 chip on the Ultra 3 lets you run CP/M software; you can also add the 65816 microprocessor of the IIGS. All the boards come with RAMdisk and AppleWorks expansion software.

Checkmate Technology (509 South Rockford Drive, Tempe, AZ 85281; [602] 966-5802) also makes memory boards for the IIc: the 512K MultiRAM CX and the 1-megabyte MultiRAM CX Plus. Checkmate also offers a 65816 option as well as RAMdisk and AppleWorks expansion software. The MultiRAM boards are a little less expensive than Applied Engineering's, but they don't have clock or Z80 capabilities.

The third board is the C' Card from Legend Industries (2220 Scott Lake Road, Pontiac, MI 48054; [800] 5LEGEND; in MI [313] 674-0953). Its claim to fame is AppleWorks expansion software, which is included with the card and lets you use a mouse with AppleWorks. The card is available in 256K, 512K, 765K, and 1-megabyte versions. —GBL



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Q. We need a program that allows us to store the text of a document, such as a will, deed, extract, or letter, and lets us find the document and then search out specific words or phrases within the text of any given document as well as search and/or sort by any given field. Is there such a program?

Mrs. Carole W. Epler
The Morgantown-Caernarvon
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ity. You can reach Software Publishing at (415) 962-8910. —CC

APPLE/UNIX TERMINAL EMULATION

Q. I want to hook my Apple to a mainframe computer running UNIX. I've been told I need a "Termcap" description for my Apple. Where can I get one?

Stephen Rynas
Monrovia, CA

A. You don't need one. A Termcap is actually a series of codes that defines the display codes of a specific terminal so that UNIX can work with them. Programs are available for the Apple, however, that allow it to emulate popular mainframe terminals such as the IBM 3101, Hazeltine 1500 series, and Televideo 900 series. ASCII Express Professional and Sof-term II are two of the better application programs that provide terminal emulation. You simply tell these programs which terminal you want to emulate on your Apple and then configure UNIX on the mainframe for that terminal. —CC

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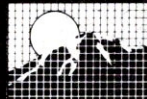
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AD INDEX BY PRODUCT CATEGORY

ACCESSORIES

CARRYING CASES

Fiberbilt Cases, Inc. 17

MISCELLANEOUS

Cheatsheet Products, Inc. ... 104
Computer Cover Co. 74
Nikrom Technical Products,
Inc. 106

HARDWARE

DISK DRIVES/STORAGE DEVICES

Central Point
Software 12,13
First Class Peripherals 55

INTERFACE CARDS

Applied Engineering .. 14,27,36,
37,59,61,71,83,85,129
AST Research, Inc. 53
Beagle Brothers, Inc. 80,81
Legend Industries Ltd. 70
Micro Systems Research 23
Ohio Kache Systems Corp .. 22
SMT, Inc. 144

MISCELLANEOUS

Central Point
Software 12,13
Computer Friends 92
Covox, Inc. 109
Icon, Inc. Cover 3
Interactive Microwave 106
Kalglo Electronics Co.,
Inc. 109
Kensington Microwave Cover 4
Sun Systems
Remarketing 60
Yam Educational Software .. 98

PRINTERS/PRINTER ACCESSORIES

Diconix 66
Dresselhaus Computer
Products 94
Funk Software, Inc. 11
Texprint 124

MAIL ORDER

Business Computers of
Peterborough 62,63
Coit Valley Computers 117
Computer Network 128
Conroy-LaPointe, Inc. 125
Jameco Electronics 130
JDR Microdevices 114
Memory Plus Distributors . 104
PC Network 96,97
Precision Data Products 111
Preferred Computing 47
Programs Plus 24,25
Pro-Tech-Tronics 122
Ribbon Land 91
Roger Coats 73
Silicon Express 123
Unitech 116
World of Computers 34
Zimco 126

SOFTWARE

BUSINESS

Dac Software, Inc. 79
H & E Computronics .. Cover 2
Softsync, Inc. 16

EDUCATIONAL

Compu-Teach 68
Davidson Associates 67
Field Publications 76
Learning Company, The 5
SoftKat 118
Springboard Software 1
Wenger Corporation 46

ENTERTAINMENT/ STRATEGY

Activision, Inc. 42,72,86,110
Electronic Arts 8
Enlightenment, Inc. 113
Infocom 56,57
Interlude 107
New World Computing 108
SubLOGIC Corporation 4

GRAPHICS

Baudville 51
Spectral Graphics Software .. 10

MISCELLANEOUS

Creative Peripherals 30
Davka Corp. 135
Megahaus Corporation 75
Pacific Technology
Systems 141
Soft-Byte 111
SoftCore 31
Software Touch 88
StatSoft 144
UPTIME 21

ON-LINE SERVICES

CompuServe 2,3
General Electric Information
Services 33
Source, The 93

PERSONAL BUSINESS- HOME

Intuit 127

UTILITIES

Alpha Logic
Business Systems, Inc. 26
Central Point
Software 132
Quality Computers 58
Thirdwave Technology,
Inc. 135
Utilico Microwave 94

WORD PROCESSING/SPELLING CHECKERS

Advanced Logic Systems,
Inc. 133
Batteries Included 101
Sensible
Software 18,132
Word Perfect Corp. 95

INDEX TO ADVERTISERS

| READER SERVICE NO. | PAGE |
|---|-------|
| A | |
| 176 Activision, Inc..... | 42 |
| 174 Activision, Inc..... | 72 |
| 208 Activision, Inc..... | 86 |
| 209 Activision, Inc..... | 110 |
| 117 Advanced Logic Systems, Inc. | 133 |
| 262 Alpha Logic Business Systems, Inc. | 26 |
| * Applied Engineering.... | 14 |
| * Applied Engineering.... | 36,37 |
| * Applied Engineering.... | 27 |
| * Applied Engineering.... | 59 |
| * Applied Engineering.... | 61 |
| * Applied Engineering.... | 71 |
| * Applied Engineering.... | 83 |
| * Applied Engineering.... | 85 |
| * Applied Engineering.... | 129 |
| * AST Research, Inc. | 53 |
| B | |
| 186 Batteries Included..... | 101 |
| 310 Baudville..... | 51 |
| 148 Beagle Brothers, Inc. | 80,81 |
| * Business Computers of Peterborough ... | 62,63 |
| C | |
| 184 Central Point Software | 132 |
| 107 Central Point Software..... | 12,13 |
| * Cheatsheet Products, Inc..... | 104 |
| 105 Coit Valley Computers | 117 |
| 271 CompuServe | 2,3 |
| 192 Compu-Teach | 68 |
| 136 Computer Cover Co | 74 |
| 195 Computer Friends | 92 |
| 137 Computer Network ... | 128 |
| 129 Conroy-LaPointe, Inc. | 125 |
| 151 Covox, Inc. | 109 |
| 159 Creative Peripherals Unlimited, Inc. | 30 |

| READER SERVICE NO. | PAGE |
|---|---------|
| D | |
| 140 Dac Software, Inc..... | 79 |
| 338 Davidson & Associates..... | 67 |
| 302 Davka Corp. | 135 |
| 156 Diconix | 66 |
| 339 Dresselhaus Computer Products | 94 |
| E | |
| 170 Electronic Arts | 8 |
| 203 Enlightenment, Inc. ... | 113 |
| F | |
| 164 Fiberbilt Cases, Inc. | 17 |
| 350 Field Publications | 76 |
| 111 First Class Peripherals .. | 55 |
| 154 Funk Software, Inc. | 11 |
| G | |
| * General Electric Information Services | 33 |
| H | |
| 335 H&E Computronics Inc..... | Cover 2 |
| I | |
| 112 Icon, Inc..... | Cover 3 |
| 225 Infocom | 56,57 |
| 324 Interactive Microware | 106 |
| 177 Interlude..... | 107 |
| 108 Intuit | 127 |
| J | |
| 279 Jameco Electronics ... | 130 |
| 167 JDR Microdevices | 114 |

| READER SERVICE NO. | PAGE |
|-------------------------------------|---------|
| K | |
| 116 Kalglo Electronics | 109 |
| * Kensington Microware .. | Cover 4 |
| L | |
| 158 Learning Company, The | 5 |
| 287 Legend Industries, Ltd. | 70 |
| M | |
| 259 Megahaus Corporation . | 75 |
| 152 Memory Plus Distributors | 104 |
| 218 Micro Systems Research..... | 23 |
| N | |
| 149 New World Computing, Inc.. | 108 |
| 329 Nikrom | 106 |
| O | |
| 178 Ohio Kache Systems Corp..... | 22 |
| P | |
| 199 Pacific Technology Systems..... | 141 |
| 315 PC Network..... | 96,97 |
| 228 Precision Data Products | 111 |
| * Preferred Computing ... | 47 |
| 299 Programs Plus | 24,25 |
| 143 Pro-Tech-Tronics | 122 |
| Q | |
| 104 Quality Computers..... | 58 |

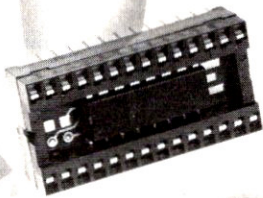
| READER SERVICE NO. | PAGE |
|--|------|
| R | |
| 202 Ribbon Land | 91 |
| 109 Roger Coats | 73 |
| S | |
| 325 Sensible Software, Inc. | 132 |
| 165 Sensible Software, Inc.. | 18 |
| 231 Silicon Express | 123 |
| 280 SMT, Inc. | 144 |
| 200 Soft-Byte | 111 |
| 256 SoftCore..... | 31 |
| * Softkat | 118 |
| 171 Softsync, Inc..... | 16 |
| 173 Software Touch | 88 |
| * Source Information Network, The..... | 93 |
| 139 Spectral Graphics Software..... | 10 |
| 261 Springboard Software ... | 1 |
| 207 StatSoft | 144 |
| 110 SubLOGIC Corp. | 4 |
| 103 Sun Systems Remarketing | 60 |
| T | |
| 343 Texprint | 124 |
| 145 Third Wave Technology, Inc. | 135 |
| U | |
| 160 Unitech, Inc..... | 116 |
| 219 UPTIME | 21 |
| 190 Utilico Microware | 94 |
| W | |
| 123 Wenger Corp, Music Software Div..... | 46 |
| 118 WordPerfect Corp..... | 95 |
| 235 World of Computers | 34 |
| Y | |
| 119 Yam Educational Software..... | 98 |
| Z | |
| 126 Zimco..... | 126 |



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| 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 |

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| Apple IIc | B | I |
| Apple IIe | C | J |
| Apple II+ | D | K |
| Apple II | E | L |
| Other (specify) | F | M |
| None | G | N |

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| 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 |
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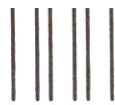
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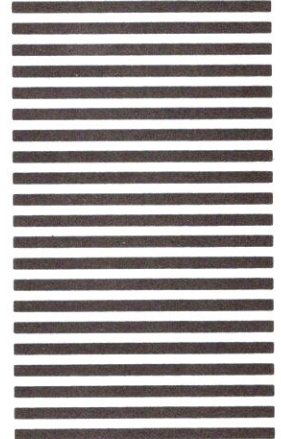
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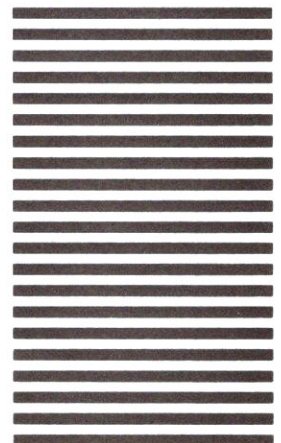
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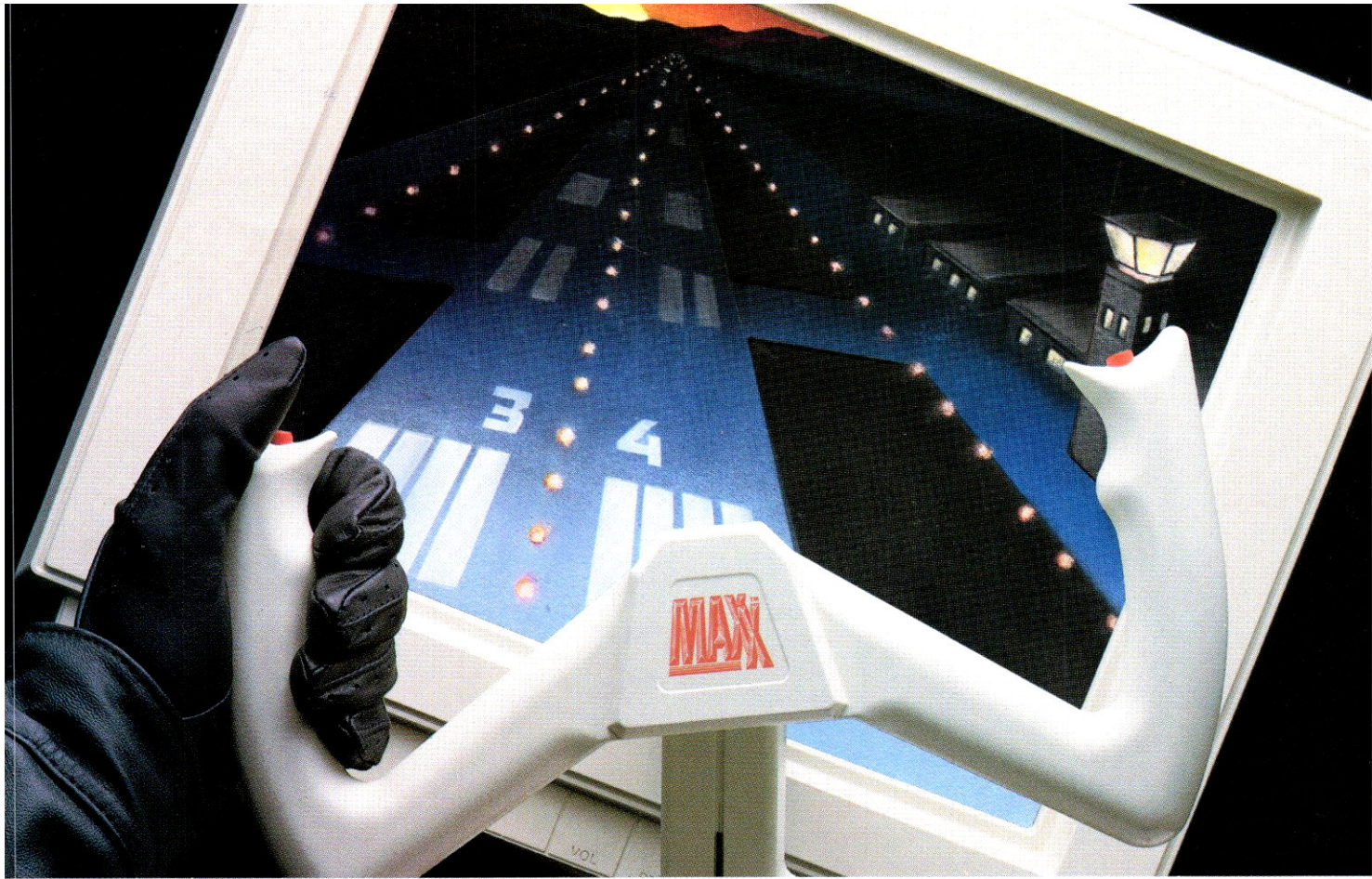
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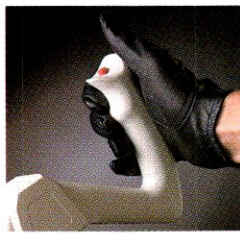
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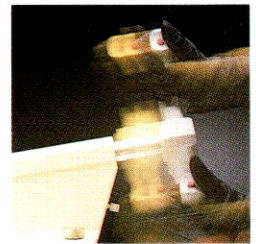
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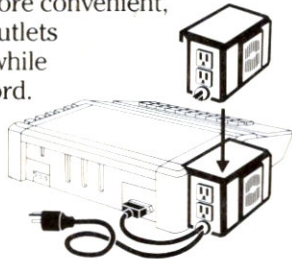
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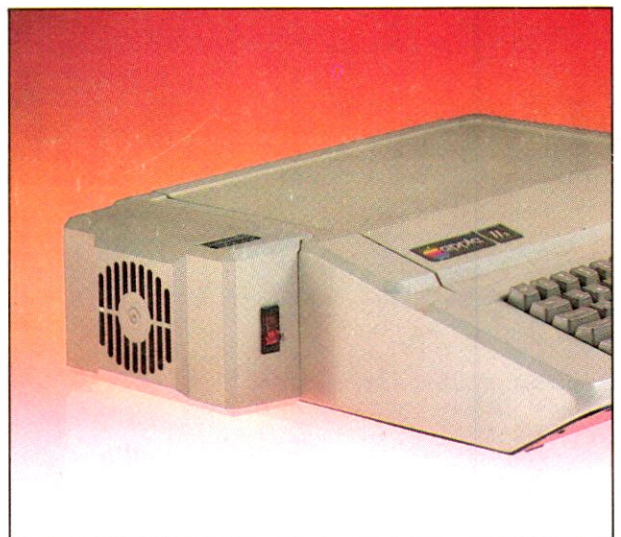
System Saver solves power line problems.

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.

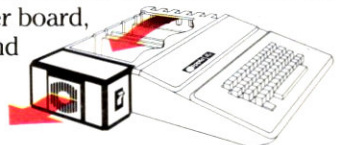
System Saver clips surges and spikes at a safe level and filters out line noise. It makes your Apple more accurate, more efficient and more reliable.

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.

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